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KDDW2019 Korea Digestive Disease Week

Gut and Liver

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November 28(Thu)-30(Sat), 2019
Grand Hilton Seoul Hotel, Seoul, Korea

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Korea Digestive Disease Week 2019

Plenary Session

Plenary 1	Upper GI, Lower GI, Motility
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KDDW2019
Korea Digestive Disease Week

Plenary 1 PL1-01

Eradication of *Helicobacter pylori* Infection Decreases Risk for Dyslipidemia: A Cohort Study

Yewan Park, Tae Jun Kim, Hyuk Lee, Yang Won Min, Byung-hoon Min, Jun Haeng Lee, Poong-lyul Rhee, and Jae J Kim

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Background/Aims Previous studies have suggested a link between *Helicobacter pylori* infection and dyslipidemia, yet large-scale longitudinal studies have not elucidated this association. Therefore, we assessed the longitudinal effects of both *H. pylori* infection and eradication on lipid profiles in a large cohort of asymptomatic men and women.
Methods This cohort study included 18,621 adults without dyslipidemia at baseline, who participated in a repeated, regular health screening examination, which included upper gastrointestinal endoscopy, between January 2009 and December 2018. The primary outcome was incident dyslipidemia at follow-up.
Results During the 52,992 person-years follow-up, participants with persistent *H. pylori* infection had a higher incidence rate (177 per 1,000 person-years) of dyslipidemia than those whose infections had been successfully eradicated (158.2 per 1,000 person-years) and those who were uninfected (157.6 per 1,000 person-years). In a multivariable model adjusted for age, sex, body mass index, smoking status, alcohol intake, and baseline levels of low-density lipoprotein-cholesterol, high-density lipoprotein-cholesterol, and triglyceride, the *H. pylori* eradication group was associated with a lower risk of dyslipidemia than the persistent group (hazard ratio, 0.89; 95% confidence interval, 0.82 to 0.96; p=0.005). The risk of dyslipidemia in the eradication group was similar to that of participants uninfected with *H. pylori* (p=0.245).
Conclusions Persistent *H. pylori* infection was significantly associated with the risk of dyslipidemia. *H. pylori* infection may play a pathophysiologic role in the development of dyslipidemia and *H. pylori* eradication might decrease the risk of dyslipidemia.
Keywords *Helicobacter pylori*; Dyslipidemia; Eradication; Cohort study

Table 1. Development of Dyslipidemia According to *Helicobacter pylori* Status

	Person-years	Number of Incident cases	Incidence density (per 1,000 person-years)	Age- and sex-adjusted HR (95% CI)	Multivariable-adjusted HR* (95% CI)
Persistent *H. pylori* infection	14,361.4	2,542	177	1.00 (reference)	1.00 (reference)
Eradication of *H. pylori* infection	4,868.1	770	158.2	0.87 (0.81-0.95)	0.89 (0.82-0.96)
Persistent *H. pylori* negative	33,762.8	5,321	157.6	0.88 (0.84-0.93)	0.94 (0.89-0.98)

*Estimated from Cox proportional hazards models adjusted for age, sex, body mass index, smoking status, alcohol intake, and baseline levels of low-density lipoprotein cholesterol, high density lipoprotein cholesterol, and triglyceride..
HR, hazard ratio; CI, confidence interval.

Plenary 1 PL1-02

Clinical Epidemiology of Esophageal Cancer during Recent 10 years: Nationwide Cohort Study of 6,354 Patients with Esophageal Cancer in Korea

Hye-Kyung Jung[1], A Reum Choe[1], Chung Hyun Tae[2], Hye-ah Lee[1], Hyuk Lee[3], Kee Don Choi[4], Jun Chul Park[5], Joong Goo Kwon[6], Yoon Jin Choi[7], Su Jin Hong[8], Jae Kyu Sung[9], Woo Chul Chung[10], Ki Bae Kim[11], Seung Young Kim[12], Kyung Ho Song[13], Kyung Sik Park[14], Seong Woo Jeon[15], Byung-wook Kim[16], Han Seung Ryu[17], Ok-jae Lee[18], Gwang Ho Baik[19], Yong Sung Kim[20], and Hwoon-yong Jung[4]

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Background/Aims The detection of early esophageal cancer which is treatable with endoscopy can improve prognosis and the quality of life. And there is few large studies into the treatment of local progressive cancer. This study was aimed to analyze the treatment and prognosis of esophageal cancer in the hospital cohort over a 10-year period in Korea.
Methods This historical hospital cohort was recruited by 19 referral hospitals nationwide for newly diagnosed esophageal cancer patients from January 1, 2005 to December 31, 2017. The cancer stage was defined according to the seventh edition of American Joint Committee on Cancer.
Results The newly-diagnosed esophageal cancer patients was 6,354 and the mean age was 64.9±9.0 and mostly squamous cell cancer (96.9%). Early esophageal cancer was more frequently detected recently from 24.7% in 2005 to 37.2% in 2015 (p<0.001). In all stage, esophagectomy was performed in 52.3% (3,321/6,354) and endoscopic resection was undergoing in 5.8%, neoadjuvant therapy in 12.4%, adjuvant therapy in 11.1% and definitive concurrent chemoradiotherapy (CCRT) in 27.0%. The overall 5-year survival was 45.7%± 0.7%. Endoscopic resection showed similar median survival compared to patients who underwent surgery in stage Ia. In stage II-III, definitive CCRT was associated with poor survival compared with neoadjuvant or adjuvant therapy; however, there was no difference between neoadjuvant and adjuvant therapy.
Conclusions Early esophageal cancer is gradually increasing and endoscopic resection showed a similar long-term survival with surgery. In locally advanced cancer, surgery and/or chemoradiotherapy was more chosen recently with survival benefit compared to the definitive CCRT.
Keywords Esophagus; Neoplasm; Epidemiology; Survival; Therapy

Plenary 1 PL1-03

Exogenous Vasoactive Intestinal Peptide Maintains Colon Mucosal Lining in Experimental Colitis Models by Attenuating Colonic Mitochondrial Dysfunction through Scavenging of Superoxide and Hydroxyl Radicals: Implications in Ulcerative Colitis

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Background/Aims Vasoactive intestinal peptide (VIP) has emerged as a promising agent for treatment of inflammatory bowel disease; however, its impact in ulcerative colitis (UC) targeting colonic mitochondrial dysfunction for maintenance of colon epithelial tract remains uninvestigated.
Methods Two working models are as follows. *In vivo* model: DSS was administered in C57BL/6J mice @ 3.5%/gm body weight for three cycles of 5 days each (5 days gap in between each cycle); i.p. dose of VIP @ 0.5 nmol/mouse/day was administered for next 10 days. Posttreatment mice were sacrificed and isolated mitochondria were utilized for experimentation. *In vitro* model: to substantiate *in vivo* findings and accurately identify the reactive species involved in progression of UC, HT29 MTX-E12 mucosal model depicting semi-wet interface as in colon, was subjected to DSS (5%) treatment for 6 days followed by VIP (10 nM) treatment for 4 days in presence and absence of $O_2^{\bullet-}$ scavenger superoxide dismutase (SOD; 20 mM) or $^{\bullet}OH$ scavenger dimethyl sulfoxide (DMSO; 20 mM) or H_2O_2 scavenger catalase (CAT; 50 μg/mL) or nitric oxide (NO) scavenger L-NAME (100 μM) or $ONOO^-$ scavenger cum nitric oxide synthase inhibitor MEG (0.5 mM).
Results *In vivo*: treatment with VIP reduced clinical and histopathological severity of DSS-induced colitis with partial recovery of inhibited mitochondrial respiratory complexes, altered mitochondrial membrane potential and lowered ATP generation. Amelioration of mitochondrial oxidative stress variables were also observed following VIP treatment. *In vitro*: treatment with VIP restored mitochondrial dysfunction and its efficacy proved at par with SOD and DMSO indicating involvement of $O_2^{\bullet-}$ and $^{\bullet}OH$ in the process. However, other free radical scavengers/inhibitors like CAT, L-NAME and MEG proved ineffective indicating non-involvement of H_2O_2, NO and $ONOO^-$ in the process.
Conclusions VIP can act as potent anticolitogenic agent by virtue of its free radical scavenging property as it restored colonic mitochondrial function that contributed in maintenance of colon epithelial lining following exogenous VIP treatment.
Keywords Inflammatory bowel disease; Ulcerative colitis; Mitochondrial dysfunction; Vasoactive intestinal peptide; Colon

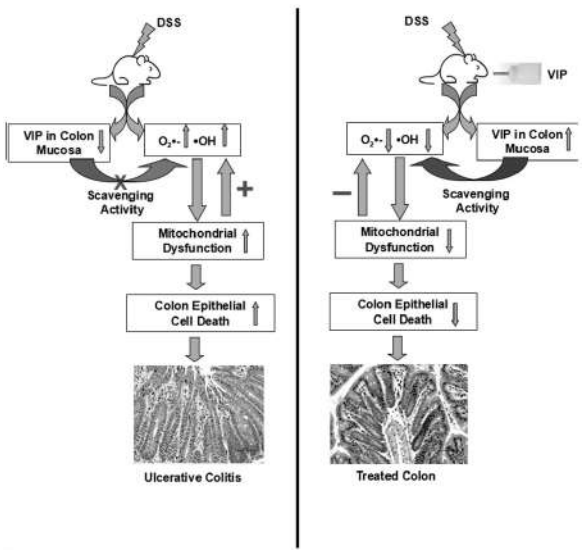

Fig. 1. Graphical abstract.
VIP, vasoactive intestinal peptide.

Plenary 1 PL1-04

Low Skeletal Muscle Mass Is an Independent Risk Factor for Advanced Colorectal Neoplasm: Integrative Analysis Using Three Skeletal Muscle Mass Indices

Hyo Jeong Lee[1], Ji Young Lee[1], Min Jung Lee[2], Hong-kyu Kim[2], Gwang-un Kim[1], Jong-soo Lee[1], Hye Won Park[1], Hye-sook Chang[1], Dong-hoon Yang[3], Jaewon Choe[1], and Jeong-sik Byeon[3]
Divisions of [1]Gastroenterology and [2]Endocrinology, Health Screening and Promotion Center, and [3]Department of Internal Medicine-GI/Hepatology, Asan Medical Center, Seoul, Korea

Background/Aims This study aimed to evaluate an association between the risk of colorectal neoplasms (CRNs) and skeletal muscle mass using three widely accepted skeletal muscle mass indices (SMIs) in a large average-risk population.
Methods We performed a cross-sectional study using a screening colonoscopy database of 33,958 asymptomatic subjects aged 40 to 75 years. Appendicular skeletal muscle mass (ASM) was measured using a bioelectrical impedance analyzer. ASM adjusted for height squared (ASM/ht^2), weight (ASM/wt), and body mass index (ASM/BMI) were used as indices for muscle mass. Logistic regression models were used to evaluate the association between SMIs and CRN.
Results In a multivariable-adjusted model, the risk of advanced CRN increased linearly with decreasing quartiles for all three SMIs. The adjusted odds ratios (ORs) for advanced CRN in quartiles 1, 2, and 3 of ASM/wt compared with that in quartile 4 were 1.279, 1.196, and 1.179, respectively (P_{trend}=0.017); for ASM/BMI, ORs were 1.307, 1.144, and 1.091, respectively (P_{trend}=0.002); and for ASM/ht^2, ORs were 1.342, 1.169, and 1.062, respectively (P_{trend}=0.002). The risk of distally located advanced CRN was higher in quartile 1 than in quartile 4 for all three SMIs (ASM/wt: OR, 1.356; 95% confidence interval [CI], 1.021 to 1.801; ASM/BMI: OR, 1.383; 95% CI, 1.065 to 1.796; and ASM/ht^2: OR, 1.430; 95% CI, 1.076 to 1.900).
Conclusions Our study demonstrated that low skeletal muscle mass was consistently an independent risk factor for advanced CRN in an average-risk population, regardless of the operational definition of SMIs applied, and is particularly associated with distal advanced CRNs.
Keywords Colorectal neoplasms; Colorectal cancer; Sarcopenia; Skeletal muscles; Risk factors

Plenary 1 PL1-05

The Effect of Bile Acid as a Major Regulator of Intestinal Microbiota, Especially on Different Parts of the Mice Colon

Mingyu Seok, Ki Hyun Rhyu, Young Woo Kang, Young Woo Choi, Kyu Chan Huh, Tae Hee Lee, Sun Moon Kim, Kyung Ho Song, Hoon Sup Koo, and Chang Bum Rim
Department of Internal Medicine, Konyang University Hospital, Daejeon, Korea

Background/Aims We examined the effect of each bile acids on various microbiotas in vitro and tried to find out whether similar changes occurred in the intestines by artificially increasing the fraction of specific bile acids, especially on different parts of colon.
Methods We analyzed the effects of each bile acids on the various microbiotas using the disk diffusion method. In the subsequent animal experiments, bile acids were delivered by transgastric rout. And fecal samples were collected from the cecum and other colon.
Results From the disk diffusion study results, microbiotas found in the bile or intestinal tract were less inhibited than the trains found in other organ. And most of repressed strains were inhibited by DCA and CDCA. In the subsequent animal experiments, cecum showed opposite of disk diffusion study. And rest of colon showed similar result of disk diffusion study.
Conclusions Bile acids have inhibitory effect on microbiotas, which varies according to the type of strain and bile acid. And the effect of bile acids on microbiotas in the intestinal tract is similar to that of microbial susceptibility tests and this result was significant in the colon except the cecum. So, the artificial control of bile acid composition can read to change the environment of bowel microbiotas.

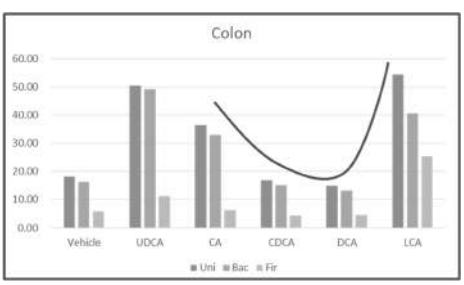

Fig. 1. The colon except cecum.

Plenary 1 PL1-06

Lyon Gastroesophageal Reflux Disease Consensus Criteria Is Not Correlated with Gastroesophageal Reflux Disease Questionnaire in Korean Patients

Hyungchul Park, Kee Wook Jung, Hee Kyong Na, Ji Yong Ahn, Jeong Hoon Lee, Do Hoon Kim, Kee Don Choi, Ho June Song, Gin Hyug Lee, and Hwoon-yong Jung
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Background/Aims Gastro-esophageal reflux disease questionnaire (GerdQ) has been developed for diagnosis of gastro-esophageal reflux disease (GERD). Recently published Lyon GERD consensus defines parameters on esophageal testing that conclusively establish the presence of GERD. However, Lyon GERD consensus criteria was not validated in Asian population. Therefore, we aimed to validate the Lyon GERD consensus criteria using GerdQ.
Methods Patients with suggestive GERD symptoms were enrolled in the study. They underwent pH monitoring, upper endoscopy and asked to GerdQ between January 2018 and July 2019. Patients previously treated with surgical or endoscopic treatment were excluded. The results of pH monitoring and endoscopic grade of esophagitis were analyzed according to the Lyon consensus criteria.
Results A total of 181 patients (male:female, 71:110; median age, 57 years) were included and 114 patients (63.0%) had GerdQ score over 8. On the pH monitoring, 13.8% of patients had acid exposure time (AET) over 6%, 7.2% had AET 4% to 6%. On endoscopic finding, 0.6% patients had grade C or D esophagitis; 13.2% had grade A or B esophagitis; and 1.1% had Barrett's esophagus. By Lyon consensus, 26 patients (14.4%) were classified as conclusive evidence of GERD, 102 patients (56.3%) were against GERD, 50 patients (27.6%) were borderline or inconclusive, and three patients (1.7%) were adjunctive or supportive. The GerdQ was not correlated with Lyon consensus criteria (rho=−0.050, p=0.507) but positively correlated with endoscopic esophagitis grade (rho=0.236, p=0.001).
Conclusions Despite high rate of GerdQ over 8, proportion of conclusive evidence of GERD and higher grade of reflux esophagitis were low. GerdQ and Lyon consensus criteria showed poor correlation to each other. The development of criteria suitable for Korea's situation is warranted.
Keywords Gastroesophageal reflux; Consensus; Correlation of data

Plenary 2 PL2-01

Integrative Multi-OMICs Analysis Reveals Consensus Molecular Subtypes Reflecting Distinct Clinical Phenotypes of Hepatocellular Carcinoma

Sung Hwan Lee[1], Sun Young Yim[2], Sang-hee Kang[3], Bo Hwa Sohn[1], Yun Seong Jeong[1], Ji-hyun Shin[1], You Rhee Choi[1], Jae-jun Shim[4], Jihoon Kim[2], Henry Li[5], Sheng Guo[5], Randy Johnson[6], Ahmed Kaseb[7], Koo Jeong Kang[8], David Wheeler[9], and Ju-seog Lee[1]
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Background/Aims Hepatocellular carcinoma (HCC) is a heterogeneous disease with therapeutic resistance even in the early stage. Current genomic subtyping systems reflect the heterogeneity of HCC, but its clinical use is hampered by discrepancies among different studies. To stratify resectable HCC tumors into clinically and molecularly homogeneous subtypes, we identified clinically relevant consensus subtypes of HCC to apply precise therapeutic strategies for resectable HCC.
Methods By integrating 15 previously established genomic signatures for HCC subtypes, we identified five clinically and molecularly distinct consensus subtypes using transcriptomic data from eight HCC cohorts with 1,754 patients. An integrative analysis using multi-OMICs dataset was performed to clarify subtype-specific biological property and clinical phenotype, especially for therapeutic efficacy in molecular targeted therapy or immunotherapy in each consensus HCC subtypes.
Results We demonstrated five consensus subtypes of HCC showing distinct molecular and clinical features regarding STM (STeM), CIN (chromosome instable), IMH (immune high), BCM (beta-catenin with male high predominance), and DLP (differentiated and low proliferation) subtypes. Briefly, STM is characterized by high stem cell features, vascular invasion, and sensitivity to sorafenib. CIN has moderate stem cell features, but high genomic instability and low immune activity. IMH is characterized by high immune activity predicting possible responders for immunotherapies. BCM is characterized by prominent beta-catenin activation, low microRNA expression, and hypomethylation. DLP is differentiated with high HNF4A activity. Lastly, we developed and validated a robust predictor of integrated consensus subtype with 100 genes (PICS100) and subtype-specific serum biomarkers using integrative genomic and statistical analysis.
Conclusions Consensus subtypes of HCC showed distinct biological and clinical phenotypes as well as independent subtype-specific serum biomarkers that can facilitate the clinical application of consensus subtypes in the clinical setting. Based on the clinical relevance of consensus subtypes for current available therapeutic options, our findings may provide the foundation for rationalized biomarker-based clinical trials for resectable HCC.
Keywords Hepatocellular carcinoma; Integrative analysis; Molecular subtyping

Plenary 2 PL2-02

Predictors and Outcome of Emergent Liver Transplantation for Patients with Acute-on-Chronic Liver Failure

Ji Eun Kim, Dong Hyun Sinn, Gyu Seong Choi, Jong Man Kim, Jae Won Joh, Wonseok Kang, Geum-youn Gwak, Yong-han Paik, Moon Seok Choi, Joon Hyeok Lee, Kwang Cheol Koh, and Seung Woon Paik

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Background/Aims Acute-on-chronic liver failure (ACLF) is a syndrome characterized by acute decompensation of chronic liver disease associated with organ failures and high short-term mortality. The controversy exists over the role of emergent liver transplantation (LT) in patients with ACLF, especially for those with multiple organ failures.
Methods A total of 110 ACLF patients, defined according to EASL-CLIF were analyzed for 90-day survival. Outcome was compared between patients who received and did not, stratified by ACLF grade. We also analyzed the factors associated with mortality among patients who received LT.
Results Mortality was observed in 41 patients. Survival rate at 90 day for those received LDLT, DDLT and patients who did not was 94.1%, 86.3%, and 15.4% (p<0.001). When stratified according to the grade, 90-day survival rate for those received and those did not was 80.0% and 11.7% among ACLF grade 1 (p=0.005), 91.1% and 36.4% among ACLF grade 2 (p<0.001), and was 87.5% and 0% among ACLF grade 3 (p<0.001). LT was independent factor associated with survival among patients at all grades. For those who received LT, baseline Model for End-Stage Liver Disease (MELD) score and progression of ACLF grade were independent factors for survival. Among LT recipient, 90-day survival was 96% for patients with baseline MELD ≤32 without progression of ACLF grade at the time of LT, while it was 33.3% for those with baseline MELD >32 and progression of ACLF grade at the time of LT.
Conclusions LT provided significant survival benefit regardless of baseline ACLF grade. However, post-LT outcome was worse for those with high baseline MELD score with progression of ACLF grade. Our findings suggest LT can be considered for ACLF patients regardless of ACLF grade, and may benefit best when LT is performed before progression of ACLF, especially when MELD score is high.
Keywords Acute on chronic liver failure; Liver transplantation

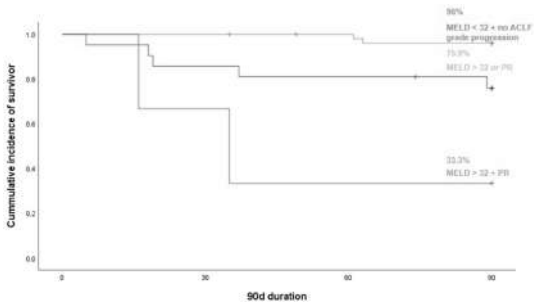

Fig. 1. Overall survival of MELD and progression (PR).
MELD, Model for End-Stage Liver Disease; ACLF, acute-on-chronic liver failure.

Plenary 2 PL2-03

The Relationship between Triceps Skinfold Thickness and Overall Survival of Pancreas, Bile Duct and Gallbladder Cancer

Jong-In Chang[1], Joo Kyung Park[1], Sang-geul Lee[1], Kwang Hyuk Lee[1], Kyu Taek Lee[1], Jong Kyun Lee[1], and Kyunga Kim[2]

[1]Department of Internal Medicine and [2]Statistics and Data Center, Samsung Medical Center, Seoul, Korea

Background/Aims Cachexia is frequently seen in pancreatic cancer (70%–80%) and associated with reduced survival, reduced treatment tolerance and reduction in quality of life. In recent studies, low-normal body mass index (BMI) has worse outcome (overall mortality) in cardiovascular, malignant, chronic disease (so-called obesity paradox). Skinfold thickness is strongly associated with body fatness than BMI. The aims of this prospective study were to find out significance of triceps skinfold (TSF) thickness correlation to overall survival (OS) and treatment response in patient with pancreatobiliary tract cancer along with other nutritional and body fatness parameters.
Methods This is the prospective cohort study; newly diagnosed unresectable or borderline pancreatic and biliary tract cancers at Samsung Medical Center were enrolled as study patients. TSF using skin thickness caliper was measured on the half of right upper arm in every 3 weeks. BMI, body weight, and weight changes were also tracked along with TSF. The laboratory data and clinical data were monitored. This trial is registered with https://clinicaltrials.gov (identifier: NCT03637569).
Results The total of 310 patients were enrolled and there were 224 patients with pancreatic cancers and 86 patients with biliary tract caners. The first line chemotherapy regimen of pancreatic cancer patients was Gemcitabine/Abraxane or FOLFIRNOX and 19 patients (5.9%) could not receive chemotherapy due to patients' wishes, old age and poor performance status. The first line chemotherapy regimen of biliary tract cancer patients was Gemcitabine/Cisplatin. The median OS of pancreatic cancer and biliary tract cancer were 6.4 and 7.5 months respectively. Initial body weight, TSF and serum albumin level were the independent prognostic factors among the nutritional parameters and initial stage and Eastern Cooperative Oncology Group were also the independent prognostic factors as we can easily expect.
Conclusions This study was the first prospective cohort study investigating OS and treatment response correlation to nutritional status in pancreatobiliary tract cancer.
Keywords Triceps skin fold; Pancreatic cancer; Bile duct cancer; Gallbladder cancer; Body mass index

Plenary 2 PL2-04

Effect of Bile Acid Composition on Biliary System Infection in Microbial Area

Kihyun Ryu, Myunghwan Lee, Youngwoo Choi, Changbum Lim, Youngwoo Kang, Kyuchan Huh, Taehee Lee, Sunmoon Kim, Kyungho Song, and Hunsup Koo

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Background/Aims Human bile acids are mainly occupied by CA, CDCA, DCA and LCA. Since most of the bile acids secreted into the intestine are reused through the enterohepatic circulation, each person has a difference in composition. Each of bile acids have a varying degree of hydrophobicity and pH, so the influence on microbiotas also varies. We wanted to know the composition and amount of bile acids correlated with the biliary tract infectious organisms.
Methods We evaluated 85 patients who underwent biliary system drainage with percutaneously or endoscopically. The bile acid composition was analyzed using HPLC, and relative ratios were calculated with absolute amounts. We examined four endogenous bile acids, such as CA, CDCA, DCA, and LCA, as well as UDCA. In order to analyze the direct effect of each bile acid on the microorganisms, the disk diffusion method, which is an antibiotic susceptibility test, was performed.
Results The patients without bacteria in the bile were significantly higher than those detected, in the percentage of bile CDCA and total amount of bile acids. The higher percentage of UDCA was found in the *Escherichia coli* detection group, which was the most common in the bile duct, and the absolute amount of DCA was low in the *Enterococcus faecium* detection group. As a result of *in vitro* bile acid sensitivity test, CA, CDCA and DCA had inhibitory effect against *E. coli*, and CDCA and DCA showed inhibitory effect against *E. faecium*, *Klebsiella pneumoniae*, *Enterococcus faecalis*.
Conclusions Bile acids have a remarkable inhibitory effect on biliary microbiotas, which varies according to the type of strain and bile acid. The effect of bile acids on microbiotas in the biliary system was similar to that of microbial susceptibility tests. The composition and amount of bile acids in bile may be related to the proliferation of biliary microbiotas.
Keywords Biliary tract; Microbiotas; Bile acids

Plenary 2 PL2-05

Malignant Potential of Small Pancreatic Neuroendocrine Neoplasm and Its Risk Factors: A Multicenter Nationwide Study

Woo Hyun Paik[1], Hee Seung Lee[2], Korean GEP-NET Tumor Research Group, KSGC[3], Woo Jin Lee[4], and Yong-tae Kim[1]

[1]Department of Internal Medicine-GI/Hepatology, Seoul National University Hospital, Seoul, [2]Department of Internal Medicine-GI/Hepatology, Severance Hospital, Seoul, [3]Korean GEP-NET Tumor Research Group, Korean Society of Gastrointestinal Cancer (KSGC), Seoul, and [4]Department of Internal Medicine-GI/Hepatology, National Cancer Center, Goyang, Korea

Background/Aims Pancreatic neuroendocrine neoplasm (PNEN) represents heterogeneous biological behavior, and most of small PNENs 2 cm or less in size are known to show indolent feature. Thus, observation can be considered in selected cases according to the National Comprehensive Cancer Network guideline; however, there is a lack of clinical evidence, and the criteria are vague. We evaluated the clinical course of PNENs via a multicenter nationwide study.
Methods A total of 158 patients from 14 institutions with pathologically confirmed PNENs 2 cm or less in initial imaging were enrolled. The primary outcome was any event of metastasis or recurrence during follow-up.
Results The median age was 57.5 years (range, 22 to 84 years), and 86 patients (54%) were female. Eighteen patients (11%) had a tumor-related symptoms at initial diagnosis, and the median size of the tumor was 1.3 cm (range, 0.7 to 2.0 cm). The results of World Health Organization (WHO) classification were available in 147 patients: 126 patients (86%) with grade 1 and 21 patients (14%) with grade 2. Pathological diagnosis with endoscopic ultrasonography (EUS)-guided biopsy was confirmed in 22 patients, and among them, identification of WHO classification was also available in 17 patients. Among six patients who underwent EUS-guided biopsy and radical resection together, the concordance rate of WHO classification between two methods was 83% (5/6). A total of 142 patients (90%) underwent radical resection, and seven metastasis or recurrence (5%) were detected during follow up. Tumor size and WHO classification grade 2 were risk factors predicting metastasis or recurrence in univariate analysis. In multivariate analysis, WHO classification grade 2 (hazard ratio, 8.03; 95% confidence interval, 1.60 to 40.41; p=0.012) was the only predictive factor of malignant potential.
Conclusions Even small PNEN has a malignant potential. In small PNENs, EUS-guided aspiration biopsy may be recommended to predict the malignant potential of the tumor, and provide early treatment.
Keywords Pancreatic neuroendocrine neoplasm; Prognosis; Size; Recurrence; Metastasis

Plenary 2 PL2-06

Development and Validation of a Novel Prognostic Model for Predicting Lymph Node Metastasis in Early Colorectal Cancer

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Background/Aims Population screening for colorectal cancer (CRC) is expected to increase the number of early stage tumor. The identification of simplified prediction model for lymph node metastasis (LNM) for early CRC is urgently needed to determine the treatment and follow-up strategies. This study aims to develop an accurate prediction model for the LNM in early CRC.
Methods We used data from the 2004 to 2016 Surveillance, Epidemiology, and End Results database to develop and validate the prediction models for LNM. Six models, namely, neural network, naïve-Bayesian, Support vector machines, logistic regression, decision tree, and random forest (RF) models were assessed.
Results A total of 32,725 patients with a diagnosis of early CRC (Tis and T1) were analyzed in the study. The model included eight independent prognostic variables, including age at diagnosis, sex, race, primary site, histologic type, tumor grade, tumor size, and tumor depth. LNM was significantly more frequently in patients with larger tumor, in elderly patients, and in patients with more poorly differentiated tumor. The RF algorithm had the best predictive performance in comparison to the other methods, achieving an accuracy of 94.7%, a sensitivity of 71.4%, a specificity of 92.2%, and an area under the curve of 0.90.
Conclusions Our data show that the age at diagnosis is the most important feature in predicting LNM of early CRC in the RF model. We established a simplified reproducible predictive model for LNM in early CRC that could be used to guide treatment decisions.
Keywords Neural network; Colorectal cancer; Prediction, Metastasis

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Topic Forum

Upper GI

GI Cancer 1-2

Pancreatorbiliary 1-2

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Topic Forum (Upper GI) **TF-UGI2-01**

Correlation between the Result of Antimicrobial Susceptibility Testing and Outcome of Eradication Therapy for *Helicobacter pylori*

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Background/Aims Clarithromycin resistance is known for important factor for successful eradication of *Helicobacter pylori*. Other components which comprise eradication regimen such as amoxicillin, metronidazole can be also important for eradication. The aim of our study is to investigate the correlation between the result of antimicrobial susceptibility testing and eradication rate for *H. pylori*, and to elucidate the importance of antimicrobial susceptibility testing for *H. pylori* eradication.

Methods We reviewed medical records of 335 patients who diagnosed with *H. pylori* infection by culture between March 2015 and June 2019. Among 335 isolates, 245 isolates were performed antimicrobial susceptibility testing by Epsilometer test. Resistant breakpoints of MIC were followed by European Committee on Antimicrobial Susceptibility Testing guidelines. Among 245 patients, 141 patients who received *H. pylori* eradication therapy were evaluated eradication rate. We analyzed eradication rate according to eradication regimens and susceptibility to antibiotics.

Results Resistance rates to clarithromycin, amoxicillin, metronidazole, tetracycline, and levofloxacin were 29.4%, 10.2%, 24.1%, 7.8%, and 35.5% respectively. In the standard triple therapy (n=4), both clarithromycin- and amoxicillin-susceptible isolates had higher eradication rate (88.7%) than clarithromycin-susceptible and amoxicillin-resistant isolates (75.0%) or clarithromycin-resistant and amoxicillin-susceptible isolates (50.0%). In the concomitant therapy (n=40), both clarithromycin- and metronidazole-susceptible isolates had higher eradication rate (100.0%) than clarithromycin-susceptible and metronidazole-resistant isolates (87.5%) or clarithromycin-resistant and metronidazole-susceptible isolates (60.0%).

Conclusions There was a correlation between the result of antimicrobial susceptibility testing and eradication rate for *H. pylori*. Not only susceptibility to clarithromycin, but also others such as amoxicillin and metronidazole are also important for successful eradication of *H. pylori*.

Keywords *Helicobacter Pylori*; Eradication rate; Antimicrobial susceptibility testing; Standard triple therapy; Concomitant therapy

Topic Forum (Upper GI) **TF-UGI2-02**

Current Trend in the *Helicobacter pylori* Eradication Rates of First-Line Sequential and Concomitant Therapies in Korea: A Nationwide Multicenter Retrospective Study over the 10 Years

Bong Eun Lee[1], Byung-wook Lim[2], Jie-hyun Kim[3], Jin Il Kim[4], Jun-won Chung[5], Seong Woo Jeon[6], Joon Sung Kim[2], Jeong Hoon Lee[7], Ji Hyun Kim[8], Na Young Kim[9], Ju Yup Lee[10], Seung Young Seo[11], Seon-young Park[12], Sung Eun Kim[13], Moon Kyung Joo[14], Hyun Joo Song[15], Ki Bae Kim[16], Chang Seok Bang[17], and Hyun Jin Kim[18]

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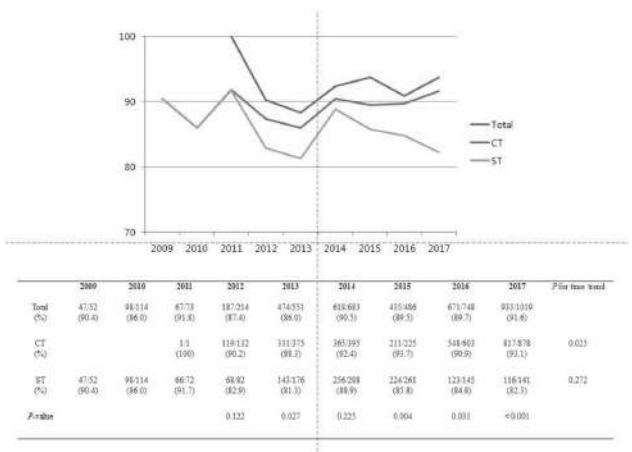
Background/Aims Eradication rate of standard triple therapy for *Helicobacter pylori* has declined to unacceptable level, and alternative regimens such as concomitant and sequential therapy have been introduced. We aimed to assess the current trend of eradication rates of concomitant and sequential therapies as for the first-line *H. pylori* eradication in Korea.

Methods A nationwide multicenter retrospective study was conducted including 18 second or tertiary medical centers from January 2008 to December 2017. We included 3,940 adults who had test to confirm *H. pylori* eradication within 1 year after first-line concomitant or sequential therapy.

Results First-line concomitant and sequential therapy was prescribed for 2,609 and 1,331 patients, respectively. The overall eradication rate of concomitant therapy was significantly higher than sequential therapy (91.6% vs 85.7%, p<0.001). In time trend analysis, concomitant regimen also showed higher eradication rate from 2015 to 2017 with an increasing trend (93.7% vs 85.8%, p=0.004 in 2015; 90.9% vs 84.8%, p=0.031 in 2016; 93.1% vs 82.3%, p<0.001 in 2017; p for trend=0.025). Among 289 patients with first-line eradication failure, second-line bismuth-based quadruple therapy and quinolone-based triple therapy was given for 202 (69.9%) and 71 (24.6%) patients, respectively. Bismuth-based quadruple therapy showed significant higher eradication rate than quinolone-based triple therapy (74.8% vs 52.1% in intention-to-treat analysis, p<0.001; 83.4% vs 62.7% in per-protocol analysis, p=0.001).

Conclusions Concomitant therapy was superior to sequential therapy as the first-line *H. pylori* eradication, showing consistent higher eradication rate with an increasing trend over the last 9 years. In patients with eradication failure after concomitant or sequential therapy, bismuth-based quadruple therapy is preferable than quinolone-based triple therapy in Korea.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	P for time trend
Total (%)	47/52 (90.4)	98/114 (86.0)	67/73 (91.8)	187/214 (87.4)	474/551 (86.0)	618/683 (90.5)	435/486 (89.5)	671/748 (89.7)	933/1019 (91.6)	
CT (%)			1/1 (100)	119/132 (90.2)	331/375 (88.3)	365/395 (92.4)	211/225 (93.7)	548/603 (90.9)	817/878 (93.1)	0.025
ST (%)	47/52 (90.4)	98/114 (86.0)	66/72 (91.7)	68/82 (82.9)	143/176 (81.3)	256/288 (88.9)	224/261 (85.8)	123/145 (84.8)	116/141 (82.3)	0.272
P-value				0.122	0.027	0.225	0.004	0.031	<0.001	

Fig. 1. Time trend of *Helicobacter pylori* eradication rates.

Topic Forum (Upper GI) TF-UG12-03

Superior Efficacy of Gastric Juice-Guided First-Line *Helicobacter pylori* Eradication: A Prospective Randomized Controlled Trial

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Background/Aims With the increasing antibiotic resistance, *Helicobacter pylori* eradication of clarithromycin-based triple therapy has declined to less than 80%. Although no consensus suggests the necessity of culture for 1st-line therapy, precision therapy by tailored antibiotic susceptibility-guided can be important to achieve better treatment efficacy and avoid secondary resistances. However, the literature on gastric juice-guided therapy via polymerase chain reaction (PCR) is scant; therefore, we conducted this prospective randomized controlled trial and aimed to investigate efficacy of antibiotic susceptibility-guided therapy via gastric juice PCR for first-line eradication.

Methods Treatment-naïve *H. pylori*-infected patients were randomly allocated to juice-guided therapy or empirical triple standard therapy for 7 days. The eradication and antibiotic resistance rates were compared. CYP2C19 and interleukin (IL)-1B polymorphisms were analyzed and their associations with treatment were compared.

Results One hundred eighty-two *H. pylori*-infected patients were enrolled and 176 completed the study. Baseline characteristics were similar between the two groups. The intention-to-treat eradication rates were 89% (81/91) in juice-guided therapy and 75.8% (69/91) in the empirical triple therapy (p=0.031). The per-protocol eradication rates were 91.0% (81/89) in the juice-guided therapy and 79.3% (69/87) in the empirical therapy (p=0.034), as shown in Fig. 1. Among the subgroups of different antibiotic resistance, patients with juice-guided therapy demonstrated better eradication rates with statistical significance (91.7% vs 45.5%, p=0.027) in the subgroup of both clarithromycin resistance and levofloxacin resistance. CYP2C19 and IL-1B polymorphisms were analyzed and showed no statistically significant association with treatment results.

Conclusions This randomized controlled trial demonstrated superior efficacy of susceptibility-guided therapy via gastric juice PCR for first-line *H. pylori* eradication. It is an ideal alternative to empirical standard triple therapy, which is currently often prescribed but should be abandoned due to its low eradication rate in the era of increasing antibiotic resistance.

Keywords *Helicobacter pylori* eradication; Gastric juice polymerase chain reaction; Susceptibility-guide therapy

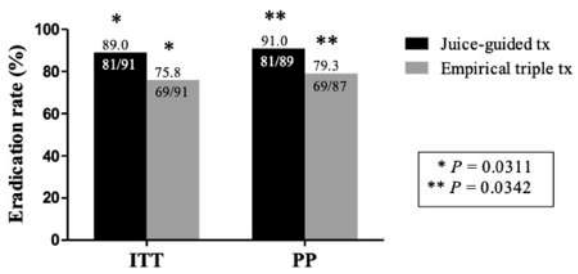

Fig. 1. Eradication rates in juice-guided therapy (tx) and empirical triple tx. ITT, intention-to-treat; PP, per-protocol.

Topic Forum (Upper GI) TF-UG12-04

Annual Eradication Rate of Bismuth-Containing Quadruple Therapy as Second-Line Treatment for *Helicobacter pylori* Infection: A Prospective Study for 15 Years in the Tertiary Hospital in Korea

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Background/Aims Bismuth-containing quadruple therapy has been widely employed as second-line treatment for *Helicobacter pylori*. The aim of this prospective study was to investigate the changes between the annual eradication rate of quadruple therapy.

Methods A total of 452 patients who failed to eradicate *H. pylori* with first line therapy from 2003 to 2018 were enrolled as intention-to-treat (ITT) population. All subjects received 14-day bismuth-containing quadruple therapy consisting of 40 mg esomeprazole twice a day, 500 mg metronidazole 3 times a day, 120 mg bismuth subcitrate 4 times a day, and tetracycline 500 mg 4 times a day. Patients followed-up with complete adherence to treatment were analyzed as per-protocol (PP). The ^{13}C urea breath test, rapid urease test (campylobacter-like organism test), and histology were used to confirm eradication. Compliance and side effects were also investigated. A minimal inhibitory concentration test was done on tissue samples of 70 patients.

Results Overall ITT and PP eradication rates were 78.8% (356/452) and 89.5% (314/351), respectively. During 15-year period, the annual success rate did not show significant changes (p for trend: ITT, 0.062; PP, 0.857) (Fig. 1). Adverse events were reported in 57.3% of ITT population. Resistance rates to metronidazole and tetracycline were 52.9% and 17.1%.

Conclusions In spite of high antibiotic resistance rates, there were no significant drops in the annual eradication rate between the years.

Keywords *Helicobacter pylori*; Quadruple therapy; Intention-to-treat analysis; Per-protocol analysis

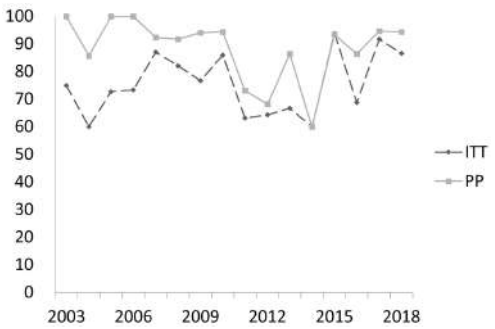

Fig. 1. The annual eradication rate of *Helicobacter pylori*. ITT, intention-to-treat; PP, per-protocol.

Topic Forum (Upper GI) **TF-UGI2-05**

Efficacy and Cost-Effectiveness of *Helicobacter pylori* Eradication: Comparison of Tailored Therapy Based on Clarithromycin Resistance and Concomitant Therapy

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Background/Aims The *Helicobacter pylori* eradication rate using conventional triple therapy has decreased due to clarithromycin resistance. Concomitant therapy or tailored therapy based on dual priming oligonucleotide (DPO)-based multiplex polymerase chain reaction (PCR) is considered as alternative first-line eradication strategies. We aimed to evaluate the eradication rate and cost-effectiveness of concomitant and tailored therapy.
Methods Data from *H. pylori*-positive patients were collected between January 2017 and June 2019. The tailored therapy group underwent DPO-PCR testing; if DPO-PCR positive, 7-day bismuth-containing quadruple regimen were given, and if negative, 14-day conventional triple regimen was prescribed. In concomitant therapy group, 14-day concomitant regimen was prescribed. The cost-effectiveness of evaluated according to the average cost per patient and the incremental cost-effectiveness ratio.
Results A total of 200 patients were allocated to the concomitant therapy group and 100 patients to the tailored therapy group. The eradication rate of first-line regimen was marginally higher in tailored therapy group than concomitant therapy group (179/200, 89.5% vs 96/100, 96.0%; p=0.055). The average costs per patient for tailored therapy were ₩591562.56 and ₩573304.30 for first-line and second-line treatments, respectively. Compared with concomitant therapy, the incremental cost-effectiveness ratios of tailored therapy were -₩31118.44 and -₩49376.70 per patient for first-line and second-line treatments, respectively.
Conclusions Tailored therapy using DPO-PCR shows tendency of higher eradication rate cost-effectiveness compared with concomitant therapy. Larger scale, randomized trial may be necessary in the future.
Keywords Tailored therapy; Concomitant therapy; Clarithromycin resistance

Table 1. The Difference between Using PPI Switch

Bismuth containing quadruple eradication therapy after the failure of standard triple therapy	Success (n=380)	Failure (n=99)	*P*-value
Sex (male: female)	181 : 199	49: 50	0.74
Age (mean ± SD)(year)	59.14 ± 11.85	58.84 ± 11.80	0.84
Current smoker	68	21	0.45
Alcohol drinking	93	28	0.44
Diagnosis			0.03
Peptic ulcer disease	162	48	
Gastric ulcer	90	20	
Duodenal ulcer	72	28	
Atrophic gastritis	177	33	
Gastric epithelial dysplasia	41	18	
10 day regimen	81	19	0.64
PPI change	285	67	0.14
Strategy to overcome 2C19 polymorphism	143	26	0.03*

PPI, proton pump inhibitor; SD, standard deviation.

Topic Forum (Upper GI) **TF-UGI2-06**

Proton Pump Inhibitor Switching Strategy after the failure of Standard Triple Therapy for *Helicobacter pylori* Eradication

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Background/Aims It is still a vague question of whether cytochrome 2C19 polymorphism influences *Helicobacter pylori* eradication, especially in Eastern Asia. We aim to evaluate how the change of proton pump inhibitor (PPI) or strategy to overcome CYP 2C19 polymorphism affects the eradication when it is used as 2nd line regimen.
Methods From January 2009 to December 2018, we performed a retrospective cohort study of 675 patients with the failure of standard triple therapy for *H. pylori* eradication. All patients took classic bismuth-containing quadruple therapy (10- to 14-day regimen), and the successful eradication rates were evaluated for serial years. We compared the eradication rates with or without the second-line PPI switch and looked into the differences with or without the strategy to overcome CYP2C19 polymorphism using rabeprazole.
Results The eradication rate was 85.2% (204/244)for the first 5 years whereas it was 78.7% (339/431) for the rest 5 years, and it showed a statistically significant decrease (p=0.03). When second-line PPI switch was conducted, the eradication rate was 81.0%, but it was 74.8% without switching (p=0.14). When it comes to the strategy to overcome CYP2C19 polymorphism, the eradication rate was 84.6% whereas it was 76.5% without the strategy. The difference between using this strategy and not using it was significant (p=0.03).
Conclusions Strategy to overcome CYP2C19 polymorphism using rabeprazole must be essential to increase the efficiency of eradication after the failure of standard therapy for *H. pylori*.
Keywords *Helicobacter pylori*; Eradication; Proton pump inhibitor; Cytochrome 2c19

Topic Forum (Upper GI) **TF-UGI2-07**

Comparison between Conventional Quadruple Therapy Administered Four Times-a-Day and a Revised Regimen Administered Twice-a-Day for Second-Line *Helicobacter pylori* Eradication

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Background/Aims *Helicobacter pylori* eradication-failure subjects may have a difficult time in taking second-line quadruple therapy owing to its frequent intake. We aimed to compare the efficacy and side effects between conventional quadruple therapy administered four times-a-day and a revised regimen administered twice-a-day.
Methods From December 2018, all consecutive subjects who failed in first-line eradication (amoxicillin 1 g, clarithromycin 500 mg, and pantoprazole 20 mg; all twice-a-day for 1 week) underwent second-line eradication by taking metronidazole 750 mg, tetracycline 1 g, tripotassium bismuth dicitrate 300 mg, and pantoprazole 20 mg; all twice-a-day for 1 week. The same number of consecutive subjects who underwent conventional quadruple therapy (metronidazole 500 mg 3 times a day, tetracycline 500 mg 4 times a day, tripotassium bismuth dicitrate 300 mg 4 times a day , and pantoprazole 20 mg twice a day for 1 week) before December 2018 were included as controls. Eradication failure was diagnosed based on a urea breath test performed after 4 weeks.
Results Among 100 twice-a-day group subjects and 100 four times-a-day controls, two and one did not follow the regimen, respectively. Eradication rate was 93.9% (92/98) in twice-a-day group and 92.9% (92/99) in four times-a-day group (p=0.789). Adverse effects were found in 36 and 50 subjects among twice-a-day group and four times-a-day group, respectively (p=0.051). Abdominal distention, discomfort, and pain were more common in four times-a-day group (13.1%) than twice-a-day group (4.1%, p=0.024).
Conclusions One week of twice-a-day intake of bismuth-based quadruple therapy is effective as the conventional quadruple therapy. Twice-a-day intake may decrease drug adverse effect (abdominal distention, discomfort, and pain).
Keywords *Helicobacter pylori* eradication

Topic Forum (GI Cancer 1) TF-GI1-01

Current Status Gastric Cancer among Mongolian Population

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Background/Aims Gastric cancer is one of the most leading causes of mortality in world population. Incidence of Mongolian gastric cancer patient is second place after South Korea but its mortality is first place. Despite leading incidence of gastric cancer in South Korea, its mortality is 51st place in the world, and Japanese incidence of gastric cancer is third place, but its mortality is 31st place. Analyze current status of statistic on gastric cancer incidence and mortality.
Methods We analyzed statistic on gastric cancer incidence and mortality, based on data from National Statistics Office of Mongolia, health indicator of Ministry of Health, National Cancer Center and others.
Results According to the analyze, the new incidence of gastric cancer increased steadily during the last decade. In 2008, 10,000:1.69 new cases were registered, while in the last 3 years, 10,000:2.67, 10,000:2.90, 10,000:2.23 new cases in 2015, 2016, and 2017, respectively. And it is observed that gastric cancer incidence is more common among the men and elderly people. There was observed smaller difference between men and women than gastric cancer. Gastric cancer related mortality was rose in 2015–2017, while esophageal cancer related mortality remained steady. In addition, most of the people who are diagnosed gastric cancer at the National Cancer Center are the people of western provinces.
Conclusions Gastric cancer incidence and related mortality are very high in our country, stabilized approximately at 10,000:2. So, there is an urgent need to determine risk factors of gastric cancer, capability to diagnose in early stage, in order to implement national screening program and other activities.
Keywords Gastric cancer; Mortality; Cancer incidence

Topic Forum (GI Cancer 1) TF-GI1-02

Gender-Specific Effect of Dietary and Physical Activity on Gastric Cancer : Population-Based Cohort Study

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Background/Aims There is rare report to investigate simultaneous effect of dietary and physical activity on gastric cancer in Korea.
Methods Persons who underwent both National Gastric Cancer Screening and general health examination during 2008 and had no gastric cancer at baseline, were enrolled and followed up to 2017. Diet pattern was categorized into vegetable preferred, mixed, and meat preferred diet. Regular physical activity classified as none, 1–2/wk, 3–4/wk, 5–6/wk, and daily. Regression analysis was performed to evaluate the risk of gastric cancer using hazard ratios (HRs) and 95% confidence intervals (CIs).
Results Gastric cancers developed in 45,741 of 3.98 million during follow-up. In overall analysis, mixed diet (HR, 1.12; p<0,001) and meat preferred diet (HR, 1.09; p=0.01) increased gastric cancer risk comparing to vegetable preferred diet. Regular physical activity reduced gastric cancer risk; HR of 0.92 in 1–2/wk, 0.93 in 3–4/wk, and 0.94 in 5–6/wk. However, daily physical activity paradoxically increased the risk of gastric cancer (HR, 1.28; p<0.001). In gender analysis, mixed diet (HR, 1.06; p=0.001) and meat preferred diet (HR, 1.26, p<0.001) increased gastric cancer risk in men. In women, meat preferred diet (HR, 1.25; p=0.01) increased the risk of gastric cancer. However, daily physical activity increased the risk of gastric cancer in men (HR, 1.25; p<0.001) but reduced its risk in women (HR, 0.82; p<0.001).
Conclusions Meat preferred diet increased the risk of gastric cancer in both men and women. Regular physical activity of 1–6/wk decreased the risk of gastric cancer, whereas daily physical activity increased the risk of gastric cancer in men. Grant: This study was supported from "The Korean Society of Gastroenterology".
Keywords Gastric cancer; Diet; Physical activity; Gender

Topic Forum (GI Cancer 1) TF-GI1-03

Predictors of Smoking Cessation after Diagnosis of Cancer among Gastrointestinal Cancer Survivors: Nationwide Population-Based Study

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Background/Aims Cessation of smoking is essential to improve cancer related outcomes among gastrointestinal cancer (GIC) survivors. However, few studies have assessed the determinant factors to resistant to quit smoking after diagnosis of GIC.
Methods Total of 625 GIC survivors (age ≥40 years; median, 7.1 years of follow-up) from the Health Examinees Study (2004–2016) were included in this study. Smoking status at diagnosis of GIC cancer was investigated. After exclusion of never smoker, GIC survivors were classified in to quitters and non-quitters according to the smoking status at the diagnosis of GIC. To evaluate the determinant factors to quit smoking after diagnosis of GIC, we used a univariate and multivariate regression analyses between two groups (quitter vs non-quitter).
Results The overall smoking cessation rate was 60.3% (226/375) among current smoker at the time of diagnosis of GIC. In univariate analysis, female sex (7.7% vs 1.7%, p=0.006), current high risk drinking (72.9% vs 41.4%, p≤0.001), obesity (23.3±3.0 vs 22.6±2.6, p=0.02)were more prevalent in non-quitter group than quitter group with statistical significance. In multivariate analysis, low household income (odds ratio [OR], 1.2; 95% confidence interval [CI], 1.1 to 2.0), current high risk drinking (OR, 1.4; 95% CI, 1.1 to 1.9), no regular exercise (OR, 1.6; 95% CI, 1.3 to 2.9), smoking duration more than 30 years (OR, 1.3; 95% CI, 1.1 to 1.9), and heavy smoker (≥25 cigarettes/day; OR, 1.5; 95% CI, 1.1 to 2.5) were the independent risk factors to resistant to quit smoking after diagnosis of cancer even after adjusting after adjusting cancer type, treatment status, age at diagnosis of GIC, the smoking age, education status, income status, work type, and cancer related factors.
Conclusions Given that smoking cessation is important for cancer prognosis, it is necessary for physicians to pay attention to survivors who have determinant factors to resistant to quit smoking with monitoring and educating carefully.
Keywords Gastrointestinal cancer; Cessation; Smoking; Health surveys; Quit

Topic Forum (GI Cancer 1) TF-GI1-04

Metformin Decreases Stomach Cancer Risk: Comparing with Other Hypoglycemic Agents

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Background/Aims Several studies presented anti-cancer effect of metformin, especially, lowering the risk of gastrointestinal tract. However, few studies conducted about the effect of metformin with stomach cancer. So this study was to compare metformin with other agents considering the correlation of stomach cancer risk.
Methods Patients prescribed only one kind of oral hypoglycemic agents (OHAs) or insulin from January 2009 to December 2018 were included. Among them, we reviewed their endoscopic biopsy results conducted after prescription, retrospectively. Included OHAs were metformin, dipeptidylpeptidase-4 (DPP4)-inhibitors, sulfonylureas and insulin. The biopsy results were divided into three groups, benign (gastritis, hyperplastic polyp), precancerous (adenoma), cancer (adenocarcinoma, signet). Then, the correlation of each agent with biopsy was compared.
Results Forty-three thousand nine hundred forty-seven patients were prescribed one or more OHAs or insulin during 10 years. Among them, patients who were prescribed only one OHA or insulin were 18,318. In 18,318, patients took endoscopic biopsy were five in a-glucosidase inhibitors, 317 in metformin, 43 in DPP4-inhibitors, 0 in GLP-1 receptor agonist, 1,583 in insulin, 19 in meglitinides, four in SGLT-2 inhibitors, 59 in sulfonylureas, four in thiazolidinedione. Less benign lesions and more precancerous or cancer lesions were found in insulin (p=0.000). When comparing metformin with each other agents, there were no significant difference between metformin and DPP4-inhibitors (p=0.672) but precancerous and cancer lesions in metformin were significantly lower than both sulfonylurea (p=0.033) and insulin (p=0.000). When it comes to comparing the prescription duration, there was not any significant difference.
Conclusions Besides lowering hyperglycemia, metformin has been known to reduce cancer risk. As we showed above, metformin lowers precancerous and cancer lesion in stomach but a larger and prospective trial may be needed to confirm our observations.
Keywords Metformin; Stomach cancer

Topic Forum (GI Cancer 1) **TF-GI1-05**

Predictive Factors for Extragastric Recurrence of Early Gastric Cancer after Curative Resection

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Background/Aims Extragastric recurrence of early gastric cancer (EGC) after curative resection is rare, but it is important for prognosis of patients. The aim of this study is to elucidate the patterns and predictive factors for extragastric recurrence of EGC after curative resection.

Methods We retrospectively reviewed the medical records of 1,147 patients who underwent endoscopic and surgical resection for EGC at Gangnam Severance Hospital between January 2010 and December 2018. We analyzed clinicopathological characteristics of enrolled patients and evaluated predictive factors for extragastric recurrence. And four classifier genes (*GZMB*, *WARS*, *SFRP4*, and *CDX1*), which is known for association with prognosis of gastric cancer, were also analyzed.

Results The overall incidence of extragastric and intragastric recurrence was 1.0% and 3.1%, respectively. Among extragastric recurrences, three patients (27.3%) and eight patients (72.7%) underwent endoscopic and surgical resection, respectively. Mean interval between curative resection and extragastric recurrence was 29.0 months. The interval ranged from 6 to 92 months. Liver (n=3) and lymph node (n=3) were the most common site of recurrence. In the multivariate analysis, submucosal invasion (p=0.041) and lymph node metastasis (p=0.045) were significant predictive factors for extragastric recurrence. Notably, lymph node metastasis was independent risk factor for overall (extragastric and intragastric) recurrence (p=0.014). The patients with extragastric recurrence showed intermediate to high risk based on classifier genes.

Conclusions Submucosal invasion and lymph node metastasis (especially more than six lymph node metastasis) are independent predictive factors for extragastric recurrence of EGC after curative resection. Classifier genes may be helpful to predict the extragastric recurrence of EGC.

Keywords Early gastric cancer; Extragastric recurrence; Classifier genes; Lymph node metastasis; Submucosal invasion

Topic Forum (GI Cancer 2) **TF-GI2-01**

Classification of Esophageal Cancer Stadium Using Recurrent Neural Network Model

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Background/Aims One way to detect the presence of esophageal cancer is by examining it using colonoscopy. After an esophageal cancer is detected, classification is done to determine the stage of cancer. In this study, we used the recurrent neural network (RNN) model for the classification of esophageal cancer stages. This study aimed to explain the procedure and the accuracy of the Elman tissue RNN modeling in esophageal cancer stage classification from the colonoscopy photo.

Methods The process carried out is to convert the image of red green blue to a grayscale image on the colonoscopy data. After that the image was extracted with gray-level co-occurrence matrix which was designed using graphical user interface with Matlab. There are 14 features, namely energy, contrast, correlation, sum of square, inverse different moment, sum average, sum variance, sum entropy, entropy, differential variance, differential entropy, maximum probability, homogeneity, and dissimilarity. The feature is used as input, which is then divided into training data and testing data. After that, Elman network RNN modeling was carried out with data normalization, best model design and data denormalization. The best model design was done by finding the number of hidden neurons and eliminating network inputs using the backpropagation algorithm.

Results The results of the best model training data and testing data were measured using sensitivity, specificity, and accuracy. So that from 74 training data obtained 92% accuracy rate, 96% sensitivity level as a reliable indicator when the results show esophageal cancer, and 79% level of specificity as a good indicator when the results show normal esophageal. While in 18 data testing showed 94% accuracy, 100% level of sensitivity, and 80% level of specificity.

Conclusions The classification results are stated to be very good.

Keywords Classification; Esophageal cancer; Recurrent neural network model

Topic Forum (GI Cancer 2) **TF-GI2-02**

Quantitative Analysis/Tissue Characterization for Malignant Mediastinal/Abdominal Lymph Nodes Using Endoscopic Ultrasound Elastography

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Background/Aims Endoscopic ultrasound elastography (EUS-EG), has emerged as a useful modality of estimating tissue stiffness. Second generation elastography allows quantitative measurements of average elasticity of a lesion. With help of this study, we can improve diagnostic accuracy of malignant lymph nodes. The main objective of this study is to assess the specificity, sensitivity and predictive values of the stain ratio measured by EUS-EG in differentiating benign from malignant lymph nodes.

Methods It is a prospective study included 54 patients with abdominal/mediastinal lymphadenopathy. Second generation EUS-EG was performed, in addition to detailed sonographic features, including size, diameter, character, shape echotexture (echogenic or echo-poor) and hilum (lost or preserved), were also included.

Results Total of 54 patients were included in this study; out of 28 (50.9%) were male. Total 14 (25.5%) had malignant lymphadenopathy, while 40 (72.7%) had benign lymphadenopathy. Size of more than 1 cm was present in 10 patients (18.2%). High strain ratio values and lymph node size were found to be significantly associated with presence of malignant disease with p-value of 0.01 and 0.001 respectively. Higher values of strain ratio were found to be associated with malignant lymphadenopathy with area under the receiver operating characteristics of 0.821. At a cutoff value of ≥15 for strain ratio sensitivity, specificity, positive, and negative predictive value are as 52.1%, 93.5% ,85.7% and 72.5%, respectively. The preserved hilum of lymph node was found to be significantly associated with benign lymphadenopathy with p-value of 0.016 (Fig. 1).

Conclusions EUS-EG can be used to predict malignant lymphadenopathy providing additional diagnostics information before Biopsy. Further larger studies are required for tissue characterization of malignant lymph nodes.

Keywords Endoscopic ultrasound; Strain ratio; Lymph nodes

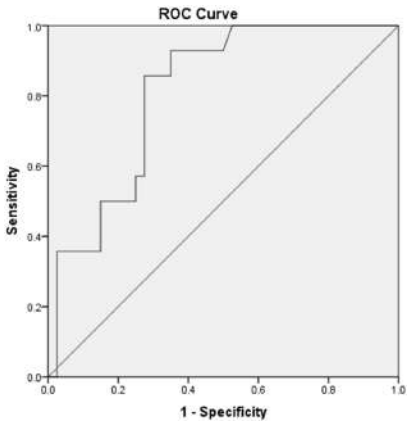

Fig. 1. Lymph node and strain ratio. ROC, receiver operating characteristic.

Topic Forum (GI Cancer 2) TF-GI2-03

Causal Relationship between the Loss of Slc26a9 and Gastric Cancer

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Background/Aims Slc26a9 is a member of Slc26a family with high expression in the stomach to control parietal cell function and survival. It is known that loss of parietal cells contributes to a premalignant environment in the gastric mucosa. The present study was therefore undertaken to study a potential role of Slc26a9 downregulation in the development and progression of gastric cancer.
Methods GeneChip analysis as well as histopathological and immunohistochemical (IHC) analysis were performed in Slc26a9 knockout and wildtype mice at different age. Slc26a9 mRNA and protein expression were measured by qPCR and Western-blot in human normal gastric epithelium, CAG and gastric cancer tissues as well as different cell lines. The cell functional experiments were performed to test the role ofSlc26a9 in gastric cancer cell line.
Results With advanced of age, Slc26a9 deficient mice exhibited severe gastric pre-neoplastic phenotype including oxyntic atrophy followed with chronic inflammation, TFF2-expressing (SPEM) and intestinal metaplasia, high-grade intraepithelial neoplasia, ultimately gastric cancer. Accompanying with over proliferation and inhibition of apoptosis of gastric epithelial cells, as well as downregulation of P53 and bcl2. Consistent with animal experiment, human CAG and gastric carcinoma tissues displayed significantly decreased of Slc26a9 mRNA and protein expression when compared with healthy control. Moreover, IHC analysis of human normal gastric epithelial, CAG, high grade intraepithelial neoplasia and gastric cancer indicated progressive decrease in Slc26a9 expression. Additionally, Slc26a9 was downregulated in all types of gastric cancer cell lines. Compared with control groups, re-expressing of Slc26a9 in the lowest expressing cell line AGS caused a significantly reduction in proliferation and migratory speed but promoted AGS cell apoptosis. This was accompanied with upregulation of P53 and bcl2 both in mRNA and protein levels.
Conclusions Genetic deletion of Slc26a9 resulted in dysregulation of the P53/bcl2 signaling pathway and lead to spontaneous premalignant and malignant lesions in murine gastric epithelia.

Topic Forum (GI Cancer 2) TF-GI2-04

Additive Tumor-Suppressive Effect of Niclosamide and Metformin in Mouse Model of Colorectal Cancer

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Background/Aims The anti-helminthic niclosamide and anti-diabetic metformin has shown tumor-suppressive effect through inhibition of Wnt and mTOR signaling, respectively. Considering their safety, they can be good candidates of adjunctive anti-tumor drugs. Therefore, we investigated the combined effect of niclosamide and metformin in mouse model of colorectal cancer.
Methods Two colorectal cancer cell lines, SW480 and HT29 cells, were used, and treated with niclosamide, metformin, and combination of two drugs. Activity of beta-catenin, p-AMPK, and mTORC1 were measured. As mouse model of colorectal cancer, APCmin/DSS model were used and treated with same drugs, and immunohistochemical stain for beta-catenin and pS6 was done in tumor of mouse model.
Results Combined treatment of niclosamide and metformin showed significant decrease of cell proliferation compared to treatment of niclosamide or metformin alone. In APCmin/DSS model, combination of niclosamide and metformin induced significant decrease of tumor number, compared to treatment of niclosamide or metformin alone. In addition, combined treatment of niclosamide and metformin decreased activity of both beta-catenin and mTORC1 (pS6) significantly in cell lines and mouse models, while treatment of niclosamide and metformin alone induced separate suppression of beta-catenin and pS6, respectively.
Conclusions Combined treatment of niclosamide and metformin showed significant suppression of colorectal tumor by decreasing activity of both beta-catenin and mTOR.
Keywords Metformin; Niclosamide; Colon cancer; Beta-catenin; mTOR

Topic Forum (GI Cancer 2) TF-GI2-05

miR-490-3p Targets CDK1 through a Phase-Separation-Depend System and Inhibits the Proliferation of Colon Cancer Cells

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Background/Aims Liquid-liquid phase separation (LLPS) is a burgeoning concept in cell biology, which was reported associated with miRISC machinery in vitro. However, whether miRISC undergoes LLPS under natural condition remains unknown.
Methods Firstly, IUPred2A was used to predict the internal disordered regions (IDRs) of miRISCs in order to find the potential site inducing LLPS. Then, fluorescence redistribution after photobleaching experiments (FRAP) were performed to confirm the fluidity of miRISCs under the overexpression of core proteins. The interaction between miR-490-3p and its target gene CDK1 were conformed by qPCR and luciferase assays. Without any overexpression of miRISC, after treating with 1,6-hexanediol, a widely used LLPS suppressor, qPCR and luciferase assays were performed again to identify the disturbance of LLPS suppressor to the function of miRISCs under transcription and translation levels. Finally, MTS assays and cell cycle assays were performed to find out the biological function of miR-490-3p.
Results Firstly, IDR of TNRC6B, a core protein of miRISCs, was identified by IUPred2A (Fig. 1A). The results of FRAP (Fig. 1B and C) suggested that the fluorescence intensity of these two proteins could recover slowly after photobleaching, giving us a stronger proof to confirm the fluidity of miRISCs in colon cancer. Then, qPCR assays (Fig. 1D left) and luciferase assays (Fig. 1E and F) confirmed that miR-490-3p suppressed the expression of CDK1, which suggested miRISCs functioned normally and decreased luc2 expression by specifically interacting between miR-490-3p and predicted binding site. After treating with 1,6-hexanediol, the suppression of CDK1 by miR-490-3p was totally abolished (Fig. 1D right and 1G), suggesting that miRISC functions in a LLPS-depend way under natural condition, which could be disturbed by LLPS suppressor (Fig. 1H). Finally, MTS (Fig. 1I) assays and cell cycle assays (Fig. 1J and K) showed that miR-490-3p could induce G1/S arrest and inhibit cell proliferation.
Conclusions We found that miR-490-3p could target CDK1 in a LLPS-depend manner and inhibit the proliferation of CC cells.
Keywords miR-490-3p; CDK1; Phase separation; Proliferation; Colon cancer

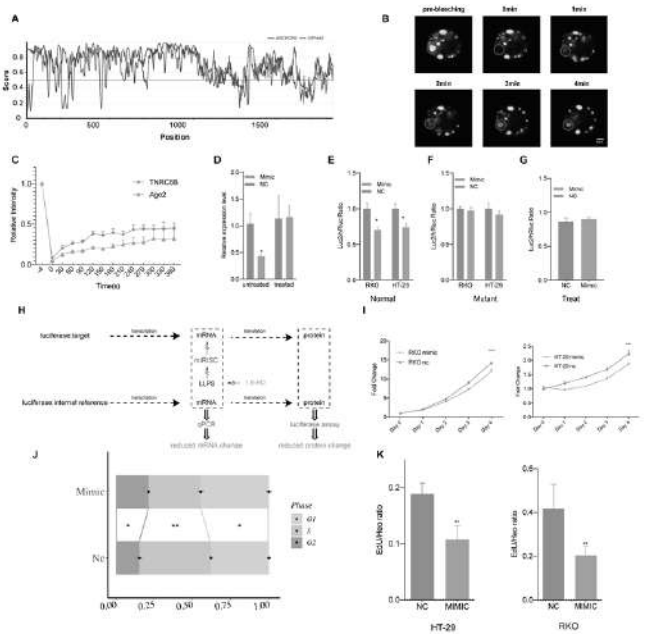

Fig. 1. LLPS, liquid-liquid phase separation.

Topic Forum (Pancreatorbiliary 1) **TF-PB1-01**

Establishment of Patient-Derived Pancreatic Ductal Adenocarcinoma Organoids Platform and Analysis of Its Characteristics

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Background/Aims Recent studies about pancreatic ductal adenocarcinoma (PDAC) used resettable tumor, derived from surgical specimen, even though most PDACs were unresectable. From this point of view, study based on unresectable PDAC is important, and it is possible to obtain specimen using endoscopic ultrasound (EUS)-guided fine needle aspiration/biopsy (FNA/B). Moreover, organoid was more similar to original tissue derived from patient with PDAC, than two-dimensional cell culture. Our study aimed to evaluate concordance between primary tissue and patient derived organoid using EUS guided FNA/B and clinicopathologic factors which impact on organoid platform.
Methods We obtained PDAC tissue form EUS-guided FNA/B between June 2015 and August 2019 at Samsung Medical Center. To examine the PDAC patient-derived organoid, we performed three-dimensional high resolution immunofluorescent staining, chromosome spread and whole exome sequencing (WES).
Results Two hundred seven PDAC samples were analyzed. We confirmed pancreatic ductal cancer cells stained with sox9 and cytokeratin antibodies, and also observed the aneuploidy detected by karyotyping. The WES data showed the high concordance between primary PDAC tissue and its organoid, and the enriched genetic alterations in organoids. Success rate of organoid culture was 41.1% (85/207). Because laboratory set up developed from 2017, success rate has increased every year since 2017: 29.2% (11/39) in 2015, 20.8% (11/53) in 2016, 26.7% (8/30) in 2017, 60.8% (31/51) in 2018, and 70.6% (24/34) in 2019. On multivariable logistic regression analysis, high cellularity of aspiration sample (>10 cluster) was prognostic factor associated with organoid success compared to low cellularity (<3 cluster; odds ratio, 2.76; 95% confidence interval, 1.06 to 7.22; p=0.038).
Conclusions In our study, the concordance between primary PDAC tissue and its organoid seems to be high and its characteristics were well explained clinicopathologically. High cellularity of aspiration sample tended to be higher success rate of organoid culture.
Keywords Pancreatic ductal adenocarcinoma; Organoid; Whole exome sequencing

Table 1. Prognostic Factor Associated with Success of Organoid Culture

		*OR	*p value
Age	year	0.98 (0.95-1.02)	0.314
Gender	Male	1	
	Female	0.81 (0.42-1.58)	0.539
Stage	I	1	0.466
	II	0.49 (0.09-2.71)	0.414
	III	1.17 (0.33-4.20)	0.810
	IV	0.66 (0.18-2.47)	0.539
Size of mass	mm	0.99 (0.97-1.01)	0.256
Cellularity of aspiration	Low (<3 cluster)	1	0.108
	Mod (3-10 cluster)	1.56 (0.63-3.88)	0.342
	High (> 10cluster)	2.76 (1.06-7.22)	0.038
Date of EUS-FNA/B	2015	1	0.003
	2016	0.55 (0.19-1.56)	0.259
	2017	0.63 (0.18-2.23)	0.477
	2018	2.69 (0.82-8.78)	0.102
	2019	5.64 (1.33-23.88)	0.019
Death	No	1	
	Yes	0.90 (0.34-2.39)	0.834

OR, odds ratio; EUS, endoscopic ultrasound; FNA/B, fine needle aspiration/biopsy.
*Multivariable analysis.

Topic Forum (Pancreatorbiliary 1) **TF-PB1-02**

Establishment of Patient-Derived Pancreatic Cancer Organoid by Means of Endoscopic Ultrasound-Guided Fine Needle Aspiration: Comparison between Core Biopsy Tissues and Organoids

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Background/Aims There are numerous conditions observed amongst pancreatic cancer patients. The artificial organ-like structure called as organoid reflects this variety in patients and consequently is predicted to be the most suitable model for pancreatic cancer research. However, the previous reported organoids were made mainly from surgically obtained tissues, but theses cannot represent unresectable pancreatic cancer patients. In this study, we used endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) to collect unresectable pancreatic cancer tissues for creating organoid and also compared core biopsy tissues and organoids to demonstrate their homology.
Methods This study was conducted between January 2017 and December 2017. All EUS-FNA procedures were performed by a single, experienced echoendoscopist (LeeSH) at Seoul National University Hospital. We employed single pass of EUS-FNA to establish organoids. Among the established organoids, we selected paired available samples (the amount of core biopsy tissue is limited) and compared core biopsy tissues and organoids with hematoxylin and eosin (H&E) staining for morphological comparison and next generation sequencing (NGS) for detecting the common somatic mutations.
Results Twenty EUS-FNA tissues, which had not been contaminated, were used. Successfully isolated organoids were achieved in 14 of 20 tumors (70%) and established organoids more than five passages of growth were reached in 12 of 20 tumors (60%). We did NGS on established 12 organoids. Among them, we selected eight pairs of organoid and core biopsy tissue. They showed similar patterns in H&E staining (Fig. 1). NGS data showed that the mutations in *KRAS*, *TP53*, *CDKN2A*, *SMAD4 and BRCA1*, which are frequently observed in pancreatic cancer, were about 90% homology.
Conclusions We established 12 patient-derived pancreatic cancer organoids by means of EUS-FNA. Comparison between core biopsy tissues and organoids indicates that they are morphologically and genetically similar each other compared to other model systems. Therefore, the organoids established from EUS-FNA core biopsies can be used for diverse model systems for cancer research.
Keywords Pancreatic cancer; Endoscopic ultrasound-guided fine needle aspiration; Organoid; Histology; High-throughput nucleotide sequencing

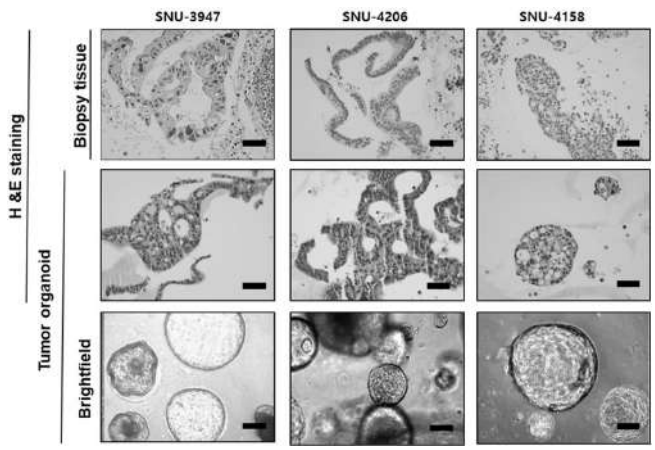

Fig. 1. H&E staining of each tissue.

Topic Forum (Pancreatorbiliary 1) TF-PB1-03

Successful Establishment of Pancreatic Cancer Patient-Derived Orthotopic Xenograft Models

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Background/Aims Most of the previous pancreatic patient-derived xenograft (PDX) models have been developed by subcutaneous implantation method. To assess the availability of orthotopic implantation method and evaluate clinical association, we developed PDX model by orthotopic transplantation of tumor tissues acquired from various origins.
Methods Tissue of PC (n=132) were collected by surgical specimen (n=52), percutaneous liver biopsy (n=30), and endoscopic ultrasound-guided fine needle biopsy (EUS-FNB; n=50). PDX was established with the technique of orthotopic implantation to pancreas tail of 5- to 6-week-old female Athymic (nu/nu) mice. Tumor growth was monitored using T2-weighted axial magnetic resonance imaging image. When the tumor reached certain size (volume 1,000–1,500 mm^3), tumor was removed and divided into 3×3×3 mm^3 cubic fragment for systematic maintenance, cryopreservation, and analysis for histopathology and genetic alteration.
Results From March 2015 to January 2019, 49 PDOX models were successfully established (37.1%). Success rates were highest for surgical specimen (44.2%), followed by percutaneous liver biopsy (36.7%), and EUS-FNB (30%). Among the engraftments, the duration between inoculation and tumor formation averaged 186.7 days (range, 27 to 365 days). Tumor morphology and differentiation grade were maintained during passages. Shorter engraftment time (<100 days) was associated with poor overall survival in univariate analysis (hazard ratio [HR], 4.01; p=0.014), but with marginal significance in multivariate analysis (HR, 3.26; p=0.073). In addition, metastatic stage and higher concentration of K-ras mutation in cell free DNA were also associated with poor overall survival in multivariate analysis (HR, 4.15; p=0.006 and HR, 1.37; p=0.020, respectively).
Conclusions PDX models were successfully established by orthotopic implantation method regardless of tissue origin. The engraftment time for the model might be associated with the clinical outcome.
Keywords Pancreatic cancer; Patient-derived xenograft model

Topic Forum (Pancreatorbiliary 1) TF-PB1-04

Whole Exome Sequencing of Primary Pancreatic Ductal Adenocarcinoma and Paired Liver Metastasis

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Background/Aims Although metastases is the key determining factor of survival in pancreatic ductal adenocarcinoma (PDAC) patients, the genetic alteration behind the mechanism of metastases remains unclear. We aimed to identify the genetic alteration that endows metastatic potential to primary PDAC by comparing whole exome sequencing results of primary PDAC and paired liver metastases samples from living, treatment-naïve patients.
Methods Whole exome sequencing analyses were performed for 11 paired sets of fine needle aspiration (FNA) samples from primary PDAC, percutaneous liver biopsy samples, and white blood cell (WBC) samples acquired form living, treatment-naïve PDAC patients with liver metastases (stage IV). Somatic mutation profiles, somatic copy number alterations profile, and tumor phylogeny were analyzed.
Results Median age of study patients was 71 years old. Sex ratio was 5:6 (male:female). The median overall survival of study patients was 4.3 months. The first line chemotherapy regimens of enrolled patients were FOLFIRINOX ([3/11, 27.3%], Gemcitabine/Erlotinib [3/11, 27.3%], Gemcitabine/Abraxane [2/11, 18.2%], and Gemcitabine/Capecitabine [1/11, 9.0%]). Two patients (18.2%) could not receive chemotherapy due to the patients' wishes, old age or poor performance status. Average read depth per exon exceeded 100 times in all tumor samples and exceeded 50 times in all WBC samples. Proportion of exon areas with 10 times or higher read depth reached nearly 100%. Among 22 FNA or liver metastases samples, average purity and ploidy was 0.36 and 2.4, respectively. There were sharing mutations between primary cancers and liver metastasis, however, specific nonsharing mutations were existed.
Conclusions Whole Exome sequencing of primary pancreatic cancer and liver metastasis revealed both shared genomic signature, interestingly, we could also find unique unshared mutations of liver metastasis.
Keywords Whole exome sequencing; Pancreatic cancer; Metastasis

Topic Forum (Pancreatorbiliary 1) TF-PB1-05

Integrative Analysis for Genomic Profiling of Multifocal Intrahepatic Cholangiocarcinoma: Clinically Relevant Evidence for Precision Therapeutic Strategies

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Background/Aims Intrahepatic cholangiocarcinoma is the second most common primary liver cancer. There is no clinical consensus for the management of multiple tumors in the intrahepatic cholangiocarcinoma. The aim of this study is to evaluate the spatiotemporal evolutions of multiple tumors that belong to the same patients and provide the clinically relevant evidence for precision therapeutic strategies in the intrahepatic cholangiocarcinoma.
Methods A total of 34 tumors from nine patients were analyzed by next-generation sequencing using custom-designed targeted gene panel with the deep targeted platform. Single nucleotide variants with indel aberration, somatic mutations, and copy number alterations were obtained from bioinformatics computational analysis.
Results All multiple tumors in each patient showed the significant similarity of somatic mutation with indel pattern and copy number alteration. The analysis for spatiotemporal evolution using clustering cancer evolutionary trees revealed that eight out of nine patients have multiple tumors from genetically same clonal origin even in different anatomical locations of the liver. We identified shared driver mutations in each patient in terms of BRCA1-associated protein-1 in two patients, Isocitrate dehydrogenase 1 in two patients, mediator complex subunit 12, ATP-dependent helicase SMARCA4 (also known as BRG1), serine/threonine-protein kinase B-Raf (BRAF), and erythropoietin-producing hepatocellular carcinoma cell surface type-A receptor 3 (EPHA3). The only patient not having shared nonsynonymous somatic mutation showed a significantly concordant pattern of copy number alteration in multiple tumors.
Conclusions Genomic profiles were concordant among all tumors in each patient, suggesting a common progenitor cell origin regardless of the location in the liver. Most of the patients were identified to share the actionable genetic alteration commonly in multiple tumors. Our results support the development of molecular-targeted therapeutic strategies in multifocal intrahepatic cholangiocarcinoma.
Keywords Intrahepatic cholangiocarcinoma; Multiple tumors; Molecular profiling; Integrative analysis

Topic Forum (Pancreatorbiliary 1) TF-PB1-06

Single Cell Analysis of Primary and Metastatic Pancreatic Cancer Cells

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Background/Aims Tumor microenvironment and intratumoral heterogeneity are known to be playing important roles in tumor evolution and implicated in patient outcomes. Although the complex nature of the tumor microenvironment and intratumoral heterogeneity can be inferred to a certain degree using conventional next-generation sequencing analysis of bulk tumor tissues, precise deconvolution of the diverse the cell types present in the tumor is still difficult to be achieved. The aim of this study was to perform single cell analysis of primary and metastatic pancreatic ductal adenocarcinoma (PDAC) cells.
Methods Metastatic PDAC patients were enrolled and each primary and metastatic PDAC cell was acquired using endoscopic ultrasound-guided fine needle aspiration or ultrasound-guided biopsy technique. We aligned reads generated by 10X Chromium Single Cell 3' reagent kits to the human reference genome (hg19) using the STAR and generated gene-barcodes count matrix using CellRanger (version 3.0.2) with default parameters. Principal component analysis was performed using 3,000 highly variable genes, and each significant principle component was determined by JackStraw and elbow plot. We used "FindClusters" functions with default parameter to identify clusters of cells. Each clusters were projected onto UMAP analysis using "RunUMAP" function.
Results The median age of study patient was 6 years (range, 151 to 75 years) and the sex ratio was 1:2 (male, 7; female, 14). The median overall survival was 2.9 months (range, 0.5 to 8.8 months) and American Joint Committee on Cancer staging of study patients were the following: stage III, 6; stage IV, 15. The 17 patients (81%) received Gemcitabine/Abraxane or FOLFIRNOX as 1st line chemotherapy with. The advent of single-cell RNA sequencing (scRNA-seq) has given an unprecedented opportunity to understand the diversity of the cellular composition of a tumor and also provides information on tumor microenvironment composed of various cell types. Here, we present the preliminary results of scRNA-seq analysis of both nonmetastatic and liver-metastatic pancreatic cancer.
Conclusions scRNA-seq reveals tumor microenvironment and intratumoral heterogeneity in pancreatic cancer.
Keywords Single cell analysis; RNA sequencing; Pancreatic cancer; Metastasis

Topic Forum (Pancreatorbiliary 1) **TF-PB1-07**

Analysis of Extracellular Vesicles and Clinical Application in Pancreatic Cancer

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Background/Aims Recent studies highlight the putative utility of tissue-specific vesicles in diagnosis and disease monitoring in pancreatic cancer. Exosomes are small extracellular vesicles released via the endocytic pathway by fusion of multivesicular bodies with the plasma membrane. Because exosomes contain an abundant of cell-specific biomolecules acting as a fingerprint of the cell of origin, they possess promising potential as novel biomarkers for early cancer detection. Therefore, we examined exosome-derived proteins and RNAs in liquid biopsies of patients with pancreatic ductal adenocarcinoma (PDAC).
Methods For our study, 100 PDAC and 23 benign patients were enrolled to collect blood samples. A lab-on-a-disc "Exodisc" based on a centrifugal microfluidic filter system was used for the automatic enrichment and isolation of exosomes from plasma along with subsequent analysis by *in situ* enzyme-linked immunosorbent assay or fluorescence labeling for putative protein markers; CD9, CD63, CD81, GPC1, Caveolin1, Alix, Flot1, epidermal growth factor receptor, epithelial cell adhesion molecule (EpCAM). Clinical and laboratory data was reviewed. AI technique was applied to find out correlation between exosome analysis results and clinical parameters.
Results The total of 100 patients with PDACs were enrolled as study patients. The median overall survival (OS) of study patients was 13.9 months. The clinical staging were the following: II (A,B), 12; III, 33; IV, 55. The first line chemotherapy regimen of study patients was Gemcitabine/Abraxane or FOLFIRNOX. Nine protein markers were examined with isolated exosomes from the patient plasma. PDAC patients were divided by two groups with good prognosis (OS $\geq$36 months) and poor prognosis (OS <36 months) after chemotherapy. As a result, the level of exosomal GPC1, CD63 and EpCAM was increased in the poor prognosis group.
Conclusions We found some candidates of exosomal protein markers predicting chemotherapy response and prognosis. This is the first study investigating correlation between clinicopathology of PDACs and exosome markers via AI technique.
Keywords Extracellular vesicles; Exosomes; Pancreatic ductal adenocarcinoma; Artificial intelligence

Topic Forum (Pancreatorbiliary 2) **TF-PB2-01**

Comparison of Liquid-Based Cytology with Conventional Smear Cytology for Endoscopic Ultrasound-Guided Fine Needle Aspiration of Solid Pancreatic Masses: Prospective Randomized Noninferiority Study

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Background/Aims There is limited data on the efficacy of SurePath liquid-based cytology (SP) for endoscopic ultrasound-guided fine needle aspiration specimens. We aimed to evaluate the diagnostic efficacy of SP for solid pancreatic neoplasms compared to conventional smears (CS).
Methods In this randomized, crossover, noninferiority trial, we randomly assigned (1:1) patients with suspected pancreatic cancer to either SP or CS groups. Aspirates from the first needle pass were processed by one method, aspirates from the second pass by the other method, and specimens from the last pass were processed as core biopsies. The primary endpoint was the diagnostic efficacy of each method, with the final diagnosis as the gold standard. A noninferiority margin of 10% was assumed. This trial is registered with https://clinicaltrials.gov, number NCT03606148.
Results Of 170 randomized patients, 165 were classified as "malignant" and five as "benign." Unsatisfactory samples were less frequent in SP (1.78%) compared to CS (5.33%). The diagnostic accuracy, sensitivity, specificity, positive predictive value, and negative predictive value of SP versus CS were 88.0% versus 83.8% (p=0.276), 87.7% versus 83.2% (p=0.256), 100% versus 100% (p=0.999), 100% versus 100% (p=0.999), and 16.7% versus 16.1% (p=0.953). A bloody background was significantly more frequent in CS (CS, 85.2%; SP, 1.8%; p<0.001), while the nuclear features were similar for both groups.
Conclusions The diagnostic utility of SP was comparable to that of CS. The cytomorphologic features did not significantly differ between the two methods, and the reduced bloody backgrounds allowed better visibility in SP method.
Keywords Endoscopic ultrasound-guided fine needle aspiration; Pancreatic neoplasms; Cytodiagnosis

Topic Forum (Pancreatorbiliary 2) **TF-PB2-02**

Direct Peroral Cholangioscopy Using a New Multibending Ultra-Slim Endoscope without Device or Scope Assistance: A Large Single Center Experience

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Background/Aims Direct peroral cholangioscopy (DPOC) using a conventional ultra-slim endoscope has been limited because of its low and inconsistent success rate in spite of several advantages such as high-quality endoscopic imaging with image-enhanced technology, and the relatively larger working channel. To overcome the technical difficulties of DPOC, a prototype multibending (MB) ultra-slim endoscope has been developed as a dedicated cholangioscope. In this study, we evaluated the clinical usefulness of the DPOC using a MB ultra-slim endoscope with a free-hand insertion of an endoscope into the bile duct.
Methods A total of 145 patients with biliary diseases requiring diagnostic and/or therapeutic DPOC were enrolled prospectively. Initially, DPOC using a MB ultra-slim endoscope was tried without device assistance ("free-hand") in all patients up to 15 minutes. The primary outcome was the technical success of free-hand insertion of the MB endoscope during DPOC.
Results Free-hand biliary insertion of the MB endoscope for DPOC was technically successful in 133 of 145 patients (91.7%). The procedure time (mean$\pm$standard deviation) of DPOC using a free-hand biliary insertion was 2.7$\pm$1.6 minutes. DPOC-guided target biopsy was performed in 38 patients (28.6%) and showed technical success in 36 patients (94.7%). Among 110 patients who had no stricture and/or suspicious malignant biliary lesions on previous radiological images, malignant lesion was diagnosed incidentally by DPOC-guided target biopsy in two patients (1.8 %). During the DPOC, total 69 therapeutic interventions were performed and technically successful in 65 patients (94.2%). Adverse events was observed in six patients (4.1%) and treated conservatively in all patients.
Conclusions Free-hand biliary insertion of the MB ultra-slim endoscope showed a high technical success rate without severe adverse events. Therefore, the MB endoscope is considered to facilitate broadening the indications for DPOC in various biliary diseases.

Topic Forum (Pancreatorbiliary 2) **TF-PB2-03**

Efficacy of Endobiliary Radiofrequency Ablation Plus Stenting versus Stenting Alone in Patients with Inoperable Hilar Cholangiocarcinoma

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Background/Aims In a recent, the endobiliary radiofrequency ablation (RFA) has been showed clinical efficacies in a palliative management of extrahepatic distal malignant biliary stricture. In this study, we evaluated the efficacy and safety of endoscopic stenting after the endobiliary RFA compared with stenting alone in a patients with inoperable hilar cholangiocarcinoma.
Methods Total 42 patients diagnosed with inoperable hilar cholangiocarcinoma were enrolled prospectively. Twenty-one patients underwent endobiliary RFA using an automatically temperature controlled RFA catheter (ELRA, STARmed) before endobiliary stenting with plastic or metallic stents (RFA group). The primary outcome was stent patency duration.
Results The clinical success rates were not statistically significantly different between the RFA and non-RFA groups (95.2% vs 90.5%, p=1.000). After 3 months, stent patency rates was significantly higher in RFA group than that of non-RFA group (95.2% vs 71.4%, p=0.047). The reintervention due to recurrent biliary obstruction in RFA and non-RFA groups was performed in 12 patients (57.1%) and 18 patients (85.7%), respectively (p=0.043). The median cumulative stent patency duration in RFA group was 8.0 months which was significantly longer than 4.0 months of non-RFA group (log-rank test, p=0.01). In a multivariate analysis, RFA was a favorable independent factor (adjusted hazard ratio, 0.416; 95% confidence interval, 0.198 to 0.876; p=0.021) for stent patency. Survival probability and adverse events were not different between the two groups.
Conclusions The endobiliary RFA before endoscopic stenting is considered to be effective for improvement of stent patency in patients with inoperable hilar cholangiocarcinoma. Further randomized controlled trials using a large numbers of subjects are required to confirm the benefit and safety of the endobiliary RFA.

Topic Forum (Pancreatorbiliary 2) TF-PB2-04

Innovation of Endoscopic Ultrasonography-Guided Transmural Gallbladder Drainage Using a Novel Self-Expending Metal Stent

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Background/Aims Endoscopic ultrasonography (EUS)-guided transmural drainage has been accepted as a modality of choice in peripancreatic fluid collection and acute cholecystitis. Each type of stent, including double-pigtail plastic stents, tubular self-expandable metal stents (SEMS), and lumen-apposing metal stents, for these procedure has its own advantages and disadvantages. To overcome their disadvantages, this animal study evaluated the feasibility of a newly designed twisted fully covered SEMS with spiral coiled ends.

Methods We performed the EUS-guided cholecystogastrostomy with a newly developed metal stent in eight mini pigs with surgically induced gallbladder distension. This novel stent is a twisted fully covered SEMS with spiral coiled ends, a diameter of 8 mm, and a length of 6 cm. The stent has been maintained for 4 to 7 weeks after EUS-guided cholecystogastrostomy. The primary outcome was the technical success rate, and the secondary outcomes were adverse events, stent dysfunction, stent removability, and fistula formation.

Results The stent was placed successfully between the gallbladder and the stomach in all cases without any adverse event. We observed neither stent migration nor dysfunction during the study period, and all the stents were removed easily as scheduled. We confirmed successful cholecystogastric fistula formation at endoscopic and histologic level in all cases.

Conclusions EUS-guided transmural drainage and fistula formation using a new twisted fully covered metal stent with spiral coiled ends was technically feasible without any adverse event in this animal study. Further clinical studies are needed to evaluate its efficacy and safety in real practice.

Fig. 1. Tornado stent.

Topic Forum (Pancreatorbiliary 2) TF-PB2-05

Endoscopic Ultrasound-Guided Antegrade Metal Stent Deployment for Benign Hepaticojejunostomy Anastomosis Stricture

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Background/Aims Approach technique for Hepaticojejunostomy anastomosis stricture (HJAS) is attempted under enteroscopy. However, long time procedure may be required for this approach, and adverse events including perforation and relatively low technical success rate may be disadvantages. Recently, endoscopic ultrasound-guided biliary drainage (EUS-BD) has been emerged. Although various adverse events including stent migration has been reported, technical success rate may be high according to previous report. EUS-BD for HJAS has not been enough reported. In this study, we evaluated clinical impact of EUS-BD for HJAS, and also of antegrade stent deployment for HJAS site through EUS-BD route.

Methods Between September 2016 and October 2017, patients who were complicated with HJAS were enrolled. In this study, EUS-BD was firstly performed. And after 1 week, antegrade stent deployment for HJAS site was performed through EUS-BD route. As antegrade stent, fully covered metal stent (8 mm×3 cm, M-Intraductal) was used. After 1 month, this stent was removed through EUS-BD route.

Results A total of 21 patients were retrospectively enrolled. Among them, the intrahepatic bile duct puncture was failed in two patients due to bile duct dilatation was not seen. Among 19 patients, EUS-BD could be successfully performed (technical success, 90.4%). Antegrade stent deployment was successfully performed in all cases. And stent removal through EUS-BD route was also successfully performed in all cases. During clinical follow-up (median, 280 days), recurrence of HJAS was not seen in any patients.

Conclusions Although long-term outcome should be evaluated, antegrade stent deployment for HJAS through EUS-BD route may be one of option as the treatment for HJAS.

Keywords Endoscopic ultrasound-guided biliary drainage; Antegrade; Hepaticojejunostomy; Stricture

Topic Forum (Pancreatorbiliary 2) **TF-PB2-06**

Pure Natural Orifice Transluminal Endoscopic Surgery Retrograde Cholecystectomy Using a Single Channel Flexible Endoscope: A Pilot Experiment in a Porcine Model

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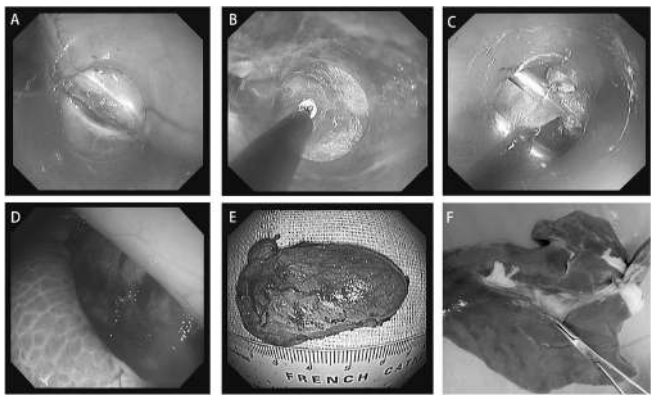
Background/Aims Natural orifice transluminal endoscopic surgery (NOTES) represents an emerging technology, and recently NOTES cholecystectomy has become the hottest area of research. Initial enthusiasm for NOTES cholecystectomy has been partly tempered by the reality that in some instances laparoscopic assistance required. The aim of this study was to evaluate the feasibility and safety of a newly proposed operative method- retrograde cholecystectomy using pure NOTES.

Methods An incision was created on the vagina wall, and an endoscope with transparent cap and snare attached on the tip was introduced into the pelvic cavity proceeding upward into peritoneal cavity. After locating the liver and gallbladder (Fig. A), the fundus wall of gallbladder was grasped by forceps and a snare was then released to ligate the funds. The gallbladder was dissected carefully from intrahepatic fossa along the slit to the neck using hook/IT knives (Fig. B). The cystic duct and cystic artery were identified and clipped twice (Fig. C). The cystic duct and artery was then cut off using hook knife (Fig. D). The gallbladder was dragged with snare into vagina, and removed without suturing vaginal crevasse (Fig. E).

Results The procedure was successfully performed in all eight porcine models. Average procedure time was 53 minutes (range, 40 to 60 minutes). No severe bleeding or any other complication observed either during or after the procedure in all the animals. Normal diet was given to the animal on the same day after the procedure. All the animal recovered completely without any incident.

Conclusions We successfully performed pure NOTES retrograde cholecystectomy. In our experience, pure NOTES retrograde cholecystectomy performed with single channel flexible endoscope is safe and feasible. In addition, this procedure has advantages including no visible scar, and quicker recovery. The translation of this technique to human subjects seems straight forward and provide a new fitting path to pure NOTES.

Keywords Natural orifice transluminal endoscopic surgery; Retrograde cholecystectomy; Flexible endoscope; Trans-vaginal



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Free Paper

Liver 1-2

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Lower GI 1-2

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Free Paper (Liver 1) FP-LV1-01

Increased Annual Incidence of Pyogenic Liver Abscess and Its Risk Factors: An Analysis from Health Insurance Review and Assessment Service-National Patient Samples of South Korea, 2012–2016

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Background/Aims The epidemiology of pyogenic liver abscess (PLA) continues to change but few population-based studies have been conducted in Korea. This study investigated the epidemiology and clinical outcomes of PLA patients in current 5 years.
Methods We used the Health Insurance Review and Assessment Service-National Patient Samples (HIRA-NPS) between 2012 and 2016. The HIRA-NPS, including approximately 1.4 million individuals, is a stratified random sample of 3% of the entire Korean population. The annual incidence rates, demographic data, underlying diseases, complications, and mortality rates were analyzed using the data.
Results The annual incidence of PLA for all age groups increased gradually in Korea from 0.0273% (388 cases) in 2000 to 0.0298% (438 cases) in 2016. It occurred more commonly in male sex, and older age (>65 years). Among the 2,042 adult patients with PLA, 998 patients (48.9%) had diabetes mellitus, 108 patients (8%) colon cancer, and 346 patients (16.9%) biliary disease. Surgery due to PLA was in 44 patients (2.2%), and one patient (0.05%) received enucleation due to endogenous endophthalmitis. The mortality rate was 8.2%. In particular, the mortality rate was 13.4% in patients aged over 65 years and 19.3% over 85 years.
Conclusions The incidence of PLA is increasing and the number of patients with comorbidity is also increasing. Especially, the mortality of PLA tend to increase in the old age. Further surveillance of epidemiology using National Health Insurance data is needed.
Keywords Liver abscess; Epidemiology; Incidence; Mortality

Table 1. The Mean Numbers of Metabolic Complications in Each Obesity Group, 2011–2018

Obesity group	The number of metabolic complications (%, 95% CI)						mean (95% CI)	mean difference[1] (95% CI)	p-value
	n	0	1	2	3	4			
Non-obese	654166	75.7	20.3	3.7	0.3	0.1	0.29		
Class I Obesity	106616	60.1	30.8	8	1	0.02	0.5	0.21 (0.19, 0.24)	<.0001
Class II Obesity	25266	43.7	39.5	14.3	2.3	0.16	0.76	0.47 (0.44, 0.5)	<.0001
Class III Obesity	4605	22.8	47.9	22.8	5.6	0.9	1.14	0.85 (0.79, 0.92)	<.0001

[1]: the mean difference for the number of metabolic complication compared with non-obesity group
CI, confidence interval.

Free Paper (Liver 1) FP-LV1-02

Prevalence of Metabolic Complications Associated with Severe Obesity among Korean Children and Adolescents: A Nationwide Study (2011–2018)

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Background/Aims The prevalence of severe obesity is increasing worldwide among children and adolescents. Although obesity in children has a relatively low risk of metabolic complications, those with more severe types of obesity may be at higher risk in adults. In many countries with moderate increase of the obesity epidemic, the association between metabolic complications and extremely severe obesity has been rarely reported in pediatric populations. This study aims to assess the prevalence of each metabolic complication related with extremely severe obesity using a nationally representative data in Korea.
Methods A total of 790,653 students (380,580 females) aged 5 to 19 years were recruited from the Korean student health examination. Body mass index (BMI) reference was defined according to the World Health Organization Growth reference data. Obesity was defined as obesity (BMI ≥100% of 95th percentile), severe obesity (BMI ≥120%), and extremely severe obesity (BMI ≥140%).
Results Comparing 2011 and 2018, the prevalence of severe obesity have increased by 63% and extremely severe obesity increased by 100%, whereas obesity increased by 28.7%. The adjusted odds ratios for extremely severe obesity were calculated according to each metabolic complication; hypertension was 12 times higher than non-obese, hyperglycemia was 2.6, hypercholesterolemia was 2.1, and elevated aminotransferase was 15.2. The mean numbers of metabolic complications in each obesity group was 1.14 in extremely severe obesity, and 0.29 in non-obese group.
Conclusions We found that the prevalence of metabolic complications was dramatically increased with the severity of childhood obesity. Close monitoring of metabolic complications is important to track severe obesity. Further longitudinal studies are needed to verify extremely severe obesity in childhood at the highest metabolic risk.
Keywords Severe obesity; Korea; Children

Free Paper (Liver 1) FP-LV1-03

Outcomes after Nonhepatic Surgeries in Patients with Alcoholic Liver Diseases: A Nationwide Study

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Background/Aims Limited information was available on the outcomes after surgery for patients with alcoholic liver diseases (ALDs). The aim of this study was to estimate the risk of adverse outcomes after nonhepatic surgeries in patients with ALD.
Methods We conducted a retrospective cohort study of 32,548 adults aged 20 years and older who underwent nonhepatic surgical procedures using Taiwan's National Health Insurance Research Database 2008–2013 claims data. Using a propensity score matching procedure, 32,548 non-ALD adults were selected for comparison. Logistic regression was used to calculate the odds ratios (ORs) and 95% confidence intervals (CIs) of postoperative complications and in-hospital mortality associated with ALD.
Results Patients with ALD had higher risks of postoperative acute renal failure (OR, 2.75; 95% CI, 2.37 to 3.19), septicemia (OR, 1.88; 95% CI, 1.75 to 2.00), pneumonia (OR, 1.63; 95% CI, 1.49 to 1.77), and in-hospital mortality (OR, 3.28; 95% CI, 2.81 to 3.83) compared with non-ALD people. Patients with ALD also had longer hospital stays (mean±standard deviation, 10.2±14.1 vs 8.5±13.6 days, p<0.0001) and higher medical expenditures after non-hepatic surgical procedures than controls. Jaundice (OR, 5.80; 95% CI, 4.58 to 7.33), ascites (OR, 5.72; 95% CI, 4.71 to 6.96), gastrointestinal hemorrhage (OR, 5.39; 95% CI, 4.49 to 6.46), and hepatic coma (OR, 6.54; 95% CI, 5.36 to 7.97) were significant determinants for postoperative mortality in patients with ALD compared with those without ALD.
Conclusions Surgical patients with ALD showed more adverse events, with a risk of in-hospital mortality approximately 3-fold higher after non-hepatic surgeries compared with non-ALD people. These findings suggest the urgent need to revise the protocols for postoperative care for this population.
Keywords Alcoholic liver diseases; Nonhepatic surgeries; Postoperative outcomes

Free Paper (Liver 1) FP-LV1-04

Correlation of Infiltration by T Cells and Macrophages with the Severity of Liver Damage in Drug-Induced Liver Injury: Implications in Responsiveness to Steroid Therapy

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Background/Aims Drug-induced liver injury (DILI) is liver injury caused by the interplay between drugs, their metabolites and host immune response. The aim of this study is to characterize liver infiltrating immune cells in DILI and to evaluate the correlation between infiltrating immune cells and clinical outcome.
Methods From January 2017 to February 2019, 23 patients with DILI were prospectively enrolled in this study. Diagnosis of DILI was based on patient medication history after exclusion of other etiology (virus, alcohol, autoimmune, ischemic hepatitis or extrahepatic obstruction of the bile duct). Liver biopsy was performed, and immunohistochemical stain for CD3, CD68, CD20, and CD38 was done. Experienced pathologist confirmed the pathologic and immunohistochemical findings.
Results The causes included health foods or dietary supplements (n=8, 34.8%), folk remedies (n=6, 26.1%), medications (n=4, 17.4%), herb (n=3, 13.0%). Eighteen patients (78.3%) treated with steroid. Two patients progressed to hepatic failure and recovered after steroid treatment. All patients were completely recovered from DILI at 1 month after diagnosis, whether they were treated with steroid or not. The frequency of infiltrated T cells, macrophages, and B cells was quantified by immunohistochemistry. The amounts of T cells, showed linearly ascending correlation with total bilirubin (r=0.370, p=0.030) and Model for End-Stage Liver Disease (MELD) score (r=0.340, p=0.047). The amounts of macrophages showed linearly ascending correlation with total bilirubin (r=0.401, p=0.020), aspartate aminotransferase (r=0.445, p=0.010), and MELD score (r=0.402, p=0.020).
Conclusions In this study, we found the positive correlation between the amounts of T cells and macrophages infiltrations and deterioration of liver function in DILI. Favorable responses to steroid therapy suggest that vigorous innate and adaptive immune responses play critical roles in DILI.
Keywords Drug-induced liver injury; T cell; Steroid

Free Paper (Liver 1) FP-LV1-05

Cardiopulmonary and Neurologic Safety in Patients with Liver Cirrhosis of Etomidate-Based Sedation Compared with Propofol During Upper Endoscopy: A Double-Blind, Randomized Controlled Trial

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Background/Aims Etomidate-based sedation during endoscopy was superior to propofol in terms of the overall hemodynamic and respiratory events in previous reported trials. However, there is a lack of evidence on the safety of etomidate in patients with liver cirrhosis (LC). The aim of this study was to compare efficacy and safety profiles including hepatic encephalopathy of etomidate and propofol for endoscopic sedation in patients with LC.
Methods This single-center, randomized, double-blind trial included patients with chronic liver disease who had evidence of LC who were undergoing diagnostic or therapeutic endoscopy. Either etomidate or propofol was administered according to group allocation. The primary endpoint was the proportion of patients with any cardiopulmonary adverse events. Also, the trail making test (TMT) A consists of documenting the time required to sequentially connect randomly placed circles which are labeled from 1 to 25 was also assessed.
Results Fifty-three and 56 patients were enrolled in the etomidate and propofol groups, respectively. There were no significant differences between the groups regarding the total procedure time, induction time, awake time, and recovery time. The overall incidence of respiratory and cardiovascular events was not different between the groups. The time for TMT tended to be higher in the propofol group than etomidate group without significant difference (mean±standard deviation, 92.4±116.8 vs 67.1±56.6 seconds; p=0.151). Also, the proportion of patients without any cognitive dysfunction was not different between the groups (etomidate vs propofol, 12 [22.6%] vs 11 [19.6%]; p=0.570).
Conclusions Etomidate-based sedation in patients with LC was noninferior to propofol-based sedation in terms of the overall incidence of respiratory, cardiovascular and neurologic adverse events.
Keywords Safety; Etomidate; Propofol, Liver cirrhosis; Encephalopathy

Free Paper (Liver 1) FP-LV1-06

Three-Year Efficacy and Safety of Tenofovir Alafenamide Compared to Tenofovir Disoproxil Fumarate in Chronic Hepatitis B Patients

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Background/Aims In two identically-designed double-blind, randomized (2:1), phase 3 studies, the safety and efficacy of tenofovir alafenamide (TAF) vs tenofovir disoproxil fumarate (TDF) was evaluated in subjects treated for 3 years.
Methods One thousand two hundred ninety-eight HBeAg(–) and HBeAg(+) chronic hepatitis B patients were randomized and treated with TAF25 mg or TDF300 mg QD. Included in this analysis, were 1,118 patients (759 HBeAg(+)and 359 HBeAg(–)); 866 of whom received TAF and 252 who received TDF for 3 years. Efficacy analyses included virologic, biochemical, and serologic responses, and pooled safety assessments included changes in bone mineral density (BMD), serum creatinine, and estimated glomerular filtration rate (eGFR) by Cockcroft-Gault method.
Results Baseline characteristics were similar between two groups: mean age, 39 years; 63% males; 78% Asian mostly genotypes C (48%) and D (26%); mean hepatitis B virus DNA was 7 log IU/mL and 25% previously treated with nucleos(t)ides. At week 144, high rate of virologic control were maintained in TAF versus TDF subjects; a greater proportion of TAF versus TDF patients achieved alanine aminotransferase normalization (Table 1). Overall, adverse events (AEs) and serious AEs were similar between groups. At week 144, greater median declines in eGFR were observed with TDF treatment; similarly, hip and spine BMD declines in the TDF group were larger than in TAF group (Table 1).
Conclusions After 3 years of treatment, high and similar rate of virologic suppression were achieved and maintained and continued improvements in renal and bone safety were observed in patients receiving TAF compared to TDF.
Keywords Hepatitis B virus; Tenofovir alafenamide; Year 3; 144 Week; 108/110

Table 1. Efficacy and Safety at Year 3

Table: Efficacy and Safety (Renal and Bone) Results at Year 3

	HBeAg Negative (Study 108)		HBeAg Positive (Study 110)	
Efficacy Parameters*	**TAF (N=285)**	**TDF (N=74)**	**TAF (N=581)**	**TDF (N=178)**
HBV DNA <29 IU/mL, n/N (%)	247 (87)	62 (84)	423 (80)	123 (82)
P value	0.58		0.48	
HBV DNA, mean (SD) change (log_{10} IU/mL)	-4.27 (1.41)	-4.27 (1.28)	-5.94 (1.44)	-6.07 (1.39)
ALT normalization (AASLD 2018 criteria), n/N (%)†	188/264 (71)	43/73 (59)	359/517 (69)	86/144 (61)
P Value	0.05		0.06	
HBeAg loss n/N (%)	N/A	N/A	133/565 (24)	36/175 (25)
HBsAg loss n/N (%)	1/281 (0.4)	0/74	8/576 (1.6)	3/177 (2)
Pooled Renal and Bone Parameters‡	**TAF**		**TDF**	
$eGFR_{CG}$, median (Q1, Q3) change (mL/min)	n= 748 -1.2 (-9.6, +7.2)		n= 198 -6.0 (-15, +2.4)	
P value	<0.001			
Hip BMD, mean (SD) % change	n=713 -0.40 (2.97)		n=187 -2.505 (3.66)	
P value	<0.001			
Spine BMD, mean (SD) % change	n=720 -0.498 (3.83)		n=191 -2.09 (4.46)	
P value	<0.001			

*Efficacy results are missing = failure unless otherwise specified; †ULN ≤35 U/L (males), ≤25 U/L (females); ‡Safety results are missing=excluded
$eGFR_{CG}$ is creatinine clearance by Cockcroft-Gault method, BMD is bone mineral density by dual energy x-ray absorptiometry (DXA), Q is quartile

HBeAg, hepatitis B e antigen; TAF, tenofovir alafenamide; TDF, tenofovir disoproxil fumarate; HBV, hepatitis B virus; SD, standard deviation; ALT, alanine aminotransferase; N/A, not available; eGFR, estimated glomerular filtration rate; BMD, bone mineral density.

Free Paper (Liver 1) FP-LV1-07

Continuing Besifovir Dipivoxil Maleate versus Switching from Tenofovir Disoproxil Fumarate for Treatment of Chronic Hepatitis B: 192 Weeks Results of Phase 3 Trial

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Background/Aims Besifovir dipivoxil maleate (BSV) is an acyclic nucleotide phosphonate with a potent antiviral activity against hepatitis B virus (HBV). An antiviral efficacy of BSV for 48 weeks was shown to be comparable to tenofovir disoproxil fumarate (TDF) with improved renal and bone safety. We evaluated the efficacy and safety of BSV in treatment-naïve chronic hepatitis B patients in 192 weeks follow-up study.
Methods After 48 weeks of double-blind comparison of BSV to TDF, patients continued to participate in the open-label BSV study. We evaluated antiviral efficacy and drug safety up to 192 weeks for both BSV continuing group (BSV-BSV) and the group switched from TDF to BSV after 48 weeks (TDF-BSV). The primary endpoint was virological response (HBV DNA <69 IU/mL).
Results Among 197 patients who received randomized treatments, 170 for 2nd year, 157 for 3rd year and 152 for 4th entered the open-label phase extensional study. Finally, 150 patients completed 192 weeks of follow-up. The virological response rate over 192 weeks was 92.5% in BSV-BSV while 93.1% in TDF-BSV patients (p=0.90). HBeAg seroconversion and alanine aminotransferase normalization rates were similar between the groups. There were no drug resistant mutations to BSV. Bone mineral density and renal function were well preserved in BSV-BSV while those were once worsened and then recovered after switching therapy in TDF-BSV patients.
Conclusions BSV maintained antiviral efficacy over 192 weeks without any resistance. BSV was also effective for those who have switched from TDF to BSV. BSV was safe and well tolerated.
Keywords Antiviral therapy; Hepatitis B; Drug resistance; Bone mineral density; Nephrotoxicity

Free Paper (Liver 1) FP-LV1-08

Detection of Hepatitis B Virus (HBV) Integration in the Human Genome Using High-Throughput Targeted Sequencing: Oncogenic Role of HBV Integration

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Background/Aims While it has long been known that hepatitis B virus (HBV) integrates into the host genome, the biological role of HBV integration in hepatocarcinogenesis still remains uncertain. The study aimed to localize HBV integrants throughout the host genome by high-throughput sequencing method.
Methods Next-generation sequencing (NGS)-based target enrichment sequencing was performed to detect HBV integration in paired tumor/non-tumor tissues from 33 hepatocellular carcinoma (HCC) patients. The Illumina NGS workflow was conducted in the following steps: gDNA sonication to generate DNA libraries, HBV sequence capture using HBV probes, followed by high-throughput sequencing. Chimeric count >10 and AVG_MQ >20 was regarded as true signal.
Results HBV integration was identified in all (25/25, 100%) HBsAg-positive and two (2/8, 25%) HBsAg-negative patients with HCC. Two patients who lost HBsAg before HCC development also harbored HBV integration. The average number of integration sites in HBV-related HCC and adjacent non-tumor tissues was 12.45 and 24.04 per sample, respectively. HBV integration most frequently occurred in chromosomes 5 and 10. Recurrent target genes for HBV integration included TERT, MLL4, and PREX2 for tumor and FN1 for non-tumor. The major hotspot breakpoints of host and HBV genomes were located at upstream of *hTERT* gene and nt 1,600–1,800 of HBV genome, respectively. Integrations in tumor were over-presented in promoter or exon and less presented in intergenic region. Gene-annotation analysis indicated that the recurrent HBV integrations are enriched in cancer-associated genes. HBV integration breakpoints were validated by Sanger sequencing in twelve randomly selected tumor tissues.
Conclusions Our study reports a new NGS-based high-throughput targeted sequencing with high detection ability to identify HBV integration in the human genome. This cost-effective method facilitates a survey of HBV integration in a large number of samples in an unbiased way and helps in investigating the oncogenic role of HBV integration in HCC.
Keywords Hepatitis B virus; Genome integration; Carcinogenesis; Liver cancer

Free Paper (Liver 1) FP-LV1-09

A Survey on Knowledge and Testing Rate of Hepatitis C in the General Population of South Korea

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Background/Aims To eliminate hepatitis C virus (HCV) infection by 2030, improving the public knowledge of and accessibility to HCV screening and treatment is essential. The aim of this study was to evaluate the knowledge and testing rate of HCV and the opinions about the inclusion of the HCV test in the Nation Health Examination among the general population of South Korea.
Methods A telephone interview survey was conducted by an independent research company using a 16 item-questionnaire (demographic, knowledge on HCV, testing rate and its result, necessity of screening) during May 2019. The sample population consisted of 1,003 Korean adult residents adjusted by age, gender and area according to the standard Korean population in 2019.
Results Among the 1,003 participants (498 men and 505 women, mean age of 47.9 years), 56.4% recognized HCV; 44.4% understood HCV is transmittable; and 56.4% thought HCV is curable by medication. Testing for anti-HCV was reported by 91 people (9.1%); among them, 10 people (11.0%) reported a positive result, and eight people were treated. The common reasons for HCV testing were a health check-up (58.5%), a physician's recommendation (11.0%) and elevated liver enzymes (10.7%). The HCV testing rate was significantly low in the young age group with those in their 20s (2.3%), but the people in their 30s and above had a similar testing rate from 9% to 12.9% according to increasing age. The majority (75.1%) agreed to HCV screening by integration into the National Health Examination System.
Conclusions The level of knowledge on HCV is suboptimal, and the self-reported testing rate of HCV is less than 10%, but once diagnosed, the treatment rate seems to be high in South Korea. More active campaigns and effective screening are urgently needed.
Keywords Hepatitis C; Chronic; Awareness; Knowledge; Transmission; Mass screening

Free Paper (Liver 2) FP-LV2-01

MicroRNA99a Restricts Hepatitis C Virus Replication by Blocking mTORC1-Mediated De Novo Lipogenesis

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Background/Aims In this study, we have demonstrated that microRNA99a (miR-99a), a microRNAs (miRNA) that has been reported to regulate mammalian target of rapamycin (mTOR) pathway and cell survival, restricts hepatitis C virus replication by blocking mTORC1-mediated *de novo* lipogenesis.

Methods Huh-7 cells were infected by cell culture-produced hepatitis C virus (HCV; JFH-1; genotype 2a). HCVcc infected cells and full-genomic HCV replicon (FGR) cells were used for miRNA experiments. Serum samples of HCV-infected patients and those of age-matched healthy controls were collected and miR99a level was quantified by real-time qPCR.

Results The relative expression of miR-99a was significantly lower in the sera of the patients with chronic HCV infection compared to the sera of those without viral hepatitis. HCVcc infection caused downregulation of miR-99a expression in Huh-7 cells, and FGR cells showed lower expression of miR-99a than wild-type Huh-7 cells. Forced expression of miR-99a-5p resulted in dramatic decrease in intracellular and secreted HCV RNA levels in HCVcc-infected cells. Using in silico analysis tools, mTOR was identified as a potential target of miR99a with a high binding score. Transfection of miR-99a-5p mimics resulted in the decreased level of mTOR protein and decreased phosphorylation of 4E-BP and S6K in FGR cells. The mRNA and protein level of sterol regulatory element binding protein-1c (SREBP-1c), the master transcriptional regulator of fatty acid and triglyceride synthesis, was decreased when either miR99a mimics or si-mTOR was transfected. In cells transfected with miR-99a-5p mimics, oleic acid-induced intracellular lipid accumulation were significantly decreased compared to cells treated with scrambled miRNAs. Forced expression of mTOR rescued the replication of HCV RNA and lipid droplet accumulation in miR99a mimics-transfected FGR cells, suggesting that mTOR is responsible for the anti-lipogenic activity of miR-99a.

Conclusions Our data clearly demonstrate that miR-99a ameliorate intracellular lipid accumulation by regulating the expression of SREBP-1c and its target genes, and cause inefficient replication and packaging of intracellular HCV.

Keywords Hepatitis C virus; Lipid; Replication; MicroRNA

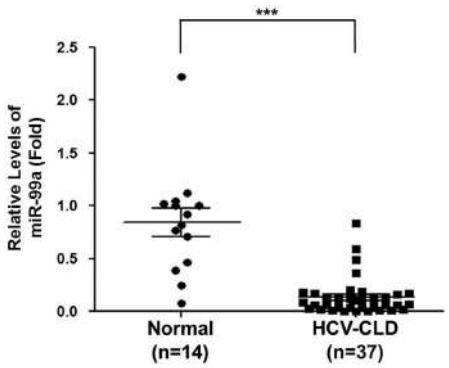

Fig. 1. miR-99a, microRNA99a; HCV, hepatitis C virus.

Free Paper (Liver 2) FP-LV2-02

Integrated Omics Analysis Identifies Novel Targets for Aspirin Mediated Regression of Liver Fibrosis

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Background/Aims Aspirin is known to alleviate the progression of liver fibrosis via its anti-platelet activity. However, study of its antifibrotic effect linked to proteomic and metabolomic alterations in liver could identify novel therapeutic targets.

Methods C57/B6 mice were treated with CCl_4 for 8 weeks followed by aspirin treatment. Integrated proteomic and metabolomics analysis followed by global cross-correlation network analysis predicted regulatory network of aspirin and identified targets which were validated in mice model of liver fibrosis as well as in patients with fibrosis.

Results Biochemical and histopathological changes were higher in the CCl_4-treated group compared to CCl_4-aspirin (CCl_4-ASA) group ($p<0.05$). The proteome (>450 up- and >340 downregulated proteins) and metabolome (>70 up- and >60 downregulated metabolites) of CCl_4-ASA group was markedly different compared to CCl_4, ASA or control group ($p<0.05$). Aspirin treatment significantly induced proteins and metabolites linked to drug and fatty acid metabolism, glutathione metabolism, autophagy, energy metabolism and amino acid metabolism ($p<0.05$). Inflammatory pathways: tumor necrosis factor α, NF-κB signaling, arachidonic acid metabolism, cholesterol metabolism, synthesis of ketone bodies, butanoate metabolism and others were significantly reduced in liver fibrosis model with aspirin ($p<0.05$). Global cross-correlation and clustering analysis showed significant association of differentially regulated pathways with biochemical parameters and markers of fibrosis (sirius red, transforming growth factor-β; $r^2>0.5$, $p<0.05$). Similarly, protein-metabolite network analysis identified pathways and targets regulated by aspirin ($p<0.05$). Of them urea cycle (arginase-1), leukotriene metabolism (ALOX5), oxidative-stress (RYR2) and tryptophan metabolism (KMO) showed significant correlation with α-SMA, PDGFR-β and the degree of liver fibrosis ($r^2>0.75$, $p<0.05$).

Conclusions Aspirin reduces liver fibrosis via inhibition of oxidative stress (RYR2), inflammation (ALOX5), urea cycle (ARG1) and tryptophan metabolism (KMO). Modulation of identified molecules may have therapeutic implication.

Keywords Liver fibrosis; Hepatic proteome; Hepatic metabolome; RYR2; Alox-5; ARG-1; KMO

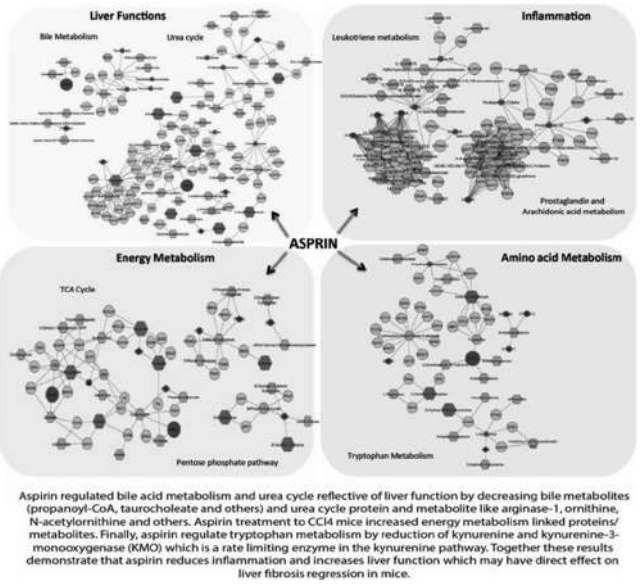

Fig. 1. Aspirin (hepato-protective/antifibrotic).

Free Paper (Liver 2) FP-LV2-03

MicroRNA-101-3p Suppresses Hepatic Stellate Cell Activation and Promotes the Hepatic Differentiation of Human Bone Marrow-Derived Mesenchymal Stem Cells by Targeting EZH2

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Background/Aims Although the therapeutic mechanisms of bone marrow-derived mesenchymal stem cells (BM-MSCs) are still unclear, BM-MSCs play key therapeutic roles in liver fibrosis. Furthermore, microRNAs (miRNAs) are regulators in hepatic differentiation and liver fibrosis. miR-101-3p is upregulated during hepatic trans-differentiation, whereas miR-101-3p is downregulated in a stage of liver fibrosis. The purpose of this study is to investigate miR-101-3p's roles in the hepatic differentiation of human BM-MSC and hepatic stellate cell (HSC) activation.
Methods To detect the miRNAs, the next-generation sequencing (NGS) was performed in hBM-MSCs before and after hepatic differentiation, normal and fibrotic liver tissues. miRTarBase and miRDB were used to predict targets of miR-101-3p. hBM-MSC was treated with mimic, inhibitor, or siRNAduring the hepatic differentiation. hHSC LX2 was treated with transforming growth factor beta 1 (TGF-β1), and with or without miR-101-3p mimics, inhibitors, and EZH2 siRNA. The role of miR-101-3p was identified through the change of liver-specific genes, epithelial-mesenchymal transition markers, and fibrosis genes using the quantitative real-time PCR (qRT-PCR) and western blotting.
Results As a result of NGS analysis, miR-101-3p showed a higher expression level in differentiated hepatocyte-like cells than hBM-MSC but lower expression level in liver fibrosis than the normal liver. miR-101-3p caused the increase in the liver-specific genes in hBM-MSC, while mesenchymal markers, fibrosis markers, and apoptosis inhibitor genes decreased in LX2. At this time, the expression of EZH2 was decreased and the same result as miR-101-3p overexpression was obtained by knockdown of EZH2. As a result, miR-101-3p mimic promoted the hepatic differentiation of hBM-MSC and inhibited the TGF-β1 mediated LX2 activation via regulating EZH2.
Conclusions In this study, we identified miR-101-3p that can regulate the hepatic differentiation of hBM-MSC and the hepatic fibrosis by targeting EZH2. Our results demonstrate that miR-101-3p may be a biomarker, monitoring the response to therapeutic effect by BM-MSC in liver fibrosis.
Keywords Human bone marrow-derived mesenchymal stem cells; Hepatic differentiation; microRNAs; Fibrosis; EZH2

Free Paper (Liver 2) FP-LV2-04

Real World Efficacy of Mac-2 Binding Protein Glycosylation Isomer on Diagnosing Liver Fibrosis in Chronic Hepatitis Patients

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Background/Aims Mac-2 binding protein glycosylation isomer (M2BPGi) is a novel noninvasive marker for liver fibrosis, but still needs more validation. We aimed to compare the diagnostic efficacy of M2BPGi with transient elastography (TE), FIB-4, and APRI.
Methods This retrospective study included chronic hepatitis patients who underwent M2BPGi and TE for evaluation of liver fibrosis.
Results A total of 302 patients were included: non-alcoholic fatty liver disease, 135 (44.7%); fatty liver, 76 (25.2%); alcoholic hepatitis, 61 (20.2%). M2BPGi levels were well correlated with TE levels (r=0.715). Clinically significant liver cirrhosis (LC) was observed in 37 patients (12.3%). Using cutoff 1.0 and 3.0 the area under the receiver operating characteristic curve of M2BPGi for predicting clinical LC was 0.839, which was comparable with TE, FIB-4, and APRI, 0.921, 0.918, and 0.818, respectively. The sensitivity and specificity for predicting clinical LC were 97.3% and 86.8% for TE alone; however, positive predictive value (PPV) was only 50.7%. Adding TE with M2BPGi increased the PPV to 80.8%.
Conclusions A novel fibrosis marker M2BPGi well correlates with TE and other noninvasive markers, and M2BPGi can improve the diagnostic probability of TE.
Keywords Liver fibrosis; Chronic hepatitis; Noninvasive marker

Free Paper (Liver 2) FP-LV2-05

Protein Intake Pattern and Effect of Protein Intake in Patient with Chronic Liver Disease

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Background/Aims In patient with chronic liver disease, protein intake affects mortality as well as complications. Therefore, it is recommended that patients with chronic liver disease consume 1.2–1.5 g/kg or more of protein daily. The purpose of this study was to investigate the pattern of protein intake and the effects of protein intake on chronic liver disease.
Methods A total of 713 patients with chronic liver disease (283 patients with cirrhosis [39.7%] and 430 patients with chronic liver disease [60.3%] participated in the study. The patient's dietary intake was assessed by a food frequency questionnaire by one-on-one interviews with the patient and a trained nutritionist. Nutrients from dietary intake were calculated using CAN-Pro 4.0 from the sixth National Health and Nutrition Examination Survey (2013–2015).
Results The average protein intake per body weight of 713 patients with chronic liver disease was 1.3 g/kg. Total protein intake was significantly lower in patients with cirrhosis (85.85 g vs 94.49, p=0.015), and protein intake per body weight was lower, but there was no statistically significant difference (1.31 g vs 1.34 g, p=0.553). The mean protein intake was significantly lower (84.75 g vs 94.23 g, p=0.008) when compared to patients with viral hepatitis and nonviral patients (alcohol and non-alcohol), but there was no statistically significant difference in protein intake per body (1.30 g vs 1.35 g, p=0.335). Skeletal muscle mass (25.8 kg vs 26.8 kg, p=0.039), skeletal muscle index (7.25 kg vs 7.43 kg, p=0.049), upper arm circumference (31.3 cm vs 32.3 cm, p=0.005), and hand grip force (29.9 kg vs 32.4 kg, p=0.008) were significantly decreased, and the sarcopenia defined as hand grip was increased (14.2% vs 8.1%, p=0.017) in patients with less than 1.2 g/kg/day protein intake.
Conclusions Intake of less than 1.2 g/kg/day protein in patients with chronic liver disease decreases skeletal muscle mass, limb muscle mass, brachial circumference, grip strength, and increases the frequency of sarcopenia.
Keywords Chronic liver disease; Protein; Sarcopenia

Free Paper (Liver 2) FP-LV2-06

miR-148a-5p Attenuates the Expression of CD44 and Suppresses Liver Cancer Progression in Hepatocellular Carcinoma

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Background/Aims Cancer stem cells play a key role in cancer invasion and metastasis. Among CSCs, CD44 has known as important modulators of epithelial-mesenchymal transition (EMT) together with transforming growth factor beta 1. EMT is epithelial cells lose their polarity and acquire mesenchymal cell migratory characteristics. microRNAs (miRNA) could lead to either EMT through the regulation of various transcription factors. This study aimed to investigate the role of miR-148a-5p regulating the EMT as well as CD44 in hepatocellular carcinoma (HCC).
Methods We sorted $CD44^-$ and $CD44^+$ cells by fluorescence-activated cell sorting in transforming growth factor beta 1 (TGF-β1)-positive SNU-368 cells and TGF-β1-negative SNU-354 cells. The miRNAs expression profiles of CD44 sorted cells and TGF-β1–treated cells were analyzed through next-generation sequencing. miR-148a-5p mimic and inhibitor were transfected into HCC cells. The expression of mRNA and protein were detected by quantitative real-time PCR and Western blot.
Results FACS analysis showed high expression of CD44 in two HCC cell lines. SNU-354 $CD44^+$ cells with no TGF-β1 expression only showed increased N-cadherin. However, TGF-β1-stimulated SNU-354 cells and SNU-368 $CD44^+$ cells exhibited lower E-cadherin and higher N-cadherin. We identified different miRNAs between two groups ($CD44^-$ vs $CD44^+$ cells and con vs TGF-β1–treated cells), among which miR-148a-5p was up-regulated in SNU-354 $CD44^+$ cells and was downregulated in SNU-354 TGF-β1–stimulated cells. Similarly, miR-148a-5p expression was also down-regulated in SNU-368 $CD44^+$ cells. The Inhibition of miR-148a-5p in SNU-354 cells induced EMT and cell migration. In contrast, overexpression of miR-148a-5p in SNU-368 cells reduced mesenchymal marker and cell migration as well as down-regulation of CD44. Also, TGF-β1 stimulation after miR-148a-5p overexpression induced neither the mesenchymal phenotype nor cell migration.
Conclusions Overexpression of miR-148a-5p suppressed EMT. The results suggest that miR-148a-5p may serve as specific biomarkers and therapeutic targets for HCC.
Keywords CD44; Transforming growth factor beta 1; Epithelial-mesenchymal transition; Hepatocellular carcinoma; miR-148a-5p

Free Paper (Liver 2) FP-LV2-07

Factors Associated with Rapid Progressive Disease Despite Transarterial Chemoembolization in Intermediate Stage Hepatocellular Carcinoma: Potential Implications for Treatment Selection

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Background/Aims For intermediate stage hepatocellular carcinoma (HCC) patients, TACE is first-line recommended treatment option. However, intermediate stage is comprised of heterogeneous population, and for some cases, TACE might not be a first-line option, in the era of multiple available systemic treatment options. Patients who shows rapid progressive disease (PD) despite TACE might be candidate for early systemic therapy. We analyzed incidence and risk factors for rapid PD in intermediate stage HCC treated with TACE.
Methods A total of 222 patients with intermediate stage HCC who underwent treatment with TACE and showed PD between January 2007 and December 2012 were analyzed. Rapid PD was defined for patients who showed PD, defined by mRECIST criteria, within 90 days after first TACE treatment.
Results Rapid PD was identified in 19.4% of patients (43/179). Progression pattern was significantly different between rapid PD and non-rapid PD group. Proportion of patients with extrahepatic metastasis and/or vascular invasion was 50.2% among rapid PD group, which it was 7.8% among non-rapid PD group. Overall survival was worse in rapid PD group (median, 1.1 vs 3.3 years; p<0.001). Tumor size >10 cm, AFP titer over 1,000 ng/mL, PIVKA-2 levels over 500 mAU/mL were independent factors associated with rapid PD. When stratified by identified three risk factors, proportion of patients with rapid PD were 5.5%, 18.9%, 43.2% and 62.5% for patients with 0, 1, 2 and 3 risk factors, respectively.
Conclusions Among intermediate stage HCC patients, about 20% experienced rapid PD despite TACE. Pattern of PD were vascular invasion or extrahepatic spread in about 50% of rapid PD group. Patients with large tumor, high AFP, and PIVKA-2 levels were at high risk of rapid PD after TACE. For them, first-line systemic treatment might be an option. This warrants further evaluation.

Free Paper (Liver 2) FP-LV2-08

Lymphocyte to Monocyte Ratio Based Nomogram for Predicting Outcomes of Hepatocellular Carcinoma Treated with Sorafenib

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Background/Aims The ability of the pretreatment lymphocyte to monocyte ratio (LMR) to predict outcomes of patients with hepatocellular carcinoma (HCC) receiving sorafenib is not conclusively determined.
Methods We retrospectively studied patients treated with sorafenib for HCC in two tertiary referral centers in South Korea (KOR) and United States (US). Primary endpoints were overall survival (OS) and progression-free survival (PFS). Predictive factors for the primary outcomes were determined by Cox proportional hazards models. A risk-assessment tool was developed.
Results Compared to the US cohort, the KOR cohort was more heavily pretreated (72.1% vs 35.2%, p<0.001), had higher proportion with hepatitis B virus infection (87.6% vs 5.6%, p<0.001), and more distant metastases (83.2% vs 25.4%, p<0.001). Lower monocyte count in the KOR cohort (median, 462.7 vs 600.0/μL; p=0.023) resulted in a higher LMR (median, 2.6 vs 1.8; p<0.001). High LMR was associated with a significantly higher OS (hazard ratio [HR], 0.90; 95% confidence interval [CI], 0.83 to 0.98; p=0.021). This was confirmed in a sensitivity analysis including only Asian patients (HR, 0.90; 95% CI, 0.82 to 0.98; p=0.019). A nomogram for OS was constructed with following variables selected in the multivariate Cox model: LMR, race, previous treatment, $\log_{10}$AFP, lymph node metastasis, and Child-Pugh score. The concordance score was 0.71 (95% CI, 0.67 to 0.75). LMR did not predict PFS.
Conclusions Pretreatment LMR predicts OS in HCC patients treated with sorafenib. Our OS nomogram, incorporating LMR, can be offered to clinicians to improve their ability to assess prognosis, strengthen the prognosis-based decision making, and inform patients in the clinic.

Free Paper (Liver 2) FP-LV2-09

Pure laparoscopic versus Open Right Hepatectomy in Live Liver Donors: A Propensity Score Matched Analysis

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Background/Aims Pure laparoscopic donor right hepatectomy (PLDRH) has been reported as a safe and feasible approach. However, its outcomes have not yet been evaluated in a large comparative study. The aim of this study is to describe our experience with PLDRH and to compare its outcomes with those of open right hepatectomy in live liver donors using propensity score matching.
Methods The medical records of live liver donors between January 2010 and September 2018 at Seoul National University Hospital were retrospectively reviewed. Donors who underwent hepatectomy other than conventional open right hepatectomy or PLDRH were excluded. Propensity score matching study was conducted. Subsequently, 198 donors were included in each group.
Results The total operation time (270.8 vs 289.9, p<0.001), time to remove the liver (166.2 vs 211.4, p<0.001), and warm ischemic time (3.7 vs 12.3, p<0.001) were longer in the PLDRH group. The percentage of getting multiple bile duct openings was higher in the PLDRH group (44.9% vs 56.1%, p=0.027). ΔHemoglobin (Hb)%, calculated as ΔHb%=[(preoperative Hb − postoperative Hb)/preoperative Hb]x100, was lower (21.3% vs 16.6%, p<0.001) and Δaspartate aminotransferase (AST)%, calculated as ΔAST%=[(postoperative AST − preoperative AST)/preoperative AST]x100 (783.8% vs 1,136.9%, p<0.001), and Δalanine aminotransferase (ALT)%, calculated as ΔALT%=[(postoperative ALT − preoperative ALT)/preoperative ALT]x100 (912.7% vs 1,358.1, p<0.001), were higher in the PLDRH group. The length of postoperative hospital stay was significantly shorter in the PLDRH group (8.6 days vs 7.5 days, p<0.001). However, the rate of complications was similar in both groups (10.6% vs 6.1%, p=0.102).
Conclusions PLDRH is safe and feasible when performed at an experienced LDLT center.

Free Paper (Upper GI) FP-UG11-01

Loss of Slc26a9 Results in the Disorder of Gastric Stem Cell Differentiation and Acid/Base Homeostasis, Which Is a Key Event to the Development of Chronic Atrophic Gastritis

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Background/Aims Chronic atrophic gastritis (CAG) is an important precancerous lesion of gastric cancer, but the molecular mechanism remains further study. It is known that loss of parietal cells contributes to a premalignant environment in the gastric mucosa. Slc26a9 is a member of Slc26a family with high expression in the stomach to control parietal cell function and survival. Our previous study showed that loss of Slc26a9 caused the development and progression of gastric cancer. The present study was undertaken to study a potential role of Slc26a9 in the development of CAG.
Methods Histopathological and immunohistochemical (IHC) analysis were performed both in Slc26a9 wild type (WT) and knockout (KO) mice. Gastric pH and gastrin measurement were detected by Ussing chamber, two photon confocal microscopy and radioimmunoassay respectively. Slc26a9 mRNA and protein expression of human tissues were measured by molecular biology experiments.
Results Compared with Slc26a9WT mice, Slc26a9KO mice exhibited severe gastric preneoplastic phenotype including CAG, mucous cell metaplasia including TFF2-expressing (SPEM) and intestinal metaplasia. Accompanying with over proliferation and inhibition of apoptosis of gastric epithelial cells. More importantly, downregulation of gastric stem cell markers Lrig1 and Lgr5, functional analysis showed that deletion of Slc26a9 in mice caused upregulation of interleukin (IL)-17 and IL-1b, as well as hypergastrinemia and increased gastric pH, but strongly reduction of acid secretion both *in vitro* and *in vivo*, suggesting that absence of Slc26a9 led to gastric stem cell and acid/base homeostasis disbalance in the stomach. Consistent with animal experiment, human CAG displayed significantly decreased of Slc26a9mRNA and protein expression when compared with healthy control and independent of *Helicobacter pylori* infection. Furthermore, IHC analysis of human normal gastric epithelial, CAG, and gastric cancer indicated progressive decrease in Slc26a9 expression.
Conclusions Genetic deletion of Slc26a9 resulted in the disorder of gastric stem cell differentiation and acid/base homeostasis, which is a key event to the development of CAG.

Free Paper (Upper GI) FP-UGI1-02

A Novel LincRNA HERES Epigenetically Regulates CACNA2D3 in Esophageal Squamous Cell Carcinoma

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Background/Aims Esophageal squamous cell carcinoma (ESCC) display a very poor clinical outcome in 5-year survival rate. Although long non-coding RNAs (lncRNAs) exert critical roles in cancer development, the promising biomarkers and therapeutic target candidates of ESCC-expressed lncRNAs has not been comprehensively examined.
Methods High-throughput RNA sequencing were performed from paired nontumor and tumor samples of Korean ESCC patients. Highly expressed lncRNA in ESCC (HERES), was experimentally tested with cell proliferation, colony formation, invasion and migration assays following siRNA-treatment against HERES in ESCC cell lines. To identify downstream targets of HERES, the expression and DNA methylation changes of cancer-related genes, NanoString, ChIP-qPCR, MS-PCR, RNA immunoprecipitation assay and RNA fluorescence *in situ* hybridization were used. KYSE-30 cells were injected into nude mice, respectively, and the xenograft tumors were generated to verify the effect of HERES in tumor progression.
Results We identified 113 commonly dysregulated lncRNAs in the Korean, Chinese, and TCGA ESCC cohorts, 20 of which were novel lncRNA genes. Six lncRNAs were significantly associated with the clinical outcomes of ESCC patients: two (RP11-1L12.3 and HERES) showed a positive hazard ratio while others (RP11-114H23.1, RP11-114H23.2, CTD-2319I12.1, and LINC00330) showed a negative hazard ratio. The reduction of HERES, which is most significantly upregulated in ESCC, repressed cell proliferation, migration, invasion and colony formation in ESCC cell lines and tumor growth in xenograft models. HERES appeared to simultaneously regulate CACNA2D3, SFRP2 and CXXC4 to activate Wnt signaling pathways through a chromatin remodeler, EZH2.
Conclusions These results suggest that HERES holds a substantial potential to be developed as not only a biomarker and a therapeutic target to cure ESCC and probably other squamous-type cancers caused by defective Wnt signaling pathway.
Keywords Esophageal squamous cell carcinoma; Long non-coding RNAs; RNA sequencing

Free Paper (Upper GI) FP-UGI1-03

Tumor Suppressor Role of miR-363 in Esophageal Squamous Cell Carcinoma

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Background/Aims Increasing evidences revealed that microRNAs played important function in esophageal squamous cell carcinoma (ESCC) carcinogenesis. In this study, expression, significance, prognosis and underlying mechanism of miR-363 in ESCC was investigated.
Methods We used RT-PCR to quantify the expression of miR-363 in 80 ESCC tissues and analyzed its relationship with clinicopathological factors and survival. Then, the effects of miR-363 on proliferation, apoptosis, and invasion of ESCC cells was detected using MTT, flow cytometric analysis, and transwell invasion assays, respectively. Then, we investigated the posttranscriptional regulation of sperm-associated antigen 5 (SPAG5) expression using Western blot and luciferase reporter assays. Finally, effect of SPAG5 on function of miR-363 was also studied by overexpression of SPAG5.
Results Expression of miR-363 decreased in both ESCC specimens and cell lines, and expression of miR-363 correlated with lymph node metastases and tumor differentiation. Then low miR-363 expression was identified as an independent prognostic factor. Over-expressed of miR-363 in ESCC cells decreased cell proliferation and invasion and increased cell apoptosis, while down-expressed got the opposite results. Moreover, we identified that SPAG5 was the direct target of miR-363, and reintroduction of SPAG5 restored the miR-363-induced effects on the cell events like cell proliferation, apoptosis, and invasion. Last, there is a negative correlation between miR-363 and SPAG5 expression in ESCC tissues.
Conclusions Our results suggested that miR-363 may act as a tumor suppressor by post-transcriptional regulation expression of SPAG5, and miR-363 might be a potential biomarker in the diagnosis and a therapeutic target in treatment for ESCC patients.
Keywords miR-363; Esophageal squamous cell carcinoma; Sperm-associated antigen 5

Free Paper (Upper GI) FP-UGI1-04

LPA1-Mediated Lysophosphatidic Acid Signaling Promotes Esophageal Cancer by Activating PI3K/AKT Signaling Pathway

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Background/Aims Esophageal cancer (EC) is the eighth most common cancer globally. Lysophosphatidic acid (LPA), a bioactive glycerophospholipid, mediates multiple biological process and diseases, including inflammation and cancer. However, the importance of LPA and LPA receptors in the development and progression of EC is unclear. In this study, we sought to determine whether LPA and LPA receptors regulate the progression of EC.
Methods The expression level of autotaxin (ATX), a major LPA-producing enzyme, was analyzed by immunohistochemistry in EC tissue and the expression level of different LPA receptors (LPA_1–LPA_6) was determined by RT-PCR. The effect of LPA on cell proliferation was analyzed by cell counting kit-8 proliferation assay, EdU labeling and colony formation. Wound-healing assay and transwell assay were used to determine the metastasis of EC cell lines. Furthermore, we knockdown LPA_1 and LPA_2 respectively to explore which receptor involved in the effect of LPA.
Results A significant highly expression of ATX was found in EC tissues compared with adjacent normal tissues. The expressions of LPA_1 were higher in KYSE30 and TE-2 compared with HET-1a. Administration of LPA remarkably increased cell proliferation and metastasis in esophageal squamous cell carcinoma (ESCC) cell lines. Furthermore, Knockdown of LPA_1 abolished the effect of LPA on promoting EC. In addition, Western blot showed that LPA activated several signaling pathway including PI3K/AKT, MAPK/ERK and Hippo pathway *in vitro*. However, only PI3K inhibitor LY294002 inhibited LPA-induced migration and proliferation of ESCC cell lines. Subcutaneous xenograft tumor model showed that the weight and volume of tumors in LPA group were higher than that in control group. What's more, the phenomenon could be inhibited by siLPA_1.
Conclusions These results indicated that LPA promoted EC by activating PI3K/AKT signaling pathway via LPA1.
Keywords Esophageal cancer; Lysophosphatidic acid; PI3K/AKT signaling pathway; Lysophosphatidic acid receptor 1

Free Paper (Upper GI) FP-UGI1-05

Vitamin C Solution Spray Can Replace Sodium Thiosulfate Solution Spray to Completely Neutralize Iodine Staining and Substantially Relieve the Mucosal Irritation Caused by Lugol Chromoendoscopy: A Multicenter, Randomized, Double-Blind, Parallel Trial

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Background/Aims Lugol chromoendoscopy facilitates the endoscopic visualization of esophageal dysplasia and carcinoma. Vitamin C solution (VCS) can theoretically neutralize free iodine, which causes mucosal irritation. Aim was to assess the safety and efficacy of VCS for relieving adverse symptoms caused by Lugol's iodine staining.
Methods Two hundred forty eligible subjects were randomized to receive 20 mL of normal saline (NS), 5% sodium thiosulfate solution (STS) or 2% VCS after spraying 10 mL of 2% Lugol's iodine solution on the mid-distal esophagus. The primary endpoints were statistically significant reductions in the acute and late adverse symptom severity scores. The secondary endpoint was the discoloration effect on esophageal brown iodine-stained mucosa.
Results Spraying both VCS and STS similarly decreased the severity scores of the acute [NS vs VCS: 2.58 vs 1.61, p=0.040; VCS vs STS: 1.61 vs 1.89, p>0.999] and late [NS vs VCS: 1.70 vs 0.91, p=0.002; VCS vs STS: 0.91 vs 1.38, p=0.212] adverse symptoms after Lugol chromoendoscopy compared with spraying NS. Compared with STS spray, VCS spray remarkably alleviated acute acid regurgitation or heartburn (33% vs 15%, p=0.017) and late retrosternal discomfort or pain (21% vs 9%, p=0.027). Moreover, compared with spraying NS, spraying VCS quickly discolored the iodine-stained mucosa, with a better decolorization score (2.26 vs 3.56, p=0.000), which was similar to the effects of spraying STS (3.56 vs 3.59, p=0.908).
Conclusions VCS can reduce the mucosal irritation symptoms induced by Lugol chromoendoscopy and can be routinely recommended.
Keywords Lugol's Iodine; Staining; Esophageal dysplasia; Vitamin C; Endoscopic screening

Free Paper (Upper GI) FP-UG11-06

International Agency for Research on Cancer's Gastric Cancer Research Programs

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Background/Aims The International Agency for Research on Cancer (IARC), as the specialized cancer agency of the World Health Organization, recognizes that gastric cancer (GC) is a disease of high global importance and the burden will continue to rise unless effective control measures are implemented. The Working Group convened by IARC recommended that all countries consider including GC in their national cancer control programs.
Methods IARC has launched three major GC research programs for epidemiology, prevention and implementation of preventive strategies, namely ENIGMA, a series of international prevalence surveys to investigate age-specific prevalence of *Helicobacter pylori* in areas of low and high GC risk using standardized methods, HELPER, a unique large randomized controlled clinical trial to investigate the effect of *H. pylori* eradication on GC development in Korea in collaboration with the Korean National Cancer Center, and GISTAR, another large clinical trial to investigate if *H. pylori* screening followed by treatment of participants tested positive and endoscopic follow-up of those with serological evidence of atrophic gastritis can reduce GC mortality in East Europe in collaboration with University of Latvia.
Results The first ENIGMA was completed in Chile (Antofagasta and Valdivia) and is underway in Iran (Shiraz and Ardabil). ENIGMA will start shortly in Uganda and Costa Rica with plans to include more countries. HELPER is set to complete its recruitment target by 2019. The GISTAR Pilot was completed in 2015 involving 3,455 Latvians. Recruitment for GISTAR continues with more than 8,000 participants included so far. The design and progress/preliminary results from each study will be presented.
Conclusions Through international collaborations, IARC puts forward major efforts to understand worldwide epidemiology of *H. pylori* infection and GC and to identify markers for risk stratification and relevant preventive measures for implementation to reduce its global burden which will remain substantial for the next decades.
Keywords International Agency for Research on Cancer/World Health Organization; Gastric cancer; *Helicobacter pylori*; Prevention; Global burden

Free Paper (Upper GI) FP-UG11-07

Development of a Deep Learning Based Endoscopic Image Analyses to Differentiated Malignant Gastric Ulcers from Benign Lesions

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Background/Aims Even though early detection of gastric cancer is imperative for the best prognosis and optimal therapy, it is challenging for physicians to differentiate malignant from benign gastric ulcers on endoscopy constantly. We have developed a deep learning based image analysis algorithm to differentiate malignant gastric ulcers from benign lesions using endoscopic images.
Methods We retrospectively reviewed the upper gastrointestinal endoscopic findings of 3,015 cases (normal range, n=1,076; benign ulcer, n=970; malignant ulcer, n=969) between January 2010 and March 2019 using histologic diagnosis as reference standard. After data augmentation in preprocessing, finally 14,709 images were enrolled (normal range, n=4,515; benign ulcer, n=4,074; malignant ulcer, n=4,073). We then randomly assigned 4300, 3,880 and 3,880 shots of normal, benign gastric ulcer, and malignant ulcer images as training set, and 216, 194 and 193 shots of images as the test set, respectively. Using training and test sets, we developed and validated modified ResNet-50 based convolutional deep learning algorithm highlighting the pathologic lesions with computer aided detection system.
Results The deep learning based algorithm to differentiate malignant gastric ulcer lesions from benign legions achieved averaged area under the receiver operating characteristic curve of 96.65%.
Conclusions The experimental results suggest that deep learning based image analyses algorithm could achieve remarkable discriminative results and hold promise in detection of malignant gastric ulcer lesions.
Keywords Gastrointestinal endoscopy; Deep learning; Malignant gastric ulcer; Benign gastric ulcer

Free Paper (Upper GI) FP-UG11-08

Feasibility of Endoscopic Resection in Gastric Gastrointestinal Stromal Tumor

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Background/Aims Endoscopic resection (ER) can be applied for small gastric SETs. Gastrointestinal stromal tumors (GISTs) can be diagnosed pathologically after resection. Initially we used endoscopic submucosal dissection (ESD). Submucosal tunneling endoscopic resection (STER) was introduced for overcoming limitations of ESD. However, STER was very difficult to apply for gastric lesions. We developed new ER method, clip-assisted surgical endoscopy (CASE, Jung's method). In this study, we evaluate the feasibility of ER for GISTs and compared three ER methods.
Methods Medical records of 53 patients who diagnosed GISTs after ER for SETs from 2005 to 2019 were reviewed retrospectively. Average age was 60.0±10.6 years. ESD, STER and CASE were performed for 23, 5, and 25 patients, respectively. Clinical characteristics, procedure times, and outcomes of each endoscopic technique were analyzed.
Results Average pathological size of GIST was 2.1 cm. The 94.3% proved to be very low risk of malignant potential. Location of SETs were different; ESD applied mainly for body lesions, STER tried for fundus lesions, CASE also mainly for fundus and high body lesions. Overall R0 and R1 resection rate was 62.3%, and 35.8%. There are 34 patients who had complications after the procedure (21 micro-perforation, 12 macro-perforation, one bleeding), but perforation would be a part of ER procedure for SETs. In ESD, some macro-perforations were a reason for surgical conversion. Four patients (two, ESD; one, STER; one, CASE) underwent surgical conversion during ER. STER had the longest procedure time (50.3, 95.2, 40.7 minutes, p=0.018). After development of CASE, we can reduce procedure time and on-site surgical conversion. R0 resection rate was highest in CASE. No R1 resected patients were recurred so far.
Conclusions ER seems to be safe and effective therapeutic options for small gastric GISTs. Using CASE (Jung's method), ER would be more comfortable especially in the fundus lesions.
Keywords Endoscopic resection; Gastrointestinal stromal tumor; Clip-assisted surgical endoscopy; Endoscopic submucosal dissection; Submucosal tunneling resection

Table 1. Characteristics of Patients and Endoscopic Methods

	Standard ESD (n=23)	CASE (n=25)	STER (n=5)	Total (n=53)	P-value[*]
Sex (%)					0.641
Male	9 (39.1%)	12 (48.0%)	3 (60.0%)	24 (45.3%)	
Female	14 (60.9%)	13 (52.0%)	2 (40.0%)	29 (55.3%)	
Age, y,					0.454
Mean±SD	57.8±11.0	51.8±10.3	60.2±10.2	60.0±10.6	
Hospitalization days, d					0.216
Mean±SD	5.3±2.9	4.6±1.7	6.0±1.2	5.0±2.3	
Tumor grade (%)					0.297
Very Low risk	23 (100.0%)	22 (88.0%)	5 (100.0%)	50 (94.3%)	
Low risk	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Intermediate risk	0 (0.0%)	3 (12.0%)	0 (0.0%)	3 (5.7%)	
High risk	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Symptom (%)					0.465
Asymptomatic	17 (73.9%)	20 (80.0%)	5 (100.0%)	42 (79.2%)	
Epigastric discomfort	6 (26.1%)	3 (12.0%)	0 (0.0%)	9 (17.0%)	
Bleeding	0 (0.0%)	1 (4.0%)	0 (0.0%)	1 (1.9%)	
etc.	0 (0.0%)	1 (4.0%)	0 (0.0%)	1 (1.9%)	
Location1 (%)					0.051
Fundus	7 (30.5%)	15 (60.0%)	1 (20.0%)	23 (43.4%)	
Cardia	0 (0.0%)	1 (4.0%)	0 (0.0%)	1 (1.9%)	
Body	13 (56.5%)	8 (32.0%)	4 (80.0%)	25 (47.2%)	
Antrum	3 (13.0%)	1 (4.0%)	0 (0.0%)	4 (7.5%)	
Location2 (%)					0.928
Anterior wall	7 (30.4%)	7 (28.0%)	0 (0.0%)	14 (26.4%)	
Posterior wall	3 (13.1%)	2 (8.0%)	1 (20.0%)	6 (11.4%)	
Greater curvature	7 (30.4%)	9 (36.0%)	4 (80.0%)	20 (37.7%)	
Lesser curvature	6 (26.1%)	7 (28.0%)	0 (0.0%)	13 (24.5%)	
GIST size (EUS), cm					0.013
Mean±SD	2.1±0.6	1.6±0.48	1.8±0.6	1.9±0.6	
GIST size (pathology), cm					0.027
Mean±SD	2.4±0.8	1.8±0.6	2.2±0.6	2.1±0.7	
Procedure time, min					0.018
Mean±SD	50.3±25.5	40.7±21.1	95.2±53.6	50.0±30.7	
Complication (%)					0.159
Microperforation	8 (34.8%)	10 (40.0%)	3 (60.0%)	21 (39.6%)	
Macroperforation	2 (8.7%)	9 (36.0%)	1 (20.0%)	12 (22.6%)	
Bleeding	1 (4.3%)	0 (0.0%)	0 (0.0%)	1 (1.9%)	
Stenosis	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
None	12 (52.2%)	6 (24.0%)	1 (20.0%)	19 (35.9%)	
Resection margin (%)					0.462
R0	12 (52.2%)	18 (72.0%)	3 (60.0%)	33 (62.3%)	
R1	10 (43.5%)	7 (28.0%)	2 (40.0%)	19 (35.8%)	
R2	1 (4.3%)	0 (0.0%)	0 (0.0%)	1 (1.9%)	
Surgery (%)	2 (8.7%)	2 (8.0%)	1 (20.0%)	5 (9.4%)	0.766
Primary repair	0	1	0	1	
Wedge resection	2	0	1	3	
Distal gastrectomy	0	1	0	1	
None	21 (91.3%)	23 (92.0%)	4 (80.0%)	48 (90.6%)	

ESD, endoscopic submucosal dissection; EUS, Endoscopic ultrasound elastography.
*Statistical significance test was done by Kruskal-Wallis test.

Free Paper (Upper GI) FP-UGI1-09

Helicobacter pylori Infection Rate and Gastric Mucosal Changes during Endoscopy

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Background/Aims To detect *Helicobacter pylori* infection and mucosal changes during endoscopy. To evaluate *H. pylori* infection during the gastroscopy using MON-HP rapid urease test. To evaluate gastric mucosal changes in patients with dyspepsia.
Methods A random sampling was carried out by randomly selected individuals who served at the hospital's Mungunguur. Using endoscopy-based invasive method, MON-HP invasive test was used to detect the distribution of *H. pylori*. The participants of the study were informed about the research and approved the Fujinon EG-250WR5 video screen with a flexible ejector using the fluorine monitor using the Sydney methodology. He took a lot of meat from 2 cm and tested urease. Over 18 years of age, gastric syndrome, selected patients who did not use antibiotics, proton-pump inhibitor and antacids in the last 1 month.
Results A total of 90 people were tested for *H. pylori* infection status using MON-HP urease test. Fifty-seven cases (63.3%) have positive, 33 cases (36.6%) have negative results. Findings shown that *H. pylori* infection was more in women. Flexible endoscopy revealed the esophageal and gastric mucosal changes in all patients. Gastroesophageal reflux disease, chronic gastritis, gastric ulcers, dysplasia and cancers were found in 24 (35.3%), in 59 (89.7%), eight (11.8%), four (4.4%) and three (3.33%) cases, respectively. Chronic gastritis includes chronic superficial gastritis, erosions, atrophic changes, intestinal metaplasia and lymphofollicular hyperplasia.
Conclusions *H. pylori* infection rated was high in patients who visits endoscopy unit. Esophageal ad gastric mucosal changes including lymphofollicular hyperplasia were common in *H. pylori* infected patients.
Keywords Gastritis; Urease test; Endoscopy

Free Paper (Lower GI 1) FP-LGI1-01

Development of Real-Time Deep Learning Based Colorectal Polyp Detection System Using Unedited Videos of Standard Colonoscopies

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Background/Aims Although high-quality controlled conventional colonoscopy is essential to prevent advanced colorectal polyps and even cancers, intra-and interobserver variabilities for polyp detection rate among endoscopists has been in issue in medical health care system. We have developed a real-time deep learning based colorectal polyp detection system using unedited videos of standard colonoscopies.
Methods We prospectively enrolled and retrospectively reviewed the low gastrointestinal endoscopic videos of 142 cases (within normal range, 81 videos; colorectal polyp cases, 61 videos with 94 polyps) and still cut images of 10,709 cases (within normal range, 6,264 stills; colorectal polyp cases, 4,445 stills) labeled by experienced endoscopists between March 2018 and June 2019. In preprocessing, multiple splits with 30 frames per 1 second of each video were done. For the first step, using still cut images including 9,639 training set (normal, 5,637 stills; colorectal polyp, 4,002 stills), RetinaNet based convolutional neural network with transfer learning through ImageNet for automatic polyp detection algorithm was developed and tested using 1,070 stills (normal, 627; polyp, 446). For second step, the developed convolutional network algorithm in first step was applied to real time and unaltered colonoscopy videos. To prevent overfitting, seven fold cross validation was done.
Results The deep learning based algorithm to detect colorectal polyps using real time and unedited videos achieved sensitivity of 97.87% and false positive rate per frame (Fps/Frame) of 6.47%.To reduce the false positive rate from stools, bubbles or so, we then modified the algorithm as follow; algorithm recognized the region of interest as polyp only when five consecutive frames contained polyps continuously. After applied this method, the Fps/frame was decreased to 0.78%.
Conclusions Deep learning based automatic colon polyp detection system using unedited video might show the possibilities helping physicians to detect polyps with better function.
Keywords Colonoscopy; Real time; Deep learning; Colon polyp detection

Free Paper (Lower GI 1) FP-LGI1-02

Preventive Effects on Colorectal Cancer by Colonoscopy Differ Depending on Gender and Metabolic Syndrome in 40s

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Background/Aims This study was aimed at measuring the preventive effect of colonoscopy for colorectal cancer (CRC) development depending on age of index colonoscopy, gender and metabolic syndrome among persons aged 40 to 59 years.
Methods Between January 2005 and December 2006, data for the population aged from 40 to 59 years who underwent colonoscopy (CSP cohort) claimed were collected from National Health Insurance Service (NHIS). Non-CSP (N-CSP) subjects were also collected by 1:5 propensity score matching with parameters of age, sex, and metabolic profiles, smoking, alcohol and past history of cancer. Compared with N-CSP cohort, hazard ratios (HRs) were obtained via conditional logistic regression analysis to estimate the risk of CRC in CSP cohort by age groups using the link of National CRC Registry to NHIS database from January 2009 to December 2014.
Results A total of 2,339,359 subjects were included (CSP cohort: 395,738 and matched N-CSP cohort: 1,943,621). The HRs for developing CRC by ages of 40–44, 45–49, 50–54, and 55–59 years in a CSP cohort were 0.864 (p=not significant [NS]), 0.591 (p<0.001), 0.599 (p<0.001), and 0.524 (p<0.001) in men, and 0.774 (p=NS), 0.841 (p=NS), 0.598 (p<0.001), and 0.605 (p<0.001) in women, respectively. Interestingly, when confined to patients with metabolic syndrome, HRs for CRC in the colonoscopy cohort were statistically significantly lowered to 0.372 in early 40s men and 0.386 in late 40s men, but not in women of 40s.
Conclusions The CRC prevention effect of colonoscopy is expected from late 40s in men and early 50s in women. Furthermore incases with metabolic syndrome, this effect is extended in men of early forties.
Keywords Forties; Colonoscopy; Colorectal cancer; Metabolic syndrome; Screening

Free Paper (Lower GI 1) FP-LGI1-03

Effect of Diminutive Polyps with High Grade Dysplasia on Surveillance Colonoscopy

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Background/Aims The AGA colonoscopy surveillance guideline 2012, set the surveillance schedule based on the characteristics of polyp. Polyp with high grade dysplasia (HGD) requires three years of follow-up regardless of size. It is unclear whether diminutive polyps (less than 5 mm) with HGD have more risk than the low risk group. Therefore, in this study, the effect of diminutive with HGD on the occurrence of Advanced adenoma was analyzed.
Methods From Jan 2015 to Dec 2017, all patients who underwent index and surveillance colonoscopy were retrospectively screened, and after the exception of 298 cases, 1,210 patients were included. Through logistic analysis, patients were grouped into diminutive HGD group, low-risk group (patients with no polyp, 1–2 low grade dysplasia [LGD] patients), and high-risk group (HGD >5 mm, 3 or more adenoma) according to the index colonoscopy results. Advanced adenoma was defined as follow; adenoma with ≥1 cm in size, tubule-villous or villous adenoma, HGD.
Results The mean follow-up period was 22.47 month (95% confidence interval [CI], 21.65 to 23.33 month). Four hundred ninety-two patients had LGD (40.7%) and 116 patients (9.6%) had HGD. Among them, 59 patients (5.0%) had diminutive polyp with HGD. The risk of developing advanced adenoma in the surveillance colonoscopy was analyzed. Compared with the low risk group, diminutive HGD group didn't showed significant risk (odds ratio [OR], 1.634; 95% CI, 0.843 to 3.168; p=0.142), but the high risk group showed a significant risk (OR, 1.428; 95% CI, 1.027 to 1.984; p=0.034).
Conclusions Diminutive HGD does not increase the risk of developing advanced adenoma compared to the low risk group.
Keywords High grade dysplasia; Surveillance; Colonoscopy; Diminutive; Polyp

Free Paper (Lower GI 1) FP-LG11-04

Factors Affecting the Characteristics of Advanced Colorectal Adenoma in Diabetic Patients

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Background/Aims In recent years, the incidence of diabetes mellitus (DM) and colorectal cancer have been increasing in Korea. The aim of this study is to evaluate the factors affecting on the incidence of advanced colorectal adenoma known as precancerous lesion in diabetic patients.
Methods We retrospectively analyzed the data of the patients who have type 2 DM and had a colonoscopy from August 2008 to August 2016 in Kangwon National University Hospital. After having a colonoscopy, the patients were divided into two groups with or without advanced colorectal adenoma (size ≥ 1 cm or high grade dysplasia or villous adenoma or cancer) by pathologic findings and then the data from the both groups were analyzed by multivariate logistic regression analysis.
Results Four hundred sixty-three patients were excluded in 990 enrolled patents from the study by exclusion criteria and the advanced adenomas were found in 65 patents (12%).
Conclusions The incidence of colorectal adenoma was higher in the male diabetic patients. The users of metformin showed lower tendency to have advanced colorectal adenoma but there was not statistical significance in multivariate analysis. Further study with more patients will be needed to know the factors affecting on the characteristics of advanced colorectal adenoma in diabetic mellitus.
Keywords Diabetes mellitus; Advanced colorectal adenoma; Metformin

Table 1. Baseline Characteristics of the Patients

	Advanced Colorectal Adenoma (N=65)	No or low risk Colorectal Adenoma (N=462)	P
Age	67.66±9.57	66.54±8.79	0.341
Sex			0.041
female	15(23.1)	166(35.9)	
male	49(77.8)	296(64.1)	
BMI			0.176
< 25	39(60.0)	264(57.1)	
≥ 25	26(40.0)	198(42.9)	
CFS전 DM duration	11.16±8.19	10.96±8.11	0.857
Smoking			0.755
No	27(51.0)	181(55.9)	
Yes	26(26.4)	143(22.2)	
Alcohol			0.116
None	38(73.1)	187(58.3)	
Yes	14(23.1)	134(33.3)	
Aspirin			0.203
No	32(49.2)	203(43.9)	
Yes	33(50.8)	259(56.1)	
Insulin			0.443
No	50(76.9)	374(81.0)	
Yes	15(23.1)	88(19.0)	
SU/Meglitini de			0.620
No	27(41.5)	207(44.8)	
Yes	38(58.5)	255(55.2)	
TZD			0.309
No	62(95.4)	424(91.8)	
Yes	3(4.6)	38(8.2)	
a-GI			0.940
No	58(58.8)	418(90.5)	
Yes	6(6.2)	44(9.5)	
DPP4i			0.965
No	44(67.7)	314(68.0)	
Yes	21(32.3)	148(32.0)	
Metfromin			0.011
No	28(43.1)	128(27.7)	
Yes	37(56.9)	334(72.3)	
Statin			0.743
No	24(36.9)	161(34.8)	
Yes	41(63.1)	301(65.2)	
HbAlc	6.71±2.31	7.04±2.11	0.316
Glucose	153.58±61.92	157.04±68.45	0.717
t-cholesterol	142.43±53.05	154.98±45.45	0.042

Values are presented as mean±SD or number (%).
BMI, body mass index; DM, diabetes mellitus; α-GI, alpha glucosidase inhibitor; DPP4, dipeptidylpeptidase-4.

Table 2. Multivariate Analysis Assessing Independent Risk Factor of Advanced Colorectal Adenoma

	Odds ratio	95% CI	P
t-cholesterol	**0.427**	**0.150-1.218**	**0.112**
HDL Chol	**0.406**	**0.201-0.819**	**0.012**
LDLChol	3.598	1.138-11.379	0.029
Sex			
male vs female	2.536	1.205-5.335	0.014
Metformin			
Yes vs No	0.507	0.266-0.965	0.039

CI, confidence interval; HDL Chol, high-density lipoprotein cholesterol; LDL Chol, low-density lipoprotein cholesterol.

Free Paper (Lower GI 1) FP-LG11-06

Risk of Colorectal Neoplasm Development in Kidney Transplant Recipients

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Background/Aims Organ transplantation has a higher risk for malignancies compared to general subjects. The purpose of this study was to investigate the incidence of colorectal neoplasms in renal transplant recipients and to find risk factors for the development of advanced colonic neoplasms in renal transplant recipients.
Methods Between 1992 and 2017, colorectal neoplasm screening was performed in renal transplant recipients with colonoscopic evaluation. We compared the incidence of colorectal neoplasms with that of 26,760 controls who had screening health check-up between 2012 and 2015. To determine the risk factors for the development of advanced colonic neoplasms, we investigated demographics, body mass index and types of main immunosuppressive agents. Advanced colorectal neoplasms were defined as adenomas larger than 10 mm, adenoma with villous component, adenoma with high grade dysplasia, or invasive cancer.
Results Among 1,828 renal transplant recipients, 729 patients underwent colonoscopic evaluation between 1992 and 2017. Mean age was 53.3±9.6 years (range, 30 to 82 years) and 49.7±11.1 years (range, 20 to 88 years) in recipient and control group, respectively. In the controls, incidence of colorectal neoplasms was 25.9% (n=6,944), of which advanced colorectal neoplasm comprised 16.4% (n=940). In renal transplant recipients, total neoplasms occurred in 182 patients (25.0%), of which advanced adenoma and adenocarcinoma comprised 54.4% (n=99) and 8.2% (n=15), respectively. (vs control, p<0.001). In multivariate analysis, age >45 years (odds ratio [OR], 3.2; 95% confidence interval [CI], 2.02 to 5.16; p<0.001) and long interval of colonoscopy were independent risk factors for colorectal neoplasms. Also, the risk of advanced neoplasm development was increased in age >45 years (OR, 6.1; 95% CI, 2.59 to 14.18; p<0.001). The type and duration of immunosuppressants were not statistically significant in the development of advanced colorectal neoplasms.
Conclusions Renal transplant recipients had a higher incidence of advanced colorectal neoplasm. Colon cancer screening should be recommended before 45 years in these patients.
Keywords Colorectal neoplasms; Kidney transplantation; Colonoscopy

Table. Multivariate analysis for risk of Advanced colorectal neoplasia in renal recipients

	Univariate analysis			Multivariate analysis		
	OR	95% CI	*P*	OR	95% CI	*P*
Male sex (vs. Female)	1.4	0.85-2.20	.204			
Age ≥ 45 years	6.2	2.67-14.52	<.001	6.1	2.59-14.18	<.001
Obesity (BMI ≥ 25 kg/m²)	1.7	0.94-2.88	.081			
Deceased donor (vs. Living donor)	1.0	0.91-1.17	.636			
Cyclosporine use (vs. Tacrolimus use)	1.6	0.99-2.51	.058			
Duration of Immunosuppressants ≥ 8 years	1.7	1.10-2.76	.019	1.0	0.520-1.93	.998
Interval of colonoscopy ≥ 5 years	1.1	1.03-1.18	.005	1.1	0.99-1.21	.066

OR, odds ratio; CI, confidence interval; BMI, body mass index.

Free Paper (Lower GI 1) FP-LG11-07

Therapeutic Colonoscopy Does Not Reduce the Incidence of Colorectal Cancer in the Elderly over 80 Years: A Nationwide Population-Based Cohort Study

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Background/Aims Colonoscopy (CSP) is recommended for colorectal (CRC) screening worldwide. However, evidence for the effectiveness of CSP in the elderly over 80 years is limited. We estimated whether CSP decrease the risk of CRC in the elderly population.
Methods Between January 2006 and December 2007, data for subjects aged 70 years and older who underwent CSP claimed were collected from National Health Insurance Service (NHIS). CSP subjects cohort was matched to non-CSP (N-CSP) subjects who did not undergo CSP. The risk of developing CRC was estimated by the incident new cases from January 2009 to December 2014 based on the link of National CRC Registry to NHIS database. Compared with N-CSP cohort, hazard ratios (HRs) were obtained via conditional logistic regression analysis to estimate the risk of CRC in CSP cohort (diagnostic and therapeutic CSP) by ages at which CSP was performed.
Results A total of 2,673,651 subjects were included (CSP cohort: 114,799 and N-CSP cohort: 2,558,852). Compared to matched age groups in N-CSP cohorts, the HRs for developing CRC by ages of 70–74, 75–79, and >80 years were 0.393, 0.490, and 0.652 in diagnostic CSP group (p<0.001, p<0.001, and p=0.002), respectively. Also, the HRs for developing CRC by ages of 70–74 and 75–79 were 0.635 and 0.636 (p<0.001 and p<0.001). Of note, however, CRC risk was not decreased by therapeutic CSP in the elderly over 80 years of age (HR, 1.023; p=0.909).
Conclusions Diagnostic CSP is associated with a reduction in CRC development among the elderly over 70 years or older. However, therapeutic CSP did not prevent the incidence of CRC in the very elderly over 80 years, suggesting a differentiated CRC screening guideline for these very elderly persons.
Keywords Colonoscopy; Colorectal cancer; Screening; Elderly; Guideline

Free Paper (Lower GI 2) FP-LG12-01

Incidence and Risk Factors of Micronutrient Deficiency in the Patients with Inflammatory Bowel Disease in Korea: Folate, Vitamin B_{12}, 25-OH-Vitamin D, Ferritin

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Background/Aims Inflammatory bowel disease (IBD) patients are vulnerable to micronutrient deficiencies due to diarrhea-related gastrointestinal loss and lack of dietary intake from anorexia related to disease activity. According to the ESPEN guideline, patients with IBD should be regularly checked for micronutrient deficiencies and certain defects should be adequately corrected. However, there is still limited number of studies on the incidence and risk factors of micronutrient deficiency.
Methods We retrospectively analyzed 105 IBD patients who underwent micronutrient examination including folate, vitamin B_{12}, 25-OH-vitamin D, ferritin from March 2016 to March 2017. In addition, all of these patients had follow-up blood tests 6 months later at single tertiary university hospital.
Results In the deficiency group, 76 patients (72.4%) had a deficiency in one of the four micronutrients (folate, vitamin B_{12}, 25-OH-vitamin D, and ferritin), and 29 (27.6%) were in the nondeficient group. Deficiency group showed significantly higher rate of young age (mean±standard deviation, 38.7±14.5 vs 54.4±15.0; p<0.001), incidence of deficiency in Crohn's disease (CD; ulcerative colitis [UC], and intestinal Behcet disease [BD]: 78.9% vs 14.5% vs 6.6%; p<0.001), use of azathioprine (35.5% vs 10.3%; p=0.011) and anti-tumor necrosis factor agents (50.0% vs. 20.7%; p=0.006) compared with non-deficient group. On the multivariate analysis, CD (hazard ratio [HR], 3.600; 95% confidence interval [CI], 1.057 to 12.253; p=0.040) and intestinal BD (HR, 15.469; 95% CI, 1.081 to 221.359; p=0.044) were determined to be significant independent factors for micronutrient deficiency compared with UC.
Conclusions In conclusion, the incidence of micronutrient deficiency is high, and CD and intestinal BD were associated with higher risk of deficiency than UC. Therefore, in IBD patients, especially the patients with CD and intestinal BD, need more attention in micro-nutrition.
Keywords Micronutrient deficiency; Inflammatory bowel disease patients

Free Paper (Lower GI 1) FP-LG11-08

Discovery of Hesperidin Based Novel AMPK/mTOR Kinase Inhibitor against Colorectal Cancer Cells

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Background/Aims Patient with inflammatory bowel disease are at high risk for expanding the colorectal cancer. Angiogenesis play an important and fundamental role in the expansion of solid tumor growth and development of chronic inflammation. Various mediators such as proliferation, angiogenesis, and expansion of tumor cells constantly expand the malignancy reactions. Metastasis and postoperative recurrences are still considering the major reason for breast cancer. Amusingly, like AMPK, mTOR serine/threonine kinase plays a significant role not only in cell proliferation and growth control but also in metabolism. AMPK/mTOR kinase is the major site for estimated the therapeutic effect because it validated important pathway. In the current experimental study, we showed that hesperidin exerted cytotoxic, pro-apoptotic and anti-proliferative effect against colorectal cancer cells via AMPK/mTOR signaling pathway.
Methods Docking study was used for the estimated the effect of hesperidin on AMPK/mTOR signaling pathway. For, molecular and cellular mechanism, we performed the MTT assay and flow cytometirc on cell lines HT-29 and HCT-116 and scrutinized the possible mechanism against the collateral cancer via transforming growth factor beta (TGF-β) and AMPK/mTOR signaling pathway.
Results Cell toxic experiments were able to predict inhibition with average of IC_{50} 58.45 μmol/L. Hesperidin reduce the number of cell in S and G2-M phase and increase the cells in G0-G1 phase. Hesperidin induces the tumor cell apoptosis via concentration dependent manner. Hesperidin significantly reduced the invasion and migration of TGF-β induced HT-29 cells and HCT-116 *in vitro*. These effects were accompanied via reduced the MMP-2/9 protein expression and regulating the AMPK/mTOR signaling pathway via hesperidin, which suggest the role in coordinating anti-tumor metastasis. On docking study, we observed that hesperidin inhibit the AMPK/mTOR signaling pathway.
Conclusions Overall, we can say that hesperidin could be safe agent for the prevention and treatment of colorectal cancer via AMPK/mTOR signaling pathway.
Keywords Hesperidin; Inflammatory bowel disease; Colorectal cancer; AMPK/mTOR signaling pathway

Free Paper (Lower GI 2) FP-LG12-02

Treatment of Ulcerative Colitis with Tonsil-Derived Mesenchymal Stem Cells via Regulation of Programmed Death-1/Programmed Death Ligand-1

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Background/Aims The programmed death 1 (PD-1)/programmed death-ligand 1 (PD-L1) pathway has not been fully elucidated in inflammatory bowel diseases. We evaluated PD-1/PD-L1 expression in the mucosa of patients with ulcerative colitis (UC) and demonstrated its role in the immunomodulation mediated by tonsil-derived mesenchymal stem cells (T-MSCs).
Methods We utilized a chronic murine colitis model. We measured PD-1 and PD-L1 expression levels in colonic tissues before and after treatment with T-MSCs. Moreover, we determined PD-1 and PD-L1 levels in colonic tissue from patients with UC and compared it with those from normal (control) individuals.
Results In the chronic murine colitis model, PD-L1 expression was lesser than that in normal conditions (fold change of 1.0 vs 0.46±0.08, p=0.05). However, PD-1 levels were higher than that in control samples (1.0 vs 6.84±8.16, p=0.142). T-MSC treatment led to significant increase (1.04±0.77 vs 0.46±0.08, p=0.031) and decrease (3.63±1.94 vs 6.84±8.16, p=0.537) in levels of PD-1 and PD-L1, respectively, along with significant improvements in colitis symptoms. We detected PD-1 and PD-L1 expression in both soluble medium (182.63 pg/mL) and T-MSC cell lysates (11.85 pg/μg) post 7 days of differentiation. In experiments using human colonic tissues, a significant increase in PD-1/PD-L1 expression levels was observed in UC patients, compared to that in controls (PD-1: 2.09±3.95 vs 7.93±14.21, p=0.034 and PD-L1: 2.24±2.91 vs 10.08±18.13, p=0.044).
Conclusions The altered expression of PD-1 and PD-L1 in colonic mucosa represents a possible mechanism of UC at the molecular level. Our study demonstrates the potential therapeutic effects of PD-L1 derived from T-MSCs in UC treatment.
Keywords Inflammatory bowel disease; Ulcerative colitis; Mesenchymal stem cell

Free Paper (Lower GI 2) FP-LG12-03

Metagenomic Biomarker for Upper Gastrointestinal Tract Involvement in Patients with Crohn's Disease

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Background/Aims The human gut microbiota serves as an important component in the pathogenesis of Crohn's disease (CD) that promote host-microbe imbalances leading to perturbed intestinal and immune homeostasis. In this study, we aimed to assess the potential clinical usefulness of using the colonic tissue microbiome by which biomarkers for upper gastrointestinal (UGI) involvement of CD could be obtained.
Methods We analyzed colonic tissue samples from 26 patients with CD, including 13 with and 13 without UGI involvement at diagnosis from the Inflammatory Bowel Disease Multi-Omics Database. Metagenomic analysis of the V3-V4 region of the 16S ribosomal RNA gene was performed using QIIME1, DiTaxa and linear discriminant analysis effect size (LEfSe) method.
Results Non-metric multidimensional scaling using Bray-Curtis distances revealed a complex pattern of community structures. There were no statistically significant differences in the community richness estimator (Chao) and the diversity estimator (Shannon index) between the CD patients with and without UGI involvement. The overall abundance of the genus Bacteroides was significantly increased in the patients with UGI involvement compared with those without UGI involvement. Taxa predicted by DiTaxa had the species Ruminococcus torques as significantly associated with UGI involvement, which was confirmed based on the LEfSe analysis (p=0.025).
Conclusions These finding suggest that the species Ruminococcus torques might serve as a novel potential biomarker for UGI involvement of CD and its correlations in abundance with a range of bacterial species. The mechanisms of interactions between hosts and *Ruminococcus torques* should be further investigated.
Keywords Microbiome; Crohn disease; Upper gastrointestinal tract; Biomarker

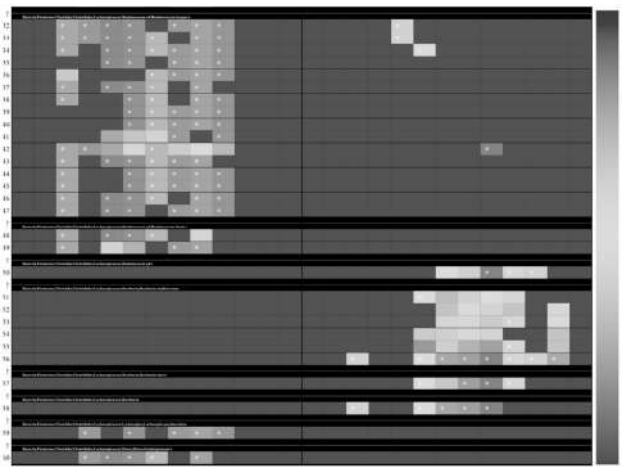

Fig. 1. Taxa heatmap.

Free Paper (Lower GI 2) FP-LG12-04

Changes of Fecal Calprotectin and Related Clinical Factor in Neonates

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Background/Aims Fecal calprotectin and its changes can reflect gastrointestinal inflammation in children and adults. Fecal calprotectin has been studied on the aspect of necrotizing enterocolitis or gastrointestinal distress; however, the clinical usefulness is not yet determined in neonates. The aim of the study were to investigate change of fecal calprotectin and associated clinical factors in preterm and full-term neonates.
Methods One hundred twenty neonates born between 26 and 40 weeks of gestation and their 185 stool samples were included. Stool samples were collected in the 1st, 2nd, and 3rd–4th week after birth and fecal calprotectin was measured. Clinical characteristics were reviewed from medical records. Statistical analyses were performed on difference of fecal calprotectin according to clinical variable and affecting factors on changes of fecal calprotectin.
Results Preterm neonates with less than 34 weeks of gestation were 38 (31.7%) and range of birth weight was from 600 to 4,310 g. Male was 58 and mortality was 1. Mean hospital stays were 20.3 days. Wide range (5.5 to over 6,000 mg/kg of stool) of fecal calprotectin was presented in neonates and calprotectin of the 1st week-stool was the highest during neonatal period (n=110; 363.79 vs 156.02 in 2nd and 144.10 in 3rd week after birth, p<0.05). Preterm neonates <34 week of gestation, whole milk, respiratory distress syndrome, and necrotizing enterocolitis were associated with higher level of fecal calprotectin by bivariate analysis, respectively. However, factors affecting changes of fecal calprotectin in neonates were time and feeding formula when multivariate analysis with generalized linear mixed effects model was performed.
Conclusions Fecal calprotectin was decreased with time during neonatal period and breast milk could affect decrement of fecal calprotectin.
Keywords Calprotectin; Neonate; Breast milk

Free Paper (Lower GI 2) FP-LG12-05

Mechanisms of TL1A Promoting Epithelial-Mesenchymal Transition in Chronic Colitis-Associated Intestinal Fibrosis

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Background/Aims To explore the mechanisms of TL1A promoting epithelial-mesenchymal transition in intestinal fibrosis.
Methods We divided TL1A Transgenic mice and C57BL/6 WT mice into four groups: Con/WT, DSS/WT, Con/Tg, and DSS/Tg. Chronic colitis was induced by oral administration of 2% DSS for 7 days followed by a recovery period of 2 weeks with normal drinking water. This was repeated three times to establish a fibrotic model. For experimental mice, the expression levels of interleukin (IL)-13 and transforming growth factor beta 1 (TGF-β1) in serum were detected by enzyme-linked immunosorbent assay. The protein and mRNA expression of TGF-β/Smad3 pathway and epithelial-mesenchymal transition (EMT)-related transcription molecules such as Snail1 and ZEB1 were detected by Western blot and RT-PCR. Next, HT-29 cells were divided into five groups: Control, TL1A, TL1A+TL1A Ab, TL1A+BMP-7, and TL1A+TL1A Ab+BMP-7. Immunofluorescence was applied for the colocalization E-cadherin^{+}FSP1^{+}, and the expression of EMT-related markers and transcription factors were further detected by Western Blot to investigate the effect of TL1A on epithelial-mesenchymal transition in epithelial cells.
Results In mice, IL-13, TGF-β/Smad3 pathway protein, Snail1 and ZEB1 protein levels and mRNA levels were elevated, and serum IL-13 and TGF-β1 expression were elevated, especially in the DSS/Tg group. Epithelial- mesenchymal transition can occur after induction of TL1A. Expression of E-cadherin were increased in TL1A Ab and/or BMP-7 group, while the expression of interstitial markers FSP1 and α-SMA were decreased, and TL1A +TL1A Ab+BMP-7 group changed most obviously.
Conclusions TL1A may induce epithelial-mesenchymal transition in intestinal epithelial cells by interfering with the TGF-β/Smad3 pathway, which through affected the EMT-associated transcription factors Snail1 and ZEB1.
Keywords Inflammatory bowel disease; Intestinal fibrosis; Epithelial-mesenchymal transition; Tumor necrosis factor-like ligand 1a

Free Paper (Lower GI 2) FP-LG12-06

The Efficacy and Safety of Adalimumab for Patients with Moderately to Severely Active Ulcerative Colitis and Predictors of Response in Korea

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Background/Aims To assess the efficacy and safety of adalimumab, a recombinant human monoclonal antibody against tumor necrosis factor α (TNF-α), and to explore predictors of response in Korean patients with ulcerative colitis (UC).
Methods We conducted a prospective observational multicenter study over 56 weeks in adult patients with moderately to severely active UC. The primary outcomes were rates of clinical response at week 8 and 56. Secondary outcomes were rates of clinical remission, steroid-free remission, and mucosal healing at week 8 and 56. Adalimumab drug levels were checked at week 8 and at loss of response.
Results A total of 146 patients were enrolled and included in the analysis. Clinical response rates were 52.1% (76/146) and 37.7% (55/146) at week 8 and 56, respectively. Clinical remission were achieved in 24.0% (35/146) and 21.9% (32/146) of patients at week 8 and 56. Steroid-free remission rates was 21.2% (31/146) at week 56. Mucosal healing rates were 39.0% (57/146) and 30.1% (44/146) at week 8 and 56. Prior use of anti-TNF-α did not affect the primary and secondary outcomes. Adalimumab drug level was significantly higher in patients with clinical response, clinical remission, and mucosal healing at week 8. Clinical response (74.5% vs 38.5%, p<0.001) and mucosal healing (52.7% vs 30.8%, p=0.008) at week 8 were associated with clinical response at week 56. Serious adverse drug reactions were identified in 2.7% (4/146) of patients including one case of pulmonary tuberculosis.
Conclusions Adalimumab is safe and effective for induction and maintenance in Korean patients with UC, regardless of prior anti-TNF therapy. A better response to induction therapy can predict a better long-term response.
Keywords Inflammatory bowel disease; Ulcerative colitis; Adalimumab

Free Paper (Lower GI 2) FP-LG12-07

Differentially Abundant Bacterial Taxa Associated with Progression of Crohn's Disease: Results from the IMPACT Study

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Background/Aims Although dysbiosis has been reported in Crohn's disease (CD) compared with healthy controls (HC), limited studies have examined the intestinal microbiota composition in relation to prognosis of CD. We aim to analyze difference in microbial communities and relevant metabolic pathways according to the prognosis of CD.
Methods We analyzed a cohort of 370 CD and 740 HC fecal samples from 14 centers in Korea, applied a 16S rRNA sequencing approach. We categorized CD patients into three groups as good (CD-G), intermediate (CD-I), and poor (CD-P) prognosis group according to history of using biologics and intestinal resection. The microbial composition, diversity and microbial community function were analyzed.
Results Microbiota α-diversity was decreased in within all CD groups vs HC, with more significant reduction in CD-P compared with CD-G and CD-I. β-Diversity indicated different microbial patterns in CD-P compared with CD-G and CD-I. Among microbiota that were differentially abundant between HC and CD groups, 13 genera and 10 species showed difference abundance between CD-G and CD-P groups (Fig. 1). *Escherichia coli* from proteobacteria phylum and species Producta and genera *Lactobacillus* and *Coprococcus* from *Firmicutes phylum* consistently showed difference between CD-G and CD-P groups after adjusting for confounding clinical variables. In functional profiling, the increased microbial catabolic pathways, pathways related to enterobacterial common antigen and LPS biosynthesis were presented in the CD-P group than the CD-G group. Family Enterobacteriaceae or its species *E. coli* were the top contributor for these pathways.
Conclusions CD prognosis is associated with changes in microbiota composition and decreased diversity. Specific bacteria such as *E. coli* might not only causally involved in CD progression but also adapted to live in inflammatory environment.

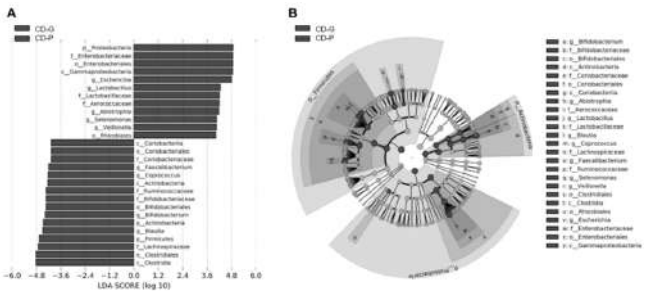

Fig. 1. CD, Crohn's disease; CD-G, good prognosis group; CD-P, poor prognosis group.

Free Paper (Lower GI 2) FP-LG12-08

Novel Candidate Drug in Anti-tumor Necrosis Factor Refractory Crohn's Diseases: In Silico Study for Drug Repositioning

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Background/Aims Biologicals like anti-tumor necrosis factor (TNF) therapy for Crohn's disease (CD) are safe and effective but there is a significant rate of primary and secondary nonresponse in the patients. In this study, we applied a computational approach to discover novel drug therapies for anti-TNF refractory CD in silico.
Methods We use a transcriptome dataset (GSE100833) for the anti-TNF refractory CD patients from NCBI GEO. After co-expression analysis, we specifically investigated the extent of protein-protein interactions among genes in clusters based on a protein-protein interaction database, STRING. Pathway analysis was performed using the clEnrich function based on reactome gene sets.
Results Co-expressed genes in cluster 1, 2, 3, 5, 8, up or downregulated genes and all differential expression genes are highly connected, while genes in other clusters are less connected. Furthermore, based on the ratio of actual interaction and expected interaction, the connectivity between genes in cluster 1 (with ratio value, 8), 2 (18), 3 (4.33) and 5 (23) is higher than those in other clusters. Among them, cluster 3, which is highly enriched for CTLA4-inhibitory signaling, also showed enrichment for immune related pathways and identifies several drugs including mercaptopurine and ciclosporin with known efficacy in CD. Piperlongumine, which is known to have inhibitory effect on activity of NF-κB, and CP-690334-01 alleviating proinflammatory responses of CD8+ T cells were also identified.
Conclusions These finding suggest that piperlongumine and CP-690334-01 might serve as a novel therapeutic option for anti-TNF refractory CD and support the use of public molecular data and computational approaches to discover novel therapeutic options for CD.
Keywords Biological therapy; Crohn disease; Drug repositioning

Free Paper (Lower GI 2) FP-LG12-09

Dysbiosis before Fecal Microbiota Transplantation Is a Positive Predictor for a Favorable Outcome in Ulcerative Colitis Patients

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Background/Aims Fecal microbiota transplantation (FMT) can induce remission in patients with ulcerative colitis (UC). However, it is not clear which factors influence the outcomes of FMT. Our study aimed to investigate the predictive biomarkers of good prognosis and adverse outcomes by analyzing the microbial changes and clinical outcomes in UC patients after FMT.
Methods Ten UC patients received FMT twice with a month of interval. Frozen donor solution was given after extensive work-up, and fecal microbiota of donor and recipients along with the clinical and laboratory outcomes were analyzed.
Results According to the dysbiosis, the patients were categorized into two groups: dysbiosis (DUC) and non-dysbiosis (NUC). There was no significant difference in disease activity in the two groups (p=0.41). Three out of seven DUC group showed response after FMT whereas three patients showed adverse events at the first FMT to receive immunomodulatory therapy. When the latter received second FMT after lessening the inflammatory burden, there was a response after second FMT. One patient did not respond to the FMT in DUC group. In NUC group, none of the patients either showed responses or adverse events. The responders showed decrease in number of diarrhea and microbial shift towards the donor within a week after FMT, and the patients who showed adverse event also experienced hematochezia or increase in diarrhea within a week along with significant increase in Proteobacteria phylum. The microbial composition of the donor did not show significant difference according to the responses.
Conclusions Regardless of disease activity, UC can be divided into two groups. In patients without dysbiosis, less efficacy of FMT can be predicted. In DUC, patients can respond differently according to the disease activity before FMT, and the prognosis can be improved by lessening the inflammatory burden before FMT.
Keywords Ulcerative colitis; Fecal microbiota transplantation; Microbiota; Dysbiosis

Free Paper (Lower GI 2) FP-LG12-10

Molecular Mapping for Dissecting Colorectal Cancer Heterogeneity by Matrix-Assisted Laser Desorption/Ionization Imaging

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Background/Aims Colorectal cancer (CRC) is one of the most common malignancies and leading causes of cancer-related deaths globally. It is well documented that molecular alterations occur during tumorigenesis at the tissue and cellular levels, which represent an important hallmark of cancer. A more detailed understanding of the underlying molecular changes is critical for early detection, accurate disease diagnosis and classification, but to date the molecular landscape of CRC is still not yet well characterized. Matrix-assisted laser desorption/ionization (MALDI) imaging mass spectrometry is a powerful technique for comprehensive mapping of biomolecules from intact tissue sections that can be correlated with the histological features, hence allowing the integration of molecular data with the morphological details. In this study, we aim to identify molecular profiles associated with CRC tissues by using MALDI imaging.
Methods We first developed a MALDI imaging method to profile spatial distribution of proteins in CRC tissue sections. The tissue sections were coated with sinapinic acid matrix and analysed using MALDI imaging. Mass spectra data was classified by hierarchical clustering by similarity and correlated with the tissue histopathology. All data was normalized by total ion count and analysed statistically by principal component analysis and classification methods.
Results The MALDI imaging analysis revealed significant variation in the expression levels of a number of mass ion peaks reflecting heterogeneity within the tumor tissue section. We identified distinct signatures of mass ion peaks and generated classification model based on the differentially expressed mass peaks that were discriminative between tumor regions and adjacent normal regions.
Conclusions In conclusion, our findings demonstrate the usefulness of MALDI imaging for dissecting clinically relevant molecular alterations that could potentially serve as biomarkers for CRC and provide some insights into the molecular complexity underlying cancer pathogenesis.
Keywords Colorectal cancer; Matrix-assisted laser desorption/ionization imaging; Biomarker

Free Paper (Motility 1) FP-MO1-01

Oesophageal Motility Disorders in Systemic Sclerosis: Observational Study

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Background/Aims Systemic sclerosis is an autoimmune disorder characterized by vasculopathy and tissue fibrosis. Oesophageal disorder is the most common digestive disorder. The diagnosis is confirmed and characterized by high-resolution esophageal manometry (HRM). The main objective of this study is to characterize esophageal motility disorders by high resolution esophageal manometry, according to the third version of the Chicago classification, in patients followed for systemic sclerosis.
Methods This is an observational study from April 2018 to July 2019, including 12 patients with systemic sclerosis according to the European League Against Rheumatism/American College of Rheumatology (EULAR/ACR) 2013 criteria, referred to the gastroenterology department at Ibn Sina Hospital of Rabat, for HRM. Our study was based on the Chicago version 3.0 classification to classified oesophageal motor disorders into two categories: major disorders of peristalsis and minor disorders of peristalsis. Four parameters were analyzed: lower esophageal sphincter resting pressure (LES), integrated relaxation pressure (IRP), distal latency (DL) and distal contractile integral (DCI).
Results One hundred twenty-eight high-resolution manometry were performed during this period, which 10.34% (n=12) were indicated for systemic sclerosis. There were a women predominance in 100% of cases. The average age of patients was 58.6 years (range, 16 to 67 years). The main digestive symptom was gastroesophageal reflux in 42% of cases (n=5), followed by dysphagia in 25% of cases (n=3), and 33% (n=4) had no symptoms. All patients had normal IRP. HRM was normal in 33% of cases (n=4). Major disorders of oesophageal peristalsis were diagnosed in 50% of cases (n=6) type: hypotonia of the LES with absent contractility in 50% of cases (n=3) and only absent contractility in 50% of cases (n=3). Seventeen percent of patients (n=2) had minor disorders of oesophageal peristalsis: hypotonia of the LES with ineffective motility ($\geq$50% of swallows are ineffective with DCI <450 mm Hg.s.cm).
Conclusions HRM should be considered in all patients with systemic scleroderma according to the EULAR/ACR 2013 criteria, even in the absence of digestive symptoms. In our series, HRM found esophageal motility disorders in 67% of cases, which 50% was classified as major disorders of peristalsis according to the classification of Chicago version 3.0.
Keywords Motility; Disorders; High-resolution esophageal manometry; Chicago

Free Paper (Motility 1) FP-MO1-02

Long-term Results of Surgical Treatment of Gastroesophageal Reflux Disease in Combination with a Hiatal Hernia

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Background/Aims Analyze the long-term results of surgical treatment of gastroesophageal reflux disease (GERD) in combination with hiatal hernia (HH).
Methods The study included 41 patients aged 24 years to 71 years, 10 men and 31 women. All patients underwent surgical treatment of GERD in combination with HH. Patient complaints, endoscopic and fluoroscopic signs of GERD and HH were evaluated in the range from 1 year to 8 years after surgery.
Results The average age of patients at the time of surgery was (47.2±2.4) years. Laparoscopic fundoplication (LFP) was performed on 38 patients (92.7%) according to Toupet with unilateral (13 people) or bilateral (25 people) crurography. Two patients underwent NFP according to Nissen; one patient, esophagofundoraphia with incomplete fundoplication according to Chernousov. In 10 cases, simultaneously with LFP, a laparoscopic cholecystectomy was performed for chronic calculous cholecystitis, in six cases, selective proximal vagotomy was performed for patients with duodenal ulcer, five patients underwent laparoscopic hernioplasty (umbilical hernia, white line hernia). When analyzing the long-term results of surgical treatment in the period (2.8±0.7) years after surgery, HPAI was detected in 22 people. It was also revealed that the presence of gastroesophageal reflux correlated with the age of the patients at the time of surgery (r=0.32, p=0.04), the presence of a fixed HH correlated with the male gender (r=0.3, p=0.04). Axial cardial HPLC was less frequently detected after Toupet LFP combined with bilateral crurography (r=−0.36, p=0.02).
Conclusions Thus, post-fundoplication symptoms often occur after surgery at an older age. Toupet LFP with bilateral crurography is associated with better postoperative outcomes.
Keywords Gastroesophageal reflux disease; Surgical treatment; Hiatal hernia; Long-term results

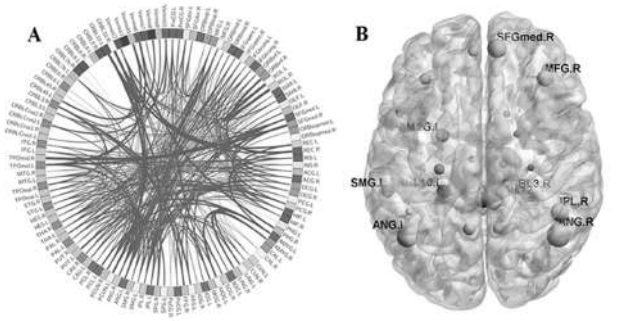

Fig. 1 The visualization of the consensus features and the weight of regions in the classification. A was a connectogram which showed the consensus functional connections in the brain. The thickness of the line represented the weight of the connection. The thicker the line, the larger the weight. The red lines represented the positive connection and the green lines represented the negative connection. **B** showed the regions with significantly higher weight in the classification. The size of the node represented the weight of the normalized region.

Free Paper (Motility 1) FP-MO1-03

Classification of Functional Dyspepsia Using Resting-State Functional Brain Network: A Machine Learning Study

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Background/Aims Functional dyspepsia (FD) is a common functional gastrointestinal disease which accompanied with alterations in cerebral functional connections. This study aimed to explore the potential of the functional brain network to be utilized for FD diagnosis and purposed to pick out the important consensus features to distinguish FD patients from healthy subjects.
Methods Sixty-seven FD patients and 68 healthy subjects were scanned with a 3.0T magnetic resonance imaging scanner. The whole brain was divided into 116 regions according to the automated anatomical labeling atlas. The static correlation was adopted to compute the functional connectivity between each pair of regions to generate the functional brain network, which would be used as the classification feature. After feature filtering with the method of differential region accumulation, a linear kernel support vector machine (SVM) classifier was adopted to do the classification analysis. A leave-one-out cross-validation strategy was used to evaluate the performance of the classifier, and the accuracy, the sensitivity, the specificity, and the area under the receiver operating characteristic curve (AUROC) were applied to quantify the performance of the classifier.
Results The accuracy of the SVM classifier could reach up to 0.926 (specificity, 0.912; sensitivity, 0.94; AUROC, 0.969) by using the 65 highest ranked features. The consensus features used to distinguish FD were mainly located within the gastric sensation neuromatrix, the limbic system, and the default mode network. Specifically, the bilateral angular gyrus demonstrated the highest weight in classification (Fig. 1).
Conclusions This study illustrated that the resting-state functional brain network had good diagnostic potential for FD. The gastric sensation neuromatrix, limbic system, and default mode network could be used as the classification features to distinguish FD patients from healthy subjects.
Keywords Functional dyspepsia; Functional brain network; Machine learning; Support vector machine; Magnetic resonance imaging

Free Paper (Motility 1) FP-MO1-04

Predictors of Decreased Stool Frequency in Constipated Elderly: A Hierarchical Linear Regression Model Approach

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Background/Aims Based on our earlier study among the elderly in primary care, the prevalence of functional constipation was 13.5% and 20% reported stool frequency <3 per week. In the current study, we aimed to determine predictors of decreased stool frequency among constipated elderly using a hierarchical linear regression model approach.
Methods Consecutive elderly (above 65 years old) participants were recruited after informed consent. In addition to questionnaires (Rome III Questionnaire, demographic, diet and physical activity), patients underwent anorectal studies including high resolution anorectal manometry (M-Compass, Medspira), balloon expulsion test, and colonic transit study (Sitzmarks). Using multiple linear regression, association between a lower stool frequency in constipated elderly and independent factors (three hierarchical models i.e., model 1 demographic, model 2 risk factors and model 3 anorectal parameters) was determined with p<0.05 as significant.
Results Of 71 elderly screened, 31 (2/3 females) were recruited, 17 had constipation and 14 without. With univariable analysis, those with versus without constipation reported lower stool frequency, longer duration of defecation, more Bristol type 1, 2 & 3 stools, water intake <6 glass per day, and less income per month (all p<0.05) (Table 1). With hierarchical model analysis, significant predictors of less frequent stools in elderly were the use of medications (adjusted B, −3.41; 95% confidence interval [CI], −6.61 to −0.22; p=0.037) in model 1, Bristol type 1, 2 & 3 stools (adjusted B, −5.4; 95% CI, −8.59 to −2.22; p=0.002) and longer duration of defecation (adjusted B −2.82; 95% CI, −5.34 to −0.31) in model 2, and lastly hyposensitivity (adjusted B, 0.19; 95% CI, 0.06 to 0.31) in model 3.
Conclusions Among constipated elderly, the use of medications, Bristol type 1, 2 & 3 stools, longer duration of defecation and hyposensitivity predict less frequent stools.
Keywords Constipation; Elderly; Predictors; Hierarchical; Anorectal

Table 1. Univariable Analysis Comparing Elderly with versus without Constipation

Variable	Constipation (N=17)	Normal (N=14)	P-value
Monthly income, MYR (mean, SD)	607 (± 222.80)	1736 (± 306.5)	0.005 *
Duration defecation (n, %)			
< 10 minutes	6 (35.3)	10 (71.4)	0.045 **
≥ 10 but < 30 minutes	11 (64.7)	4 (28.6)	
Frequency defecation (mean, SD)	3 (± 0.7)	8 (± 1.2)	0.004 *
Bristol Stool Type (n, %)			
Types 1, 2 or 3	17 (100)	8 (57.2)	0.004 **
Types 4, 5, 6 or 7	0	6 (42.8)	
Water intake per day (n, %)			
< 6 glass	10 (58.8)	3 (21.4)	0.036 **
≥ 6 glass	7 (41.2)	11 (78.6)	

MYR, Malaysian ringgit.
*Independent t-test; †Pearson chi-square/Fisher exact test.

Free Paper (Motility 1) FP-MO1-05

^{99m}Tc-Phytate Is a Suitable Cheaper Alternative to the Gold-Standard ^{99m}Tc-Sulfur Colloid in Gastric Emptying Scintigraphy: A Validation Study among Healthy Volunteers

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Background/Aims Gastric emptying scintigraphy (GES) is the current gold standard for measurement of gastric emptying time but ^{99m}Tc-sulphur colloid is expensive. The current study was aimed to compare and validate ^{99m}Tc-phytate as a suitable cheaper alternative to ^{99m}Tc-sulphur colloid in GES of healthy volunteers.
Methods Consecutive healthy participants were consented to undergo two sessions of GES using a standardized radiolabeled solid test meal protocol; one session with ^{99m}Tc-sulphur colloid and the other with ^{99m}Tc-phytate. The interval between two sessions was 2 weeks. The differences in mean gastric retention between two radiopharmaceuticals were analyzed using repeated measures analysis of variances with significant p<0.05.
Results Thirty-two healthy volunteers (mean age, 28.4 years; 15 females) were included. The mean gastric retention of ^{99m}Tc-sulfur colloid was 72.78% at 1 hour and 3.59% at 4 hours. Comparable mean gastric retention was seen with ^{99m}Tc-phytate including 67.22% at 1 hour and 4.50% at 4 hours. No significant differences in mean gastric retention at 1 and 4 hours were observed between the two agents (all p>0.05). Males had lower gastric retention at 1 and 4 hours than females (both p<0.05), but in females, no differences were observed between luteal and non-luteal phase (p>0.05).
Conclusions ^{99m}Tc-phytate is a suitable alternative to the gold-standard ^{99m}Tc-sulfur colloid in GES with comparable gastric retention at 1 and 4 hours.
Keywords Gastric emptying; Validation; Sulfur colloid; Phytate

Free Paper (Motility 1) FP-MO1-06

The Assessment of High-Resolution Oesophageal Manometry with Nonobstructive Dysphagia

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Background/Aims Nonobstructive dysphagia (NOD) is defined as the sensation of food stuck in the esophagus in the absence of mechanical obstruction, and is often encountered in daily clinical practice. Esophageal motility disorders, including achalasia and other hyper- or hypocontractile disorders are the major causes of NOD and further investigation is often required for a correct diagnosis. High-resolution esophageal manometry (HRM), currently remains the gold standard for differentiating the various esophageal motility disorders. This exploration allows for more convenient and thorough evaluation of esophageal motor function. The aim of this study is to assess the prevalence and to identify the type of esophageal motor disorders in patients with NOD according to Chicago classification.
Methods Between May 2018 to June 2019, 188 consecutives patients with NOD underwent high-resolution manometry. Mechanical obstruction and mucosal disease have been excluded by upper endoscopy. They were 96 men (51%) and 92 women (49%). Mean age was 41 ans (range, 14 to 72). HRM data were analyzed with esophagogastric junction resting and relaxation pressures, and esophageal pattern contraction.
Results HRM was pathological in 116 patients (62%). Achalasia was diagnosed in 100 patients (86%). Sixty-four percent classified as type II (n=64), 29% as type I (n=29) and 7% as type III (n=7). HRM showed motor disorders corresponding to scleroderma in nine patients (1,8%), a esophagogastric junction outflow obstruction in four cases (8%) and a jackhammer esophagus in three cases (3%). HRM was normal in 72 patients (38%).
Conclusions HRM is an important advance in the assessment of esophageal motor disorders. It provides benefits in research and clinical practice, is fast becoming the gold standard to study esophageal dysmotility in spite expansive equipment. Achalasia is the most prevalent primary motor disorder found and the type II is the most frequent according to Chicago version 3.0 classification.
Keywords Dysphagia; Achalasia; High-resolution esophageal manometry; Chicago

Free Paper (Motility 1) FP-MO1-07

Result of Colonic *Lactobacillus* of Relativity Healthy Adults and Correlate the Link between Dairy Consumption

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Background/Aims The aim of our study is to determine intestinal *Lactobacillus* of relativity healthy adults by colony-forming units (CFU) and correlate the link between dairy consumption.
Methods This cross-sectional study was conducted covering Ulaanbaatar city. In this study, a total of 80 healthy participants, 18 to 72 aged Mongolian adults. Participants collected freshly voided feces at home himself in a sterile container.
Results A total of 80 people from 18 to 70 years of age were relatively healthy, there was 30% of male (n=24) and 70% of female (n=56) participants. The age groups were divided as follows: 5% (n=4) of age 15–24 years; 38.7% (n=431) of age 25–34; 13.7% (n=411) of age 35–44; 17.5% (n=445) of age 45–54 (n=414); 20% (n=455) ages 55–64; 5% (n=44) over 65 years of age. The value of colonic *Lactobacillus* was relatively healthy adults are $1,443\times10^4$ CFU/mL. Colony forming units of gut *Lactobacillus* were positive significantly associated with consumption amount of dairy foods per week (r=0.4, p<0.001).
Conclusions Colonic *Lactobacillus* of relativity healthy adults were $1,443\times10^4$ CFU/mL and the colony forming units of *Lactobacillus* was positively associated with the amount of dairy consumption and types of dairy products in the healthy people.
Keywords *Lactobacillus*; Colony forming units; Dairy product

Free Paper (Motility 2) FP-MO2-01

Metabolically Healthy Obesity and the Risk of Erosive Esophagitis: A Cohort Study

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Background/Aims Obesity is an established risk factor of erosive esophagitis and metabolic unhealthiness has been implicated in the pathogenesis of erosive esophagitis. Yet, the risk of erosive esophagitis among obese individuals without obesity-related metabolic unhealthiness, a condition referred to as metabolically healthy obese (MHO), remains unclear. We examined the association between body mass index (BMI) categories and the development of erosive esophagitis in a cohort of metabolically healthy individuals.
Methods We conducted a cohort study of 14,725 asymptomatic adults free of erosive esophagitis and metabolic abnormalities, who underwent repeated health check-ups including screening endoscopy. A metabolically healthy state was defined as having no metabolic syndrome components and a homeostasis model assessment of insulin resistance <2.5. The presence of erosive esophagitis was determined using endoscopy.
Results During 81,385.2 person-years of follow-up, 1,865 participants developed erosive esophagitis (incidence rate, 22.9 per 1,000 person-years). The multivariable adjusted hazard ratios (95% confidence intervals) for incident erosive esophagitis comparing overweight (BMI, 23.0–24.9 kg/m^2) and obese (≥25 kg/m^2) with normal-weight participants (18.5–22.9 kg/m^2) were 1.12 (1.00–1.25 kg/m^2) and 1.29 (1.14–1.47 kg/m^2), respectively. In dose-response analyses, increasing BMI also showed positive association with overall and LA-B grade or higher. The association persisted in MHO individuals without central obesity. The association between waist circumference categories and the development of erosive esophagitis was also evident.
Conclusions In a large cohort of strictly defined metabolically healthy men and women, the MHO phenotype was associated with an increased incidence of erosive esophagitis, providing evidence that the MHO phenotype is not protective from gastroesophageal reflux disease.
Keywords Erosive esophagitis; Obesity; Metabolic syndrome

Table 1. Development of Erosive Esophagitis by BMI Categories in Metabolically Healthy Participants

BMI category (kg/m^2)	Person-years	Incident cases	Incidence density (per 1,000 person-years)	Multivariable-adjusted HR* (95% CI)		
				Model 1†	Model 2‡	Model 3§
≥ LA-A grade						
<18.5	4430	76	17.2	1.09 (0.86-1.38)	1.06 (0.84-1.35)	1.04 (0.82-1.31)
18.5-22.9	47471.4	904	19.0	1.00 (reference)	1.00 (reference)	1.00 (reference)
23.0-24.9	18525.4	510	27.5	1.11 (0.99-1.24)	1.12 (1.00-1.25)	1.15 (1.02-1.29)
≥25	10958.4	375	34.2	1.28 (1.13-1.45)	1.29 (1.14-1.47)	1.34 (1.18-1.54)
P for trend				0.002	0.001	<0.001
Per 1kg/m^2 increase in BMI						1.05 (1.03-1.07)
≥ LA-B grade						
18.5-22.9	47471.4	43	0.9	1.00 (reference)	1.00 (reference)	1.00 (reference)
23.0-24.9	18525.4	49	2.7	1.84 (1.21-2.81)	1.90 (1.25-2.90)	1.90 (1.24-2.92)
≥25	10958.4	40	3.7	2.28 (1.46-3.57)	2.26 (1.44-3.54)	2.18 (1.35-3.52)
P for trend				<0.001	<0.001	<0.001
Per 1kg/m^2 increase in BMI						1.13 (1.05-1.22)

BMI, body mass index; HR, hazard ratio; CI, confidence interval; LA, Los Angeles; GERD, gastroesophageal reflux disease; HOMA-IR, homeostasis model assessment of insulin resistance; hsCRP, high sensitivity C-reactive protein.

Free Paper (Motility 2) FP-MO2-02

Alterations of Mucosal Impedance Values in the Duodenum and Antrum of Patients with Functional Dyspepsia

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Background/Aims Impedance baseline measurements can be used to evaluate changes in the integrity of the mucosa. Baseline impedance is known to be correlated with transepithelial resistance, which reflects impaired mucosal permeability. Recently, impaired duodenal mucosal integrity associated with increased mucosal permeability and/or low grade inflammation is suggested to be involved in the pathogenesis of functional dyspepsia (FD). The aim of the study was to measure the mucosal impedance values in the duodenum and antrum of patients with FD and compare those values with healthy controls.
Methods Eighteen adult patients (male:female, 8:10; mean age, 60 years) referred to Ajou University Hospital for chronically recurrent dyspeptic symptoms, who were finally diagnosed FD based on the Rome IV criteria, and 12 asymptomatic healthy controls (male:female, 2:10; mean age, 60 years) were enrolled in a prospective manner. Mucosal impedance measurement was performed on the duodenal 1st part, distal antrum, and distal esophagus just above EG junction during conventional endoscopy in the fasting state.
Results Age and sex ratio did not significantly differ between patients with FD and healthy controls. Mucosal impedance values at D were significantly lower in patients with FD (p=0.012) and in patients with PDS alone (p=0.049), and tended to be lower in patients with EPS alone (p=0.074), compared with healthy controls. Mucosal impedance values at A were significantly lower in patients with FD (p=0.043), and tended to be lower in patients with EPS alone (p=0.073) and in patients with PDS and EPS (p=0.071), compared with healthy controls. Those values did not significantly altered in patients with PDS alone. Mucosal impedance values at E were significantly lower in patients with EPS alone, but did not significantly altered in other groups, compared with healthy controls.
Conclusions Mucosal impedance values are significantly decreased on the duodenum and distal antrum in patients with FD, compared with controls. Mucosal impedance values are significantly decreased in the duodenum of the patients with PDS and the distal esophagus of the patients with EPS, and tend to be decreased in the duodenum and distal antrum of the patients with EPS, and the distal antrum of the patients with overlap of PDS and EPS. These alterations may suggest the involvement of altered mucosal permeability in the pathogenesis of FD, requiring further investigation.
Keywords Functional dyspepsia; Impedance; Duodenum; Antrum

Free Paper (Motility 2) FP-MO2-03

The Predictive Factors of Favorable Outcomes in Biofeedback Therapy in Defecatory Dysfunction and Fecal Incontinence Patients: Real World Experience

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Background/Aims The Aim of this study is to evaluate the predictive factors prior to the initiation of biofeedback therapy in patients with dyssynergic defecation or fecal incontinence.
Methods We retrospectively reviewed patients who underwent biofeedback therapy at tertiary referral hospital between October 2004 and April 2015 for symptoms of defecatory dysfunction and fecal incontinence. Clinical response was recorded after a course of biofeedback therapy and response rates based on patient opinion (3 points or more satisfaction and two or more times a week increased the number of defecation).
Results A total of 238 patients who underwent biofeedback therapy. One hundred sixty-nine (71%) were responder and 69 (29%) were not. Of those who underwent at least four biofeedback sessions, subjective short-term response rates were 113 of 167 (67%) in the constipation group and 27 of 39 (69%) in the FI group, 26 of 29 (89%) in the combination group and 3 of 3 (100%) in the anal pain group. Multivariate analysis was performed for those variables significant in the univariate analysis. The global bowel satisfaction score before biofeedback therapy (odds ratio [OR], 0.718; 95% confidence interval [CI], 0.583 to 0.886; p=0.002), the bowel movement frequency before biofeedback therapy (OR, 0.860; 95% CI, 0.764 to 0.968; p=0.012), rectal volume for constant sensation (OR, 0.989; 95% CI, 0.979 to 1.000; p=0.047), and pelvic floor descent (OR, 0.655; 95% CI, 0.456 to 0.942; p=0.022) were found to be the factors independently associated with good respond to biofeedback therapy.
Conclusions Our data show that the higher global bowel satisfaction score, higher bowel movement frequency before biofeedback therapy, higher rectal volume for constant sensation, and higher pelvic floor descent are associated with poor response to biofeedback therapy for patients with dyssynergic defecation or fecal incontinence.
Keywords Biofeedback; Dyssynergic defecation; Functional incontinence; Anorectal manometry; Defecography

Free Paper (Motility 2) FP-MO2-04

Initial Experience and Clinical Outcomes of Peroral Endoscopic Myotomy for the Treatment of Esophageal Achalasia and Esophageal Motility Disorders

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Background/Aims Recently, peroral endoscopic myotomy (POEM) has been performed as an initial method in place of laparoscopic myotomy or balloon dilatation as a treatment for achalasia and other major motility disorder. We describe our initial experience and clinical outcome with the twelve POEM procedures performed at our institution.
Methods Twelve patients (mean age, 47±15.1 years) with achalasia and major esophageal motility disorders were performed POEM. This completely endoscopic procedure involved an opening with mid-esophageal mucosal incision, a submucosal tunneling to cardia portion of stomach, and selective myotomy of circular muscle layer including the lower esophageal sphincter. The mucosal incision site was closed by endoscopic clips. Clinical data including manometry, esophagogram, symptom and procedure was analyzed retrospectively.
Results Before POEM, mean integrated relaxation pressure of manometry was 24.78±9.86 and balloon dilatation was performed on seven patients previously. All twelve patients successfully treated by POEM procedure, and the myotomy had a median length of 13 cm (range, 10 to 16 cm). After the procedure, passage disturbance of endoscope was improved in all patients. Operative time ranged from 62 to 170 minutes. No leaks were detected in the postoperative esophagogram and mean hospital admission days was 11.17±4.2. No clinical complications were observed, and there was significant clinical improvement on Eckardt score (7.0±2.3 vs 1.2±0.8, p<0.001).
Conclusions Based on the clinical results of our institution, POEM is a safe and clinically effective treatment for symptomatic achalasia. Long-term data for sustained symptom improvement maintenance will be needed in the future.
Keywords Achalasia; Peroral endoscopic myotomy

Free Paper (Motility 2) FP-MO2-05

An Altered Composition of Gut Microbiota, Organic Acids, and the Effect of Probiotics in the Guinea Pig Model of Postoperative Ileus

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Background/Aims Postoperative ileus (POI) is an impaired gastrointestinal (GI) motility caused by surgery. The aim of this study was to investigate the altered composition of gut microbiota, organic acids, and the effect of probiotics in guinea pig model of POI.
Methods A laparotomy with cecal manipulation was performed to induce POI in guinea pigs. Fecal pellets were collected before (control) and 1, 3, and 5 days after the operation. Extracted fecal DNA was amplified and sequenced using Illumina MiSeq sequencing system. Same procedures were performed before and after pretreatment of probiotics (a mixture of *Enterococcus faecalis*, *Bacillus mesentericus*, and *Clostridium butyricum*) or placebo via oral route for 7 days. Fecal samples were analyzed by species specific PCR, and enzyme-linked immunosorbent assay to evaluate the effect of probiotics on specific species, and fecal acetate and butyrate. GI transit was assessed via measurement of fecal pellet output.
Results Community alpha-diversity of fecal microbiota was not significantly different between control and POI model. However, beta-diversity measured by Bray-Curtis dissimilarity in POI model was significantly different from that of control, and lactic-acid producing bacteria was more abundant in control. The relative abundances of *C. butyricum*, *Lactobacillus plantarum*, *Bifidobacterium longum*, and *Bifidobacterium bifidum* were significantly decreased at 1 or 3 days after operation. In probiotics pretreatment group, the abundances of *B. longum* and *B. bifidum* were significantly increased compared with those of placebo group after operation. Fecal butyrate level was decreased in POI model, and significantly increased at the level of control in probiotics pretreatment group. GI transit was significantly improved in probiotics pretreatment group.
Conclusions POI induces gut bacterial dysbiosis, and reduces fecal organic acids. Pretreatment of probiotics before operation restores the abundance of several beneficial bacterial species, butyrate production, and bowel movement. The modulation of gut microbiota may help for the treatment and prevention of POI.
Keywords Postoperative ileus; Gut microbiota; Probiotics

Free Paper (GI Cancer) FP-GI3-01

Clinical Characteristics in Young-Age Onset Colorectal Cancer

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Background/Aims The incidence of colorectal cancer (CRC) in young adults has increased, the death rate is on the rise. We aimed to evaluate clinicopathologic outcomes, the treatment and outcomes in our institution of patient aged under 40 years with colorectal adenocarcinoma.
Methods Patients aged 40 years and younger, diagnosed with CRC in our institution between March 2010 and March 2018, were included. A total of 61 CRC patients were enrolled in this retrospective, observational and descriptive study. We conducted an analysis of data on demographics, staging, treatment and survival in young adults with CRC.
Results The median age was 37 years (range, 22 to 40 years) and 33 (54.1%) were male. Twenty-four patients (39.3%) were diagnosed as stage IV CRC, the proportion of surgery was high (66.7%) in patients with stage IV colon cancer. Two patients had history of familial adenomatous polyposis, and there was no other genetic predisposition of CRC. Locations were 10, 30 and 21 in right colon (from cecum to proximal transverse colon), left colon (from hepatic flexure to sigmoid colon) and rectum, respectively. Recurrence rate was 27.0% (10/37) in stage I to III CRC. Operation was taken in 66.6% of patients with stage IV colon cancer.
Conclusions The incidence of young-age CRC patients is increasing. Physicians tend to treat more surgery and more chemotherapy aggressively in young patients compared to old patients. Younger patients have more advanced and aggressive cancer with poor prognosis located predominantly left side. Clinical suspicion is important in young adults with symptoms, proper tests are needed to prevent misdiagnosis or delayed diagnosis. Further studies should seek to increase understanding of molecular and genetic biology.
Keywords Colon cancer; Young; Surgery

Table 1. Demographic and Tumor Characteristics According to Treatment Modality

	Surgery	Surgery and Chemotherapy	Chemotherapy	Supportive care	All patents
Number of patients, number (%)	11 (18.0)	42 (69.9)	4 (6.6)	4 (6.6)	61 (100)
Age, years, mean (SD)	37.2 (3.0)	35.3(4.2)	34.3 (5.1)	27.5 (5.8)	35.0 (4.6)
Gender M:F (%F)	7:4 (36.4)	21:21 (50.0)	3:1 (25.0)	2:2 (50.0)	33:28 (45.9)
Stage					
Stage I, n (%)	6 (54.5)	1 (2.4)	0	0	7 (11.5)
Stage II-III, n (%)	4 (36.4)	26 (61.9)	0	0	30 (49.2)
Stage IV, n (%)	1 (9.1)	15 (35.7)	4 (100)	4 (100)	24 (39.3)
Location					
Right side tumor, n (%)	1 (9.1)	7 (16.7)	1 (25)	1 (25)	10 (16.4)
Left side tumor, n (%)	5 (45.5)	23 (54.8)	1 (25)	1 (25)	30 (49.2)
Rectal tumor, n (%)	5 (45.5)	12 (28.6)	2 (50)	2 (50)	21 (34.4)

M, male; F; female.

Free Paper (GI Cancer) FP-GI3-02

Tolerability of Adjuvant Chemotherapy with TS-1 or XELOX Regimen in Elderly Patients with Stage II or III Gastric Cancer after D2 Gastrectomy

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Background/Aims Compared to surgery, adjuvant TS-1 and XELOX regimen in gastric cancer (GC) has shown survival benefit after D2 gastrectomy. As the elderly population continues to grow, adjuvant chemotherapy (AC) has become important. Clinicians hesitate to offer chemotherapy to elderly patients because of comorbidities and intolerability. This study aims to investigate the efficacy, safety, and compliance of AC with TS-1 and XELOX regimen in patients aged >70 years.
Methods We collected data on stage II/III GC patients who underwent D2 gastrectomy followed by AC (TS-1 or XELOX regimen) between January 2013 and December 2018 at Chungnam National University Hospital. They were classified into two groups by age which is over 70 years or not; we analyzed baseline characteristics, adverse events, overall survival (OS), relapse free survival (RFS), rates of regimen completion, and dose reduction.
Results There was no significant difference in OS and RFS between both regimens. The TS-1 group had 232 patients (92 elderly). For grade >3 adverse events, elderly patients had more anemia (p=0.029) and lower completion rates (78.4% vs 91.5%, p<0.001) but not dose reduction rates; both OS and RFS were lower (p=0.034 and 0.026) (Fig. 1A and B). The XELOX group had 119 patients (27 elderly). For grade >3 adverse events, elderly patients had more thrombocytopenia (p=0.02); no differences in completion and dose reduction rates; and no differences in OS and RFS (Fig. 1C and D).
Conclusions There was no difference in efficacy between the TS-1 and XELOX regimens; both were tolerable in elderly patients. The XELOX group showed no differences in OS and RFS, which were lower in the TS-1 group, possibly due to decreased completion rates. Clinicians should not hesitate to prescribe AC to elderly patients. Furthermore, completing chemotherapy schedule should be important.
Keywords Gastric cancer; Adjuvant chemotherapy; Elderly; TS-1; XELOX

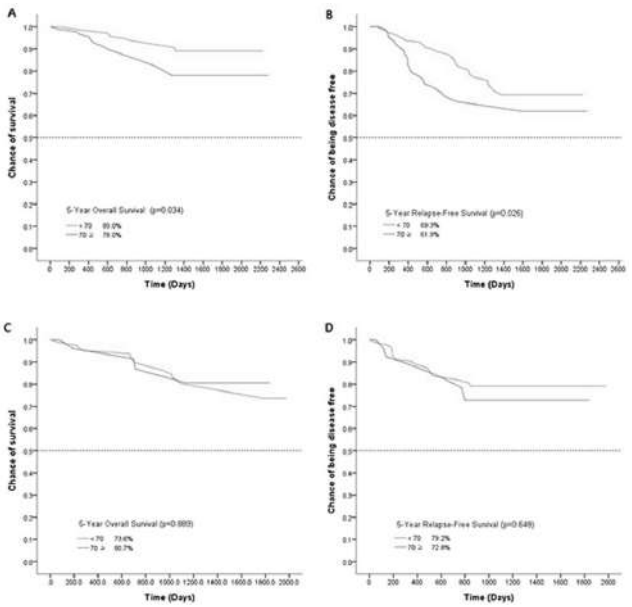

Fig. 1. Kaplan-Meier curve.

Free Paper (GI Cancer) FP-GI3-03

Acute Cardiac Toxicity in Concurrent Chemoradiotherapy for Oesophageal Cancer

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Background/Aims Cisplatin and 5 fluorouracil (5-FU) based concurrent chemoradiotherapy (CCRT) has become a standard treatment option for patients with unresectable or medically inoperable esophageal cancer. The aim of this study was to assess the acute cardiac toxicity in CCRT for oesophageal cancer patients.
Methods From August 2016 to September 2017, 41 patients with histologically proven oesophageal cancer were treated with three dimensional conformal radiotherapy with total dose of 50 Gy with concurrent chemotherapy (cisplatin+5-FU) for 3 weeks. To assess the acute cardiac toxicity, weekly early gastric cancer (ECG) during CCRT and chest X-ray, ECG and Echocardiogram before and after CCRT were done.
Results In this study, 14 patients (34%) had no specific ST-T changes and specific ST-T changes. Although 34% were diagnosed as coronary artery disease, only 10 patients (24%) developed chest pain. V30Gy was <40% in all patients (p=0.87175). The mean cardiac dose was less than 26% and EF was reduced after CCRT (p=0.26015). Two patients (5%) developed grade 1 cardiac dysrhythmia during treatment which were transient. All patients had reduction in resting EF by <20% after CCRT (grade 1 cardiac toxicity) but no therapy was required. Fourteen patients (34%) developed grade 1 and grade 2 cardiac ischaemia during and after CCRT which were treatable but no patient developed cardiac/pericardial effusion during and after CCRT treatment.
Conclusions In conclusion, CCRT for oesophageal cancer impaired LVF both systolic and diastolic and this impairment was prominent in the high LV-dose group. Cardiac ischaemia which was a treatable stage of radiation induced coronary artery disease was also found. Therefore, all patients in this study were tolerated well to combination of radiotherapy and concurrent chemotherapy without significant side effects.
Keywords Concurrent chemoradiotherapy; Oesophageal cancer; Acute cardiac toxicity

Free Paper (GI Cancer) FP-GI3-04

Hepatoid Adenocarcinoma of Gastrointestinal Tract: Experience of 23 Cases at a Single Tertiary-Care Oncology Center

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Background/Aims Hepatoid adenocarcinoma (HAC) is a rare variant characterized by hepatocellular differentiation and poor outcome. Little is known about HAC due to its rarity. We aimed to evaluate the distribution and clinicopathologic spectrum of HAC of the gastrointestinal tract (GIT).
Methods Clinicopathologic data of all HAC of GIT (2003–2018) were retrieved and the diagnosis confirmed on histopathology (as per the World Health Organization classification).
Results A total of 23 cases were studied. The median age was 55 years (range, 33 to 85 years); male-to-female ratio was 1.3. Sites of primary tumor included: stomach (61%), gallbladder (17%), rectum (13%), gastroesophageal junction (4.5%), and pancreas (4.5%). Serum alfa-fetoprotein levels ranged from 54 to 22,570 ng/mL (median, 1,725 ng/mL). Serum carcinoembryonic antigen was elevated in 13 (58%). Seventy percent of patient had distant metastases at presentation. Median tumor size was 6.5 cm. Radical surgery was possible in five patients; two received prior neoadjuvant chemotherapy. On microscopy, tumor cells were hepatoid in appearance; the proportion of hepatoid cells ranged from 10% to 90%; 25% revealed subnuclear vacuolation reminiscent of fetal enteric-type epithelium. On immunohistochemistry, all tumors showed reactivity for at least two glandular markers (CK20, CDX2, CK19, CK7) and two hepatocytic markers (HepPar1), glypican-3, AFP and arginase-1. c-erbB2 (0/6) and mismatch repair protein deficiency (0/3) was absent. Adjuvant chemotherapy, palliative chemotherapy, and best supportive care were given in five, 15 and two patients, respectively. Distant metastases were observed in 88% patients; the commonest site was liver (71%). One patient was alive without disease, 17 developed progressive disease while five patients died of disease. Median progression-free survival was 4 months and median overall survival was 6 months.
Conclusions HAC is a rare malignancy with a high rate of systemic dissemination and a poor outcome. Accurate diagnosis at an early stage and effective multimodality treatment is the need of the hour.
Keywords Hepatoid adenocarcinoma; Gastrointestinal; Clinicopathologic correlation; Immunohistochemistry; Outcome

Free Paper (GI Cancer) FP-GI3-05

Optimal Adjuvant Therapy in Patients with Locally Advanced Pancreatic Cancer Who Have Received Preoperative FOLFIRINOX

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Background/Aims Pancreatic cancer has been known to have a dismal prognosis since only about 20% of patients are eligible for radical resection at initial diagnosis. However, with the advent of the first line treatment with FOLFIRINOX or albumin-bound paclitaxel for unresectable pancreatic cancer, the radical resection rate of pancreatic cancer is rising. Since the adjuvant therapy after preoperative FOLFIRINOX has not been established, we analyzed the predictive factors which are associated with improved disease-free survival in these patients.

Methods From July 2013 till April 2017, 117 patients with locally advanced pancreatic cancer who received FOLFIRINOX as a first-line chemotherapy in Seoul National University Hospital were retrospectively analyzed.

Results Eventually, 29 patients (24.8%) underwent radical resection, and 25 patients (86.2%) received adjuvant therapy: concurrent chemoradiation (n=9), FOLFIRINOX (n=5), gemcitabine single (n=8), S-1 (n=2), and FL (n=1). During median follow-up of 28 months, 17 patients (58.6%) experienced recurrence, and median disease-free survival was 22 months (95% confidence interval, 3.905 to 40.095 months). Adjuvant therapy was the only significant factor predicting longer disease-free survival. The relative hazard ratio of recurrence in adjuvant FOLFIRINOX therapy group and the group with adjuvant therapy other than FOLFIRINOX was 0.033 (p=0.017) and 0.031 (p=0.004) respectively, when compared with the group with no adjuvant therapy. Tumor regression grade score after preoperative FOLFIRINOX was not associated with recurrence or disease free survival in our study.

Conclusions Adjuvant therapy lowers the risk of recurrence in locally advanced pancreatic cancer patients who have received preoperative FOLFIRINOX.

Keywords Pancreatic cancer; FOLFIRINOX; Adjuvant therapy

Free Paper (GI Cancer) FP-GI3-06

Predictive Factors for Technical/Clinical Success of Colorectal Stenting in Malignant Colorectal Obstruction

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Background/Aims With the development of treatment for colorectal cancer, stenting is used with increasing as a treatment for malignant colorectal obstruction. Compared with surgery, colorectal stent insertion shows similar result and less complications, successful colorectal stent insertion will improve quality of life in curative and palliative treatment patients. The aim of this study is to predict factors related to technical/clinical success in colorectal stent insertion for improvement of the success rate.

Methods From January 2013 to December 2019, we retrospectively identified 479 patients with malignant colorectal obstruction who underwent placement of colorectal self-expandable metal stent (SEMS) at Chonnam National University Hwasun Hospital, Korea. Main outcome measures included technical success, clinical success, complications, and predictors of outcome.

Results The incidence Technical success was achieved in 86.4% (414/479) and clinical success in 74.3% (356/479) of the cases. Pain and tenderness were present in 75.8% (363/479) and 44.1% (211/379), there were statistically related factor to technical failure of SEMS insertion (odds ratio [OR], 3.041; p=0.029 and OR, 2.358; p=0.012). Also, metastasis and microperforation were present in 306 of 479 (63.9%), 17 of 479 (3.6%) and it was a statistically significant factor associated with technical failure (OR, 7.128; p=0.04 and OR, 4.413; p=0.008). But there were no statistically factor associated with clinical failure in multivariate analysis.

Conclusions Pain, tenderness, microperforation, and metastasis were a predict factor of technical failure of colorectal SEMS insertion in malignant colorectal obstruction.

Keywords Colorectal cancer; Stent; Obstruction; Technical success; Clinical success

Table 1. Multivariate Logistic Regression Analysis of Risk Factors Associated with Technical Failure of Colon Stenting

Factors	OR (95%CI)	p-value
Metastasis	7.128 (1.093 – 46.476)	0.040
Ileus	0.248 (0.120 – 0.514)	0.131
Microperforation	4.413 (1.462 – 13.320)	0.008
Carcinomatosis peritonei	1.866 (0.945 – 3.682)	0.072
Pain	3.041 (1.122 – 8.240)	0.029
Tenderness	2.358 (1.207 – 4.610)	0.012
Aim of stent insertion		
Pre-operative bridging (Cure)	Ref.	
Palliative operation bridging	2.80 (0.927 – 8.451)	0.068
Palliative	1.419 (0.632 – 3.189)	0.396
Degree of obstruction		
Total	0.545 (0.283 – 1.047)	0.068
Partial	Ref	
TNM stage of cancer		
Stage II	Ref	
Stage III	0.444 (0.092 – 2.136)	0.311
Stage IV	0.344 (0.046 – 2.584)	0.300

OR, odds ratio; CI, confidence interval.

Table 2. Multivariate Logistic Regression Analysis of Risk Factors Associated with Clinical Failure of Colon Stenting

Factors	OR (95%CI)	p-value
Metastasis	1.843 (0.412 – 8.233)	0.423
Ileus	0.462 (0.269 – 0.794)	0.060
Microperforation	2.521 (0.900 – 7.058)	0.078
Carcinomatosis peritonei	1.620 (0.949 – 2.767)	0.077
Tenderness	1.952 (1.249 – 3.052)	0.003
Aim of stent insertion		
Pre-operative bridging (Cure)	Ref.	
Palliative operation bridging	1.928 (0.807 – 4.607)	0.140
Palliative	1.652 (0.901 – 3.032)	0.105
TNM stage of cancer		
Stage II	Ref	
Stage III	0.614 (0.251 – 1.501)	0.285
Stage IV	0.894 (0.188 – 4.260)	0.888

OR, odds ratio; CI, confidence interval.

Korea Digestive Disease Week 2019

E-poster Oral

Upper GI 1-3

Lower GI 1-3

Motility

GI Cancer

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KDDW2019
Korea Digestive Disease Week

Upper GI 1 EP-UG11-01

OLGA and OLGIM Stage for the Prediction of Metachronous Gastric Neoplasia after Endoscopic Resection in *Helicobacter pylori* Negative Early Gastric Cancer Patients

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Background/Aims Prospective cohort studies have reported that operative link for gastritis assessment (OLGA) and operative link for gastric intestinal metaplasia assessment (OLGIM) staging systems could predict the risk of gastric epithelial neoplasia progression in patients without gastric cancer. We evaluated metachronous gastric neoplasia risk after endoscopic submucosal dissection (ESD) in early gastric cancer (EGC) patients without *Helicobacter pylori* infection according to the OLGA and OLGIM stages.
Methods This retrospective study included 568 EGC patients who underwent ESD for EGC between 2004 and 2015. OLGA and OLGIM stages were determined when *H. pylori* status was all negative at biopsy specimens from the antrum, corpus lesser and greater curvature. OLGA and OLGIM stages III-IV was defined as high-risk group. Primary outcome was risk of metachronous gastric neoplasia including adenoma and cancer, and age-sex adjusted hazard ratio (aHR) was calculated using the Cox-proportional hazard model.
Results During a median follow-up of 5.0 years, metachronous neoplasia developed in 71 of the 568 patients (12.5%; 42 cancer and 29 adenoma). Of 519 patients evaluated by OLGA stage, aHR for metachronous neoplasia was 6.81 in stage I, 4.71 in stage II, 7.68 in stage III, and 8.71 in stage IV. High-risk OLGA group (aHR, 1.82; p=0.028) had a significantly increased risk of metachronous neoplasia compared with low-risk group. OLGIM stages were evaluated in all included 568 patients, and risk of metachronous neoplasia increased with advanced OLGIM stages: aHR 2.25 in stage I, 2.56 in stage II, 3.35 in stage III, and 4.36 in stage IV. High-risk OLGIM group had also significantly increased metachronous neoplasia risk (aHR, 1.81; p=0.026).
Conclusions OLGA and OLGIM stages may be a risk assessment tool for the prediction of metachronous gastric neoplasia development after ESD in EGC patients who had negative *H. pylori* infection.
Keywords OLGA stage; OLGIM stage; Metachronous gastric neoplasm

Upper GI 1 EP-UG11-02

Preprocedural Features for Predicting the Risk of Lymph Node Metastasis in Early Gastric Cancer

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Background/Aims Endoscopic submucosal dissection (ESD) is a curative method for some cases of early gastric cancer (EGC). However, some patients still need additive gastrectomy after ESD because of lymph node metastasis (LNM) risk. If an accurate predicting for the risk of LNM before ESD is possible, appropriate treatment strategy could be established at the timing of decision for ESD. We aimed to investigate preprocedural features for predicting the risk of LNM in EGC.
Methods We collected the data of 1,162 patients who underwent ESD for EGC. Non-curative resection patients due to LNM, positive vertical margin, lymphovascular invasion, or submucosal invasion in undifferentiated-type and submucosal invasion over 500 μm in differentiated-type were assigned as LNM risk group (n=133). Among curative resection patients, undifferentiated-type limited to mucosa and differentiated-type with submucosal invasion limited to 500 μm, were assigned as a control group (n=145). We analyzed endoscopic and pathologic features about the risk of LNM.
Results A larger size (>30 mm, p=0.001), elevated morphology (p=0.002), the presence of erythema (p<0.001) and fold convergence (p<0.001) increase the risk of LNM. When fold convergence was existed with ulcer, the risk increases more than fold convergence alone (odds ratio [OR]=6.46 vs OR=4.14, p<0.001). Pathologic discrepancy (p=0.03) between preprocedure biopsy and ESD increases the risk of LNM. On the contrary, diagnosis of signet ring cell (SRC) at preprocedure biopsy (p=0.023) decreases the risk of LNM. In differentiated-type, erythema (p<0.001) increases the risk of LNM. In undifferentiated-type, larger size (p=0.003), elevated morphology (p=0.01) and erythema (p<0.001) increase the risk of LNM. However, diagnosis of SRC at preprocedure biopsy (p=0.04) decreases the risk.
Conclusions Several preprocedural features were associated with the risk of LNM. Therefore, considering these features in addition to existing ESD criteria may be helpful in providing patients with the best treatment option.
Keywords Endoscopic submucosal dissection; Lymph node metastasis; Early gastric cancer; Non-curative resection; Risk prediction

Upper GI 1 EP-UG11-03

Favorable Long-term Outcomes of Endoscopic Submucosal Dissection for Differentiated-type-Predominant Early Gastric Cancer with Histological Heterogeneity

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Background/Aims Differentiated-type-predominant early gastric cancer with histological heterogeneity (EGC-HH) including minor undifferentiated component has more aggressive clinicopathologic behaviors and higher risk of lymph node metastasis than pure differentiated-type EGC without undifferentiated component. Long-term outcomes of endoscopic submucosal dissection (ESD) for EGC-HH remain unclear.
Methods This study included 277 patients with 278 EGC-HH treated with ESD between 2007 and 2014. After ESD, EGC-HH was managed in the same way as pure differentiated-type EGC. The clinicopathologic characteristics and short- and long-term outcomes of ESD for EGC-HH were reviewed.
Results Among 278 EGC-HHs, submucosal invasion, lymphatic invasion, and lateral resection margin involvement rates were 42.5%, 29.5%, and 10.1%, respectively. *En bloc* and R0 resection and curative resection rates were 84.5% and 49.3%, respectively. During a median 59 months of follow-up after curative ESD, six patients had metachronous recurrence (4.7%) and one patient underwent extragastric recurrence in a regional lymph node (0.8%) (Fig. 1). All recurrence cases were curatively treated with ESD or gastrectomy. The 5-year overall survival rates were 93.6% and 98.0% for patients with EGC-HH meeting the curative endoscopic resection criteria for tumors of absolute or expanded indications, respectively.
Conclusions ESD showed favorable long-term outcomes and can be an acceptable treatment option for EGC-HH meeting the curative endoscopic resection criteria. After curative ESD for EGC-HH, careful follow-up with abdominal computed tomography is required.
Keywords Early gastric cancer; Endoscopic submucosal dissection; Histological heterogeneity

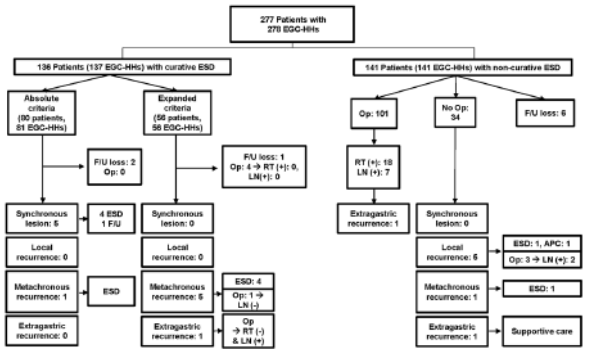

Fig. 1. Long-term outcomes of endoscopic submucosal dissection (ESD).
EGC-HH, early gastric cancer with histological heterogeneity; F/U, follow-up; Op, operative; RT, radiotherapy; LN, lymph node; APC, argon plasma coagulation.

Upper GI 1 EP-UG11-04

Development of Endoscopic Scoring System to Predict Risk of Intestinal Type Gastric Cancer: Preliminary Prospective Study

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Background/Aims We aimed to develop endoscopic scoring system to evaluate atrophic gastritis and intestinal metaplasia using narrowing band imaging (NBI) and magnification view and to compare endoscopic scores with operative link for gastritis assessment (OLGA) and operative link for gastric intestinal metaplasia assessment (OLGIM).
Methods Total 28 patients underwent diagnostic esophagogastroduodenoscopy were enrolled and endoscopic scoring using NBI and magnification view were performed. Four areas (the lesser and greater curvatures of the antrum and the lesser and greater curvature side of the body) were observed and biopsies were taken. Degree of atrophy was scored from 0 to 2 according to Kimura-Takemoto classification (0, C0-2; 1, C3-O1; 2, O2-3). Degree of metaplasia was scored from 0 to 3 (0, no metaplasia; 1, metaplasia at antrum; 2, metaplasia at body; +1, 1/2 >observed filed). Endoscopic scores were compared to OLGA and OLGIM staging.
Results Correlation coefficients for atrophy between endoscopic and histologic scores 0.85 (95% confidence interval [CI], 0.70 to 0.93; p<0.001) and those for metaplasia was 0.74 (95% CI, 0.85 to 0.87; p<0.001). For atrophic gastritis, endoscopic score >1 correlated OLGA Stage III and IV with a sensitivity, specificity, positive predictive value, and negative predictive value of 92%, 88%, 86% and 93%, respectively and for metaplasia, endoscopic score >1 correlated high OLGIM Stage III and IV with those values of 78%, 100%, 100% and 73%, respectively.
Conclusions Endoscopic scoring for gastric atrophy and intestinal metaplasia using NBI-magnification view seems to correlate well with histologic staging.
Keywords Atrophy; Metaplasia; OLGA; OLGIM

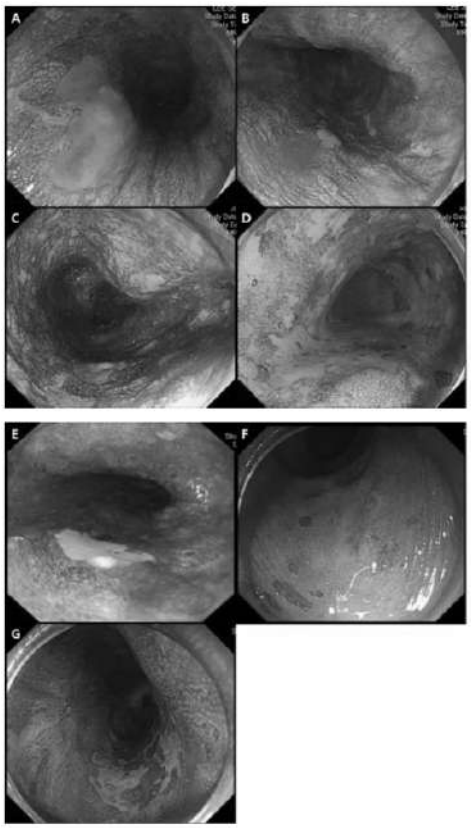

Fig. 1. Endoscopic images of Lugol chromoendoscopy. (A) No Lugol-voiding lesions (LVLs). (B) Several small LVLs (≤ 10). (C) Many LVLs (>10). (D) Many (>10) irregular-shape multiform LVLs around the main lesion. (E) Clear margin of main LVL. (F) Unclear margin of main LVL. (G) Spiculated margin of main LVL.

Upper GI 1 EP-UG11-05

Risk Factors of Metachronous Recurrence after Endoscopic Submucosal Dissection for Superficial Esophageal Squamous Cell Carcinoma

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Background/Aims Esophageal endoscopic submucosal dissection (ESD) can be used for curative treatment of superficial esophageal squamous cell carcinoma (SESCC). However, it is not clear whether the development of metachronous recurrence after ESD may be explained based on several risk factors. This study aimed to assess the incidence rate and the risk factors of developing metachronous recurrence of SESCC after ESD.
Methods This was a retrospective analysis conducted in Samsung Medical Center, Seoul, Korea, from April 2007 to May 2018. Two hundred and fifty-three SESCC patients treated by ESD were followed by surveillance endoscopy after procedure. Risk factors for metachronous esophageal SCC were analyzed by using Kaplan-Meier method and Cox proportional hazards model.
Results Metachronous esophageal SCCs were found in 21 of the 253 patients (8.3%). Six patients (2.4%) had extraesophageal recurrence, such as lymph node metastasis confirmed by imaging were excluded from patients with metachronous recurrence and data was censored from the recurrence date. Univariate analysis revealed that the presence of many (>10) irregular-shaped multiform Lugol-voiding lesions (LVLs) around the main lesion, margin of main LVL, and differentiation of tumor were risk factors for the development of metachronous cancer. Multivariate analysis also revealed that many (>10) LVLs (hazard ratio [HR], 6.32; 95% confidence interval [CI], 1.62 to 24.72; p=0.047) and unclear or spiculated margin of main LVL (HR, 6.51; 95% CI, 1.44 to 29.42, p=0.029) were associated with the risk of developing metachronous recurrence.
Conclusions Metachronous esophageal SCC develops in patients treated by ESD for SESCC. Risk assessment is important for surveillance before and after ESD for SESCC. Number of LVL and type of tumor edge are associated with increased risk of metachronous cancer in SESCC. Patients will benefit from careful endoscopic surveillance while paying attention to these tumor characteristics.

Upper GI 1 EP-UG11-06

Accuracy of Endoscopic Ultrasound for Superficial Esophageal Cancer and Factors Affecting Overstaging

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Background/Aims Endoscopic submucosal dissection (ESD) is one of the curative treatment options for superficial esophageal cancer with minimal risk of lymph node metastasis. Prior to ESD, accurate clinical staging is important to select the appropriate candidate. We aimed to estimate the practicality of endoscopic ultrasound (EUS) to determine clinical T stage.
Methods We included superficial squamous esophageal cancers treated with surgical resection or ESD between 2005 and 2018. Pathologic reports were reviewed retrospectively and pathologic T staging was compared to clinical stage evaluated by EUS.
Results Among 532 cases, 321 cases were superficial esophageal cancer (pTis, 42; pT1a, 115; pT1b, 164). Accuracy rates, sensitivity, specificity, positive predicted value, and negative predicted value for selecting cT1a by EUS was 82.3%, 60.5%, 91.5%, 74.80%, and 84.69% respectively. The overestimation rate of pT1a was 48.7%. In multivariable analysis, tumor size (>2 cm), poor differentiation, protruding gross type, use of conventional EUS were associated factors for overestimation of pT1a (Table 1).
Conclusions Although prediction accuracy of the T stage in superficial esophageal cancer with EUS was favorable, considerable overestimation rate was identified. Large size (>2 cm), poor differentiation, protruding morphology and use of conventional EUS were related to overestimation of T stage and precaution should be taken in evaluating clinical stage for cancers with those conditions.
Keywords Endoscopic ultrasound; Superficial esophageal cancer; Endoscopic submucosal dissection

Table 1. Associated Factors for Overestimation of T Staging by EUS in Pathologic T1a Esophageal Caner

Variables	Multivariate OR	95% CI	P value
Size			
≤2cm	1 (ref)		
>2cm	2.193	1.004-4.794	0.049
Histology			
High grade dysplasia	1 (ref)		
SqCC W/D	4.543	1.393-14.817	0.012
SqCC MP/D	4.918	1.572-15.389	0.006
Gross type			
Superficial	1 (ref)		
Ulcerative	1.392	0.496-3.910	0.530
Protruding	11.662	1.102-123.447	0.041
Location			
Upper/middle	1 (ref)		
Lower/GE junction	2.174	0.945-5.002	0.068
LVI	2.429	0.306-19.289	0.401
Probe			
Miniprobe	1 (ref)		
Conventional	4.176	1.766-9.879	0.001

Adjusted: age, sex, type of endoscopic submucosal dissection (EUS) probe, tumor size, location, gross type, histology lymphovascular invasion.
OR, odds ratio; CI, confidence interval; ref, reference; GE, gastroesophageal; LVI, lymphovascular invasion.

Upper GI 1 **EP-UG11-07**

Clinical Significance of Simulation Computed Tomography Images during Definitive Chemoradiotherapy in Locally Advanced Esophageal Cancer

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Background/Aims Evaluation of concurrent chemoradiotherapy (CCRT) response in locally advanced esophageal cancer (LAEC) is mostly performed by pre- and post-treatment radiologic studies. Simulation computed tomography (CT) is occasionally taken during CCRT. The aim is to investigate the clinical significance of simulation CT during CCRT, especially about the prediction of treatment response and survival.
Methods We retrospectively collected clinical data of 198 patients with LAEC who were treated by definitive CCRT from 2005 to 2014. Among them, 21patients (10.6%) underwent simulation CT during CCRT. The axial simulation CT images, including the largest primary lesion and regional lymph node (LN), were selected as a region of interest (ROI). And the ROIs were manually drawn to cover the boundary of the lesion for measurement of the area. We evaluated factors taken from the images about the association with complete remission (CR) and overall survival (OS).
Results Among 198 patients, 80 patients (40.4%) showed CR, and 25 patients (12.6%) recurred after CCRT. In 21 eligible patients for the analysis of simulation CT images during CCRT, the median follow-up period was 33 months. Eleven patients showed CR, and seven patients recurred during the follow-up period. The area reduction of both the primary lesion (8.9% vs 50%, p=0.001) and LN (1.8% vs 42.2%, p=0.003) was significantly associated with CR. The reduction of both maximal thickness of primary lesion and LN diameter also related to CR. OS was significantly longer in those with the reduction of both primary lesion and sum of primary lesion and LN more than 30% with Kaplan-Meier curve (Fig. 1).
Conclusions In LAEC patients treated by definitive CCRT, the reduction of the area of ROI in simulation CT during CCRT correlates with CR and OS. The evaluation of tumor burden reduction during CCRT may help predict the prognosis of the patients after CCRT.
Keywords Esophageal cancer; Definitive concurrent chemoradiotherapy; Simulation computed tomography

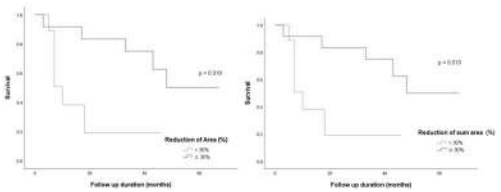

Fig. 1. Kaplan-Meier curve of overall survival.

Upper GI 1 **EP-UG11-08**

Comparison between Gastrostomy and Self-Expandable Metal Stent for Malignant Esophageal Obstruction, after Propensity Score Matching

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Background/Aims Malignant esophageal obstruction caused weight loss and malnutrition, contributing to poor prognosis. For these reasons, self-expandable metal stent (SEMS) insertion and percutaneous gastrostomy (PG) feeding are used for those patients. However, outcomes of two procedures are still controversial. This study aimed to compare outcomes between SEMS insertion and PG feeding for them, after propensity score matching.
Methods We retrospectively reviewed 568 esophageal cancer patients who underwent SEMS insertion (stent group) or PG (gastrostomy group) at Samsung Medical Center between January 1996 and December 2018. Underwent procedures for reasons other than malignant obstruction, such as radiation-induced stricture or fistula were excluded in analysis. We analyzed datasets after matching age, gender, stage, length of obstruction and treatment before procedure. Primary outcome was overall survival (OS) and secondary outcomes were post-procedural nutritional status (change of serum albumin level and body weight), need for additional intervention (AI) and occurrence of complication and aspiration pneumonia.
Results Before matching, stent group (n=195) had more advanced stage, less cervical cancers, and received chemotherapy, radiotherapy and esophagectomy less often than gastrostomy group (n=188), but there was no significant difference after matching. In Cox hazard proportional model, PG was associated with better OS compared to SEMS insertion (hazard ratio, 0.689; 95% confidence interval, 0.498 to 0.953). In addition, gastrostomy group needed less AI (2.1% vs 23.4%, p<0.001) and resulted less decrease in serum albumin levels (−0.15±0.57 g/dL vs −0.41±0.59 g/dL, p=0.021) than stent group after procedure.
Conclusions In our clinical experience, PG tended to get better outcomes than SEMS insertion in patients with malignant esophageal obstruction. Because PG needed less AI and resulted less decrease in serum albumin level, suggesting better post-procedural nutritional status. Therefore, OS in gastrostomy group seems to be much longer than stent group.
Keywords Malignant esophageal obstruction; Stent insertion; Percutaneous gastrostomy; Overall survival; Post-procedural nutrition

Table 1. Prognostic Factors Associated with Overall Survival in Patients with Malignant Esophageal Obstruction

		HR	p value	*HR	*p value
Age	year	1.006 (0.991-1.022)	0.429		
Gender	Male	1	0.489		
	Female	0.837 (0.504-1.387)			
Stage	II+III	1	0.025	1.433 (0.997-2.059)	0.052
	IV	1.464 (1.049-2.042)			
Location	Cervical	1	0.112	1	0.304
	Upper	0.923 (0.500-1.705)	0.798	1.222 (0.639-2.337)	0.544
	Middle	1.240 (0.666-2.307)	0.498	1.629 (0.840-3.158)	0.149
	Lower	0.732 (0.394-1.358)	0.322	1.147 (0.590-2.227)	0.686
Histology	Others	0.715 (0.222-2.302)	0.573		
	Squamous cell carcinoma				
Tumor length	cm	1.032 (0.980-1.087)	0.227		
Chemotherapy	None	1	<0.001	1	0.072
	Before procedure	1.148 (0.767-1.719)	0.503	0.893 (0.574-1.390)	0.313
	After procedure	0.506 (0.323-0.793)	0.003	0.597 (0.375-0.949)	0.029
Radiotherapy	None	1	<0.001	1	0.031
	Before procedure	1.608 (1.117-2.316)	0.011	1.545 (1.000-2.387)	0.050
	After procedure	0.587 (0.388-0.887)	0.012	0.791 (0.513-1.220)	0.289
Surgery (Esophagectomy)	None	1	<0.001	1	<0.001
	Before procedure	88.287 (8.005-973.727)	<0.001	123.079 (10.149-1492.596)	<0.001
	After procedure	0.258 (0.112-0.591)	0.001	0.341 (0.142-0.821)	0.016
Procedure	Stent	0.732 (0.534-1.003)	0.052	0.689 (0.498-0.953)	0.024
	Gastrostomy				

HR, hazard ratio.
*Multivariable analysis.

Upper GI 1 EP-UG11-09

Clinical Outcomes of Mucinous Gastric Carcinomas Compared with Non-mucinous and Signet Ring Cell Carcinomas

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Background/Aims The aim of this study was to analyze the differences between a group of patients with mucinous gastric carcinoma (MGC) and a group without extracellular mucin gastric carcinoma (non-MGC), and signet ring cell gastric carcinoma (SRC).
Methods We performed a retrospective cohort study of 65 patients with mucin producing gastric cancer from January 2007 to December 2016. During the same period, a total 1,814 patients with histologically proven gastric cancers had curative or palliative operations. We selected control groups for 195 patients with non-MGC as age and sex matched 1: 3 control, and 200 patients with SRC. We evaluated demographic features of patients, macro/microscopic features of tumor, and predictive factors such as recurrence and disease-free survival.
Results The incidence of MGC and SRC was 3.6% and 10.7%, respectively. The long-term recurrence and metastatic disease were significantly high in MGC, compared with non-MGC and SRC (24/65, 32/195, 41/200; p<0.01). The rate of EGCa (T1a/1b regardless of N stage) was low (9/65, 94/ 195, 119/ 200; p<0.01). Metastatic lymph node was high (43/65, 79/195, 64/200; p<0.01). The rate of initial pT4, M1 stage and direct spread of peritoneal recurrence was the highest in MGC. As for the rate of curative resection and disease-free survival, there were no significant differences between MGC and SRC.
Conclusions MGC had a negative prognostic impact and distinct clinical outcomes. Because initial T4 stage and direct peritoneal spreading were frequent in MGC, it should be treated aggressively.
Keywords Gastric cancer; Mucin; Prognosis

Upper GI 1 EP-UG11-10

Mucosal Transplantation for the Management of Stricture after Endoscopic Submucosal Dissection

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Background/Aims Endoscopic submucosal dissection (ESD) of high-grade dysplasia and early esophageal cancer has gained acceptance in the last decade as an effective therapeutic option. Although the short-term results of ESD are promising, a high risk of procedure related complications, including post-procedural stricture remains unresolved. The aim of this study was to assess the effectiveness and safety of mucosal transplantation into esophagus from the stomach and/or other part of the gut in preventing stricture formation after ESD.
Methods Six patients who underwent circumferential ESD for early esophageal cancer were enrolled. After the patients underwent ESD, the mucosal patches taken from the posterior wall of the middle part of the gastric body were placed to the ulcer site of esophagus. The guide wire was then inserted into the gastric cavity via flexible endoscopic channel to fix the patches with the stent at the ulcer site. The stent was then removed with media of 7.83 days (range, 7 to 9 days). All of the patients were followed up with endoscopy.
Results The graft survival rate was 83.3% with strictures occurring at a mean of 33.67 days (range, 20 to 56 days) after the procedure. The median number of endoscopic balloon dilatation sessions was 5.67 (range, 4 to 7).
Conclusions Gastroesophageal mucosal transplantation for stricture prevention after circumferential submucosal dissection for early esophageal cancer and or high-grade dysplasia seems feasible and effective with excellent outcome. This study opens new perspective in this field.
Keywords Endoscopic submucosal dissection; Early esophageal cancer; Mucosal transplantation

Upper GI 2 EP-UG12-01

Helicobacter pylori Prevalence in Mongolia by Using ^{14}C Urea Breath Test

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Background/Aims *Helicobacter pylori* are one of the major etiologies for stomach diseases in the Mongolian population. *H. pylori* infection prevalence is ranged 70% to 80% in adults, 60% in gastric cancer patients and around 70% in children. In Mongolia, the diagnosis of *H. pylori* infection is performed by using invasive and noninvasive methods. Urea breath test (UBT) are high accuracy diagnostic method for screening and evaluation of treatment results of *H. pylori* infection. The Maastricht V/Florence Consensus Report recommended the UBT is currently recommended as the best approach for the screening of *H. pylori* infection in patients with dyspeptic symptoms because of its noninvasiveness and high sensitivity.
Methods We enrolled in this cross-sectional study 168 patients with dyspeptic symptoms at the Gastroenterology Department of Soyorkhol Med Hospital in Mongolia between June 2018 to August 2019. The patient had drunk one urea ^{14}C capsule with 30 to 50 mL water. After 15 minutes the patient blowing into the breath collecting cart until the cart's orange dot getting yellow. Then breath collecting cart inserted to the device and estimated the number of detecting *H. pylori*. We use Microsoft excel, SPSS (ver. 20.0) program for statistical analysis.
Results Total number of collected cases were 168, among them 72 (42.85%) were men and 96 (57.14%) were women, the mean age was 36.42 years. ^{14}C-UBT was positive in 151 patients (89.88%) and negative in 17 patients (10.11%). Active *H. pylori* infection were very high 55 (32.73%) among ≤29 years, 43 (25.59%) in 30 to 39 years, 21 (12.5%) in 40 to 49 years, 18 (10.71%) for 50 to 59 years and 14 (8.3%) for 60 years older people. ^{14}C-UBT average results were 232.54, the highest result was 1,169 and the lower result was 5. During the evaluation of ^{14}C-UBT results, we could not find false negative results.
Conclusions The prevalence of active infection of *H. pylori* were high, especially among 20 to 39 years old adults compared to other participants.
Keywords *Helicobacter pylori*; ^{14}C urea breathe test

Table 1. ^{14}C Urea Breathe Test Results

	UBT	Sex		Positive	Negative
		Male	Female		
Age (yr)	168 (100)	72 (42.85)	96 (57.14)	151 (89.88)	17 (10.11)
≤29	60 (35.71)	23 (13.69)	37 (22.02)	55 (32.73)	5
30–39	46 (27.38)	28 (16.66)	18 (10.72)	43 (25.59)	3
40–49	26 (15.47)	10 (5.95)	16 (9.52)	21 (12.5)	5
50–59	19 (11.30)	5 (2.97)	14 (8.33)	18 (10.71)	1
>60	17 (10.11)	6 (3.57)	11 (6.54)	14 (8.3)	3

Data are presented as number (%).
UBT, urea breathe test.

Upper GI 2 EP-UG12-02

Correlation of Clinical and Endoscopic Findings in Patients with *Helicobacter pylori* Infection using Rapid Urease Test: A 10-Year Retrospective Study

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Background/Aims *Helicobacter pylori* (HP) infection has a role in the pathogenesis of chronic gastritis, peptic ulcer and gastric malignancies. We aimed to determine the current prevalence of HP infection and whether the presence of HP infection by rapid urease test (RUT) is associated with specific clinical and endoscopic findings in an urban tertiary referral hospital.
Methods Retrospective data collection was performed on 14,806 adult patients undergoing upper endoscopy from 2009 to 2018. Patients not tested for RUT were excluded from the study. Demographic profile, clinical and endoscopic findings were reviewed. Multivariate analysis of predictors of HP infection were analyzed using binary logistic regression.
Results A total of 10,479 patients were tested for RUT and 1,120 tested positive for HP infection. Among these, 575 were males and 645 were females. Patients who were HP positive were compared with HP negative patients. On univariate analysis, patients ≥50 years (70.7%) and upper gastrointestinal bleeding (15.7%) had a higher rate of HP infection (p<0.001). Although dyspepsia was the most common presenting symptom, it was not more frequent among patients who were HP positive. Endoscopically, peptic ulcer (38.9%) and atrophic gastritis (45.3%) were associated with HP infection(p<0.001). On multivariate analysis, independent predictors of HP infection were peptic ulcer (odds ratio [OR], 2.7; 95% confidence interval [CI], 0.324 to 0.423; p<0.001), atrophic gastritis (OR, 1.56; 95% CI, 0.566 to 0.727; p<0.001), gastric cancer (OR, 2.04; 95% CI, 0.253 to 0.952; p=0.035) and age ≥50 years (OR, 1.37; 95% CI, 0.638 to 0.837; p<0.001).
Conclusions The prevalence of HP infection using RUT at our institution during the last 10 years was 11.6%. There was no specific symptom associated with HP infection. Age ≥ 50 years, presence of peptic ulcer, atrophic gastritis and gastric cancer are associated with higher HP infection rates.
Keywords *Helicobacter pylori*; Rapid urease test; Endoscopy; Retrospective

Table 1. Clinical and Endoscopic Findings According to *Helicobacter pylori* Status (n=10,479)

Characteristic	H. Pylori Positive (n=1,220)	H. Pylori Negative (n=9,259)	P value
CLINICAL CHARACTERISTICS			
Age			**<0.001**
≥50 years	862 (13.5%)	5505 (86.5%)	
<50 years	355 (8.7%)	3727 (91.3%)	
Sex			**0.043**
Male	575 (12.4%)	4078 (87.6%)	
Female	645 (11.1%)	5181 (88.4%)	
Dyspepsia			0.347
Yes	719 (11.4%)	5,588 (88.6%)	
No	488 (12%)	3,574 (88%)	
Upper GI Bleeding			**<0.001**
Yes	191 (15.5%)	1,041 (84.5%)	
No	1,016 (11.1%)	8,121 (88.9%)	
Heartburn/Reflux			0.167
Yes	40 (9.5%)	383 (90.5%)	
No	1,144 (11.8%)	8,540 (88.2%)	
Swallowing disorders			0.990
Yes	27 (11.3%)	211 (88.7%)	
No	1,180 (11.6%)	8,951 (88.4%)	
ENDOSCOPIC FINDINGS			
PUD			**<0.001**
Yes	474 (21%)	1,787 (79%)	
No	746 (9.1%)	7,472 (90.9%)	
Esophagitis			0.685
Yes	348 (11.8%)	2,590 (88.2%)	
No	872 (11.6%)	6,669 (88.4%)	
Gastric CA			0.119
Yes	12 (18.2%)	54 (81.8%)	
No	1,208 (11.6%)	9,205 (88.4%)	
Chronic Atrophic Gastrtitis			**<0.001**
Yes	553 (13.8%)	3,468 (86.2%)	
No	667 (10.3%)	5,791 (89.7%)	
Acute Gastric Mucosal Erosions			**<0.001**
Yes	679 (10.6%)	5,729 (89.4%)	
No	541 (13.3%)	3,530 (86.7%)	
Portal Hypertensive Gastropathy			0.551
Yes	59 (12.6%)	409(87.4%)	
No	1,161 (11.6%)	8,850 (88.4%)	
Normal			**<0.001**
Yes	27 (5.4%)	471 (94.6%)	
No	1,193 (12%)	8,788 (88%)	

Data are presented as number (%).
GI, gastrointestinal; CA, cancer.

Upper GI 2 EP-UG12-03

Can Dual Priming Oligonucleotide-Polymerase Chain Reaction Based Tailored-Therapy Increase the Eradication Rate of *Helicobacter pylori*?

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Background/Aims Proton pump inhibitor (PPI)-based standard triple therapy (STT, PPI-clarithromycin-amoxicillin) for *Helicobacter pylori* eradication regimen shows lower treatment success rate recently. Dual priming oligonucleotide (DPO)-based multiplex polymerase chain reaction (PCR) can be used to detect A2142G and/or A2143G point mutations of *H. pylori* causing clarithromycin resistance (CAM-R). We compared the eradication rate of *H. pylori* between traditional method (Warthin-Starry silver stain) followed by PPI-based STT and tailored-therapy by DPO-PCR.
Methods A total of 213 *H. pylori*-infected patients were evaluated in Eunpyeong St. Mary's Hospital, Korea, between April 2019 and August 2019. DPO-PCR performed in tailored-therapy group. The CAM-R negative patients (who showed no A2142G and/or A2143G point mutations) were treated with PPI-based STT for 7 to 14 days. CAM-R positive patients were treated with bismuth-containing quadruple therapy (PPI-bismuth-metronidazole-tetracycline). Eradication success was defined as a negative ^{13}C-urea breath test.
Results A total of 152 patients were diagnosed *H. pylori* infection by traditional method and treated with PPI-based STT as first-line and 61 patients were allocated to the tailored-therapy group (Fig. 1). There was no significant difference of *H. pylori* eradication rate between traditional group and tailored-therapy group in the intention-to-treat analysis (65.8% vs 77.0%, p=0.081). The tailored-therapy group showed significant increase of *H. pylori* eradication success rate than traditional therapy group in the per-protocol analysis (75.8% vs 90.4%, p=0.043), respectively. Clarithromycin resistance ratio by DPO-PCR was 44.26% (24/61). Adverse events were higher in tailored-therapy group (7.2% vs 19.7%, p=0.029).
Conclusions DPO-PCR based tailored-therapy can be more effective than traditional therapy.
Keywords DPO-PCR; Clarithromycin resistance; *Helicobacter pylori*; Tailored therapy

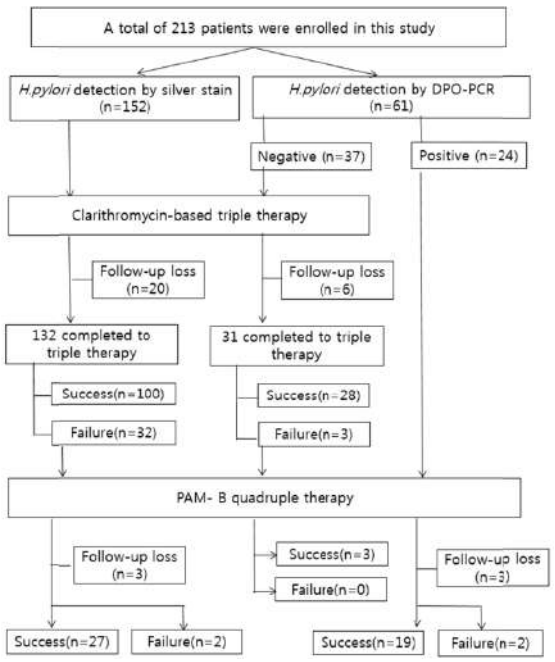

Fig. 1. Flowchart of the patient enrollment.
DPO-PCR, Dual priming oligonucleotide-based multiplex polymerase chain reaction.

Upper GI 2 EP-UG12-04

Changes in Eradication Efficacy of Fluoroquinolone-Containing Triple Therapy to *Helicobacter pylori* in Korea

Jung Won Lee[1,2], Nayoung Kim[1,3], Geun Kim[1], Siho Kim[1], Hwawon Nam[1], Siwon Lee[1], Cheol Min Shin[1,3], Young Soo Park[1,3], and Dong Ho Lee[1,3]

[1]Department of Internal Medicine-GI/Hepatology, Seoul National University Bundang Hospital, Seongnam, [2]Department of Internal Medicine-GI/Hepatology, Samsung Medical Center, Changwon, and [3]Department of Internal Medicine-GI/Hepatology, Seoul National University Hospital, Seoul, Korea

Background/Aims Fluoroquinolone-containing triple eradication therapy to *Helicobacter pylori* is alternative rescue eradication therapy as second line treatment. The aim of this study is to investigate the changes of eradication efficacy of fluoroquinolone-containing triple therapy for recent 16 years in Korea.

Methods Patients with the history of first line eradication therapy were consecutively enrolled at Seoul National University Bundang Hospital during 2003 to 2018. All patients took moxifloxacin-containing triple therapy as second line eradication therapy. Treatment regimens consisted of three drug combinations with proton pump inhibitor, amoxicillin and moxifloxacin. Age, sex, endoscopic diagnosis, eradication results, compliance and adverse outcomes were gathered. Eradication result were gathered mainly urea breath test. Statistical analysis was performed.

Results The 824 subjects participated during the study period. Forty-six patients were loss to follow-up. Consequently, 778 were included in the per-protocol (PP) analysis. The 72.1% of patients received moxifloxacin-containing triple therapy as 14-day duration. Eradication rate of moxifloxacin-containing triple therapy through the entire study period was 72.1% (594/824) in the intention to treat analysis and 76.3% (594/778) in the PP analysis. A statistically significant decrease in the eradication rate was observed in the PP analysis (p=0.046). Diarrhea was the most commonly observed adverse event at 19.6% (41/209).

Conclusions Moxifloxacin-containing triple therapy has shown adequate efficacy and safety as a second line eradication therapy. However, recent trends in the reduction of eradication rates raise concerns about future efficacy declines. Ongoing follow-up and research are needed.

Keywords *Helicobacter pylori*; Eradication rate; Fluoroquinolone; Triple therapy

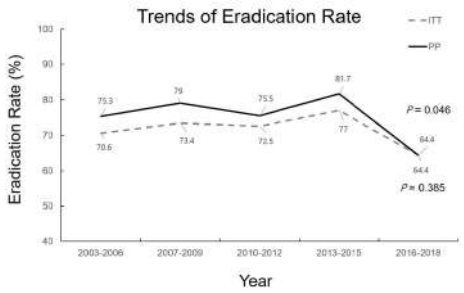

Fig. 1. Trends of eradication rate.

Upper GI 2 EP-UG12-05

Combination Therapy with PI3K/mTOR Dual Inhibitor and Chloroquine Enhances Synergistic Apoptotic Cell Death in Epstein-Barr Virus-Infected Gastric Cancer Cells

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Background/Aims Phosphoinositide 3-kinase/protein kinase B/mammalian target of rapamycin (PI3K/AKT/mTOR) signaling pathway is promising target for gastric cancer (GC) treatment, however the maximal effectiveness of PI3K/mTOR dual inhibitors has not yet been achieved. In addition, the effect of autophagy regulation by PI3K/mTOR dual inhibitors has not been clearly elucidated in GC treatment. We aimed to show that our newly developed PI3K/mTOR dual inhibitor, CMG002, in combination with an autophagy inhibitor, chloroquine (CQ), potently induced effective cancer cell death in Epstein-Barr virus (EBV)-associated GC (EBVaGC), in which both PI3K/AKT/mTOR pathway and autophagy regulation play important roles in disease pathogenesis.

Methods EBV-infected AGS and NUGC3 GC cell lines were treated with CMG002 +/− CQ. PI3K/AKT/mTOR signaling pathway mediators, cellular apoptosis and autophagy markers were confirmed by Western blot. Cell viability was assessed using Cell Counting Kit-8 (CCK-8) assay. CMG002-induced cell cycle arrest and apoptotic cell death were confirmed by flow cytometric analyses and TUNEL assays.

Results CMG002 effectively blocked the PI3K/AKT/mTOR pathway by markedly decreasing phosphorylation of AKT and its downstream mediator S6. CMG002 induced G0/G1 cell cycle arrest and enhanced apoptotic cell death in AGS and NUGC3 cells, particularly EBV-infected cells compared with mock-infected cells, as confirmed by flow cytometric analyses and TUNEL assays. The combination of CMG002 plus CQ synergistically increased apoptotic cell death in EBV-infected GC cell lines when compared with CMG002 alone ($p<0.05$).

Conclusions Our results suggest that the new PI3K/mTOR dual inhibitor, CMG002, when used in combination with the autophagy inhibitor, CQ, provides enhanced therapeutic efficacy against EBVaGC.

Keywords Pi3k/mTOR dual inhibitor; Gastric cancer; Apoptosis; Chloroquine; Autophagy

Upper GI 2 EP-UG12-06

MMP-7 Expression Predicts a Poor Prognosis in Patients with Gastric Cancer

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Background/Aims Migration of cancer cells is based on the role of MMPs in the extracellular matrix and basement membrane. MMP-7 will increase expression in cancer patients and can be used as a biological indicator that can be used to predict prognosis in many types of cancer such as bile duct cancer, skin cancer, and colon cancer. This study was to determine MMP-7 expression and correlation with clinicopathological outcome in patients with gastric cancer.
Methods A total of 400 gastric cancer patients from 2012 to 2018. Immunohistochemistry was performed to evaluate MMP-7 expression of gastric cancer tissues as well as correlation to clinicopathological outcomes. Percentage of MMP-7 positive cells stained was scored: lack of staining was scored as 0 (negative), 1 (1% to 10%), 2 (11% to 50%) and 3 (≥51%). The cases classified as 0 were considered MMP-7 negative expression, whereas 1+, 2+, and 3+ were established as MMP-7-positive expression. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated by multivariate Cox proportional hazards regression modelling and survival analysis was calculated by Kaplan-Meier Curve analysis.
Results MMP-7 were found positive in 283 (70.75%) of gastric cancer tissue (Table 1). MMP-7 expression in gastric cancer tissues were significant associated with poor clinicopathological outcomes, including vascular invasion (OR, 6.61; 95% CI, 4.26 to 9.89; p=0.024), lymphatic invasion (OR, 8.17; 95% CI, 4.47 to 12.39; p=0.017), high pathological TNM stage (OR, 1.48; 95% CI, 1.08 to 3.08; p=0.047), high carcinoembryonic antigen level (OR, 5.96; 95% CI, 2.12 to 8.12; p=0.026) and poor 5 years survival (p=0.001).
Conclusions Our study indicates, MMP-7 expression and poor clinicopathological outcome. MMP-7 will increase expression in cancer patients and can be used as a biological indicator that can be used to predict prognosis in gastric cancer patients.
Keywords MMP-7 expression; Gastric cancer

Table 1. The Association of MMP-7 Status and Clinicopathological Outcome of Gastric Cancer

Gastric mucosal pathology	MMP-7 status		OR;95% CI	*p* value
	Negative(*n*=117)	Positive(*n*=283)		
Lymphatic invasion (%)				
• Absent	99(84.61)	64(22.61)	7.39(3.64-10.71)	0.021*
• Present	18(15.38)	219(77.38)	8.17(4.47-12.39)	0.017*
Vascular invasion (%)				
• Absent	89(76.06)	52(18.37)	5.07(3.62-8.01)	0.031*
• Present	28(23.93)	231(81.62)	6.16(4.26-9.89)	0.024*
Pathological TNM stage (%)				
• IV	32(27.35)	144(50.88)	1.48(1.08-3.08)	0.047*
CEA (%)				
• < 5.0(ng/ml)	101(86.32)	67(23.67)	4.78(1.29-7.67)	0.039*
• ≥ 5.0(ng/ml)	16(13.67)	216(76.32)	5.96(2.12-8.12)	0.026*

Multivariate Cox proportional hazards regression model analysis. *p < 0.05 considered as statistically significant.

Upper GI 2 EP-UG12-07

Withdrawn

Upper GI 2 EP-UG12-08

Deep Learning with Long Short-term Memory to Predict Gastric Neoplasm in Asymptomatic Population after a Health Check-up

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Background/Aims The detection of risk factors in gastric neoplasm may be beneficial for prevention. This study applied a deep learning with long short-term memory (LSTM) neural network model to improve screening for the risk of gastric neoplasm, including non-invasive factors and displayed essential elements for the risk of gastric neoplasm.
Methods We collected data from the health screening program on the Health Promotion Center of Gangnam Severance Hospital from January 2006 to April 2019. The 88,209 people who underwent upper endoscopy, colonoscopy, abdominal ultrasound, 18 physical examinations, and 56 serological examinations were enrolled. The participants filled out a questionnaire, including 11 previous disease history, family history of any cancer, alcohol consumption, smoking, and physical activity. Among them, 753 (0.85%) were diagnosed as gastric neoplasms (501 cancer, 252 adenoma) by biopsy. We employed LSTM algorithms, a type of recurrent neural network which was suitable for time series data. The original dataset was partitioned into 70% training set, 10% validation set, and 20% testing set. The performance was evaluated by sensitivity and the area under the curve (AUC). The layer-wise relevance propagation method for variable importance identified 10 predictors using the dataset with all variables.
Results For the prediction of gastric neoplasm, the sensitivity and AUC were 0.71 and 0.746, respectively. *Helicobacter* infection and the presence of intestinal metaplasia were the most critical positive predictive factors for gastric neoplasm. Also, colon polyp, the interval of screening, spicy preference, atrophic gastritis, white blood cell count, smoking, high-intensity exercise, and total cholesterol level were identified as important positive predictive factors for gastric neoplasm.
Conclusions We can develop a prediction model for gastric neoplasm using LSTM algorithms that displayed a good performance. However, further research for validation is needed.
Keywords Gastric cancer; Dysplasia; Risk factor; Deep learning; Prediction model

Upper GI 2 EP-UG12-09

Comparison of Intestinal versus Diffuse Type Gastric Cancer from the Perspective of Large-Scale Signaling Network

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Background/Aims Gastric carcinomas (GCs) can be divided into intestinal and diffuse types according to Lauren classification. Those types are associated with different clinical, histopathological, and molecular characteristics which suggests different pathogenesis. Previous studies revealed different expression of receptors, cell adhesion molecules, apoptosis-related proteins, all of which are part of signaling molecules. However, these signaling components do not act independently, but all of them are interlinked inside large-scale signaling network.
Methods In order to consider this aspect, we investigated the difference between intestinal type- and diffuse type GC from the perspective of large-scale signaling network through the mathematical modeling and simulation analysis based on RNA sequencing data.
Results As a result, six signaling components were consistently found as differentially activated components in three different expression profiles (i.e., TCGA, GSE62254, and GSE26253). Specifically, BIRC5, TTK, FHL1 were activated in intestinal type GCs while NEK2, NR2F1, FBLN5 were activated in diffuse type GCs. Among them, BIRC5 was validated as a marker of intestinal type GC in TMA analysis using tumor tissues of patients with GCs.
Conclusions This study might provide a novel insight regarding the pathogenesis of GC with respect to signaling network.
Keywords Signaling network; Gastric cancer; Mathematical modeling; Simulation analysis

Upper GI 3 EP-UGI3-01

Using Deep Learning System in Endoscopy for Screening of Early Esophageal Squamous Cell Carcinoma

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Background/Aims Few artificial intelligence-based technologies have been developed to improve the efficiency of screening for esophageal squamous cell carcinoma (ESCC). Here, we developed and validated a novel system of computer-aided detection using a deep neural network (DNN-CAD) to localize and identify early ESCC under conventional endoscopic white light imaging (WLI).
Methods We collected 2,428 (1,332 abnormal and 1,096 normal) esophagoscopic images from 746 patients to set up a novel DNN-CAD system in two centers and prepared a validation dataset containing 187 images from 52 patients. Sixteen endoscopists (senior, middle-level and junior groups) were asked to review the images of the validation set. The diagnostic results, including accuracy sensitive, specifically, positive predictive value (PPV), and negative predictive value (NPV), were compared between DNN-CAD and endoscopists.
Results The receiver operating characteristic curve for DNN-CAD showed that the area under the curve >96%. For the validation dataset, DNN-CAD had a sensitivity, specificity, accuracy, PPV, and NPV of 97.8%, 85.4%, 91.4%, 86.4% and 97.6%, respectively. The senior group achieved an average diagnostic accuracy of 88.8%, whereas the junior group had a lower value of 77.2%. After referring to the results of DNN-CAD, the average diagnostic ability of endoscopists was improved, especially in terms of sensitivity (74.2% vs 98.2%), accuracy (81.7% vs 91.1%), and NPV (79.3% vs 90.4%).
Conclusions The novel DNN-CAD system used for screening of early ESCC has high accuracy and sensitivity, which can have the endoscopists to detect lesions previously ignored under WLI.
Keywords Artificial intelligence; Esophageal squamous cell carcinoma; Deep neural network; Endoscopy; Screening

Upper GI 3 EP-UGI3-02

Real-Time Automated Diagnosis of Precancerous Lesion and Early Esophageal Squamous Cell Carcinoma Using a Deep Learning Model

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Background/Aims We developed a computer-assisted diagnostic (CAD) system for real-time automated diagnosis of precancerous lesions and early esophageal squamous cell carcinoma (ESCC) to assist the diagnosis of esophageal cancer.
Methods A total of 6,473 narrow-band images (NBI) including pre-cancerous lesions, early ESCC and noncancerous lesions were used to train CAD system. We validated CAD system using both endoscopic images and video datasets. Receiver operating characteristic (ROC) curve of the CAD system was generated based on image datasets. Artificial Intelligence (AI) probability heat map was generated for each input of endoscopic image. The red color indicated high possibility of cancerous lesion, while the blue color indicated noncancerous lesion on the probability heat map. When CAD system detected any precancerous lesion or early ESCC, the lesion of interest was masked with color.
Results The image datasets contained 1,480 malignant NBI images from 59 consecutive cancerous cases (sensitivity, 98.04%), and 5,191 noncancerous NBI images from 2,004 cases (specificity, 95.03%). The area under ROC curve was 0.989. The video datasets of precancerous lesion or early ESCC included 27 non-magnifying videos (per-frame-sensitivity 60.8%, per-lesion-sensitivity, 100%), 20 magnifying videos (per-frame-sensitivity 96.1%, per-lesion-sensitivity, 100%). Unaltered full-range normal esophagus videos included 33 videos (per-frame-specificity 99.9%, per-case-specificity, 90.9%).
Conclusions Deep learning model demonstrated high sensitivity and specificity in both endoscopic images and videos datasets. Real-time CAD system has a promising utilization in the near future to assist endoscopists in diagnosing precancerous lesions and ESCC.
Keywords Artificial intelligence mode; Deep learning; Early esophageal cancer; Precancerous lesion; Narrow band images

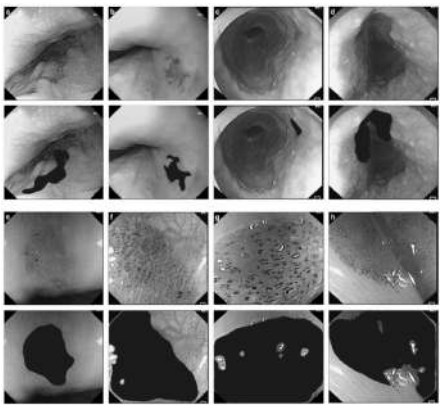

Fig. 1. Examples of artificial intelligence detection.

Upper GI 3 EP-UGI3-03

Auscultation-Assisted Bedside Postpyloric Placement of Feeding Tube in Critically Ill Patients: A Multicenter, Prospective, Observational Study

Jianguo Xiao[1], Hongjuan Zhu[2], Zhi Mao[1], Wen Li[3], Ming Hua[4], Tengfei Chen[5], Hui Liu[1], Pan Hu[1], Sheng Tang[1], Hongjun Kang[1], and Feihu Zhou[1]
[1]Department of Critical Care Medicine, First Medical Center, The General Hospital of PLA, Beijing, [2]Department of Critical Care Medicine, Fourth Medical Center, The General Hospital of PLA, Beijing, [3]Department of Internal Medicine-GI/Hepatology, First Medical Center, The General Hospital of PLA, Beijing, [4]Department of Emergency, 149 Clinical Department of the Eighty-Second Hospital of PLA, Lianyungang, and [5]Department of Critical Care Medicine, Beijing Hospital of Traditional Chinese Medicine (affiliated to Capital Medical University), Beijing, China

Background/Aims To assess the efficacy and safety of auscultation-assisted bedside postpyloric feeding tube placement in early enteral nutritional support for critically ill patients.
Methods A multicenter prospective observational study was conducted, and from July 2017 to August 2019, a total of 179 critically ill patients who met the inclusion criteria were included. The feeding tube was placed by manipulation bedside, and the position of the tube tip was judged by gas injection through jejunal end of the tube combined with abdominal auscultation until the tube reached the proximal end of the jejunum. Details of the procedure are shown in the Fig. 1. Abdominal X-ray was performed to confirm the location of the catheter tip. End points investigated were the success rate of tube placement, rate of jejunal tube placement, duration of the procedure, length of insertion, and number of attempts. Operational-related adverse events or complications were also documented and evaluated.
Results The total success rate of postpyloric feeding tube implantation was 97.8% (175/179), among which, 93.3% of the tubes (167/179) were placed proximal to the jejunum. The first-attempt success rate was 93.3% (167/179) and the mean attempt per individual patient was 1.09±0.33 times. The mean operation time was 26.8±15.2 minutes, and the mean insertion length of tube was 104.1±8.1 cm. A total of 44 adverse events occurred in 18.4% patients (33/179) and there was no serious adverse events or complications during the study period.
Conclusions Assistance by auscultation can significantly improve the success rate of nasal feeding tube placement. This simple, safe and fast approach is feasible for the application among health practitioners in the intensive care unit.
Keywords Blind bedside; Postpyloric placement; Auscultation; Nasojejunal tube; Enteral nutrition

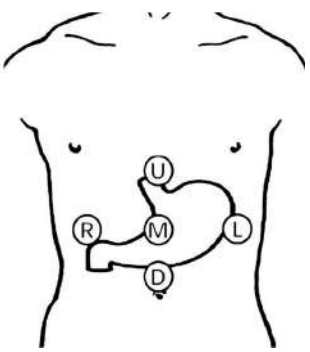

Fig. 1. Auscultation sites and anatomic location.

Upper GI 3 EP-UGI3-04

The Use of Proton-Pump Inhibitors Has a Significant Risk of Fatty Liver Disease: A Nationwide Cohort Study

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Background/Aims Proton-pump inhibitor (PPI) use alters small intestinal bacterial overgrowth and may induce increased portal endotoxins and increase the risk of fatty liver disease, but the association of PPI use with the risk of fatty liver disease has been controversial. Therefore, we evaluated the prospective association between PPI use and the incidence of fatty liver.
Methods Cohort study conducted using the Korean National Health Insurance Service-National Sample Cohort, a nationwide population-based representative sample followed-up from January 1, 2003 to December 31, 2013. PPI use was identified from treatment claims and considered as a time-varying variable. Incident fatty liver disease was identified from outpatient visit claims (ICD-10 diagnosis codes K76.0 or K70.0).
Results The age-, sex-, body mass index, residential area-, and income percentiles-adjusted hazard ratio (HR) for incident cholangitis comparing use versus no use of PPI was 1.41 (95% confidence interval [CI], 1.33 to 1.49). The association persisted after further adjustment for smoking, alcohol habit, Charlson comorbidity index score, and year of screening exam (HR, 1.35; 95% CI, 1.28 to 1.43).
Conclusions In this large cohort, PPI use was associated with an increased risk of fatty liver. Physicians prescribe PPI should consider fatty liver as a potential complication of PPI use.
Keywords Proton-pump inhibitor; Fatty liver

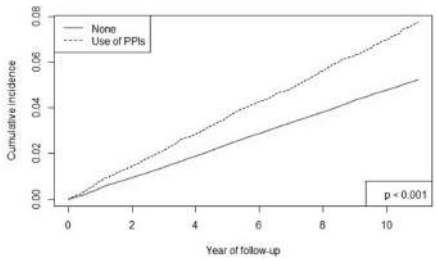

Fig. 1. Incidence of fatty liver by proton-pump inhibitor (PPI).

Upper GI 3 EP-UGI3-05

Randomized Clinical Trial: A Double-Blind, Randomized, Active-Controlled, Phase 3 Study to Evaluate the Safety and Efficacy of Tegoprazan in Patients with Gastric Ulcer

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Background/Aims Tegoprazan, a novel potassium-competitive acid blocker, is expected to demonstrate non-inferiority to lansoprazole in efficacy and safety following oral administration in patients with gastric ulcer (GU). To assess the non-inferiority of tegoprazan to lansoprazole in efficacy and safety in patients with GU.
Methods In this phase 3, double-blind, active-controlled, multicenter study, 306 GU subjects were randomized to one of three treatment groups: tegoprazan 50 mg, tegoprazan 100 mg, and lansoprazole 30 mg once daily for 8 weeks. The primary endpoint was the proportion of patients with endoscopically confirmed healed GU.
Results The cumulative endoscopic healing rates at week 8 were 100% (88/88) for tegoprazan 50 mg group, 97.85% (91/93) for tegoprazan 100 mg group, and 100% (85/85) for lansoprazole 30 mg group. At week 4, healing rates were 95.45% (84/88) for tegoprazan 50 mg group, 94.62% (88/93) for tegoprazan 100 mg group, and 92.94% (79/85) for lansoprazole 30 mg group. The differences between each dose group of tegoprazan and lansoprazole were statistically significant (p=0.050) at both time points according to Hochberg method. There was no significant difference in incidence of treatment-emergent adverse events among treatment groups as the percentages were 17.65% (18/102) for tegoprazan 50 mg, 22.55% (23/102) for tegoprazan 100 mg, and 25.00% (25/100) for lansoprazole 30 mg.
Conclusions The non-inferiority of tegoprazan at both 50 mg and 100 mg to lansoprazole 30 mg was verified in patients with GU.
Keywords Potassium-competitive acid blocker; Gastric ulcer; Tegoprazan

Upper GI 3 EP-UGI3-06

Is Gastric Gastrointestinal Stromal Tumor with Acute Bleeding Worrisome Feature?

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Background/Aims Gastrointestinal stromal tumors (GISTs) had highly variable clinical behaviors, but most of cases were asymptomatic. A small percentage of GISTs might cause acute bleeding, which requires urgent surgical intervention, and it is still equivocal whether bleeding of gastric GISTs is an independent risk factor or not.
Methods From January 2009 to December 2018, we performed a retrospective cohort study of 137 patients with surgically curative resection of gastric GISTs. According to initial presentation symptoms in patients with surgically curative R0 resection of gastric GISTs, we assessed the prognostic effects-it measured by National Institutes of Health-Fletcher criteria for GIST risk stratification system. We also evaluated the incidence of simultaneous or metachronous malignancies because the mutation of platelet-derived growth factor receptor α could be common pathway of carcinogenesis of GISTs and other malignancies.
Results A total 137 patients was enrolled (60 males and 77 females) and the age distribution was from 32 to 89 years old with an average of 64.70 years old. Twenty-six of the patients had definite bleeding episodes, 69 patients showed no signs during the health examination, and the remaining 42 patients had nonspecific gastrointestinal symptoms. The rate of intermediate to high risk was 50% in bleeding episode group, and there was no significant difference compared with the others. The incidence of simultaneous or metachronous malignancies was 18.2% (26 /137), and advanced malignancies was 11.7% (16/137).
Conclusions It is unlikely that acute bleeding episode of gastric GISTs could be a worrisome feature. A substantial portion of patients with GISTs had simultaneous or metachronous malignancies and they should have a meticulous surveillance protocol.
Keywords Gastrointestinal stromal tumor; Bleeding; Prognosis

Upper GI 3 EP-UGI3-07

Upper Gastrointestinal Neoplasm in Familial Adenomatous Polyposis: A Single-Center, Retrospective Study

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Background/Aims Although the upper gastrointestinal (GI) neoplasms are not rare in patients with familial adenomatous polyposis (FAP), only few studies have focused on the upper GI lesions, especially in Asians. Therefore, we tried to investigate the frequency and clinical outcomes of upper GI tumor in FAP patients.
Methods Among the patients who were diagnosed as FAP between December 2005 and December 2017, those who underwent esophagogastroduodenoscopy (EGD) were eligible. The clinical features and treatment outcomes of upper GI neoplasms were retrospectively investigated and analyzed.
Results Among a total of 230 patients with FAP, 218 patients underwent EGD and the upper GI neoplasms were detected in 168 patients (77.1%) as follows: fundic gland polyp in 132 patients (78.6%), gastric adenoma in 37 (22.0%), gastric cancer in eight (4.8%), and duodenal adenoma in 134 (79.8%). The patients with gastric cancer performed endoscopic submucosal dissection (ESD) in 62.5% and gastrectomy in 37.5%. In one patients, EGC was recurred 71 months after ESD and received additional ESD. Gastric adenoma was treated by ESD in 32.4%, endoscopic mucosal resection (EMR) in 13.5%, argon plasma coagulation (APC) in 8.1%, band ligation in 2.7%, and no treatment in 43.2%. In duodenal adenoma, EMR was done in 32.1%, APC in 17.9%, polypectomy in 0.7%, band ligation in 0.7%, and no treatment in 48.5%. There were no patients who underwent surgery for gastric adenoma and duodenal adenoma.
Conclusions On the basis of these results, endoscopic surveillance in FAP patients is important for the early detection of neoplasm and avoiding invasive surgery.
Keywords Familial adenomatous polyposis; Gastric adenoma; Gastric cancer; Duodenal adenoma

Upper GI 3 EP-UGI3-08

A Comparison of the Tammaro Score and the Glasgow-Blatchford Score in Predicting Outcomes and the Need for Intervention among Patients with Non-variceal Upper Gastrointestinal Bleeding

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Background/Aims Upper gastrointestinal bleeding (UGIB) remains to be one of the most important causes of death in the emergency department. Early assessment for patients with UGIB can help in determining patients who need immediate interventions. One strategy is to use risk-scoring such as the simplified Tammaro score which includes only four parameters: general condition of the patient, pulse, systolic blood pressure, and hemoglobin.
Methods A single center retrospective analysis was performed among UGIB patients over a period of 3 years. The accuracy of Tammaro score was compared to the well-studied Glasgow-Blatchford score in predicting the need for hemostatic intervention, mortality and re-bleeding was assessed by plotting the receiver operating characteristic (ROC) curve.
Results A total of 122 patients with UGIB were included. The ROC analysis for determining the need for hemostatic intervention of both scoring system showed comparable results. In detecting high-risk patients, a threshold of T-score <6 appeared to have sensitivity of 100% and specificity of 23%. Similarly, both scoring system showed comparable predictive value in determining mortality. However, in predicting re-bleeding, Tammaro score scored poorly.
Conclusions The Tammaro score is a simple, non-endoscopic risk score that can be immediately applied to patients with UGIB. Tammaro score of 6 predict both the urgent need for hemostatic intervention as well as higher in-hospital mortality.
Keywords Tammaro; Upper gastrointestinal bleeding; Glasgow-Blatchford score

Upper GI 3 EP-UGI3-09

Endoscopic Subserosal Dissection for Gastric tumors: 18-Case Series in a Single Center

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Background/Aims Endoscopic submucosal dissection has had technical limitations to resect gastric epithelial tumors accompanying by severe fibrosis and mixed or exophytic gastric subepithelial tumors (SETs). Endoscopic subserosal dissection (ESSD) could be a soluble technique working space of sub-serosa.
Methods A retrospective study enrolled 18 patients who were diagnosed as gastric tumors underwent ESSD at Presbyterian Medical Center, from March 2010 to March 2019.
Results A total of 18 patients who were treated with ESSD procedure. The mean age of the patients was 61.7 years old. The mean length of the long axis of the specimen was 18.0±5.0 mm. The mean operation duration was 44 minutes. Regarding complications, there were five cases (27.8%) of adverse events; three cases showed minor bleeding and three cases exhibited pneumoperitoneum. The histopathological results revealed nine cases of leiomyoma (50.0%), six cases of gastrointestinal stromal tumor (33.34%), two cases of low-grade adenoma with severe fibrosis (11.11%), and one case of schwannoma (5.56%).
Conclusions This ESSD procedure is a highly curable technique for treating severe fibrous epithelial tumor adhesive to muscularis propria layer and mixed or exophytic gastric SETs located in lesser curvature or fundus area considered dealing tricky in STER and EFTR methods.
Keywords Serosa; Dissection; Gastric tumor; Gastrointestinal stromal tumor

Table 1. Clinical Results of 18 Patients

Patient no.	Age	Sex	location	Tissue Size(mm)	Procedure time(min)	Complete resection /Advance event	Pathology	Follow-up period (weeks)
1	55	F	PA/LC	15	22	Yes/No	GIST	10/No
2	56	F	LB/LC	25	54	Yes/Yes*	TA(LGD)	34/No
3	56	F	LB/LC	36	61	Yes/Yes*	TA(LGD)	11/No
4	65	M	Cardia	10	72	Yes/No	Leiomyoma	166/No
5	69	M	LB/PW	25	42	Yes/Yes†	GIST	271/No
6	71	M	MB/LC	28	20	Yes/No	Leiomyoma	120/No
7	72	F	MB/PW	32	36	No/Yes†	Leiomyoma	10/No
8	51	F	DA/GC	15	15	Yes/No	Leiomyoma	12/No
9	69	F	UB/LC	15	11	Yes/No	Leiomyoma	11/No
10	56	F	MB/LC	12	17	No/No	Leiomyoma	11/No
11	67	F	LB/LC	20	52	Yes/No	GIST	164/No
12	55	F	EGJ	18	17	Yes/No	Leiomyoma	10/No
13	51	F	DA/GC	30	20	Yes/No	GIST	486/No
14	71	F	PA/GC	8	20	Yes/Yes†	Schwannoma	469/No
15	57	F	UB/PW	12	22	Yes/No	Leiomyoma	7/No
16	52	F	Cardia	6	32	Yes/No	Leiomyoma	7/No
17	73	F	Cardia	15	64	Yes/No	GIST	1/No
18	65	M	UB/GC	11	25	Yes/No	GIST	108/No

(Location) PA: proximal antrum, DA: distal antrum, UB: upper body, MB: middle body, LB: lower body, LC: lesser curvature, GC: grater curvature, PW: posterior wall body, EGJ: Esophagogastric junction; (Pathology) GIST: gastrointestinal stromal tumor, TA (LGD): Tubular adenoma with low-grade dysplasia; (Adverse event) * : Bleeding, † : Perforations

Upper GI 3 EP-UGI3-10

Gastrointestinal Foreign Body in Korean Children: A Nationwide Study

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Background/Aims Many children suffer from ingestion of foreign body (FB) and sometimes require an emergency endoscopy or surgery. Up to now, few domestic data studies on FB ingestion in children by pediatric gastroenterologists has been reported. This study aims to investigate the clinical characteristics and outcomes of FB ingestion in children and clarify proper tools for evaluating FB patients.
Methods Total of 338 children (184 girls) with FB ingestion who visited department of pediatrics at eight medical centers between January 2018 and December 2018 were reviewed. Our study include age, gender, time of accident, time to visit, route of arrival, presenting symptoms, type and size of FB, and therapeutic modalities with FB removal.
Results The median age of diagnosis was 3.0 years (range, 0.3 to 18.3 years). Most common place was their home (89.7%). Coin (15%) was the most common gastrointestinal FB. Magnet (7.7%) and disc battery (8.3%) were also significant. The locations of impacted FB were the esophagus (13.6%), stomach (24.5%), small and large intestine (16.2%), respectively. Endoscopic and surgical removal were conducted in 25.7%. Among them, school-aged children (ages, 5 to 12 years) was identified most frequently in 36.8%. Nine children underwent operations due to failure to endoscopic FB removal and prevention of complications. Severe complications related FB ingestion were identified such as gastric or esophageal ulceration in four children, gastric laceration in one, small bowel (SB) or esophageal perforation in two, and SB bowel obstruction in one, respectively. Sharp, large (>3 cm), dangerous materials and multiple magnets showed significant differences (p<0.05) in children with surgery.
Conclusions FB were very diverse with age, and mostly preventable in Korean children. Endoscopic evaluation is essential for investigating complications especially unwitnessed event, even in rare emergencies. In addition, more meticulous protocols about pediatric FB would be urgently needed.
Keywords Foreign body; Endoscopy; Korean children

Lower GI 1 EP-LGI1-01

Comparison of Conventional and Modified Endoscopic Mucosal Resections for the Treatment of Rectal Neuroendocrine Tumors

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Background/Aims Small rectal neuroendocrine tumors (NETs) can be resected endoscopically. This study aimed to determine whether modified endoscopic mucosal resections (EMRs), including EMR with ligation (EMR-L), EMR with precutting (EMR-P), and strip biopsy, are superior than the conventional EMR (cEMR) in achieving histological complete and curative resections for the treatment of rectal NETs.
Methods The medical records of 215 patients who were treated with endoscopic resections for well-differentiated rectal NETs <1.5 cm in size between January 2011 and July 2017 were retrospectively evaluated. Of the patients, 110, 33, 29, and 43 were treated with cEMR, EMR-P, EMR-L, and strip biopsy, respectively. For each method, histological complete resection (negative resection margin) and curative resection rates (negative resection margin with no lymphovascular invasion) were calculated.
Results The histological complete resection rates for cEMR, EMR-P, EMR-L, and strip biopsy were 74.5%, 90.9%, 93.1%, and 90.7%, respectively, and the cEMR was significantly inferior to the modified EMRs (p=0.045 for cEMR vs EMR-P, p=0.031 for cEMR vs EMR-L, p=0.027 for cEMR vs strip biopsy, and p=0.001 for cEMR vs modified EMRs). The curative resection rates were 58.2%, 84.8%, 82.8%, and 76.7% for cEMR, EMR-P, EMR-L, and strip biopsy, respectively, and cEMR was significantly inferior to the modified EMRs (p=0.006 for cEMR vs EMR-P, p=0.018 for cEMR vs EMR-L, p=0.041 for cEMR vs strip biopsy, and p=0.000 for cEMR vs. modified EMRs) (Table 1). No significant differences were observed in en bloc resection (p=0.096) and complication rates (p=0.071) but EMR-P required longer procedure time (p=0.000).
Conclusions The modified EMR techniques were better than the conventional EMR in accomplishing histological complete and curative resections for the endoscopic treatment of rectal NETs.
Keywords Rectal neuroendocrine tumor; Endoscopic mucosa resection; EMR with precutting; EMR with ligation; Strip biopsy

Table 1. Resection Rates According to Endoscopic Methods

	cEMR (n=110)	EMR-P (n=33)	EMR-L (n=29)	Strip Biopsy (n=43)	Total (n=215)	p-value				
						cEMR vs. EMR-P	cEMR vs. EMR-L	cEMR vs. Strip biopsy	cEMR vs. modified EMRs	Modified EMRs
Histologic complete resection, no. (%)	82 (74.5%)	30 (90.9%)	27 (93.1%)	39 (90.7%)	178 (82.8%)	0.017	0.045	0.031	0.027	0.001	0.849
Curative resection, no. (%)	65 (58.2%)	28 (84.8%)	24 (82.8%)	33 (76.7%)	150 (69.8%)	0.005	0.006	0.018	0.041	0.000	0.644
En Bloc resction, no. (%)	104 (94.5%)	28 (84.8%)	29 (100%)	41 (95.3%)	202 (94.0%)	0.096	0.067	-	0.841	0.709	-

Data are presented as number (%).
EMR, endoscopic mucosal resection; cEMR, conventional EMR; EMR-p, EMR with precutting; EMR-L, EMR with ligation.
p-values <0.05 represent statistically significant differences.

Lower GI 1 EP-LGI1-02

Patterns of Steroid Use in Korean Patients with Inflammatory Bowel Disease

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Background/Aims Corticosteroids are the cornerstone for induction of remission in active inflammatory bowel disease (IBD) but are ineffective in maintaining remission and are associated with significant side effects. we aimed to characterize patterns of using steroid and identify factors that lead to excessive use of steroid in Korean patients with IBD.
Methods We conducted a multicenter, retrospective medical chart review of all patients with IBD who visited the centers in March and April 2018 and collected data on use of steroids over the last 12 months. Cases meeting criteria for excessive steroid use which was defined as continued use of steroid in the patients with steroid dependency or refractoriness, and risk factors were identified.
Results Of 1,686 patients, 156 (9.3%) received steroid in the prior 12 months and 47 (2.8%) had excessive steroid use, which was more common in ulcerative colitis (UC) than Crohn's disease (CD) (3.8% vs 1.2%, p=0.002). Steroid refractoriness was identified in 64 patients (3.8%). Inappropriate steroid use that does not step-up despite of excessive steroid use was found in 16 cases (1.0%). In CD, high CD Activity Index was associated with excessive steroid use (odd ratio [OR], 1.01, 95% confidence interval [CI], 1.00 to 1.01, p=0.036) whereas A2 phenotype was associated with lower risk for excessive steroid use (OR, 0.2; 95% CI, 0.04 to 0.99; p=0.048). In UC, increasing age was associated with lower risk for excessive steroid use (OR, 0.94; 95% CI, 0.92 to 0.97, p<0.01).
Conclusions The overall as well as excessive and inappropriate steroid use were relatively low in Korean IBD patients. However, the proportion of excessive use among steroid users was 30.1%, and 34% of excessive user met the criteria for inappropriate steroid use. Therefore, active screening for steroid excess and efforts to minimize inappropriate steroid use by timely use of steroid sparing agents should be considered in Korean IBD patients.
Keywords Inflammatory bowel disease; Steroid; Crohn disease; Ulcerative colitis

Lower GI 1 EP-LG11-03

Comparison of Bowel-Cleansing Efficacy of Spit-Dose and Same-Day Dose Bowel Preparation for Afternoon Colonoscopy in Patients with Gastrectomy: A Prospective Randomized Study

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Background/Aims A split dose (SPD) of purgative is the recommended bowel preparation method for colonoscopy, although for colonoscopy scheduled for the afternoon, a same-day dose (SDD) of purgative is recommended. However, it has not been determined whether SPD or SDD is better in patients with gastrectomy, who are at high risk of suboptimal bowel cleansing. We compared the bowel-cleansing efficacy of SPD and SDD regimens in patients with gastrectomy who underwent colonoscopy in the afternoon.
Methods This was a prospective, randomized, assessor-blinded study. For the SDD group, polyethylene glycol (PEG) was ingested on the day of colonoscopy starting at 07:00. In the SPD group, 2 L PEG was ingested at 21:00 the day before colonoscopy, and the remaining 2 L from 10:00 on the day of colonoscopy. Colonoscopy was performed from 13:30. Before colonoscopy, the participants completed questionnaires asking about bowel-movement kinetics, adverse events, tolerability, overall satisfaction, and willingness to reuse the protocol. The bowel-cleansing efficacy was assessed using the Boston Bowel Preparation Scale.
Results A total of 193 subjects were included (SDD of 95 and SPD of 98). The rate of successful bowel cleansing was comparable between the two groups (SDD 92.6% vs SPD 95.9%, p=0.37). The incidence of adverse events (nausea, vomiting, bloating, abdominal pain, and dizziness/headache) was also comparable between the two groups. However, sleep disturbance was higher in the SPD group (SDD 10.5% vs SPD 25.5%, p=0.01). Tolerability did not differ between the SDD and SPD groups (satisfaction, p=0.11; willingness to reuse, p=0.29).
Conclusions The bowel-cleansing efficacy, safety profile, and patient tolerability of SDD and SPD were comparable. Both SDD and SPD regimens are feasible bowel-preparation methods for patients with gastrectomy who undergo colonoscopy in the afternoon.
Keywords Gastric cancer; Gastrectomy; Colonoscopy; Bowel-cleansing efficacy; Same-day bowel preparation

Lower GI 1 EP-LG11-04

Characterization of Intestinal Microbic and Metabolic Microenvironment Signatures of Inflammatory Bowel Disease

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Background/Aims Pathogenesis of inflammatory bowel disease (IBD) and the complex immune response induced by interaction between host genetic susceptibility and intestinal microflora antigen in IBD patients remains unrevealed.
Methods Fecal sample were collected from 15 ulcerative colitis (UC) patients at active phase (AUC), 14 UC patients at remission phase (RUC), and 15 normal controls (NC). By using gas chromatography coupled to time-of-flight mass spectrometry and 16S rDNA amplicon sequencing, fecal metabolites and microbiota of healthy controls and the UC patients were measured.
Results We identified 18 differentially abundant microbes (DAMbs) between AUC and NC, and 21 DAMbs between RUC and NC at genus level. All DAMbs could be divided into four clusters by WGCNA analysis. Additionally, there were 23 differentially abundant metabolites (DAMts) between AUC and NC, and 23 DAMts between RUC and NC. In WGCNA analysis, all DAMts were also divided into four clusters. Overall, gut metabolites could well distinguished UC from NC, but could not separate AUC from RUC. The association among DAMbs, DAMts and clinical characteristics were also revealed. A module-trait network based on this correlation matrix was constructed, which identified a core DAMts panel consisting of L-amino acids and other DAMts. In addition, all those DAMts were found significantly associated with C-reactive protein level.
Conclusions Observing the change of intestinal microbia and metabolites was a promising method for UC diagnosis and provided us a better understanding of the relationship between the intestinal microbiota and gastrointestinal diseases.
Keywords Inflammatory bowel disease; Metabolites; Microbes; 16S rDNA amplification sequencing

Lower GI 1 EP-LG11-05

A Multicenter, Open-Label, Controlled, Randomized Study Comparing 4 g Once Daily with 2 g Two Times Daily Prolonged-Release Mesalamine for Mild to Moderate active Ulcerative Colitis

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Background/Aims Aminosalicylates are mainstay for inducing and maintaining remission in mild to moderate ulcerative colitis (UC). Multi-dosing regimen is inconvenient and may negatively affect patients' compliance to medication. We conducted this study to determine the therapeutic equivalence and safety of once daily (OD) versus two times daily (BD) dosing of a total daily dose of 4 g prolonged-release mesalamine in inducing clinical and endoscopic remissions in patients with mild to moderated UC.
Methods In this open-label, controlled study, UC patients with Mayo score of 3 to 10 were randomly assigned either to four tablets OD or two tablets BD of prolonged-release mesalamine (1 g tablet) treatment. Disease activity was assessed at weeks 0, 4, 8 and 12 and endoscopic assessment was performed prior to and 8 weeks after treatment. Clinical remission was defined as Mayo Clinic score of 2 or lower and no individual subscore higher than 1, and endoscopic remission as Mayo endoscopic subscore of 0. Primary endpoint was composite clinical and endoscopic remission at week 8.
Results Of the total 256 eligible patients, 129 were assigned to the OD group and 127 to the BD group. There was no significant difference in composite clinical and endoscopic remission at week 8 between OD and BD groups (intention-to-treat population: 20.9% vs 15.0%, 95% confidence interval, −3.4 to 15.3; p=0.25) and non-inferiority of OD to BD was demonstrated. Clinical and endoscopic improvement, complete remission, and time to remission were similar between the two groups. Adverse events were reported in 20.9% in OD and 18.1% in BD group (p=0.57).
Conclusions Prolonged-release mesalamine 4 g once-daily is as effective and well tolerated as 2 g twice-daily for inducing clinical and endoscopic remission in patients with mild-to-moderately UC.
Keywords Ulcerative colitis; Mesalamine; Dosing; Remission

Lower GI 1 EP-LG11-06

Dipstick Proteinuria Predicts the Development of Crohn's Disease: A Nationwide Population-Based Study

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Background/Aims The impact of proteinuria and its severity on the incidence of inflammatory bowel disease (IBD) has not been studied yet. We aimed to determine the association between proteinuria measured by urine dipstick test on the development of IBD.
Methods This is a retrospective nationwide population-based study using the National Health Insurance Service (NHIS) database in South Korea. A total of 9,917,400 people aged 20 years or older who had undergone a national health examination conducted by NHIS in 2009 were followed up to 2017. The study population was classified into four groups according to the degree of proteinuria: negative, trace, 1+, and ≥2+. The primary endpoint was the newly diagnosed IBD, Crohn's disease (CD) or ulcerative colitis (UC) during follow-up period.
Results Compared with the dipstick negative group, the risk of CD was significantly increased as the degree of proteinuria increased (adjusted hazard ratio [aHR] with 95% confidence interval [CI], 1.01 [0.703 to 1.451], 1.515 [1.058 to 2.162], and 2.053 [1.301 to 3.24] in dipstick trace, 1+, and ≥2+ group, respectively), but there was no significant difference in the risk of UC (aHR with 95% CI, 1.12 [0.949 to 1.323], 0.947 [0.764 to 1.174], 1.009 [0.741 to 1.373]). Dipstick positive proteinuria increased the risk of CD regardless of subgroups. However, in the development of UC, dipstick positive proteinuria increased the risk of UC in those with diabetes mellitus (DM), but not in those without DM (aHR, 1.527 vs 0.846; interaction p-value 0.004). The risk of CD was increased or decreased according to changes in proteinuria but not associated with the risk of UC.
Conclusions Proteinuria, measured by dipstick test, is strongly associated with the development of CD.
Keywords Claims data; Incidence; Proteinuria; Crohn disease

Table 1. Modifications Made to ERAS

Standard ERAS protocol	Modifications done to overcome resource limitations
Admit on the same day of the Surgery	Admit on the previous day of the surgery
Epidural for open but not for Laparoscopic resections, free use of Patient Controlled Anesthesia (PCA)	Frequent use of epidural anesthesia (due to lack of patient-controlled analgesia devices)
Intra operative noninvasive goal directed fluid therapy	Intraoperative CVP guided fluid therapy
NG tubes are not recommended	NG tube was inserted and kept for 24 hrs
No drains recommended	Selective use of drains to all low AR, Proctocolectomy and APR patients
Post op Routine ICU care not recommended	Routine post op ICU care given in the first 24 hrs as we did not have HDU care in the center
Early discharge from the hospital(3-5days)	Discharge after establishing normal diet and mobility(5-6days) – due to lack of community health system

ERAS, enhanced recovery after surgery; op, operative; ICU, intensive care unit.

Lower GI 1 EP-LG11-07

Modified Enhanced Recovery after Surgery in Colorectal Surgery: Outcome of Novel Experience in Colorectal Surgery in a Limited Resource Setting in South Asia

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Background/Aims The principal aim of the enhanced recovery after surgery (ERAS) protocol is to attenuate the stress response to surgery by optimizing the patient's normal physiology.
Methods ERAS protocol was introduced with few modifications (Table 1) to suite the local setting. Elective colorectal cancer resections performed according to modified ERAS (mERAS) protocol by a single surgeon at the University Surgical Unit of the Colombo-South-Teaching-Hospital, Sri Lanka from 2011 to 2019 were audited to assess the outcomes
Results One hundred and twelve colorectal resections were performed (71.4% laparoscopic or laparoscopic-assisted). Median age was 60 years. The ratio of male to female was 1.08: 1. The 81% of the rectal tumor patients had received neoadjuvant therapy. Mobilization was started on postoperative day 1. Oral clear fluids were started on postoperative day 1 and normal diet was established by day 03. 70% of the patients had bowel opening on postoperative day 3. Nasogastric intubation was done in 40% of the cases and median day of removal was day 2. Median day of catheter removal was postoperative day 2. Three, who underwent laparoscopic-assisted low anterior resections had anastomosis leaks. Two, needed reopening and other was managed conservatively. Median days of hospital stay were 5 days (range, 3 to 21 days). No difference was observed between open and laparoscopic groups. Thirty-day mortality rate was zero.
Conclusions Although ERAS has proven promising results in western countries, the data from developing countries are scarce. In this background, this audit shows ERAS items tailored to suit the practice have been followed up to a reasonable success with comparable results. Thus, ERAS protocol can be performed in our setting with worthy outcomes with few modifications to basal guidelines to overcome local limitations.
Keywords Enhanced recovery after surgery; Modified; Colorectal; South Asia

Lower GI 1 EP-LG11-08

Effect of Fecal Microbiota Transplantation on Clearance of Carbapenemase Producing Enterobacteriaceae

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Background/Aims Carbapenemase producing Enterobacteriaceae (CRE) carriage could be the fatal pathogen as hospital infection. Fecal microbiota transplantation (FMT) has been reported to be a possible option for decolonization. This study aimed to whether FMT is effective to eradicate intestinal colonization of CRE.
Methods Retrospective review was performed 337 patients with CRE digestive tract colonization from August 2018 to July 2019. Among them, nine patients were received FMT for clearance of CRE or *Clostridium difficile* infection, and 30 patients was selected as control groups, that were confirmed two consecutive CRE colonization and followed for more than 1 month. Successful decolonization was determined by at least three consecutive negative rectal swabs (culture) within 1 month.
Results Median follow-up days after CRE colonization was 50.5 days (interquartile range [IQR], 36 to 95 days). In FMT group, median duration of carriage of CRE before FMT was 26 days (IQR, 10 to 67 days). A total of 14 patients (35.8%) presented free of CRE colonization within 1 month; five patients (55.6%) at FMT group and nine patients (30.0%) at control group (p=0.168). One week after FMT, five of nine patients were free of CRE colonization. Only one patient received FMT showed CRE recolonization at 28 follow-up days. Compare to CRE conversion rate within 1 week, FMT group was significantly higher than control groups (44.4% vs 6.9%, p=0.02).
Conclusions FMT could be effective for CRE decolonization in intestinal tract. These data should be confirmed by larger cohorts and randomized trials.
Keywords Fecal microbiota transplantation; Carbapenemase producing Enterobacteriaceae

Lower GI 1 EP-LG11-09

NUDT15 Intermediate Metabolizers Are Associated with Longer Infliximab Durability in Pediatric Crohn's Disease Patients Treated by Combination Treatment with Infliximab and Azathioprine

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Background/Aims We aimed to investigate the outcomes between NUDT15 normal metabolizers and intermediate metabolizers in pediatric Crohn's disease (CD) patients treated by combination treatment with infliximab (IFX) and azathioprine (AZA).
Methods This study was a retrospective study conducted at two centers in Korea between 2004 and 2019. Included patients were those who had started treatment with IFX and AZA at <19 years of age and had data available for NUDT15 polymorphisms. NUDT15 poor metabolizers and TPMT variants were excluded from the analysis. Treatment outcomes such as clinical remission (CR), biochemical remission (BR), mucosal healing (MH) at 1-year treatment, IFX trough levels (TLs), anti-drug antibodies (ADAs) to IFX, 6-TGN levels, and IFX durability were compared between NUDT15 normal and intermediate metabolizers.
Results A total of 112 patients were included, and among them 86 patients (76.8%) and 26 patients (23.2%) were each NUDT15 normal and intermediate metabolizers, respectively. No significant differences were observed between the two groups regarding the proportion of patients in CR, BR, MH at 1-year Interval shortening of IFX was done in 33.7% and 15.4% of the NUDT15 normal and intermediate metabolizer groups, respectively (p=0.121). IFX TLs, ADAs, and 6-TGN levels were also comparable between the two groups. However, IFX durability was significantly higher in NUDT15 intermediate metabolizers compared to normal metabolizers (96.2% vs 77.9%, p=0.04). According to multivariable Cox proportional hazard regression analysis, NUDT15 metabolizer group was the only factor associated with IFX discontinuation (hazard ratio, 0.127; 95% confidence interval, 0.017 to 0.947; p=0.044).
Conclusions NUDT15 intermediate metabolizers were associated with longer infliximab durability in pediatric CD patients treated by combination treatment with IFX and AZA. This finding may partially explain the longer durability of IFX in Korean children compared to their counterparts in Western countries.
Keywords NUDT15; Infliximab; Durability; Intermediate metabolizer; Discontinuation

Lower GI 2 EP-LG12-01

Clinical Characteristics of *Campylobacter* Enterocolitis in Korean Adults: A Retrospective Study in a Single Center

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Background/Aims *Campylobacter* enterocolitis has been increasing rapidly in Korea. However, knowledge on clinical characteristics of *Campylobacter* enterocolitis in Korean adults is very limited. The aim of study was to identify the clinical characteristics of *Campylobacter* enterocolitis in adults.
Methods This retrospective study included patients diagnosed as *Campylobacter* enterocolitis at Nowon Eulji Medical Center between 2016 and 2017. *Campylobacter* enterocolitis was diagnosed through polymerase chain reactions of stools from patients.
Results Among 630 hospitalized patients with acute diarrheal disease, *Campylobacter* enterocolitis was diagnosed in 88 patients (14.0%). The mean age was 37.95±19.13 years. Campylobacter enterocolitis was most prevalent in the summer (52 patients, 59.1%). Patients shows more than 10 times diarrhea in 36 patients (40.9%), high fever above 39˚C in 19 patients (21.59%), abdominal pain above 5 points of NRS in 23 patients (26.14%). In abdominal computed tomography, pancolitis was found in 58 patients (65.9%). Small intestine was involved in 37 patients (42.4%). Mean C-reactive protein was 10.14 (range, 0.72 to 32.27). The duration of diarrhea was 4.74±1.87 days in ciprofloxacin treatment group and 5.06±2.50 days in the ceftriaxone treatment group, which were significantly shorter than the non-antibiotics treatment group (8.00±3.00 days, p=0.043).
Conclusions *Campylobacter* enterocolitis was common during summer. Relatively young adults without comorbid diseases were hospitalized due to severe symptoms. Whole colon and small bowel were frequently involved mimicking inflammatory bowel disease. Appropriate antibiotics treatment might reduce the duration of diarrhea.
Keywords *Campylobacter*, Enterocolitis

Lower GI 2 EP-LG12-02

TL1A Affected Epithelial-Mesenchymal Transition in Intestinal Mucosal Epithelial Cells of Patients with Inflammatory Bowel Disease-Related Intestinal Fibrosis

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Background/Aims To investigate the correlation between the expression of tumor necrosis factor-like ligand 1A (TL1A) and epithelial-mesenchymal transition (EMT) in intestinal mucosa of patients with inflammatory bowel disease (IBD)-related intestinal fibrosis.
Methods The study included 12 patients with UC-related intestinal fibrosis, 10 patients with CD-related intestinal fibrosis, and eight individuals with control group. Firstly, we evaluated the degree of inflammation and fibrosis by hematoxylin and eosin staining, Sirius red staining and Masson staining. Immunohistochemistry was used to determine the expression of TL1A and the indicators related with EMT, including E-cadherin, FSP1 and α-SMA. Then we further explored the correlation between TL1A and the indicators related to EMT. The expression of interleukin (IL)-13, transforming growth factor (TGF)-β1, Smad3 and EMT related transcription molecules such as Snail1 and ZEB1 were also detected by immunohistochemistry.
Results Compared with the control group, mucosal inflammation and fibrosis were observed in ulcerative colitis (UC) and Crohn's disease (CD) patients, and the expression of TL1A was significantly increased in the colonic mucosa in UC and CD patients. Further correlation analysis showed that the expression of TL1A was positively correlated with the degree of fibrosis, and with the interstitial markers FSP1, α-SMA, but negatively correlated with the epithelial marker E-cadherin. Compared with the control group, immunohistochemical showed that the expression of IL-13, TGF-β1, Smad3, Snail1 and ZEB1 in colonic mucosa was increased in UC group and CD group.
Conclusions TL1A is associated with intestinal fibrosis in patients with IBD and may be involved in the process of EMT in intestinal fibrosis via the TGF-β/Smad3 pathway.
Keywords Inflammatory bowel disease; Intestinal fibrosis; Epithelial-mesenchymal transition; Tumor necrosis factor-like ligand 1A

Lower GI 2 EP-LG12-03

Clinical Significance of Patch Distribution of Residual Inflammation in Ulcerative Colitis Patients with Clinical Remission

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Background/Aims The advancement of therapeutic agent has made it possible to achieve endoscopic remission in inflammatory bowel disease. Consequently, the treatment goal of ulcerative colitis (UC) also has been changed to achieve endoscopic remission (ER). However, there was insufficient clinical evidence to whether a step-up treatment should be performed to achieve ER in clinical remission (CR) without ER. And there is inadequate data on the need to consider the distribution and severity of residual inflammation in UC. This retrospective study aimed to evaluate the prognostic significance (such as step-up therapy, hospitalization, and colectomy) of the distribution and severity of residual inflammation in UC patients with CR.
Methods A total of 134 UC patients who underwent endoscopic evaluation in CR and underwent colonoscopy more than three times between January 2000 and December 2018 were retrospectively reviewed. Patients were allocated by endoscopic healing state and distribution of inflammation to an ER (n=33, 24.6%), patch distribution (n=17, 12.7%) or rectal involvement (n=84, 62.7%). We reviewed patient's characteristics, endoscopic findings and ascertain poor outcome-free survival (PFS) until June 2019.
Results In UC patient with CR, the PFS was significantly better in ER and patch distribution (p=0.003). ER and patch distribution had similar PFS (p=0.683). The baseline clinical characteristics of the patch distribution and rectal involvement were not significantly different except for the pattern of residual inflammation (p<0.001). Multivariable analysis showed that ER and patch distribution was a good prognostic factor of PFS for UC with CR (hazard ratio, 0.11; p=0.035).
Conclusions There was no statistically significant difference in the PFS between ER and patch distribution in the CR state of UC patients. Therefore, we propose selective escalation of treatment modality in CR patients, even if they do not reach ER.
Keywords Ulcerative colitis; Endoscopic remission; Clinical remission

Lower GI 2 EP-LG12-04

Clinical Outcomes after Discontinuation of Anti-Tumor Necrosis Factor-Agents in Inflammatory Bowel Disease Patients with Clinical Remission: KASID Multicenter Study

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Background/Aims Despite of proven efficacy of anti-tumor necrosis factor-α (anti-TNF) for inflammatory bowel disease (IBD), some patients have to discontinue it for various reasons in a real-world. This study aimed to evaluate long-term outcomes and risk factors of relapse after discontinuation of anti-TNF in IBD patients with clinical remission.
Methods A retrospective cohort study was conducted at 10 referral hospitals, affiliated in IBD Study Group of Korean Association for the Study of Intestinal Diseases. The study population comprised Crohn's disease (CD) or ulcerative colitis (UC) patients, treated with anti-TNF (infliximab [IFX] or adalimumab [ADA]) to induce remission and in whom anti-TNF had been discontinued after clinical remission. The patients were excluded for follow-up of <12 months after discontinuation.
Results The 125 IBD patients were eligible, and then 109 patients (71 CD and 38 UC) were analyzed and median follow-up period was 56 months. The reasons of discontinuation of anti-TNF was physician's decision (29.4%), patient's own preference (27.5%), adverse events/opportunistic infection (16.5%), and other reasons (26.6%). Relapse rate at 1 and 5 years in CD was 11.3%, and 62.5% and that in UC was 28.9% and 60.9%. Multivariate Cox regression analysis identified risk of relapse was associated with ADA use (vs IFX: hazard ratio [HR], 3.65; 95% confidence interval [CI], 1.03 to 13.02) and discontinuation due to physician's decision (vs patient's preference: HR, 0.14; 95% CI, 0.04 to 0.48) in CD, whereas that was decreased in UC with mucosal healing (vs non-mucosal healing: HR, 0.07; 95% CI, 0.01 to 0.55). Retreatment with anti-TNF was done in 52 patients and effective in 44 patients.
Conclusions Discontinuation of anti-TNF was associated with increased risk of relapse. Although retreatment of anti-TNF seems to be effective and safe, discontinuation should be carefully considered based on anti-TNF type, reason of discontinuation, and mucosal healing status.
Keywords Inflammatory bowel disease; Anti-tumor necrosis factor; Discontinuation; Relapse

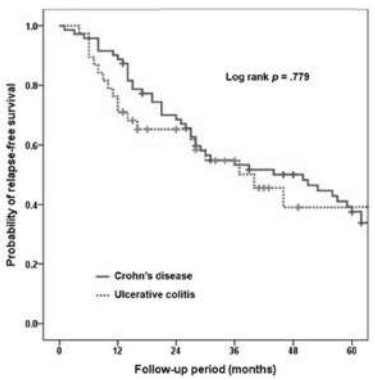

Fig. 1. Relapse free survival.

Lower GI 2 EP-LG12-05

Red Rice Extract Ameliorates Inflammation in an Ulcerative Colitis Model

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Background/Aims Ulcerative colitis (UC) is a chronic disease characterized by relapsing and diffuse colonic inflammation. Currently, natural products are necessarily sought to ameliorate the UC. Red rice is a rich source of proanthocyanidin with anti-inflammatory and antioxidant properties. Proanthocyanidin-rich red rice extract has been also associated with a decreased production of inflammatory cytokines *in vitro* study. Therefore, the present study was undertaken to elucidate the protective effect of proanthocyanidin-rich red rice extract (PRR) on UC in mice.
Methods Male C57BL/6 mice were treated with PRR for 21 days. At the day 15 to 21 of the pretreatment with PRR, colitis was induced with dextran sulfate sodium (DSS) 2.5 % for 7 days. The positive group was treated with sulfasalazine. At the end of the experiment, clinical symptoms, histological and biological marker were analyzed.
Results The pretreatment with PRR ameliorated DSS-induced colitis by protecting body weight change, reducing bleeding and restoring of the colon length. PRR significantly reduced DSS induced severe mucosal inflammation, an increased loss of crypts, and inflammatory cell infiltration. Moreover, DSS induced the expression of pro-inflammatory cytokines including tumor necrosis factor-α, interleukin (IL)-1β, and IL-6 were significantly reduced in the pretreatment with PRR.
Conclusions Our results suggest that the PRR ameliorated DSS-induced colitis accompanied by the protection of mucosal damages and reduction of pro-inflammatory cytokine levels. Thus, red rice could have therapeutic potential for the management of inflammatory bowel disease.
Keywords Red rice; Proanthocyanidin; Anti-inflammation; Dextran sulfate sodium; Inflammatory bowel disease

Lower GI 2 EP-LG12-06

Allergic Rhinitis Induced Colonic Mucosal Immune Activation in Murine Model: Association between Allergic Rhinitis and Irritable Bowel Syndrome

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Background/Aims Recent studies have shown prevalence of irritable bowel syndrome was significantly higher in patients with allergic rhinitis. It has been suggested that allergic stimulants have a potential risk of aggravating colonic mucosal inflammation. The purpose of this study was to investigate whether induction of allergic rhinitis in the mouse model can lead to inflammation of colonic mucosa and irritable bowel syndrome.
Methods Sixteen BALB/c mice were divided into two groups: six in normal and 10 in ovalbumin (OVA) treated group. OVA treated group was nebulized with OVA after intraperitoneal injection with OVA. A number of cytokines, interleukin (IL)-1b, IL-4, IL-5, IL-6, IL-10, IL-13, transforming growth factor α and interferon-γ (IFN-γ) in colonic membrane were measured by RT-PCR and multiplex protein analysis. Hematoxylin and eosin (H&E) staining was performed on colon tissues.
Results Some of IL levels we measured were significantly higher in allergic group than in normal group. IL-1b, IL-4, IL-5, IL-6, IL-10 and IFN-γ in colonic mucosa were significantly higher in allergic group than in normal group ($p<0.05$). Based on H&E staining, inflammatory cell numbers were significantly greater in allergic group than in the control ($p<0.05$). The number of mast cells was also significantly greater ($p<0.05$).
Conclusions Our data suggest that allergic stimulants increase cytokine expression and inflammatory production in an allergic murine model. This study showed allergic rhinitis in the mouse model can lead to inflammation of colonic mucosa and irritable bowel syndrome.
Keywords Irritable bowel syndrome; Cytokines; Allergic rhinitis

Lower GI 2 EP-LG12-07

ACTG2 Gene Mutation and Clinical Features in Patients with Chronic Intestinal Pseudo-Obstruction

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Background/Aims Chronic intestinal pseudo-obstruction (CIPO) is a clinically heterogenous syndrome which is characterized by compromised peristalsis and intestinal obstruction. Variants of the *ACTG2* gene, encoding gamma 2 enteric actin, a protein crucial for correct enteric muscle contraction, have been found in CIPO patients. The aim of this study is to examine the clinical features and mutation spectrum of ACTG2 gene in Korean CIPO patients.
Methods Eleven patients diagnosed with CIPO were tested for genetic analysis of *ACTG2* genes. Genomic DNA from peripheral leukocytes was extracted. All coding exons and flanking introns of the *ACTG2* gene were amplified using polymerase chain reaction. Direct sequencing was performed.
Results *ACTG2* gene mutations were found in five patients (45%). C.769C>T (R257C) was found in three patients, C.188G>A(R63Q) in one. A novel mutation, C.577A>T (p.Ile193Phe) was found in one patient. Current age ranges from 33 months to 26 years with a median of 11 years. Two patients presented at birth, two at 1 year, and one at 3 years of age. Among them, microcolon was found in two patients (40%), megacystis in five (100%). Two patients had done intermittent urinary catheterization. Four patients underwent multiple surgery, including colostomy, jejunostomy, and ileostomy and one underwent subtotal gastrectomy, cholecystectomy, and total colectomy. Three patients (60%) has been receiving long term home PN and one patient quit PN recently. Two of them had central line associated bloodstream infections. None had an intestinal transplantation. One patient has recurrent small intestinal bacterial overgrowth and is taking cyclic antibiotics. Two patients are taking oral pyridostigmine.
Conclusions *ACTG2* mutations are associated with megacystis and commonly found in Korean CIPO patients. Early diagnosis of CIPO through the ACTG2 genetic analysis can avoid unnecessary diagnostic interventions and reduce malnutrition and growth disorders with appropriate measures.
Keywords Chronic intestinal pseudo-obstruction; *ACTG2* mutation

Lower GI 3 EP-LG13-01

Comparison of Treatment and 1-Year Outcomes between Pediatric Crohn's Disease and Ulcerative Colitis in Korea: Results from a Multicenter, Registry-Based, Retrospective Cohort Study

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Background/Aims We aimed to compare the differences in treatment and outcomes of pediatric Crohn's disease (CD) and ulcerative colitis (UC) in Korea.
Methods This analysis was conducted using data from a multicenter, registry-based, retrospective cohort study conducted at five tertiary centers in Korea between 2013 and 2018. Initial treatment for induction, treatment during maintenance, and outcomes at 1-year treatment were compared between pediatric CD and UC patients who were included in the cohort.
Results A total of 221 patients were included (CD of 161 [72.9%], UC of 60 [27.1%]). For induction therapy, enteral nutrition was administered in 55.9% and 15.0% of CD and UC patients, respectively (p<0.001), while corticosteroids were used in 32.9% and 36.7% of CD and UC patients, respectively (p=0.716). During maintenance therapy, azathioprine was prescribed in 80.7% and 61.7% (p=0.006), and corticosteroids in 7.5% and 21.7% of CD and UC patients (p=0.006), respectively. Treatment with biologic agents were significantly higher in CD patients (70.8% vs 46.7%, p=0.002). Clinical remission at 1-year treatment was comparable between the two groups (77.4% vs 69.2%, p=0.340). CRP was significantly higher in CD patients (median 0.07 [interquartile range (IQR), 0.03 to 0.28 mg/dL] vs median 0.04 [IQR, 0.03 to 0.14 mg/dL], p=0.032), while fecal calprotectin levels were lower in CD patients, although the results were not statistically significant (median 137.2 [IQR, 40.1 to 897 mg/kg] vs median 612.6 [IQR, 36.7 to 1,000 mg/kg], p=0.088).
Conclusions This is the first multicenter study in Korea to compare the differences in treatment and 1-year treatment outcomes between pediatric CD and UC in Korea revealing some interesting findings. A large-scale study on a nationwide basis should better clarify these findings.
Keywords Inflammatory bowel disease; Korea; Pediatrics; Treatment; Outcomes

Lower GI 3 EP-LG13-02

Detection of Tumor Necrosis Factor-α in Colon Tissue of Ulcerative Colitis Patients Using Two-Photon Microscopy

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Background/Aims The inflammatory bowel disease (IBD) is triggered by potent pro-inflammatory cytokine, the tumor necrosis factor-α (TNF-α). For the IBD treatment, various anti-TNF-α drugs have been developed, but monitoring of their effects in treatment was limited. Numerous target-specific antibody-fluorophore conjugates have been developed by linking antibodies to one-photon, near infrared, or natural fluorophores, but they also showed their limitations in its penetration depth and resolution. Therefore, we developed a two-photon (TP) probe for TNF-α by conjugating Pyr1 moiety with infliximab (Pyr1-infliximab) that can detect the TNF-α in a live cell and human colon tissue by TP microscopy.
Methods We employed Pyr1 moiety as the fluorophore, propylene group as the spacer, and infliximab as the target. Pyr1-infliximab showed absorption maxima at 280 and 438 nm and emission maximum at 610 nm in aqueous buffer solution, and the effective TP action cross-section values of (520–2830) × 10^{-50} cm^4s/photon (GM) in RAW 264.7 cells, respectively.
Results By labeling this probe, it was possible to detect the Pyr1-infliximab/trans-membrane TNF-α complexes in a live cell and the relative proportion of the PT complexes (PPT) in the human colon tissues. The P_{PT} values in the healthy, inflammation suspected, and inflammation tissues of ulcerative colitis patients were 1.0/4.5/10.
Conclusions Herein, we report that Pyr1-infliximab can detect TmTNF in a live cell and human colon tissue by TPM. This probe may find useful application for monitoring the response to biologic agents and further be a marker for an optimal treatment choice.
Keywords Two photon microscopy; Ulcerative colitis; Tumor necrosis factor-alpha

Lower GI 3 EP-LG13-03

Prognostic Factors in Intestinal Behçet Disease

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Background/Aims There were few studies regarding prognostic factors of intestinal Behçet disease (BD) according to diagnostic algorithm by Korean inflammatory bowel diseases (IBD) study group.
Methods We reviewed the medical records of patients who had ileocolonic ulcers with clinical impression of intestinal BD from March 1986 to August 2019 in Seoul St. Mary's Hospital. We evaluated various factors at the time of diagnosis which were related with adverse event (AE, major operation or admission from disease progression) and disease-free survival (DFS).
Results Among 204 eligible patients, a total of 184 were included in the study after exclusion of 20 patients with ileocolonic ulcers from another disease. The male-to-female ratio was 1:1 and the mean age at the time of diagnosis was 49.3 ±15.9 years. The number of definite, probable, suspected, and non-diagnostic BD was 17, 64, 37, and 66 patients, respectively (Table 1). Patients with definite, probable, and suspected BD developed more AEs compared to patients with non-diagnostic BD (p=0.002). In univariate analysis, accompanying hematologic disorder, hemoglobin <10 g/dL, serum C-reactive protein >2.5 mg/dL, fever, disease activity index for intestinal BD score ≥40, and colonic involvement at the time of diagnosis were significantly related to development of AEs (p<0.001, p<0.001, p=0.034, p=0.005, p=0.014, and p<0.001). Hemoglobin <10 g/dL and colonic involvement were significantly associated with poor DFS (p=0.009 and p=0.025). Multivariate analysis revealed hemoglobin <10 g/dL, fever, and colonic involvement at the time of diagnosis were significantly associated with development of AE (p=0.003, p=0.005, and p=0.013) and hemoglobin <10 g/dL was associated with poor DFS (p=0.028).
Conclusions Anemia, fever, and colonic involvement at the time of diagnosis are poor prognostic factors in patients with intestinal BD according to diagnostic algorithm by Korean IBD study group.
Keywords Intestinal Behçet disease; Prognostic factors; Prognosis

Table 1. Baseline Characteristics of Patients

	Definite BD (n = 17)	Probable BD (n = 64)	Suspected BD (n = 37)	Non-diagnostic BD (n = 66)	P value
Age (years)	43.76±15.13	47.02±14.84	48.84±16.71	53.30±16.05	0.054
Sex (M:F)	8:9	25:39	17:20	39:27	
Hb (g/dl)	12.16±1.69	12.07±2.42	12.05±2.73	13.09±2.50	0.088
CRP (mg/dl)*	3.66±4.68	3.40±5.46	3.44±6.55	1.52±3.46	0.231
DAIBD score	61.18±30.75	58.73±29.43	49.73±30.91	24.85±21.29	<0.001
Treatment					
Steroid	16	44	18	3	<0.001
5-ASA	14	39	24	2	<0.001
Immunomodulator	5	9	2	0	0.002
Biologics	8	13	5	0	<0.001
Thalidomide	0	1	0	0	
Systemic Behcet Sx					
Oral ulcers	17	61	33	0	
Genital ulcers	11	27	0	0	
Uveitis	6	9	1	0	
Skin lesion/Etc	7/1	13/4	0/0	0/0	
Disease Extent					0.166
ICV	16	47	25	47	
Beyond ICV	1	17	12	19	
Adverse events	5	17	12	0	
Operations	0	6	3	0	
Admission	5	17	12	0	
Hematologic disorder	1	11	6	0	
MDS/AA/AML	0/0/0	5/4/0	4/1/1	0/1/0	
Lym/MM/Etc	1/0/0	1/1/0	0/0/1	0/0/1	

BD, Behçet disease; M, male; F, female; Hb, hemoglobin; CRP, C-reactive protein; DAIBD, disease activity index for intestinal BD; 5-ASA, 5-aminosalicylic acid; MDS, myelodysplastic syndrome; AA, aplastic anemia; AML, acute myeloid leukemia; Lym, lymphoma; MM, multiple myeloma.

Lower GI 3 EP-LG13-04

A Newly Developed Metric, PSDrest Predicts the Presence of Defecatory Disorders and Highly Correlates with the Balloon Expulsion Test

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Background/Aims In defecatory disorder, there is poor correlation between conventional manometry parameters and balloon expulsion test (BET) and therefore a new metric is needed. We aimed to develop a new metric and to correlate the metric with BET.
Methods Consecutive healthy participants and patients with defecatory disorders (Rome IV) were recruited after informed consent. All underwent high resolution 6-channel solid-state anorectal manometry and BET. Resting pressure profiles were converted into ASCII files and analyzed using MATLAB program. A new metric, Power Spectral Density$_{rest}$ (PSD_{rest}, unit V/$\sqrt{}$ Hz) was developed using the Fourier transform. The ideal cutoff level of PSD_{rest} was determined using receiver operating characteristic (ROC) analysis, and its correlations with defecation index (DI) and BET was analyzed using Pearson correlation analysis, with p<0.05 as significant.
Results Eight normal (mean age, 22.8 years) and 16 constipated (mean age, 51 years) females were analyzed. Of 16 constipated females, eight had normal BET (<1 minutes) and eight with abnormal BET (≥5 minutes). Those with constipation versus normal reported lower PSD_{rest} (mean 0.58 vs 0.88, p=0.05). Based on the ROC analysis, PSD_{rest} cutoff value <0.5 V/$\sqrt{}$ Hz can accurately differentiate constipation from normal with an area under the curve of 0.97 (95% confidence interval, 0.89 to 1.05; p=0.04), sensitivity 100%, specificity 88%, positive predictive value 89% and negative predictive value 100%. Among constipated individuals, PSD_{rest} was correlated with BET (R=0.81, p<0.001) but not DI (p=0.14). No correlation was seen between BET and DI (p=0.3).
Conclusions A PSD_{rest} value <0.5 V/$\sqrt{}$ Hz predicts the presence of defecatory disorder and is highly correlated with abnormal BET. A further validation study in a larger cohort is required.
Keywords High-resolution anorectal manometry; Balloon expulsion test; Constipation; Fourier transform; Power spectral density

Lower GI 3 EP-LG13-05

Efficacy and Safety of D-Sorbitol and Picosulfate Plus Ascorbic Acid, a New Bowel Cleansing Solution for Colonoscopy: Prospective Multicenter Randomized Study

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Background/Aims Poor adherent to bowel cleansing solution is major risk factor for incomplete colonoscopy. The ideal bowel cleansing solution should be effective, safe and acceptable to patients. This study was aimed to investigate the efficacy, safety and patient acceptability of D-sorbitol and picosulfate plus ascorbic acid (Asc), as a new bowel cleansing solution.
Methods This was a prospective, multicenter and randomized phase III clinical trial which was involved five tertiary hospitals in Korea. All participants scheduled to undergo colonoscopy were randomized to receive either 0.46-L D-sorbitol and picosulfate plus Asc or 2-L polyethylene glycol (PEG) + Asc. The same day bowel preparation performed 4 to 5 hours before colonoscopy was administered for D-sorbitol and picosulfate plus Asc group. Bowel cleansing was assessed by independent blinded raters via videotapes. Safety was assessed by clinical and laboratory parameters, and patient acceptability was assessed by questionnaire. All parameters were compared between two groups.
Results A total of 243 patients were enrolled (mean age 50.6 ±12.14 years, 39.9% male), of which 122 (50.2%) took D-sorbitol and picosulfate plus Asc solution. Successful bowel cleansing defined as grade A or B according to the Harefield Cleansing Scale was similar between two groups (98.36% in D-sorbitol and picosulfate plus Asc group and 96.69% in PEG+Asc group, p=0.45). Clinical and laboratory safety parameters also showed no significant difference between two groups. The proportion of patients experience difficulty in taking cleansing solution was significantly lower in D-sorbitol and picosulfate plus Asc group than in PEG+Asc group (22.13% vs 80.99%, p<0.01). Patients rating score of overall satisfaction for the solution was better for D-sorbitol and picosulfate plus Asc group than PEG + Asc group (8.71 vs 6.22, p<0.001).
Conclusions The D-sorbitol and picosulfate plus Asc solution-based bowel cleansing reduces the volume of cleansing solution to drink without compromising efficacy or safety. This solution is more acceptable to patients and can improve patients adherence to bowel cleansing solution resulting in successful colonoscopy.
Keywords Colonoscopy; D-sorbitol; Picosulfate; Ascorbic acid; Bowel preparation

Lower GI 3 EP-LG13-06

Atopic Diseases Are Associated with the Development of Inflammatory Bowel Diseases: A Nationwide Population-Based Study

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Background/Aims The association between atopic diseases and inflammatory bowel diseases (IBD) remains unclear. We conducted a nationwide population-based study to investigate the effect of atopic diseases on the development of IBD.
Methods A total of 9,950,548 subjects who received medical check-up in 2009 were included and followed up until 2017. The presence of atopic diseases including atopic dermatitis (AD), allergic rhinitis (AR), and asthma were evaluated. Patients who developed IBD including Crohn's disease (CD) and ulcerative colitis (UC) were identified using the claims data from National Health Insurance.
Results During a mean follow up of 7.3 years, 1,426 subjects (0.014%) developed CD and 5,916 subjects (0.059%) developed UC. The incidences of CD (per 100,000 person-years) were 4.088, 2.255, and 2.344, and the incidences of UC were 11.926, 9.857, and 9.377 in patients with AD, AR, and asthma, respectively. Multivariable analysis revealed that the adjusted hazard ratios (aHR) for incident CD in patients with AD, AR, and asthma were 2.21, 1.33, and 1.59 (95% confidence interval [CI]: 1.251 to 3.896, 1.152 to 1.532, and 1.186 to 2.123, respectively), while the risk for incident UC in patients in AD, AR, and asthma were 1.51, 1.32, and 1.28 (95% CI: 1.081 to 2.101, 1.235 to 1.416, and 1.110 to 1.484, respectively) compared to controls. Moreover, increase in the number of atopic diseases gradually increased the risk for CD and UC; CD showed aHR of 1.36 and 1.65 (95% CI: 1.180 to 1.571 and 1.143 to 2.370), and UC showed aHR of 1.30 and 1.49 (95% CI: 1.216 to 1.398 and 1.247 to 1.170) in one, and two or more atopic diseases, respectively.
Conclusions Patients with atopic diseases showed increased association with IBD.
Keywords Atopic disease; Inflammatory bowel disease; Crohn disease; Ulcerative colitis; Claims data

Lower GI 3 EP-LGI3-07

Comparison between Pediatric Crohn's Disease and Ulcerative Colitis at Diagnosis in Korea: Results from a Multicenter, Registry-Based, Retrospective Cohort Study

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Background/Aims We aimed to compare the differences of pediatric Crohn's disease (CD) and ulcerative colitis (UC) at diagnosis in Korea.
Methods This analysis was conducted using data from a multicenter, registry-based, retrospective cohort study conducted at five centers in Korea between 2013 and 2018. Baseline demographics, clinical characteristics, and results from laboratory, endoscopic, radiologic examinations were compared between pediatric CD and UC patients who were <19 years at diagnosis.
Results A total 307 patients were included (CD of 227 [73.9%] and UC of 80 [26.1%]). The male to female ratio was 2.49:1 for CD, and 1.29:1 for UC (p=0.019). Median age at diagnosis was 14.4 years (interquartile range [IQR], 12.4 to 16.2 years) for CD, and 14.4 years (IQR, 11.7 to 16.5 years) for UC (p=0.962). Hematochezia was the only dominant symptom in UC patients compared to CD patients (86.2% vs 30.8%, p<0.001). White blood cell counts, platelet counts, erythrocyte sedimentation rate, C-reactive protein were significantly higher, and serum albumin level was significantly lower in CD patients. ASCA was positive in 44.5% and 16.2% of CD and UC patients, respectively (p<0.001), and ANCA was positive in 15.0% and 58.8% of CD and UC patients, respectively (p<0.001). Terminal ileal involvement on endoscopy was prominent in CD (62.1% vs 16.2%, p<0.001), while rectal involvement was more prominent in UC (52.4% vs 83.8%, p<0.001). Small bowel involvement and perianal perforating diseases on radiologic exams were also more prominent in CD.
Conclusions This is the first a multicenter study in Korea to compare the differences between pediatric CD and UC at diagnosis in Korea demonstrating some novel findings. A large-scale study on a nationwide basis is expected to better clarify these findings in the future.
Keywords Inflammatory bowel disease; Korea; Pediatric; Diagnosis; Characteristics

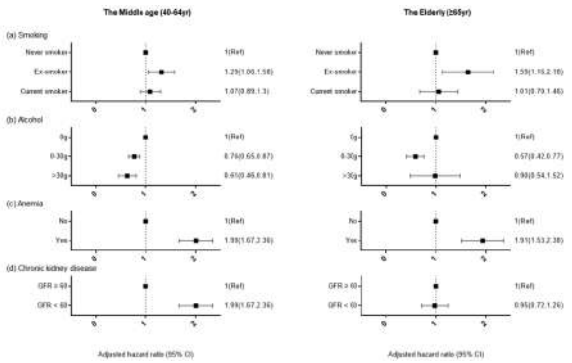

Fig. 1. Forrest plot showing risk factors.

Lower GI 3 EP-LGI3-08

Trends and Risk factors of Middle and Old-Aged Crohn's Disease: A Nationwide Study in South Korea

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Background/Aims The incidence of inflammatory bowel disease (IBD) is increasing in Asian countries and numerous risk factors associated with the development of IBD have been studied. This study aims to demonstrate risk factors of Crohn's disease (CD) in South Korea and to specify any differences between age groups using the National Health Insurance Service (NHIS) database.
Methods A total of 14,060,821 people over 40 years old who received a national health screening program in 2009 were followed up until December 2017. Patients with newly diagnosed CD were enrolled. CD was identified according to the International Classification of Diseases, 10th revision and the rare, intractable disease registration program codes from the NHIS dataset in South Korea.
Results During the mean follow-up period of 7.39 years, a total of 1,337 (1.33 per 100,000) patients developed CD. In the middle age group (40 to 64 years old), patients with history of smoking (adjusted hazard ratio [aHR], 1.29; 95% confidence interval [CI], 1.06 to 1.58) and anemia (aHR, 1.99; 95% CI, 1.67 to 2.36) appeared to have significantly higher risk of developing CD. In the old age group (65 years old or older), ex-smoking and anemia also increased risk of CD (aHR, 1.58 [95% CI, 1.16 to 2.18]; aHR, 1.91 [95% CI, 1.53 to 2.38]; respectively). Especially in the middle age group, those with chronic kidney disease had statistically elevated risk of CD (aHR, 1.38; 95% CI, 1.06 to 1.79).
Conclusions Ex-smokers and patients with anemia who are over 40 years old are at high risk of developing CD. In the middle age group in particular, chronic kidney disease patients were at higher risk of developing CD. People with potential risk factors need more cautious approach in monitoring CD.
Keywords Crohn disease; Risk factors; Cohort studies; Pathogenesis

Motility EP-MO1-01

Pelvic Floor Dysfunction in Chronic Constipated Children in Korea

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Background/Aims Pelvic floor dysfunction (PFD) is one of important causes of chronic constipation in children. We analyzed clinical characteristics, the results of diagnostic tests, and treatments of PFD in children.
Methods Thirteen children who were diagnosed PDF with fluoroscopic defecography at Konkuk University Medical Center were enrolled in this study. Clinical data, including results of colon transit time (CTT) test, were collected from medical records retrospectively.
Results Male was seven out of 13, median age was 10 years (range, 8 to 18 years), median frequency of bowel movement was 1/7 days (range, 1 to 10 days), median duration of constipation was 6.5 years (range, 2 to 18 years), and median age of onset of constipation was 3 years (range, 0 to 11 years). On the CTT test, outlet obstruction type was noted in 8 out of 12 (66.6%), and slow transit type was noted in 3 out of 12 (25%). Median CTT was 50 hours (range, 43 to 109 hours). Initial medical therapy was performed with PEG 4000 (Forlax®) regimen, and response was good in 6 out of 13, fair in 6 out of 13, and poor in 1 out of 13. Median dose of PEG 4000 was 0.47 g/kg/day (0.25 to 0.88 g/kg/day). Biofeedback was performed in 4 out of 13 with good results. Response to long-term only-medical therapy (6/13) was good in 4 out of 6, and fair in 2 out of 6. Follow-up loss was noted in 4 out of 13.
Conclusions PFD should be considered as a cause of chronic constipation in children, especially with abnormal CTT test results. Medical therapy combined with Biofeedback is an effective therapy for PFD in children.
Keywords Pelvic floor; Defecography; Colon transit; Constipation; Child

Motility EP-MO1-02

The Change of Intestinal Barrier as Aging and Irritable Bowel Syndrome

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Background/Aims The pathophysiological mechanisms of the irritable bowel syndrome (IBS) are complex and have not been fully elucidated. Tight junction (TJ) have important role for construction of a constitutive barrier of epithelial cells, and regulate the permeability of the barrier. However, there was little known the change of TJ as aging. The present study aimed to investigate the molecular and cellular mechanisms of TJ changes in IBS as aging.
Methods Colonic mucosal biopsies were acquired at right colon from old (≥65 years old) and young (20–40 years old) human, old and young IBS patients (each group, n=8). The change of inflammation (tumor necrosis factor [TNF]-α, interleukin (IL)-1ß, and IL-10) and tight junction (claudin1, 2, 5, occludin, and ZO-1) were measured by real-time polymerase chain reaction.
Results TNF-α, IL-1ß, IL-10 and claudin 2 mRNA were increased and claudin 1, 5, occludin and ZO-1 mRNA were decreased in whole IBS group (n=19) compared to control group (n=10). Comparing young (n=12) and old IBS group (n=7), inflammatory cytokine-related factors (TNF-α, IL-1ß, and IL-10) were increased and claudin 1 and 5 also increased in old IBS group, however, claudin 2, occludin and ZO-1 mRNA were decreased in old IBS group. However, there were no significant statistical differences between two groups. The inflammatory cytokine-related mRNA showed increased pattern and occluding and ZO-1 showed decreased pattern in IBS group and aging. Claudin 2 showed decreased pattern as aging, however, this factor showed increased pattern in IBS group. However, all factor did not show any statistical difference except IL-10 between young control and old IBS group (p<0.05) (Fig 1).
Conclusions In conclusion, compromised intestinal barrier function has been associated with inflammation in the gut mucosa as aging in IBS patients.
Keywords Irritable bowel syndrome; Aging; Tight junction

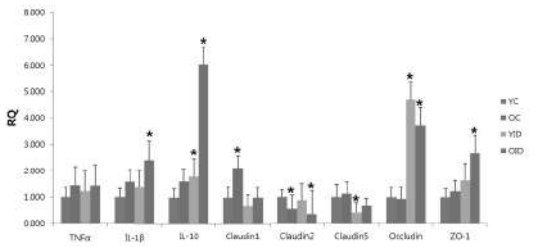

Fig 1. Relative transcript level of Inflammatory cytokine-related genes and Epithelial gut tight junction-related genes according to age in two tissue groups.
Transcript levels were normalized to *GAPDH*. Bars represent the mean ± SE, n≦11, *P<0.05
YC, young control, n≤10;
OC, old control, n≤11;
YID, Young irritable bowel syndrome patient, n≤8;
OID, old irritable bowel syndrome patient, n≤5

Motility EP-MO1-03

Nonobese Nonalcoholic Fatty Liver Disease Is Associated with Erosive Esophagitis

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Background/Aims Obesity has been registered as a risk factor for gastroesophageal reflux disease (GERD). Although nonalcoholic fatty liver disease (NAFLD) shares common features such as insulin resistance or metabolic syndrome with obesity, data regarding the association between the NAFLD and GERD is scarce. This study aimed to investigate the relationship between the NAFLD and erosive esophagitis in nonobese, nondiabetic Korean adults.
Methods A cross-section study was performed to assess the association between the erosive esophagitis and NAFLD in nonobese, nondiabetic participants. A total of 17,445 subjects who underwent health check-up and upper endoscopy were enrolled. Fatty liver disease was diagnosed using ultrasonography. The presence and odds ratio (OR) of erosive esophagitis was accessed in patients with NAFLD.
Results Participants with erosive esophagitis were associated with NAFLD. The prevalence of erosive esophagitis was higher in subjects with NAFLD than those without NAFLD (6.7% vs 3.6%, p<0.001). The risk of erosive esophagitis was significantly high in subjects with NAFLD (OR, 1.93; 95% confidence interval [CI], 1.62 to 2.30). After adjustment with multiple variables including metabolic component, abdominal obesity, and smoking, the association between the erosive esophagitis and NAFLD remained significance (OR, 1.44; 95% CI, 1.18 to 1.75, p<0.001).
Conclusions Erosive esophagitis is highly prevalent in nonobese, non-diabetic NAFLD patients. NAFLD is independently associated with erosive esophagitis regardless of obesity. Our result might represent another putative cause of erosive esophagitis such as hormonal factors besides obesity.
Keywords Erosive esophagitis; Nonalcoholic fatty liver disease; Obesity; Ultrasonography

Motility EP-MO1-04

Antidepressant for Symptoms Remission of Gastroesophageal Reflux: A Network Meta-Analysis

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Background/Aims To compare symptoms' remission of antidepressants for gastroesophageal reflux.
Methods We included randomized controlled trials (RCTs) that evaluated efficacy of antidepressants for gastroesophageal reflux by searching the MEDLINE, Embase, Web of Science, China National Knowledge Infrastructure Database, Chinese VIP Information, Chinese Medical Databases and Wan-Fang databases from the starting date of database establishment till January 1, 2019. Database were searched with the search terms of "gastroesophageal reflux disease," "antidepressant," etc. ADDIS (Aggregate Data Drug Information System) 1.16.8 was adopted for network meta-analysis. We did node split analysis to test inconsistency. Rank probability was complemented for comparison among antidepressants.
Results Totally seven RCTs were included with antidepressants of selective 5-HT reabsorption inhibitor (SSRIs) benzodiazepines (BZDs), tricyclic antidepressants (TCAs) and complex of flupentixol-melitracen (FM). FM and SSRIs showed higher total effective rate than placebo with statically significance. There was no statically significance in comparisons among antidepressants (Table 1). Rank probability showed therapeutic effects ranked as FM>BZDs>SSIRs>TCAs>placebo.
Conclusions FM and SSRIs might be more effective for symptom' remission of gastroesophageal reflux. FM might be the most effective antidepressant with maximum probability according to our analysis.
Keywords Antidepressants; Gastroesophageal reflux disease; Network meta-analysis

Table 1. Network Meta-Analysis

Comparisons	Total effective rate(RR, 95% CI)
5-HT_{1A}A vs BZDs	1.93 (0.04, 129.39)
5-HT_{1A}A vs FM	0.66 (0.04, 12.12)
5-HT_{1A}A vs SSRIs	2.56 (0.06, 95.64)
5-HT_{1A}A vs TCAs	18.30 (0.17, 2321.12)
5-HT_{1A}A vs Placebo	24.12 (0.62, 977.59)
BZDs vs FM	0.34 (0.02, 6.99)
BZDs vs SSRIs	1.32 (0.03, 52.91)
BZDs vs TCAs	9.19 (0.08, 1198.75)
BZDs vs placebo	12.28 (0.32, 563.92)
FM vs SSRIs	3.74 (0.32, 39.38)
FM vs TCAs	25.97 (0.67, 1229.93)
FM vs Placebo	35.52 (3.56, 385.92) *
SSRIs vs TCAs	6.88 (0.29, 212.29)
SSRIs vs Placebo	9.47 (2.50, 43.43) *
TCAs vs Placebo	1.40 (0.07, 26.96)

RR, relative risk; CI, confidence interval; 5-HT_{1A}As, 5-HT receptor agonist; BZD, benzodiazepines; SSRIs, 5-HT reabsorption inhibitor; TCAs, tricyclic antidepressants; FM, flupentixol-melitracen.
*Statistical significance (p<0.05).

Motility EP-MO1-06

Association between Diarrhea and Clinical Outcomes in Critically Ill Patients Receiving Enteral Nutrition

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Background/Aims Diarrhea is a common condition affecting up to 78% of critically ill patients. Pathogenesis of diarrhea includes gut infection, antibiotics use and alteration of physiologic response. This study aimed to investigate the association between diarrhea and clinical outcomes of critically ill patients receiving enteral nutrition (EN).
Methods A prospective observational study was conducted in general intensive care unit (ICU) at University Malaya Medical Centre, Malaysia. Adult, critically ill patients receiving EN were included. Data related to bowel output were collected up to 14 days of ICU stay or until discharge, whichever came earlier. Patients were followed until hospital discharge for data on clinical outcomes. Fecal output was measured using a validated stool chart, King's Stool Chart. Chi-square and Fisher exact tests were used for statistical analysis using SPSS for Windows, version 24.0.
Results Of the 102 patients included, diarrhea occurred in 48% of critically ill receiving EN. Patients who developed diarrhea (12.47±9.381 days) has longer ICU stay compared to non-diarrhea patients (5.79±4.757 days) (p=0.005). Diarrhea was associated with sepsis (p=0.027), prolonged ICU (p<0.001) and hospital stay (p=0.003). No associations found between diarrhea and prolonged mechanical ventilation (p=0.269), nosocomial infection (p=0.942) and organ failure (p=0.730). Diarrhea in critically ill patients receiving EN was also not associated with ICU and hospital mortality (p=0.526 and p=0.572).
Conclusions Diarrhea in critically ill patients receiving EN is associated with sepsis, prolonged ICU and hospital stay but not mortality. Prevention and management of diarrhea need to be addressed in ICU setting to reduce related burden.
Keywords Diarrhea; Critically ill; Enteral nutrition; Clinical outcomes

Motility EP-MO1-05

Clinical Features of Severely Constipated Children: Comparison between Infrequent Bowel Movement and Fecal Soiling Groups

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Background/Aims To compare clinical features, diagnostic findings, and medication between two groups: infrequent bowel movement and fecal soiling.
Methods The 333 children with functional constipation were enrolled. We classified the children into three groups (infrequent bowel movement without fecal soiling [G3-a], infrequent bowel movement with fecal soiling [G3-b], and only fecal soiling [G3-c]), and into two groups with fecal soiling (G2-b) or not (G2-a).
Results The median age (months) and interquartile range (IQR) was 33 (45) in (G3-a), 54 (40) in (G3-b), 73 (48) in (G3-c) (p<0.0001). The G3-c had the last onset (median, 18; IQR, 18; p=0.0219) and the longest duration of symptoms (median, 24; IQR, 24; p=0.0148). PEG 4000 was used in 59.88% (G3-a), 96.77% (G3-b), and 82.35% (G3-c) (p<0.0001). Considering two groups, the median age (months) and IQR were 33 (45) in (G2-a) and 63.5 (52.5) (G2-b) (p<0.0001). The G2-b group had a later onset (median 12, IQR 19.5, p=0.0062) and a longer duration of symptoms than the G2-a group (median, 24; IQR, 12; p=0.0070). PEG 4000 was used in 59.88% (G2-a) and 87.8% (G2-b) (p<0.0001). No statistical difference existed in maintenance doses of laxatives, colon transit time (CTT), and CTT type in terms of groups.
Conclusions Infrequent bowel movement and fecal soiling represent advanced stage of chronic functional constipation.
Keywords Fecal incontinence; Constipation; Child; Colon transit; Polyethylene glycol

Motility EP-MO1-07

Altered Intestinal Permeability and Effect of Mosapride and Glutamine on Postoperative Ileus in a Guinea Pig Model

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Background/Aims The alteration of permeability and accumulation of inflammation seems to play an important role in the pathophysiology of POI. This study was performed to characterize the alteration of intestinal permeability regarding the development of POI. Moreover, we investigated whether mosapride and glutamine have an anti-inflammatory effect and have an effect on the intestinal permeability in the POI model.
Methods An experimental POI model with guinea pig was created. Fluorescent markers (FITC-dextran) were passed through the harvested intestinal membranes in the using chamber and checked for differences in optical translucency in the ileum and the proximal colon. To characterize the alteration of intestinal permeability, we compared intestinal permeability of control group with POI group which 3 and 6 hours after surgical manipulation in the ileum and the proximal colon. We also compared inflammatory grade represented by leukocyte counts and the expression of calprotectin between control and POI group. To investigate influence of mosapride and glutamine on POI, we compared permeability and inflammatory grade of POI group with mosapride (0.3 mg/kg and 1 mg/kg, subcutaneous) and glutamine (500 mg/kg, peroral) administration group.
Results The ileum and proximal colon showed increased permeability in the POI group compared with control group. There was a significant increase in the leukocyte counts and calprotectin level in the POI group compared with the control group in the ileum and proximal colon. Elevated leukocyte counts were significantly decreased by mosapride and glutamine in the proximal colon. Elevated calprotectin level was significantly decreased by mosapride and glutamine in the ileum and proximal colon. Increased permeability of POI group was significantly decreased after mosapride and glutamine administration in the ileum and proximal colon.
Conclusions Increased inflammatory grade and intestinal permeability were observed in the POI guinea pig model. Mosapride and glutamine have an anti-inflammatory effect and modulate altered gut permeability.
Keywords Postoperative ileus; Intestinal permeability; Inflammation; Mosapride; Glutamine

GI Cancer EP-GI1-01

Response after Preoperative Long Course Chemoradiotherapy in Locally Advanced Rectal Cancer

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Background/Aims To study the response after preoperative long course chemoradiotherapy (LCRT) in locally advanced rectal cancer with the objectives of assessment of downsizing or downstaging and radiological response after treatment.
Methods From August 2016 to September 2017, 37 patients with locally advanced rectal cancer received preoperative LCRT. All patients were treated with 3D conformal radiotherapy with total dose 45–46 Gy for 5 weeks and chemotherapy with 5-fluorouracil and leucovorin during 1st and 5th week of radiotherapy. Radiological assessment was done 4–5 weeks after LCRT. Surgery was done 6–8 weeks later.
Results Patients who receiving preoperative LCRT in this study, downsizing and downstaging effects were 35.13% and 54.05% respectively after treatment. Although no patient resulted in complete response, 20 cases (54.05%) showed partial response, 13 patients (35.13%) remained as stable but four cases (10.81%) resulted in progressive disease on radiological assessment with acceptable toxicities. This result was quite promising in term of response in locally advanced rectal cancer.
Conclusions It was found that preoperative LCRT could be adapted and used successfully as one of the major treatment options in locally advanced rectal cancer as it could facilitate more curative resection in cases where the tumor was unresectable and/or circumferential resection margin was breached or threatened.
Keywords Response; Preoperative long course chemoradiotherapy; Locally advanced rectal cancer

GI Cancer EP-GI1-02

The Feasibility and Clinical Outcomes of Endoscopic Full Thickness Resection Assisted Laparoscopic Surgery for Duodenal Neuroendocrine Neoplasms

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Background/Aims The duodenal neuroendocrine tumors (dNETs) are arising from the cell of the mucosal layer and often small and confined to the superficial layer. Surgery and endoscopic resection are both considered appropriate; however, there are critical hurdles to both modalities in real practice. Laparoscopic surgery has a difficulty to determine precise tumor location, and endoscopic resection has high risks for bleeding, perforation, and incompleteness. In our study, we compared the treatment outcomes of endoscopic full-thickness resection assisted laparoscopic surgery (EFTRLS).
Methods The electronic medical record database was reviewed at a university hospital (Yeouido St. Mary's Hospital), Seoul, Korea. A total of 33 patients were found to be diagnosed during the last 10 years, from June 2008 to December 2018.
Results Among the 35 patients with dNETs, 12 were excluded, follow-up loss (n=3), transfer-out (n=2), treatment refusal (n=2), invisible after forceps biopsy (n=2), poorly differentiated histology (n=2), and the presence of metastatic lesion (n=1). Twenty-three patients who showed well-differentiated histology, less than 2 mitosis per 10 HPF and less than 3% of Ki-67 index, underwent excision of tumors. Sixteen were treated with endoscopic resection, three with surgery only and four with EFTRLS. Resection margin involvement was none in the EFTRLS group compare to other single modality groups (0% [0/4 cases] vs 19% [3/16 endoscopic resection] vs 33% [1/3 surgery only]). One endoscopically treated patient had a macroscopic residual tumor and needed additional surgery. Two patients of endoscopic resection group experienced perforation and underwent surgery. Tumor recurrence and metastasis were not reported during the study period in all patients.
Conclusions EFTRLS provides a precise and secure safety margin of tumor resection and abolishes the risk of uncontrolled bleeding and perforation. EFTRLS has the advantage in the oncological completeness and patient safety over either endoscopic resection alone or surgery alone.
Keywords Duodenum; Neuroendocrine tumor; Endoscopic full-thickness resection assisted laparoscopic surgery

GI Cancer EP-GI1-03

Comparison of Short-term and Long-term Results in the Treatment of Patients with Malignant Colorectal Obstruction: Emergency Resection or Stenting or Transanal Decompression Tube

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Background/Aims Colorectal cancer is complicated by large bowel obstruction in 7% to 29% of patients. Emergency colon resection (especially with lymphadenectomy) is associated with high mortality and complications rates. SEMS or transanal decompression tube placement as a bridge to surgery has been reported to improve short-term outcomes. However, oncological safety of endoscopic interventions is disputable. Despite the large number of guidelines and meta-analysis, there is no consensus in the treatment of this group of patients. The aim of our study was to evaluate the short-term and long-term results of treating patients with malignant colon obstruction using three different strategies (emergency surgery, stenting, and transanal decompression).
Methods We analyzed date of 131 patients (55 in surgery group, 42 in SEMS and 34 in TDT group) who were hospitalized in our clinics with malignant colonic obstruction between December 2012 and February 2019. Groups were comparable in terms of baseline characteristics of patients.
Results Complications were diagnosed in 20%, 9.8% and 20% patients (p=0,1890, Fisher test). Primary anastomosis rate was significantly higher in the SEMS group: 51.0%, 90.2% and 46.7% (p=0.01, Fisher test). Permanent stoma creation rate was significantly lower is SEMS group 29.1%, 2.7% and 7.1%, respectively. In long-term period rate of recurrence and progression of the disease was 9.1%, 14.6% and 8.8% patients, respectively (p=0.4196, chi-square). Total 1-year survival was 81.0%, 84.7% and 83.3% (p=0.423), 3-year survival was 59.2%, 69.4% and 63.9% (p=0.460), respectively (not statistically significant different).
Conclusions SEMS has some benefits in comparison with emergency surgery and transanal decompression tubes in the short-term postoperative period for patients with malignant colorectal obstruction. The overall recurrence rate was higher in the stent group in long-term period, but not statistically significant different. Moreover, the overall survival rate in the group was similar. Need to continue research to material accumulation and analysis of long-term results.
Keywords Malignant colorectal obstruction; Stenting

GI Cancer EP-GI1-04

Quercetin Loaded Nano-Lipidic Carriers Exerts Diethylnitrosamine Induced Hepatic Cancer via Attenuation of Cellular Inflammation and Cell Proliferation

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Background/Aims Hepatocellular carcinoma (HCC) is the 3rd most common cause of mortality, among all types of cancer. Clinical fraternity suggest the liver transplantation and surgical resection are the only option for the HCC, both treatment having limitations either due to late detection or patient condition. Targeted plant-based drug are appropriate resources for anticancer therapy. In this study, we examined the anticancer effect of quercetin loaded nano-lipidic carriers (QE-NLCs) against diethylnitrosamine (DEN) induced HCC via attenuation of cellular inflammation and cell proliferation.
Methods DEN (200 mg/kg) intraperitoneal injection of was used for induction the HCC and rats were orally received the QE-NLCs. The body weight, serum biomarkers, morphological and histopathological evaluation were performed at end of the experimental study. The inflammatory, pro-inflammatory, cancer preventive agent status, antioxidant enzymes and apoptosis marker were appraised to examine the possible mechanism.
Results QE-NLCs reduced the hepatic nodules (83%), with significantly ($p<0.001$) increased body weight (46.7%); altered the level of hepatic marker viz., alpha-fetoprotein (84.5%), aspartate aminotransferase (56.7%), alanine aminotransferase (59.8%), alkaline phosphatase (63.8%); non-hepatic parameter such as GGT (56.8%), albumin (54.5%), total protein (47.6%), blood urea nitrogen (57.8%), direct bilirubin (56.4%), total bilirubin (43.8%); antioxidant parameter including LPO (65.4%), GSH (53.4%), CAT (48.3%), SOD (53.8%), GST (50.4%), GPx (58.3%); apoptosis marker like caspase-3 (43.5%) and caspase-9 (50.4%), respectively. QE-NLCs significantly ($p<0.001$) down-regulated the pro-inflammatory cytokines such as tumor necrosis factor-α (54.5%), interleukin (IL)-6 (48.3%), IL-1β (52.5%); inflammatory mediators like COX-2 (43.5%), PGE2 (43.5%), iNOS (45.6%), and NF-κB (56.6%) as compared to DEN control.
Conclusions Furthermore, QE-NLCs proved its chemoprotective effect against DEN induced HCC via attenuation of cellular inflammation and cell proliferation.
Keywords Nano-lipidic carriers; Hepatic cancer; Inflammation; Cytokines

GI Cancer EP-GI1-05

An Alternative Approach to Radiological Image Guided Endoscopic Ultrasound- Guided Liver Lesion Biopsy with Atypical Malignancies

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Background/Aims Endoscopic ultrasound (EUS) is gaining attraction as an alternative method of biopsy.
Methods A total of eight patients underwent EUS-guided lesions biopsies. EUS guided LLB performed using 22-G FNA needle, 2 passes were done with slow pull technique over one minute with 10–15 strokes in each pass to obtained core samples.
Results Case 1, 78 males, H/o gastrectomy for gastric cancer, presented with weight loss and vague epigastric pain, computed tomography (CT) scan showed left lobe lesion. Biopsy showed well-differentiated Adenocarcinoma from gastrointestinal tract. Case 2, 58 males presented with weight loss and liver lesion on CT scan. Biopsy revealed Sarcomatoid carcinoma. Case 3, 53 males presented with weight loss and abdominal pain. He had multiple hepatic lesions identified on CT scan. Biopsy revealed a neuroendocrine tumor. Case 4, 35 males presented with abdominal pain. Laboratory tests showed anti-hepatitis C virus reactive with normal alpha-fetoprotein (AFP) levels. CT scan showed liver lesion suggestive of atypical hepatocellular carcinoma. Biopsy revealed smooth muscle tumor. As part of workup, he also had gastroscopy and colonoscopy with no evidence of luminal malignancy. Case 5, 60 females presented with weight loss, CT scan showed pancreatic malignancy with liver metastasis. Biopsy revealed metastatic adenocarcinoma. Case 6, 42 females presented with obstructive jaundice from ampullary lesion. She underwent EUS staging which revealed left lobe liver lesion. Biopsy revealed metastatic adenocarcinoma. Case 7, 32 males presented with weight loss and obstructive jaundice, CT scan showed left lobe malignancy consistent with cholangiocarcinoma with normal AFP and CA19-9 levels, the biopsy revealed lymphoproliferative disease (lymphoma). Case 8, 48 males presented with weight loss and abdominal discomfort, hepatitis B and C screen was negative with normal AFP levels. CT scan showed multiple liver lesion, biopsy revealed malignant melanoma.
Conclusions EUS-guided LLB is an alternative new technique for biopsy of liver lesions with suspected atypical malignancies.
Keywords Endoscopic ultrasound; Malignancy; Liver lesion biopsy

GI Cancer EP-GI1-06

Clinical Profile of Patients with Hepatocellular Carcinoma at St. Luke's Medical Center and Cardinal Santos Medical Center from 2003 to 2018

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Background/Aims In the Philippines, data is limited on the characteristics of patients with hepatocellular carcinoma (HCC). The last large study done in this country had only 200 patients, and as such, a paucity of data is seen with regards to the current status of HCC in the country. Recent studies suggest a changing trend in the epidemiology of HCC. This study aims to update the data, describe the etiology and clinical profile of patients with HCC at two tertiary centers in the Philippines.
Methods This is a retrospective study of all adult patients with HCC at St. Luke's Medical Center and Cardinal Santos Medical Center. Clinical profile data, specifically patient's age, gender, presence or absence of liver cirrhosis, Child-Pugh score and registered etiology was obtained and recorded. Data were analyzed with descriptive statistics.
Results A total of 1,260 subjects were included in this study. Patients were predominantly male (76.1%) with a mean age of 63 years. Majority (83.3%) developed HCC under a background of liver cirrhosis, with a baseline liver function under Child-Pugh B at 51.8%, followed by Child A (23%) and Child C (17.6%). Hepatitis B (44.3%) was the most common etiology, followed by nonalcoholic fatty liver disease (NAFLD). Graphed yearly, the trend showed a majority showed hepatitis B etiology on the first half of the time period, with NAFLD showing a large upward trend during the last 8 years.
Conclusions Patients with HCC from both centers were predominantly males with a mean age of 63 years. Majority developed HCC on a background of liver cirrhosis, with hepatitis B being the most common etiology followed by NAFLD. This study, with a total of 1,260 subjects is the most in any study done in the Philippines to date.
Keywords Hepatocellular carcinoma; Liver cirrhosis; Philippines; Epidemiology

Table 1. Total Subjects (CSMC and SLMC-QC) 2003 to July 2018

2003 - July 2018		Number of Patients	%
Total Patients		1260	
Mean Age		63 ± 12.5	
Males		960	76.1%
Females		300	23.9%
Cirrhosis/No Cirrhosis			
Liver Cirrhosis		1050	83.3%
No Liver Cirrhosis		207	16.7%
Child Pugh Score	A	290	23.0%
	B	653	51.8%
	C	222	17.6%
Etiology			
HBV		559	44.3%
HCV		39	3.1%
Alcoholic Liver Disease		142	11.2%
NAFLD		202	16.0%
Others			
Unknown		185	14.6%
Drug Induced Hepatitis		6	0.47%
Autoimmune Hepatitis		1	0.01%

HBV, hepatitis B virus; HCV, hepatitis C virus; NAFLD, nonsteroidal anti-inflammatory drug.

GI Cancer EP-GI1-07

Just the Tip of the Iceberg: A Case Report on Two Patients Presenting with Sister Mary Josephs Nodule

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Background/Aims Sister Mary Joseph's (SMJ) nodule is a rare metastatic lesion involving the umbilicus from an advanced intra-abdominal or pelvic malignancy. It has an estimated prevalence of 1% to 3%, most commonly from a primary gastric, ovarian or colorectal tumor. The primary source may not be found in 30% of cases. It typically presents as an umbilical or paraumbilical mass with an unclear etiology. Here, we report two cases of Filipino woman with SMJ nodule from a primary gastrointestinal malignancy.
Methods A 43-year-old female with gastric signet ring cell adenocarcinoma, who presented with a gradually increasing in size reddish, firm, non-tender umbilical mass without accompanying symptom. Computed tomography (CT) scan revealed a heterogeneously enhancing, soft-tissue density at the umbilical region (Fig. 1A). A 92-year-old female with stage IV cholangiocarcinoma, who had incidental finding of umbilical mass on surveillance CT scan (Fig. 1B).
Results The first patient underwent excision of umbilical mass extending to the anterior abdominal wall with histopathologic report of a metastatic poorly differentiated adenocarcinoma with signet ring cell features. She underwent chemotherapy thereafter. The second patient succumb to death prior to follow-up.
Conclusions SMJ nodule as first sign of malignancy is uncommon; hence, finding a suspicious looking umbilical nodule in patients with intraabdominal malignancy should prompt further evaluation as possible spread of a primary disease. Imaging will establish extent of the malignancy, but biopsy of the nodule will confirm pathologic diagnosis. Patients with SMJ nodule has a poor prognosis, palliative management may be the only option for some who are not candidates of chemotherapy or surgery.
Keywords Case report; Sister Mary Josephs nodule; Signet ring cell carcinoma; Metastatic lesion; Cholangiocarcinoma

Fig. 1. Abdominal computed tomography scan Image.

GI Cancer EP-GI1-08

Mucinous Colorectal Cancer Presenting as Pseudomyxoma Peritonei: A Case Report

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Background/Aims Pseudomyxoma peritonei (PMP) is a rare locoregional disease within the abdomen with incidence rate of one per million per year, characterized by mucinous tumor on peritoneal surfaces producing excessive amounts of mucinous ascites. It was originally applied to intraperitoneal mucinous spread originating from a cystadenoma of the appendix, which is benign, but currently it was recognized that a broad spectrum of aggressiveness may exist hence, three pathologic subtypes were proposed, disseminated peritoneal adenomucinosis, peritoneal mucinous adenocarcinoma (PMCA), intermediate type PMP (PMCA-I).
Methods A case of a 71-year-old female, Filipino who presented with abdominal pain, in right lower quadrant, vague in character, accompanied by increasing abdominal girth, change in bowel movements, anorexia and upon physical exam, pelvoabdominal mass 35×8 cm in size was noted.
Results WAB computed tomography (CT) scan was done revealed cystic pelvoabdominal mass, patient had undergone laparotomy and noted mucinous discharge covering the whole peritoneum with mesenteric cystic mass 20×20 cm with mucoid discharge and perforation 1.5×2 cm in cecal area. Biopsy result revealed PMP, carcinoembryonic antigen was elevated, a repeat WAB CT scan was done and revealed recurrence of pelvoabdominal mass, bone scan showed possible bone metastasis. Patient was then diagnosed with mucinous adenocarcinoma stage IV with peritoneal carcinomatosis and bone metastasis. Patient refused to undergo colonoscopy.
Conclusions Colorectal carcinoma has histologic subtype and 10% to 20% are mucinous colorectal adenocarcinoma (MCA), with different biological behavior, aggressiveness and prognosis. MCA is less common than classical adenocarcinoma, more common in female, originates more common at proximal colon, diagnosed at advanced age and at a late stage. MCA also has different pathway of carcinogenesis and offer resistance to chemotherapy hence treatment approach is different from the classical colon adenocarcinoma. New studies revealed that cytoreductive surgery with hyperthermic intraperitoneal chemotherapy is a potential treatment for MCA with peritoneal carcinomatosis.
Keywords Colorectal cancer; Mucinous colorectal adenocarcinoma; Pseudomyxoma peritonei

GI Cancer EP-GI1-09

A 62-Year-Old Female with Pancreatic Adenocarcinoma Presenting as Ischemic Enteritis

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Background/Aims Tumors of the pancreas usually produce painless jaundice. Other associated symptoms include upper abdominal pain, bloating, nausea, vomiting, anorexia, and weight loss, which may be secondary from direct a direct extension of the tumor resulting to bowel obstruction. In this case, we discuss a patient presenting with chronic nausea and vomiting due to partial gut obstruction secondary to small bowel ischemia.
Methods A 62 years old female came in with chronic nausea and vomiting, occasional loose bowel movement, weight loss, and anorexia. She had multiple consults but was inconclusive. Initial abdominal computed tomography (CT) scan showed a long segment wall thickening involving the third part of duodenum to proximal segment of the jejunum. Primary impression during that time was primary vs reactive enteritis, gastrointestinal tuberculosis, rule out malignancy.
Results Antegrade enteroscopy revealed a poorly distensible D3 with purplish mucosa starting at D4 until proximal jejunum. Biopsy of the affected segment showed dilated mucosal capillaries. Mesenteric CT angiography showed a long segment circumferential wall thickening of the duodenum to jejunum. In addition, there was fullness of the pancreatic head and uncinate process that encases the superior mesenteric artery. CA19-9 was elevated; hence, an upper endoscopic ultrasound with fine needle aspiration biopsy was done which revealed adenocarcinoma.
Conclusions It is uncommon for the tumor of the head of pancreas, to encase the superior mesentery artery and present as ischemic enteritis. Tumor of the head of pancreas usually presents with painless jaundice and have symptoms of the partial gut obstruction due to direct extension of the tumor itself. Since our patient has unusual presentation of the tumor of the head of pancreas and has done extensive workups, approach like enteroscopy and biopsy can be options for further investigation.
Keywords Case report; Pancreatic adenocarcinoma; Ischemic enteritis; Partial gut obstruction

Pancreatobiliary 1 EP-PB1-01

Litholytic Agents as an Alternative Treatment Modality in Patients with Biliary Dyspepsia

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Background/Aims Biliary dyspepsia presents as biliary colic in the absence of explanatory structural abnormalities. Causes include gallbladder dyskinesia, sphincter of Oddi dysfunction, biliary tract sensitivity, microscopic sludges, and duodenal hypersensitivity. However, no consensus treatment guideline exists for biliary dyspepsia. We investigated the effects of medical treatments on biliary dyspepsia.
Methods We retrospectively reviewed the electronic medical records of 414 patients who had biliary pain and underwent cholescintigraphy from 2008 to 2018. We enrolled patients who received litholytic agents and underwent follow-up scans after medical treatment. We divided the patients into the GD group (biliary dyspepsia with reduced gallbladder ejection fraction [GBEF]) and the NGD group (biliary dyspepsia with normal GBEF). We compared pre- and post-treatment GBEF and symptoms.
Results Of the 57 patients enrolled, 40 patients (70.2%) had significant GBEF improvement post-treatment, ranging from 34.4%±22.6% to 53.8%±26.8% (p<0.001). Fifty-two patients (91.2%) experienced significant symptom improvement (p<0.001). In the GD group (n=35), the GBEF improved significantly in 28 (80.0%) patients (range, 19.5%±11.0% to 47.9%±27.3%; p<0.001). In the NGD group (n=22), the GBEF improved in 12 (54.5%) patients, which was not significant (p=0.401). Most patients (97.1% in the GD group and 81.8% in the NGD group) had improved symptoms (p<0.001). No severe complication was reported during the treatment period.
Conclusions Litholytic agents improved biliary colic in patients with biliary dyspepsia. Therefore, these agents present an alternative treatment modality for biliary dyspepsia with or without gallbladder dyskinesia. Notably, biliary colic in patients with gallbladder dyskinesia resolved after normalization of the GBEF. Further prospective and large-scale mechanistic studies are warranted.
Keywords Biliary dyspepsia; Gallbladder dyskinesia; Litholytic agent

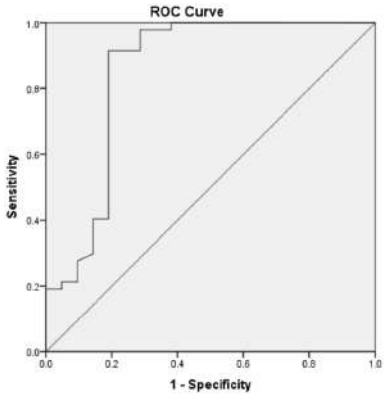

Fig. 1. Noninvasive predictor of common bile duct stone.

Pancreatobiliary 1 EP-PB1-02

AGT Score as a Predictor of Common Bile Duct Stone Using Endoscopic Ultrasound in Patients with Intermediate Probability Criteria According to ASGE Guidelines

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Background/Aims The performance of intermediate criteria guideline for the prediction of choledocholithiasis (CL) has been validated in very few studies. The objective of our study was to prospectively assess the accuracy of the American Society for Gastrointestinal Endoscopy (ASGE) guidelines intermediate criteria for the identification of CL. Furthermore, to identify the noninvasive predictors of CL.
Methods A 1-year prospective assessment of ASGE intermediate criteria was performed for the prediction of CL. Each patient underwent endoscopic ultrasound (EUS) prior to endoscopic retrograde cholangiopancreatography (ERCP). AGT score was calculated as a noninvasive predictor for CL. AGT score was calculated for each individual as ALP+GGT/TB. Sensitivity and specificity was calculated for predicting common bile duct (CBD) stone by AGT score.
Results A total of 71 patients were suspected for CL according to ASGE intermediate probability criteria. The mean age was 52.9+11.9 years and there were 42 males (59.1%). At presentation, 66 (92.9%) had abdominal pain and five patients (7%) had gall stone pancreatitis. On EUS, sludge was found to be in seven patients (9.9%). On ERCP, 47 patients (66.2%) were found to be positive for CL. Whereas, on noninvasive investigations TLC, ALP and GGT was significantly raised in stone positive group as compared to stone negative group (8.11 vs 6.97, p=0.03) for TLC, (398 vs 197, p=0.0001 and 313 vs 215, p=0.046) for Alkaline phosphatase and GGT respectively. AGT score was found to be significantly associated with presence of CBD stone with p-value of 0.001. Area under receiver operator characteristic of AGT score is 0.852. At a cutoff 467, the sensitivity, specificity, negative predictive value, and positive predictive value were 91.49%, 80.95%, 91.49%, and 80.95% respectively for AGT score in predicting CL.
Conclusions Performance of intermediate probability criteria for the prediction of CL was accurate in 66.2% of patients. Total bilirubin, gamma glutamyl transferase and AGT score was found to be the predictor of CBD stone.
Keywords Choledocholithiasis; Intermediate probability criteria; Predictor of choledocholithiasis

Pancreatobiliary 1 EP-PB1-03

Changes of Bacteriobilia and Clinical Outcome in Patients with Biliary Infection

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Background/Aims Currently, the use of antibiotics has increased, we tried to confirm the difference of cultured strains between the past and present as the frequency of antibiotic use increases. Antibiotic susceptibility and patient outcome were also investigated and to suggest the use of appropriate antibiotics.
Methods From January 2008 to December 2009 (past group) and from January 2017 to December 2018 (present group), 557 patients who underwent endoscopic retrograde cholangiopancreatography, percutaneous trans-hepatic biliary drainage, or operation to decompression of biliary tract in patients with biliary infection in Hanyang University were enrolled. Antibiotic susceptibility and antibiotic susceptibility of the patients with biliary inflammation were investigated, and the association and prognosis of the causative strains were analyzed.
Results Mean age was significantly lower in the present group than in the past group (69.72 vs 75.17, p<0.001). The cause of infectious disease was significantly higher in biliary stone in present group (83.28% vs 61.48%, p<0.001). In the bile culture, the proportion of antibiotic-resistant strains such as ESBL (+), MRSA, and multidrug-resistant bacteria was significantly increased (12.20% vs 5.19%, p<0.001) in present group and mixed strains also increased significantly (20.56% vs 12.22%, p=0.021). The blood culture reported more positive rates in the present group (18.12% vs 11.48%, p=0.002) and mixed strains were not present in the past group, but seven (2.44%) were reported in the present group. There was no statistically significant difference in gender and mean duration of antibiotics uses.
Conclusions It is thought that the frequency of antibiotic resistant bacteria has increased as the rate of antibiotic use increases recently. In addition, since the rate of grade III biliary infection has also increased, it may be helpful to use appropriate antibiotics in conjunction with decompression.

Pancreatobiliary 1 EP-PB1-04

Benefits and Pitfalls of Surgical Resection after Downstaging Concurrent Chemoradiation Therapy in Patients with Locally Advanced Perihilar Cholangiocarcinoma

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Background/Aims The role of neoadjuvant concurrent chemoradiotherapy (NAT) for locally advanced perihilar cholangiocarcinoma (PHCC) remains unclear. This study aimed to investigate the possible benefit and pitfall of NAT followed by surgical resection in patients with locally advanced PHCC.
Methods In total, 326 patients underwent curative resection for PHCC. Of these patients, 28 patients (8.6%) received NAT due to locally advanced PHCC. The patients were divided into two groups: the patients with NAT (NAT group, n=28) and the resected only patients without NAT (resection group, n=298). Perioperative outcomes and long-term survival were compared between two groups. In addition, recurrence pattern after R0 resection were compared with distal cholangiocarcinoma (DCC) group (n=258) to establish the rationale of NAT for PHCC.
Results The NAT group showed significantly higher R0 resection rate (NAT 26 [92.9%] vs resection 219 [73.5%], p=0.023) Hospital mortality rate was significantly higher in NAT group (NAT 7 [25%] vs resection 20 [6.7%], p=0.001). The median disease-free survival (DFS) were 19.0, 18.5 months in the NAT, resection groups, respectively (p=0.888). The median overall survival (OS) were 34.1, 29.4 months in the NAT, resection groups, respectively (p=0.627). In recurrence pattern, PHCC group showed higher prevalence of surgery-related recurrence than DCC group (64 [48.5%] vs 48 [33.9%], p=0.018).
Conclusions NAT could contribute to allow tumor downstaging and has potential to increase resection rate and curability in patients with locally advanced PHCC. However, NAT does not affect long-term survival. In this study, NAT group showed high mortality and complication rates after surgical resection. Optimal treatment protocol should be developed in a well-designed prospective study.

Pancreatobiliary 1 EP-PB1-05

Predictive Biomarkers in the Gemcitabine Plus Cisplatin for Unresectable or Recurrent Biliary Tract Cancer: A Single-Center, Prospective Study

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Background/Aims Gemcitabine plus cisplatin (GP) has been regarded as the standard treatment for unresectable or recurrent biliary tract cancer (BTC). Potential biomarkers for GP response include the activities of cytidine deaminase (CDA), human equilibrative nucleoside transporter-1 (hENT1), deoxycytidine kinase (dCK) and ribonucleotide reductase M1 (RRM1). Here, we investigated whether intratumoral expression of these proteins were associated with the efficacy of gemcitabine chemotherapy in treating BTC.
Methods This study prospectively enrolled 34 patients who were diagnosed with unresectable or recurrent BTC and treated with GP between 2015 and 2018 at National Cancer Center, Korea. We used immunohistochemistry to assess the intratumoral expression levels of CDA, hENT1, dCK, and RRM1 and investigated their relationship with the patients' clinical outcomes.
Results With a median follow-up of 19.2 months, the group with positive RRM1 showed significantly worse overall survival (OS) (median: 6.58 months vs 9.78 months, p=0.039). RRM1 expression was significantly associated with progression-free survival (PFS) and OS in multivariate analysis adjusting for peritoneal metastasis and lung metastasis in multivariable analysis (PFS: hazard ratio [HR], 3.90; 95% confidence interval [CI], 1.41 to 10.79; p=0.009, OS: HR, 5.21; 95% CI, 1.88 to 14.42, p=0.002). However, immunohistochemistry (IHC) of other markers did not reveal any significant results.
Conclusions Our finding suggests that IHC of intratumoral RRM1 might play an important role to predict the efficacy of GP in patients with advanced BTC. RRM1 needs further validation in the future.
Keywords Biomarkers; Gemcitabine; Biliary tract cancer

Pancreatobiliary 1 EP-PB1-06

High PD-L1 Expression Is Associated with Response to Pembrolizumab in Patients with Advanced Biliary Tract Cancer

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Background/Aims Pembrolizumab appears promising for patients with programmed cell death ligand-1 (PD-L1)-positive solid tumors. However, data on immunotherapy for biliary tract cancers are limited, and biomarkers for the identification of appropriate immunotherapy candidates are needed.
Methods One-hundred and fifty-three advanced biliary tract cancer patients were included. They were screened for PD-L1 expression using a prototype immunohistochemistry assay (PharmDx). Twelve of the PD-L1-positive patients were then treated with pembrolizumab. Treatment response was evaluated and correlated with PD-L1 expression, microsatellite instability (MSI) status, tumor-infiltrating lymphocytes, and CD8+ T cell density.
Results Of 153 screened patients, 113 (74%) showed tumoral PD-L1 positivity at 1% cut-off, and 13 (8.5%) showed high PD-L1 expression ($\geq$50%). Of the 122 patients with available MSI status, only one (0.8%) had an MSI-high tumor. Pembrolizumab ($\geq$3 cycles at a fixed dose of 200 mg every 3 weeks) was administered to twelve patients with PD-L1 positive tumors who were refractory to standard chemotherapy. Two (16.7%) of these patients were treatment responders: one complete responder and one partial responder. Both responders had high PD-L1 expression, associated with treatment response (p=0.045).
Conclusions High PD-L1 expression was associated with response to pembrolizumab. We suggest that PD-L1 expression can serve as a predictive biomarker for pembrolizumab in advanced biliary tract cancers, as <1% of the patients had an MSI-high tumor.
Keywords Cholangiocarcinoma; Biliary tract cancer; Programmed death-ligand 1; Immunotherapy

Pancreatobiliary 1 EP-PB1-07

Efficacy and Safety of Pembrolizumab for Gemcitabine/Cisplatin-Refractory Biliary Tract Cancer: Multicenter Retrospective Study

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Background/Aims Pembrolizumab, an anti-programmed cell death (PD)-1 monoclonal antibody is the representative anticancer agents showing remarkable benefit for lung cancer and melanoma. In a few studies, bile duct cancer (BTC) was introduced as being responsive for pembrolizumab. However, there was no credible data of the treatment outcome of pembrolizumab against BTC. We assessed the clinical outcomes and safety of pembrolizumab in gemcitabine/cisplatin (GP)-refractory BTC patients.
Methods In this multicenter study, 58 patients with PD-L1 positive GP-refractory BTC who received pembrolizumab in Severance Hospital, Seoul; Seoul National University Hospital, Seoul; National Cancer Center, Goyang and Pusan National University Hospital, Busan. PD-L1 positive tumors were defined at the expression of PD-L1 $\geq$1% of tumor cells by immunohistochemistry (22C3, SP263 and E1L3N assays).
Results Of the 58 enrolled patients, extrahepatic cholangiocarcinoma was the most common type (n=35, 60.3%). Most patients were diagnosed at a metastatic stage (n=51, 87.9%). Median 3 cycles (range, 1 to 15) of pembrolizumab were given during a median 3.3 months of follow-up duration. In 49 patients whose response was assessable, partial response (PR) and stable disease were achieved in five (10.2%) and 13 (26.5%), respectively. Median progression-free survival and overall survival was 1.9 months (95% confidence interval [CI], 1.7 to 2.1) and 11.1 months (95% CI, 5.1 to 17.2), respectively. Overall 34 patients (58.6%) experienced a treatment-related adverse events (AEs), most commonly fatigue (n=15, 25.9%). Four patients experienced grade 3/4 AEs (n=1 for fatigue, n=2 for drug-induced pneumonitis, and n=1 for acute renal injury due to hyper-progressive disease).
Conclusions In PD-L1 positive GP-refractory BTC, pembrolizumab showed durable anti-tumor activity with 10.2% of response rate and had manageable toxicity. Further evaluation is needed for biomarker to improve the efficacy of pembrolizumab in BTC.
Keywords Bile duct cancer; Pembrolizumab; PD-1; Immunotherapy

Pancreatobiliary 1 EP-PB1-08

Survival Improvement and Prognostic Factors in Recent Management of Extrahepatic Cholangiocarcinoma

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Background/Aims Cholangiocarcinoma (CC) was considered as a dismal disease with very poor prognosis until recently. CC is increasingly found due to increased life expectancy. However, data on the prognosis, especially extrahepatic cholangiocarcinoma (ECC), were limited, although recent advances in surgical and medical management were reported. This study aimed to identify clinicopathologic features and prognosis of patients with ECC.

Methods Patients followed up and diagnosed with ECC between January 2014 and December 2017 were included. Patients who had intrahepatic CC, gallbladder cancer, ampullary cancer, and patients with a history of chronic biliary diseases, such as cholelithiasis, sclerosing cholangitis, and liver fluke, were excluded. Past medical history was reviewed for previous cancer treatment and comorbidity.

Results A total of 103 patients were followed after the treatment. About 12.5% of patients had history of previous malignant neoplasm, and 22% patients had chronic illness. Surgical resection was possible in 61% and combined dysplasia as premalignant lesion was detected in 63%. Postoperative adjuvant chemotherapy was performed in 54%. The overall survival (OS) in all patients was 30.9±2.9 months. In analyzing the treatment modality, the mean survival of adjuvant chemotherapy, surgery only, palliative chemotherapy, and supportive care groups were 42.9±4.1, 30.9± 4.6, 12.0±0.9, and 8.9±1.8 months, respectively ($p<0.05$). In the Cox regression analysis of survival, age (<75 years), surgical resection, chemotherapy, and absence of comorbidity were good prognostic factors. In the multivariable analysis, comorbidity was the only significant factor (hazard ratio [HR], 2.80; $p=0.007$). In a subgroup analysis of surgical patients, the presence of dysplasia was a significant factor in the multivariable analysis (HR, 0.29).

Conclusions The OS of patients with ECC was quite high and increased with chemotherapy. Absence of comorbidity, and presence of dysplasia were good prognostic factors.

Keywords Cholangiocarcinoma; Survival; Prognosis

Table 1. Comparisons of Microorganisms in Blood and Bile Cultures in Patients with Acute Cholangitis

Characteristics of Microorganism in blood and bile culture			
		WB (n=95)	BILE (n=95)
No growth		66	10
SINGLE	Gram negative	25	48
	E.coli	16	24
	Klebsiella	6	12
	Citropbacter	1	3
	Enterobacter	1	7
	Achromobacter spp.	2	1
	Acinetobacter baumannii	0	1
	Pseudomonas spp.	0	1
	Stenotrophomonas	0	2
	Gram positive	3	15
	Enterococcus spp.	2	10
	Streptococcus spp.	1	1
	Staphylococcus spp.	0	3
	Micrococcus spp.	0	1
POLY		1	22
Resistance to antibiotics		6/29 (31%)	45/85 (52.9%)
	3rd cephalosporin resistant G(-)	0	8
	ESBL producing G(-)	6	31
	Ampicillin R Enterococcus	0	10
	Methicillin R G(+)	0	2
	IRAB	0	1

E. coly, Escherichia coli.

Pancreatobiliary 1 EP-PB1-09

Which Is the Determining Factor for Selection of the Antimicrobial Agent in Patient with Acute Cholangitis, Bile or Blood?

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Background/Aims Acute cholangitis is caused by biliary obstruction due to various causes, mainly bile duct stone, and is life-threatening. Thus, it is important to select appropriate antibiotics to prevent severe sepsis. The aims of study were to compare microorganisms and to evaluate proper antibiotics selection based on bile or blood culture in cholangitic patients.

Methods Among 238 patients who underwent the endoscopic naso-biliary drainage due to the acute cholangitis from January 2014 to December 2018, 95 patients who underwent blood or bile culture were evaluated. The patients' baseline characteristics, microbiological analysis of both cultures, and clinical outcomes were collected and analyzed.

Results The mean age of patients was 72.0±12.8 years and male to female ratio was 1.6:1. The rate of positive blood and bile culture were 30.5% and 89.4%, and 28 patients (29.4%) showed positive in both. The most common microorganism from either blood or bile was Gram-negative bacteria, mainly *Escherichia coli*. The rate of organisms with resistance to antibiotics in blood and bile were 31% and 52.9%, respectively (Table 1). Of 29 patients with positive blood cultures, 21 patients (72%) were improved with initial antibiotics regardless of culture result. However, five patients (17%) with persistent infection signs were changed to other antibiotics according to bile cultures. Of 85 patients with positive bile cultures, 73 patients (85.5%) were improved with initial antibiotics, however, eight patients (9.4%) were changed into the antibiotics according to bile cultures.

Conclusions Gram-negative bacteria, *E. coli*, were the most common micro-organism from bile or blood culture in patients with acute cholangitis. Clinician should keep in mind that result of bile culture can be a guide for the choice of antibiotics in patients unresponsive to empiric antibiotics.

Keywords Acute cholangitis; Antibiotics; *Escherichia coli*

Pancreatobiliary 1 EP-PB1-10

Side-by-Side Simultaneous Insertion of Covered Metal Stent and Plastic Stent for Malignant Biliary Obstruction: A Pilot Study for Efficacy, Patency and Safety

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Background/Aims Covered metal stent (CMS) for biliary obstruction is expected to have longer patency and lower in growth rate compared to uncovered metal stent (UCMS). However, high migration rate is major concern of CMS. This study aimed to assess clinical outcomes of simultaneous side-by-side insertion of both CMS and PS.

Methods CMS with PS was applied into 41 patients from 2017 and patients' medical records were reviewed retrospectively. Technical success was defined as successful placement of stents across a stricture. Functional success was defined as over 50% improvement or normalization in bilirubin within 2 weeks.

Results The technical and functional success rate both were 100%. 23 patients (56%) underwent both stents insertion as an initial treatment. Endoscopic sphincterotomy was initially performed for 24 (59%) patients. Median time to recurrent biliary obstruction was 366 days (95% CI 241-490). Six patients (15%) were confirmed as re-stenosis. These all were caused by tumor ingrowth (n=6) and no patients experienced stent migration nor clogging. All patients confirmed as re-stenosis took revision ERCP successfully. Seven patients (17%) died and no procedure-related death was found. Median follow-up was 144 days (15 to 459 days) and median overall survival was not reached due to insufficient follow-up period. Five procedure-related complications were observed, three for liver abscesses, one for acute cholecystitis and one for post-EST bleeding. Liver abscesses occurred at 12, 32 and 70 days after stent placement, respectively. The initial stenosis sites of three liver abscess patients above were confirmed equally as proximal (n=1), hilar (n=1) and distal (n=1) obstruction. No acute cholangitis nor post-ERCP pancreatitis was observed.

Conclusions Side-by-side insertion of both CMS and PS showed good success rate, long patency and few stent-related complications. Most notably, no stent migration was observed. This result may provide clinical background for further comparative study with UCMS.

Keywords Covered metal stent; Side-by-side; Biliary stent; Malignant biliary obstruction

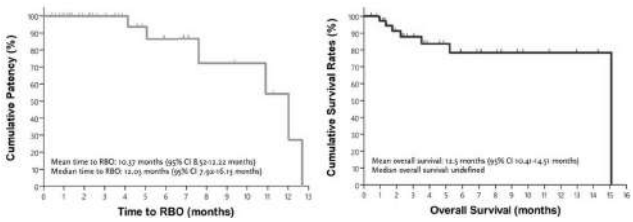

Fig. 1. Time to RBO and overall survival.

Pancreatobiliary 2 EP-PB2-01

Early Nasogastric Tube Feeding VS Nil Per Oral in Mild to Moderate Acute Pancreatitis

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Background/Aims To date, usually, the initial treatment of acute pancreatitis (AP) consists of nil per oral (NPO) regimen and administration of analgesic and abundant intravenous fluids. It is assumed that the benefit without food intake that pancreatic stimulation be enteral feeding may aggravate pancreatic inflammation. However, the validity of such assumptions is pretty much debatable. On the other hand, various studies have revealed that enteral feeding significantly reduced the risk of infection, lowers the need of surgical intervention, and reduces the length of hospital stay. Results from the meta-analysis show that mortality rate is significantly reduced when patients of acute pancreatitis are fed enterally. More importantly, the timing of the start of the start of nutrition, within 48 hours of hospital admission a factor that relate in the reduction of the mortality in patients with severe AP.
Methods The prospective randomized control trial is designed in patients with diagnosed mild to moderate pancreatitis. The patients satisfying the inclusion criteria were subjected to early nasogastric tube feeding and were compared with NPO group.
Results In the present study, we investigated an alternative approach to reinitiating feeding that was based on hunger, without the remission of abdominal pain or normalization of pancreatic amylase and lipase. Our results demonstrated that early oral refeeding based on this approach significantly decreased the duration of hospitalization. We found mean difference between the groups was 1.65 (p=0.04).
Conclusions Based on the finding illustrated above it implies that early enteral feeding could be appropriate strategy for the management of mild to moderate acute pancreatitis in term of reduction of hospital stay and intensity of pain score.
Keywords Acute pancreatitis; Nil per oral; Naso gastric tube; Early enteral feeding

Pancreatobiliary 2 EP-PB2-02

Analysis of Optimal Procedure Time to Prevent Post-ERCP Pancreatitis Using Decision Tree Analysis: A Retrospective Single Center Analysis

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Background/Aims Pancreatitis after endoscopic retrograde cholangiopancreatography (ERCP) is a major concern among procedure-related adverse events. Although several risk factors were identified from previous studies, there was no study for optimal procedure time to prevent post-ERCP pancreatitis (PEP). We reviewed ERCP database to evaluate the association between procedure time and PEP.
Methods Database for ERCP procedure between September 2012 and July 2019 at Kyungpook National University Chilgok Hospital was prospectively reviewed. We enrolled patients with naïve papilla who underwent ERCP. Risk factors for PEP was evaluated and decision tree analysis was conducted to evaluate the association between procedure time and the occurrence of PEP.
Results We analyzed 896 consecutive patients with naïve papilla. Among them, PEP occurred in 61 patients (6.8%). The times for overall procedure and selective biliary cannulation in patients with PEP were longer than in those without PEP (26.2±11.6 minutes vs 20.2±11.1 minutes, p<0.001 and 12.5±9.0 minutes vs 8.1±6.6 minutes, p<0.001). Decision tree analysis revealed that overall procedure time of less than 20 minutes and selective biliary cannulation time of less than 6 minutes were decisive factors for the reduced risk of PEP with adjust p-value of <0.001 and 0.011, respectively.
Conclusions According to our study results, we recommend that the procedure time for selective biliary cannulation might be not exceed 6 minutes to avoid the occurrence of PEP and additional preventive management would be required in case of longer procedure time.
Keywords ERCP; Pancreatitis; Adverse events; Procedure time; Cannulation

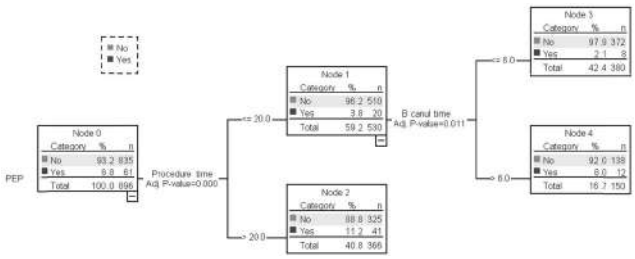

Fig. 1. Decision tree for post-endoscopic retrograde cholangiopancreatography pancreatitis (PEP).

Pancreatobiliary 2 EP-PB2-03

Incidence of Pancreatic Duct Injury in Pseudocyst and WON: A Systematic Review

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Background/Aims To systematically report incidence of PD leakage, pancreatic disruption in pancreatic fluid collection (PFC), pseudocyst and WON from existing studies.
Methods We searched from PubMed by use **Keywords** Incidence and/or PD leakage and/or PD disruption and/or pancreatic pseudocyst and/or WON and/or PFC and searched references cited by the retrieved articles which were relevant with incidence of PD leakage in pancreatic pseudocyst, WON and PFC.
Results The 2,553 papers met searching words above. Exclusion criteria were non-English language articles, unavailable full text articles, review articles, case reports, case series with number of cases <10 cases or populations of children. The 1,372 papers were then available for reviewing. Finally, only 52 papers had information of incidence of PD leakage or PD disruption in pseudocyst, WON, or PFC. To ensure true PD leakage or PD disruption, we decided to use only studies that use endoscopic retrograde pancreatography (ERP) for an evaluation of PD leakage. From 52 papers, of 4,110 cases with PFCs, PD leakage and disruption were identified in 1,097 cases (26.7%) and 840 cases (20.44%), respectively. Of 1,532 cases with pseudocyst, 618 cases (40.3%) and 78 cases (5.1%) had PD leakage and disruption, respectively. From 1,463 cases with WON, 308 cases (21.1%) and 382 cases (26.1%) had PD leakage and disruption, respectively. For the rest of 1,115 cases labelled as PFC, information was not enough to classify into either pseudocyst or WON. In patients with pseudocyst and WON, about half of them has either PD leakage or disruption confirmed by ERP. Most PD injury in pseudocyst were PD leakage whereas incidence of PD disruption was slightly higher than leakage in WONs.
Conclusions This systematic review reported incidence of PD leakage or disruption in about half of patients with PFC, pseudocyst and WON from published literatures.
Keywords Incidence; PD leakage; PD disruption; Pancreatic pseudocyst; WON

Pancreatobiliary 2 EP-PB2-04

Prognostic Value of the Cytokine Profile in Diseases of the Pancreas

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Background/Aims This study aimed to evaluate the cytokine profile in patients with chronic pancreatitis (CP) and pancreatic cancer (PC).
Methods Twenty-five patients with chronic calcifying pancreatitis (CCP), eight patients with chronic pancreatic necrosis (PN) anemnesis, transferred 1 year ago, 10 patients with CP and pancreatic duodenal resection, and 13 patients with prostate cancer (52±10) were examined. years old. Among the patients, there were 32 men and 24 women. The control group was 15 people. Interleukin (IL)-6, tumor necrosis factor-α (TNF-α) and IL-10 were determined by the immunochemiluminescent method on an Immunolight-1000 analyzer with reagents from Siemens (Germany).
Results In patients with CCD, CP, and PDL, an upward trend in IL-6 was detected, the level of IL-10 and TNF-α remained within the control values. A significant increase in IL-6 was found in patients with CP and PN compared with the control (9.2±1.6 and 4.6±0.9 pg/mL, respectively, $p<0.05$). The maximum increase in the concentration of TNF-α and IL-10 compared with the control was observed in the group of prostate cancer (14.4±0.3 and 5.3±0.9 pg/mL; 7.7±1.4 and 3.8±0.8 pg/mL, respectively, $p<0.05$).
Conclusions An increased level of IL-6 in patients with CP and PN is associated with a predominance of inflammatory processes in the pancreatic tissue, while fibrosis predominantly develops with CCD. It can be suggested that IL-10 and TNF-α can be markers of prostate cancer. However, for final conclusions it is necessary to continue the study.
Keywords Chronic pancreatitis; Pancreatic cancer; Interleukin-6

Pancreatobiliary 2 EP-PB2-05

Response of Pancreatic Ductal Adenocarcinoma to Gemcitabine Using Human Organotypic Slice Culture Model

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Background/Aims The organotypic tumor slice culture model may serve as a proper *ex vivo* platform for the response to antitumor therapies. We aimed to evaluate the response of pancreatic ductal adenocarcinoma (PDA) cells and helper/cytotoxic/regulatory T cells to gemcitabine using human PDA slice culture model.
Methods PDA tissues were obtained from patients were sliced by a vibratome, and the tumor slices were then cultured until 5 days with gemcitabine for 1 or 2 days. Tumor responses were evaluated by the number of tumor cells and the proportion of Ki-67 or caspase-3 positively expressed cells in the tumor. CD4+, CD8+, and FOXP3+ cells were analyzed by immunohistochemistry staining.
Results Gemcitabine treatment to PDA slices exerted proportional cytotoxic effects in terms of tumor cell number, and Ki-67 and cleaved caspase-3 expression. Mean Ki-67 positive cells in PDA cells tended to decrease according to the increase of gemcitabine concentration (case 1: 48 hours treatment, 65.7% in control vs 27.9% in 0.1 μM, $p=0.025$). Mean caspase-3 positive cells in PDA cells tended to increase according to the increase of gemcitabine concentration (case 1: 48 hours treatment, 8.6% in control vs 18.6% in 0.1 μM, $p=0.042$). Mean PDA cells per x200 tended to decrease according to increase of gemcitabine concentration (case 2: 48 hours treatment, 78.3 in 1.0 μM vs 27.3 in 10 μM, $p=0.042$). Mean CD4+, CD8+, and FOXP3+ cells/total cells tended to decrease according to the increase of gemcitabine concentration. However, mean CD8+/FOXP3+ cell ratio did not significantly decrease.
Conclusions Tumoricidal effect of gemcitabine could be demonstrated using organotypic slice culture model. T cells in the tumor decreased according to an increase of gemcitabine concentration; however, CD8+/FOXP3+ cell ratio relatively was maintained.
Keywords Pancreatic cancer; Slice culture; Gemcitabine; T cell

Pancreatobiliary 2 EP-PB2-06

Endoscopic Ultrasound-Guided Pancreatic Ductal Adenocarcinoma Organoid Creation

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Background/Aims Pancreatic ductal carcinoma (PDAC) has capabilities to change and adapt to chemoradiotherapy. Having organoid for testing various kinds of treatment is useful for personalized medicine for patients with PDACs. To evaluate the rate of successful creation of PDAC organoid from endoscopic ultrasound-guided fine needle biopsy (EUS-FNB) specimen as a pilot study in an experienced tertiary care center of EUS-FNB but never create organoid for PDAC from EUS-FNB specimen.
Methods In solid pancreatic masses with high likelihood of PDAC, EUS-FNB was performed for tissue acquisition. Tissues from EUS-FNB were obtained for creation of organoids and also sent for pathology.
Results Fourteen patients (5 males and 9 females) were recruited. Thirteen of them were diagnosed malignant solid pancreatic mass and one was diagnosed malignant cystic pancreatic lesion. Twenty-six passes were performed by EUS-FNB needle. Organoid creation was successful in 13 from 26 specimens (50.0%). For the rest, yeast was cultured in 10 from 26 passes (38.5%), organoid could not be created in 2 from 26 passes (7.7%), and growth of fibroblast in 1 from 26 passes (3.8%). In an experienced referral center for EUS-FNB but never has experience to create organoid from PDAC, the successful rate of PDAC organoid creation in the first 14 cases was less than 57.1% (8 from 14 patients).
Conclusions The success rate of PDAC organoid creation in early era was still too low to be accepted into daily clinical practice despite the procedure was performed in a referral center of EUS. The techniques should be refined and reevaluated again before clinical implementation.
Keywords Organoid; Pancreatic ductal adenocarcinoma; Fine needle biopsy; Endoscopic ultrasound; Precision therapy

Pancreatobiliary 2 EP-PB2-07

Correlation of Clinical Syndromes of Chronic Pancreatitis Depending on the Duration of the Disease

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Background/Aims Assess the frequency of manifestations of clinical syndromes of chronic pancreatitis (CP) in patients with different duration of the disease.
Methods We studied 100 patients with a confirmed diagnosis of CP living in the Tashkent region.
Results The group of patients with CP included 100 people (32 men and 68 women). The etiology of CP in 32% of cases is alcoholic, in 46% biliary, in 13% idiopathic, in 7% there was a connection with hyperlipidemia, in 2% with papillitis of the BDS. In patients with a disease duration of up to 4 years (39% of the group), pain was clinically prevailing, with only pain observed in 19% of patients; a combination of pain with excretory pancreatic insufficiency (ENPI) was detected in 45% of cases; the presence of pain, ENPI and impaired carbohydrate metabolism (OID) was observed in 20% of patients. In patients with a disease duration of 5 to 10 years (28% of the group), isolated pain was detected in 13% of cases; pain+ENPI were noted in 43% of patients.
Conclusions In patients with CP with a disease duration of up to 10 years, the pain picture predominates in the clinical picture, in 43% to 45% of cases in combination with ENPI and in 20% to 36% in combination with ENPI and NUO. In patients with CP more than 10 years, a decrease in the frequency of isolated pain syndrome to 5% and an increase in ENPI and NUO were noted, a combination of all three clinical syndromes occurs in 50% of patients suffering from CP for more than 15 years.
Keywords Chronic pancreatitis; Clinical syndromes; Correlation; Disease duration

Pancreatobiliary 2 EP-PB2-08

Antibiotics for Mild to Moderately Severe Acute Pancreatitis with Fever

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Background/Aims International guidelines for the management of acute pancreatitis (AP) are against the routine use of antibiotics. However, it is not clear whether antibiotics is helpful for the management of febrile AP. We performed this study to evaluate the effect of antibiotics administration for mild to moderately severe non-biliary AP with fever.
Methods From July 2018 to August 2019, patients admitted with non-biliary AP were reviewed retrospectively, and those with fever within 1 week of hospitalization were included. Severe AP was excluded. Duration of hospitalization and mortality rate were compared according to antibiotics use.
Results A total of 41 patients were included. Alcoholic pancreatitis was most common (56.1%), and hypertriglyceridemia was the second common cause (26.8%). Moderately severe AP accounted for half of the patients. Antibiotics were used for 20 patients (48.8%). Duration of hospitalization was 8 days for antibiotics group, and it was comparable to non-antibiotics group (6 days, p=0.36). Mortality case was not present in both groups.
Conclusions In mild to moderately severe AP with non-biliary etiology and fever, routine use of antibiotics did not reduce the duration of hospitalization and mortality.
Keywords Pancreatitis; Fever; Anti-bacterial agents; Mortality

Table 1. Baseline Characteristics of Patients

	ERPD with pancreatogram N=17	ERPD without pancreatogram N=19	P value
Age, mean ± SD, (years)	66.0 ± 12.5	60.7 ± 19.9	0.383
Male, n (%)	10 (58.8)	10 (52.6)	0.749
Diagnosis			
CBD stone	11 (64.7)	16 (84.2)	0.219
CBD stricture (benign)	3 (17.6)	0 (0.0)	
Hemobilia	0 (0.0)	1 (5.3)	
Gallbladder cancer	0 (0.0)	2 (10.5)	
Cholagiocarcinoma	1 (5.9)	0 (0.0)	
Ampulla of vater cancer	1 (5.9)	0 (0.0)	
Pancreatic cancer	1 (5.9)	0 (0.0)	
Diverticulum	3 (17.6)	8 (42.1)	0.156
ASA grade			
Grade I	2 (11.8)	2 (10.5)	0.670
Grade II	5 (29.4)	9 (47.4)	
Grade III	9 (52.9)	7 (36.8)	
Grade IV	1 (5.9)	1 (5.3)	
Grade V	0 (0.0)	0 (0.0)	
Cannulation			N/A
1st cannulation success	16 (94.1)	18 (94.7)	
2nd cannulation success	1 (5.9)	1 (5.3)	
Cannulation time, mean ± SD, (minutes)	11.2 ± 6.9	6.3 ± 5.0	0.002
Anatomy			
Normal anatomy	17 (100.0)	19 (100.0)	N/A
Billroth I or II anastomosis	0 (0.0)	0 (0.0)	
EST and/or EPBD			
N/A	0 (0.0)	1 (5.3)	0.999
Sphincterotomy (EST)	15 (88.2)	15 (78.9)	
EPBD	0 (0.0)	1 (5.3)	
EST & EPBD	2 (11.8)	2 (10.5)	
Side effect			
Perforation	0 (0.0)	0 (0.0)	N/A
Pancreatitis (PEP)	2 (11.8)	1 (5.3)	0.593
ERPD length (french)	6.2 ± 1.2	5.8 ± 1.0	0.436

ERPD, endoscopic retrograde pancreatic drainage; CBD, common bile duct; ASA, 5-aminosalicylic acid; N/A, not available; PEP, post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis.

Pancreatobiliary 2 EP-PB2-09

Pancreatic Duct Stent without Pancreatogram May Reduce Post-ERCP Pancreatitis than Pancreatic Duct Stent with Pancreatogram

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Background/Aims Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis (PEP) is one of the most common and severe complications of ERCP. When selective cannulation is difficult in the bile duct, biliary cannulation is performed after a guidewire or plastic stent is inserted into the pancreatic-duct (P-duct). In this case, the incidence of PEP is known to be higher than selective cannulation in the bile duct at once. When the guidewire is well inserted in the main P-duct, the use of a pancreatic stent without the use of contrast medium may reduce the P-duct irritation and pancreatitis. Therefore, we compared the incidence of PEP by dividing the patients who was received P-duct contrast or was not.
Methods Between March 1, 2019 and August 31, 2019, 122 naive papilla patients visited at the Daejeon Eulji Hospital for ERCP. A retrospective study was performed on 36 people who had a P-duct stent among the patients who inserted a guidewire in the P-duct. Patients aimed at pancreatic procedures such as chronic pancreatitis were excluded from the study. Of 36 patients, 17 patients underwent a guidewire to the P-duct, followed by pancreatogram and inserted a pancreatic duct stent (endoscopic retrograde pancreatic drainage [ERPD] with pancreatogram). On the other hand, 19 patients inserted a guidewire on the P-duct and then put a P-duct stent without pancreatogram (ERPD without pancreatogram).
Results Baseline characteristics of 17 ERPD with pancreatogram and 19 ERPD without pancreatogram were not statistically different except cannulation time (Table 1). Two of 16 patients with pancreatogram developed PEP, and only one of 11 patients without pancreatogram developed PEP (11.8% vs 5.3%, p=0.593). In univariate logistic regression, cannulation time was the only discriminating factors of PEP.
Conclusions Pancreatic duct stent without pancreatogram may reduce post-ERCP pancreatitis than pancreatic duct stent with pancreatogram, but there was no statistical difference.
Keywords Pancreatitis; ERCP; Post-ERCP pancreatitis

Pancreatobiliary 3 EP-PB3-01

Association of Diabetes Mellitus for Long-term Followed Branch Duct IPMN Along International Guideline IPMN 2017

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Background/Aims In present study we evaluated association of diabetes mellitus for branch-duct intraductal papillary mucinous neoplasms (BD-IPMN) along IPMN guideline 2017 for at least over 5 years followed BD-IPMN.
Methods The 239 BD-IPMN followed cases (mean age, 67.5 years; gender, male/female of 104/135; mean follow-up time, 109.5 months [range, 60.1 to 343.2 months]) were enrolled. These cases were divided in two groups with or without diabetes mellitus. Diabetes case was recognized as case having diabetes at initial diagnosis for IPMN and appeared diabetes during follow up. IPMN classification along IPMN guideline 2017 was used in this present study. We retrospectively analyzed proportions of imaging progression and IDC appearance between diabetes cases and non-diabetes cases.
Results Diabetes cases was 37 and non-diabetes case was 202. Age and proportion of male were 68.2 years (48.7%) and 67.3 years (42.6%) in diabetes and non-diabetes case respectively. Proportion of high risk stigmata and worrisome features were 0% and 40.5% in diabetes case and those were 2.0% and 31.2% in non-diabetes case. Proportion of imaging progression was 40.5% in diabetes case, whereas that was 17.8% in non-diabetes case (p=0.0019). Proportion of appearance of invasive ductal carcinoma was 8.1% in diabetes case, whereas that was 1.0% in non-diabetes case (p=0.0054). Time to imaging progression and appearance of invasive ductal carcinoma were not significantly different between diabetes and non-diabetes case.
Conclusions Diabetes case were high risk of imaging progression and appearance of invasive ductal carcinoma for BD-IPMN in long term follow-up.
Keywords IPMN-BD; Diabetes mellitus; Long-term follow-up; Pancreatic cancer

Pancreatobiliary 3 EP-PB3-02

The Association between Use of Statin or Aspirin and Pancreatic Ductal Adenocarcinoma: A Nested Case-Control Study in the Korean Nationwide Cohort

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Background/Aims Although several studies have suggested that aspirin and statins may help prevent pancreatic ductal adenocarcinoma (PDAC), that concept has been controversial. This study aimed to evaluate the association between use of statin or aspirin and PDAC in a nationwide large cohort.
Methods In this nested case-control study, we used data from a 12-year nationwide longitudinal cohort in Korea. Cases with PDAC and controls who were matched to cases by age, sex, income, and index year at a 1:5 ratio were established. We used multivariate logistic regression analyses to identify independent risk factors of PDAC.
Results We identified a total of 827 patients with PDAC between 2007 and 2013, and included 4,135 matched controls. Diabetes mellitus, chronic and acute pancreatitis, pancreatic cystic lesions, and cholelithiasis were independent risk factors for PDAC. Statin use (odds ratio [OR], 0.92; 95% confidence interval [CI], 0.76 to 1.11; p=0.344; adjusted OR [aOR], 0.70; 95% CI, 0.56 to 0.87; p=0.001) was associated with reduced risk of PDAC after correction of confounding factors, but aspirin use (OR, 0.98; 95% CI, 0.84 to 1.15; p=0.84; aOR, 0.84; 95% CI, 0.70 to 1.01, p=0.068) was not associated with PDAC. Among patients with risk factors, both statin use (OR, 0.50; 95% CI, 0.38 to 0.66; p<0.001; aOR, 0.56; 95% CI, 0.37 to 0.84; p=0.005) and aspirin use (OR, 0.48; 95% CI, 0.31 to 0.67; p<0.001; aOR, 0.67; 95% CI, 0.50 to 0.89, p=0.006) was associated with reduced risk of PDAC.
Conclusions This study suggests that statin use was associated with a reduced risk of PDAC incidence but not for aspirin use. Both statin use and aspirin use were associated a reduced risk of PDAC incidence for patients with risk factors.
Keywords Statin; Aspirin; Pancreatic cancer; Prevention; Cohort

Pancreatobiliary 3 EP-PB3-03

Lymph Node Ratio as Valuable Predictor in Pancreatic Cancer Treated with R0 Resection and Adjuvant Treatment

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Background/Aims Lymph-node (LN) metastasis is an important prognostic factor in resected pancreatic cancer. In this study, the prognostic value of American Joint Committee on Cancer (AJCC) 8th edition N stage, lymph-node ratio (LNR), and log odds of positive lymph nodes (LODDS) in resected pancreatic cancer was investigated.
Methods Between January 2005 and December 2017, there were 351 patients with pancreatic cancer treated with R0 resection and adjuvant therapy at Seoul National University Hospital. Relationships between the three LN parameters and overall survival (OS) and recurrence-free survival (RFS) were evaluated using a log-rank test and Cox proportional hazard regression model. Each multivariate-adjusted LN parameter was internally validated by bootstrap-corrected Harrell C-index.
Results The mean duration from surgery to adjuvant therapy was 47.6±17.4 days. In total, the median OS and RFS was 31.7 (95% confidence interval [CI], 27.2 to 37.2) and 15.4 (95% CI, 13.5 to 17.7) months. The three LN classification systems were significantly correlated with OS and RFS in log-rank tests and multivariate-adjusted models (all p<0.05). When internally validated, LNR showed the highest discrimination ability in predicting OS and RFS (each C-index, 0.65). LNR also showed the highest C-index in subgroup analysis, classified by adjuvant therapy modality. LNR and the AJCC 8th edition LN classification system were significantly associated with loco-regional recurrence (p=0.026 and p=0.027, respectively).
Conclusions LNR, which showed the best prognostic performance and significant relationship with loco-regional recurrence, can help further stratify the patients and establish an active treatment plan.
Keywords Pancreatic cancer; Adjuvant therapy; Lymph nodes; Metastasis; Prognosis

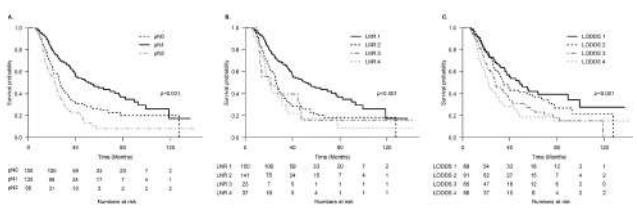

Fig. 1. Overall survival graph.
LNR, lymph-node ratio; LODDS, log odds of positive lymph nodes.

Pancreatobiliary 3 EP-PB3-04

The Effect of Adjuvant Treatment on Surgically Resected Pancreatic Adenocarcinoma According to 8th Edition AJCC TNM Stage System: A Retrospective Single Center Experience

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Background/Aims Pancreatic ductal adenocarcinoma (PDAC) is the third-leading cause of cancer-related mortality in the Unites States. Although surgical resection provides the only change for a cure, there is a high rate of disease recurrence. Until now, several studies revealed the benefit of adjuvant treatment after surgical resection. The purpose of this study was to compare disease-free survival (DFS) and overall survival (OS) between patients with adjuvant therapy and surgery alone according to 8th American Joint Committee on Cancer (AJCC) TNM staging system.
Methods We reviewed medical record for patients with PDAC who underwent curative surgical resection between 2011 and 2018. Excluding R1 resection, postoperative death, and recurrence within 3 months after surgery, DFS and OS were compared between patients with adjuvant therapy and those with surgery alone.
Results A total of 140 patients (median age, 68 years; range, 42 to 85 years; male:female=71:69) were eligible; while 58 patients (41.4%) were treated with chemotherapy or chemoradiation, 82 (58.6%) were treated with surgery alone. There were no differences in DFS and OS between patients with adjuvant treatment and those with surgery alone (14.7±1.2 months vs 9.7±1.0 months, log-rank=0.469; 27.5±16.6 months vs 18.3±1.8 months, log-rank=0.055). Among patients with stage III, adjuvant therapy was associated with higher DSF and OS compared with surgery alone (14.6±3.4 months vs 7.9±0.8 months, log-rank=0.23; 47.7±16.7 months vs 11.0±1.7 months, log-rank=0.001).
Conclusions Our study showed the benefit of adjuvant therapy in patients with surgically resected stage III PDAC according to 8th AJCC TNM stage system. Further prospective study including many cases and variable manage options is required to validate our results.
Keywords Pancreatic ductal adenocarcinoma; Adjuvant therapy; Survival; Chemotherapy; Chemoradiation

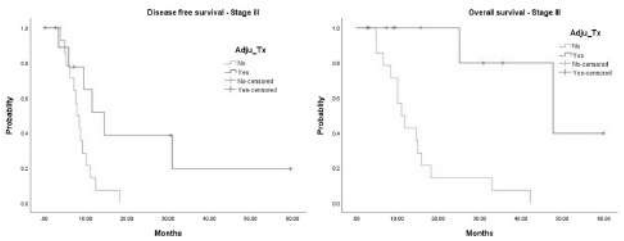

Fig. 1. Disease-free survival and overall survival in stage III.
Adju_Tx, adjuvant therapy.

Pancreatobiliary 3 EP-PB3-05

Comparison of First-Line Chemotherapy for Pancreatic Cancer: Aspect of Prognosis According to Chemoresponse of CA19-9

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Background/Aims Gemcitabine plus nab-paclitaxel (GA) and FOLFIRINOX have been widely used as standard first-line treatment in pancreatic cancer. We evaluated retrospective analysis comparing the result of GA and FOLFIRINOX.
Methods We analyzed 84 patients who presented with pancreatic cancer were underwent chemotherapy GA (n=44) or FOLFIRINOX (n=38) as a first line treatment between 2013 and 2019 April. The study was additionally analyzed three subgroups: carbohydrate antigen 19-9 (CA19-9) below 200 IU/mL before chemotherapy, patients has over 200 IU/mL, but CA19-9 level was decreased over 50% after 1st cycle of chemotherapy, patients with high CA19-9 and that was not decreased after 1st chemotherapy.
Results There was no significantly differences between the two groups in baseline characteristics, excepts high ratio of metastasis in AG group. The response rates (15.9% vs 7.9%) was higher in GA group and median overall survival (OS) (386 days vs 298 days) and progression-free survival (PFS) (229 days vs 211 days) was comparable between two groups (p=0.119, p=0.131, and p=521, respectively). However, in patient with metastatic pancreatic cancer, GA group has longer median OS (405 days vs 209 days, p=0.012) and PFS (244 days vs 147 days, p=0.031). Subgroup C has a poor prognosis. However, subgroup B was not significantly difference with subgroup A. When compared subgroup C with: A plus B, there was significantly difference in overall OS and PFS (OS: A+B 359 days vs C 223 days, p=0.029; PFS: A+B 265 days vs C 158 days, p=0.034).
Conclusions GA and FOLFIRINOX showed comparable efficacy outcomes. GA was more effective in metastatic pancreatic cancer. CA19-9, which decreases by more than 50% after chemotherapy, is not associated with poor prognosis.
Keywords Pancreatic cancer; CA19-9; Gemcitabine; FOLFIRINOX; Abraxane

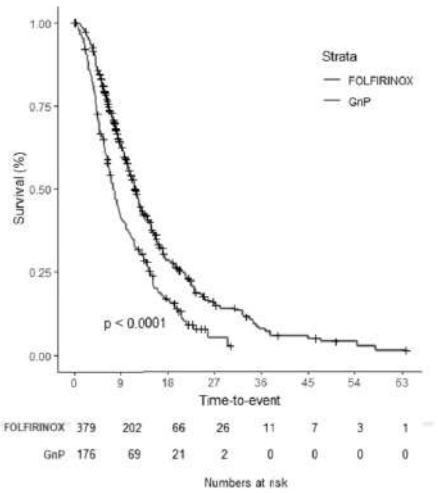

Fig. 1. Kaplan-Meier curves of overall survival.
FOLFIRINOX, 5-fluorouracil, oxaliplatin, irinotecan, and leucovorin; nab-P/Gem, nab-paclitaxel and gemcitabine.

Pancreatobiliary 3 EP-PB3-06

Comparison of Efficacy Between FOLFIRINOX and Gemcitabin plus nab-Paclitaxel in Patients with Metastatic Pancreatic Cancer

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Background/Aims Patients with metastatic pancreatic cancer (MPC) shows a dismal prognosis and requires palliative systemic chemotherapy. This study aimed to compare the efficacy of 5-fluorouracil, oxaliplatin, irinotecan, and leucovorin (FOLFIRINOX) with nab-paclitaxel and gemcitabine (nab-P/Gem) combination chemotherapy.
Methods Between May 2011 and February 2019, 555 patients with MPC who received either received FOLFIRINOX or nab-P/Gem combination chemotherapy were enrolled. The primary outcome measure was difference in overall survival (OS) between FOLFIRINOX and nab-P/Gem. Secondary outcomes were differences in progression-free survival (PFS) and overall response rate between FOLFIRINOX and nab-P/Gem. Survival analysis was based on the Kaplan-Meier method, and log-rank test was used to compare survival difference between the two groups.
Results In total cohort, median OS was 10.4 (95% confidence interval [CI], 9.6 to 11.6) months and median PFS was 7.4 (95% CI, 7.0 to 8.5) months. Three hundred and seventy-nine patients received FOLFIRINOX and 176 patients received nab-P/Gem as 1st-line systemic chemotherapy for MPC. Patients in the FOLFIRINOX group were significantly younger (60.1±9.8 vs 64.3±9.8, p<0.001). Median OS of patients receiving FOLFIRINOX was 11.8 (95% CI, 10.8 to 13.0) months, and the OS of patients receiving nab-P/Gem was 8.7 (95% CI 7.6 to 10.9) months, respectively (p<0.001). Median PFS was 7.7 (95% CI, 6.9 to 8.6) months in the FOLFIRINOX group and 7.3 (95% CI, 6.4 to 9.3) months in the nab-P/Gem group (p=0.599). There was no significant difference in overall response rate between FOLFIRINOX and nab-P/Gem (71.0% vs 68.2%, p=0.569).
Conclusions FOLFIRINOX may be a reasonable choice over nab-P/Gem as the 1st-line systemic chemotherapy in MPC, especially in young patients with good performance status.
Keywords Pancreatic cancer; Metastasis; Chemotherapy; Treatment outcomes; Prognosis

Pancreatobiliary 3 EP-PB3-07

Comparison of Outcomes between FOLFIRINOX and Gemcitabine Plus Tarceva for Pancreatic Cancer

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Background/Aims The aim of this study was to compare efficacy between combination chemotherapy regimen consisting of oxaliplatin, irinotecan, fluorouracil and leucovorin (FOLFIRINOX) and gemcitabine and tarceva as first line chemotherapy in patients with pancreatic cancer.
Methods Total 47 patients diagnosed as borderline or unresectable pancreatic cancer and Eastern Cooperative Oncology Group performance score of 0 or 1 and received either FOLFIRINOX or gemcitabine plus tarceva between January 2016 and January 2019 were included for analysis. Data of clinical characteristics of patients, response to chemotherapy, and overall survival were collected and analyzed retrospectively. FOLFINOX was performed in 22 patients (46.8%) and gemcitabine plus tarceva in 25 patients (53.2%).
Results Mean age of patients was significantly younger in the FOLFIRINOX group than gemcitabine plus tarceva group (59.3±9.7 vs 68.1±7.9, p=0.001). Male to female ratio was not different between two groups (p>0.05). Mean levels of CA19-9, total bilirubin and albumin was not different between two groups at diagnosis of pancreatic cancer (p>0.05). Presence of distant metastasis was not significantly different between two group (54.5% vs 32.0%, p=0.119). The median overall survival was 10.5 months in FOLFIRINOX group as compared with 9.3 months in the gemcitabine plus tarceva group without statistical significance (p=0.565). Median progression-free survival was 9.0 months in the FOLFIRINOX group and 7.2 months in the gemcitabine plus tarceva group (p=0.264). In subgroup analysis with patients with locally advanced pancreatic cancer, overall survival and progression-free survival was significantly longer in the FOLFIRINOX group than the gemcitabine plus tarceva group (p<0.05).
Conclusions FOLFIRINOX may be considered as first line chemotherapy in patients with locally advanced pancreatic cancer.
Keywords Pancreatic cancer; Chemotherapy; Survival

Pancreatobiliary 3 EP-PB3-08

Serial CTC Monitoring and Its Molecular Genetic Analysis during Treatment in Patients with Pancreatic Cancer

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Background/Aims Circulating tumor cells (CTCs) are cancer cells shed from either the primary tumor or its metastases, and they are regarded as the source of tumor recurrence and metastasis representing a poor prognosis in pancreatic ductal adenocarcinoma (PDAC). Thus, CTCs could provide a noninvasive alternative for diagnosis and assessment of the patient's stage and type of pancreatic cancer. In the present study, we investigated whether repeated collection and analysis of CTCs could be used to monitor disease progression or response to chemotherapy in PDAC patients.

Methods Peripheral blood samples were serially collected before and after chemotherapy. To isolate CTCs from the millions of other blood cells, we used a lab-on-a-disc system equipped with fluid-assisted separation technology. Isolated CTCs from 3 mL of blood were immune-stained with EpCAM, cytokeratin, CD45, plectin-1 and DAPI, and then enumerated by using Bioview's automated imaging system.

Results Total of 68 PDAC patients were enrolled as study patients. The median age of study patient was 67 years old and the median OS of study patients was 2.87 months. The clinical staging of study patients was the following; I (A, B) 5, II (A, B) 3, III 22 IV 38. The study patients received Gemcitabine based regimen FOLFIRNOX or TS-1 and the 14 patients (20.5%) could not receive chemotherapy due to the patients' wishes, old age or poor performance status. CTC were detected in 53 (78%) patients at the time of diagnosis. The number of CTCs dropped after 1st cycle of chemotherapy was observed in 38 patients (70%).

Conclusions Understanding the biology and genetics of CTCs "cancer cells in transit" may give us unique insights into the mechanisms behind metastasis. Identification of CTC in peripheral venous circulation may allow us to characterize genomic signature of individual patient by a simple blood draw.

Keywords Circulating tumor cells; Plectin-1; Cytokeratin; Lab-on-a-disc; Pancreatic cancer

Pancreatobiliary 3 EP-PB3-09

Impacts of New-Onset and Longstanding Diabetes on the Incidence and Mortality of Pancreatic Cancer: Population Based Big-Cohort Study

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Background/Aims We evaluated the impacts of new-onset diabete (NODM) or longstanding diabete (LSDM) on the risk and prognosis of pancreatic cancer (PC). We also analyzed the influence of levels and changes of glucose and familial diabetic history.

Methods Using Korean National Health Insurance data, NODM (n=550,949, 6.7%), LSDM (n=2,162,028, 26.2%), and non-DM (n=5,533,877, 67.1%) population (30 to 80 years old) were identified. Incidence and survival of PC in NODM or LSDM patients were compared to those of non-DM controls. Cox proportional hazard analysis was used to analyze the influence of levels and changes of glucose and family history of DM. We adjusted age, sex, alcohol drinking, smoking, cholesterol, and body mass index.

Results The incidences of PC were highest in NODM for first 2 years and in LSDM after 2 years. PC incidences (10^5 person-year) at 1 year were 37.2 in NODM, 26.8 in LSDM, and 4.6 in non-DM persons. The hazard ratio (HR) for incidence was 3.72 in NODM and 2.0 in LSDM compared to non-DM persons. Risk of high glucose level (>160 mg/dL) was greater in NODM (HR, 3.46) than LSDM (HR 2.56). HR of glucose changes was higher in non-DM (HR, 2.18) than LSDM (HR, 1.39 to 1.68) or NODM (HR, 0.57 to 1.0). Absence of family history of DM increased risks in NODM (HR, 1.79), LSDM (HR, 1.33) and non-DM (HR, 1.33). Survival rates of PC in NODM or LSDM were better than non-DM persons in all age groups and both sexes.

Conclusions NODM had two-fold high risks of PC than LSDM. NODM and LSDM revealed better prognosis than non-DM persons. High glucose levels or changes and absence of family history of DM were risk factors of PC incidence in diabetes.

Keywords Risk; Survival; New-onset diabetes; Long-standing diabetes; Pancreatic cancer

Pancreatobiliary 4 EP-PB4-01

Current Status of Basic Technique of Endoscopic Retrograde Cholangiopancreatography in Korea: Results from a National Survey

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Background/Aims The quality management in endoscopic retrograde cholangiopancreatography (ERCP) is an important issue. Although the overall procedure of ERCP is usually similar, the details of basic technique may differ for each ERCPist. The aim of this study is to assess the current status of ERCP in Korea and to evaluate the trend of basic technique in ERCP.

Methods In order to obtain information on the basic technique of ERCP in Korea, the Korean Pancreatobiliary Association (KPA) conducted a national survey in 2019. A survey-based study was designed with papered questionnaire in KPA conference. The survey was composed of 32 questions. Main topics were: environments for performing ERCP, preparation before ERCP, favorite techniques/devices in ERCP and management after ERCP.

Results Completed questionnaires were returned from 84 ERCPist of KPA members. Among them, 71% had total experience of ERCP above 1,000 cases and experience over 5 years. Main results were as follows: presence of fluoroscopy room for only ERCP procedure, 57 out of 84 (68%); use of opioid for preparation, 80 out of 84 (95%); use of prophylactic anti-spastic agent, 67 out of 84 (80%); use of restraining device, 43 out of 84 (51%). Preferred procedural sedations were balanced-propofol sedation (50%) and midazolam-only sedation (47%). Endoscopic retrograde biliary drainage was more preferred than endoscopic nasobiliary drainage (60% vs 22%). The initial method for opening of orifice was that endoscopic sphincterotomy in 60%, combination of balloon dilatation and sphincterotomy in 17%. There was some variability of basic cannulation technique, type of preferred guidewire, model of mechanical lithotripter and first salvage technique.

Conclusions Data from this survey involving a large number of ERCP experts reveal some variability of basic techniques of ERCP in Korea. A future nationwide survey is necessary to evaluate the standard basic techniques for ERCP.

Keywords ERCP; Technique; Current status; Survey; Korea

Pancreatobiliary 4 EP-PB4-02

Physician-Controlled Wire-Guided Cannulation with Short Guidewire System for Endoscopic Retrograde Cholangiopancreatography Compared to Assistant-Controlled Wire-Guided Cannulation with Long Guidewire System: Single Center Experience with Large Cohort

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Background/Aims Cannulation of the major papilla is the most challenging part of the endoscopic retrograde cholangiopancreatography (ERCP) procedure. Physician-controlled wire-guided cannulation (PCWGC) is the technique that physician performing the ERCP by manipulating the endoscope and the short guidewire for cannulation attempts. The aim of this study was to compare the safety and efficacy between PCWGC versus assistant-controlled wire-guided cannulation (ACWGC).

Methods Between January 2015 and December 2016, patients older than 20 years who had undergone diagnostic or therapeutic ERCP at the Yonsei University Medical Center (YUMC) were enrolled for the study, retrospectively.

Results There were total 2,151 patients (4,193 cases) who underwent ERCP at YUMC. Among them, 816 ERCP-naive patients were recruited. Of these, 375 (46%) underwent PCWGC. In the safety end point, between PCWGC and ACWGC group, the differences in post-ERCP complications (bleeding: 1.3% vs 2.0%, perforation 0.8% vs 2.0%) were not statistically significant (p=0.780). But, PCWGC group had lower rate of post-ERCP pancreatitis, although it was not statistically significant (8.3% vs 12.0%, p=0.079). In the efficacy end points, cannulation success rate (99.5% vs 99.3%), rate of precut sphincterotomy (22.4% vs 24.3%), bile duct cannulation time (median, 2.9 minutes vs 3.5 minutes), and total procedure time (median 13.7 minutes vs 12.9 minutes) were not different significantly (all p>0.05).

Conclusions PCWGC is not inferior to ACWGC in safety and efficacy end points. It is recommended to choose PCWGC or ACWGC when performing ERCP according to physician's preference. Also, PCWGC can be a good option in facilities lacking manpower and resources.

Keywords PCWGC; ACWGC; Short guidewire; ERCP; Cannulation

Pancreatobiliary 4 EP-PB4-03

Can Prophylactic Argon Plasma Coagulation Reduce Delayed Post-Papillectomy Bleeding? A Prospective Randomized Multicenter Trial

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Background/Aims Endoscopic post-papillectomy bleeding occurs in 3% to 20% of cases and delayed bleeding within 1 week is also problematic. However, there was no definite guideline or consensus for prevention or reduction of delayed post-papillectomy bleeding. The aim of this study was to evaluate the efficacy of prophylactic argon plasma coagulation (APC) to minimize delayed post-papillectomy bleeding and reduce the recurrence or persistence of residual tumors.

Methods A prospective randomized pilot trial was performed at six tertiary referral centers. Patients with ampulla of Vater adenoma were enrolled from January 2016 to April 2018 and were randomized to either the prophylactic APC or non-APC group. The prophylactic APC group underwent APC on the resection margin. On the day after papillectomy, all patients underwent follow-up duodenoscopy to identify post-papillectomy bleeding and followed up with duodenoscopy at 1, 3, 6, and 12 months. The main outcome measurements were delayed (>24 hours) post-papillectomy bleeding rate and tumor persistent rate between the two groups.

Results In total, 54 patients randomized into both group. Delayed bleeding rates in the prophylactic APC and non-APC groups were 30.8% (8/26) and 21.4% (6/28), respectively (p=0.434). Post-procedure pancreatitis rates were 23.1% (6/26) in the prophylactic APC and 35.7% (10/28) in the non-APC groups, respectively (p=0.310). The rate of tumor persistence did not differ between the two groups at 1 month (12.5% vs 7.4%, p=0.656), 3 months (4.2% vs 3.7%, p=1.00), 6 months (8.3% vs 3.7%, p=0.595), 12 months (0% vs 3.7%, p=1.00) (Table 1).

Conclusions The prophylactic APC may not be effective in reducing delayed post-papillectomy bleeding, and might not have an additive role on remnant tumor ablation effect immediately after papillectomy or during follow-up.

Keywords Endoscopic papillectomy; Delayed bleeding; Argon plasma coagulation; Ampulla of Vater

Table 1. Main Outcomes

	Non-APC group (n=28)	APC group (n=26)	P value
Delayed bleeding	6 (21.4)	8 (30.8)	0.434
Post-papillectomy pancreatitis, total	10 (35.7)	6 (23.1)	0.310
Tumor persistence after papillectomy	Non-APC group (n=27)	APC group (n=24)	P value
Positive biopsy at 1 month	2 (7.4)	3 (12.5)	0.656
Positive biopsy at 3 month	1 (3.7)	1 (4.2)	1.00
Positive biopsy at 6 month	1 (3.7)	2 (8.3)	0.595
Positive biopsy at 12 month	1 (3.7)	0	1.00
Total patients	3 (11.1)	5 (20.8)	0.451

Values are n (%) or mean ± standard deviation.

APC, argon plasma coagulation

Pancreatobiliary 4 EP-PB4-04

Usefulness of Unflared Intraductal Short Fully Covered Self-Expandable Metallic Stent for Endoscopic Removal of Bile Duct Stones Complicated by Biliary Stricture

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Background/Aims Endoscopic management of complicated bile duct stones in patients with benign biliary stricture (BBS) is very challenging. Recently developed modified short length of fully covered self-expandable metallic stent (FCSEMS) can be inserted intraductally and easily removed by long lasso. Our aim was to evaluate the usefulness of short intraductal FCSEMS for endoscopic removal of complicated bile duct stones after relieving of biliary stricture.
Methods Twenty-six patients (11 women; median age, 61.5 years [range, 23 to 84 years]) having retained bile duct stones with biliary stricture failed by conventional endoscopic removal included this study. Non-flared short FCSEMS (BONASTENT M-Intraductal) having 7 or 10 cm of lasso was intraductally inserted on stricture. After FCSEMS removal at 6months stenting period, endoscopic stone removal was tried. Primary outcome was complete stone clearance rate. Secondary outcomes were success rate of stent insertion and removal, relieving of biliary stricture rate, and procedure-related adverse events.
Results Intraductal placement of FCSEMS was successful in all cases. There were three cases (11.5 %) of stent migration during follow-up. Intended stent removal was successful in other 23 patients. Improvement of biliary stricture revealed in all 23 patients. Complete stone clearance was achieved 22 of 26 patients (84.6%). There were no significant adverse event related to procedures. No stent-induced ductal change was observed in all patients.
Conclusions Temporary intraductal placement of unflared FCSEMS may be an effective in endoscopic management of complicated bile duct stones in patients with biliary stricture minimizing stent induced adverse events.
Keywords Complicated bile duct stones; Benign biliary stricture; Fully covered self-expandable metallic stent

Pancreatobiliary 4 EP-PB4-05

A Short Length Stent with an Anti-migration Design Is Useful for the Treatment of High-Level Biliary Anastomotic Stricture after a Biliary Operation

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Background/Aims In the treatment of anastomotic biliary stricture (ABS), non-surgical methods have a high success rate. Recent studies reported that fully covered self-expandable metal stent (FCSEMS) is useful in advanced ABS. However, there are limits that migration rate is high and the treatment rate of high-level stricture is low. In this study, we investigated the efficacy of modified short removable FCSEMS with an anti-migration design for high-level ABS.
Methods FCSEMS insertion was performed endoscopically on patients with high-level ABS after a biliary operation. The FCSEMS was maintained initially three months and exchanged every three months until the stricture was resolved. After removal of the FCSEMS, complications and recurrence were accessed during follow-up.
Results A total of 71 patients with a median age of 58 years. The underlying diseases were hepatocellular carcinoma (53.5%), liver cirrhosis (26.8%), hepatic failure (7%) and gallbladder stone (8.5%). The types of the previous operation were living donor liver transplantation (77.5%), deceased donor liver transplantation (8.5%), liver lobectomy (11.3%) and cholecystectomy alone (2.8%). The previous procedures to resolve ABS were endoscopic retrograde cholangiopancreatography with plastic stent (39.4%), percutaneous transhepatic biliary drainage (26.8%) and both (28.2%). The technical success rate was 100%, and the clinical success rate was 95.7%. The recurrence rate was 22.5%, and the complication rate was 14%. All the stents were removable, and stent migration was noted in 4 patients (5.6%).
Conclusions The newly designed FCSEMS is a potentially feasible and effective for the treatment in patients with high-level ABS after a biliary operation.
Keywords Postoperative biliary stricture; Postoperative biliary stricture; Biliary stricture; Liver transplantation

Pancreatobiliary 4 EP-PB4-06

Efficacy of Early ERCP in Primary and Secondary Distal Malignant Biliary Obstruction

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Background/Aims Early endoscopic retrograde cholangiopancreatography (ERCP) in patients with acute cholangitis, mainly from biliary stones, is known to improve outcomes. Currently, there is a lack of studies regarding optimal timing of ERCP in patients with malignant biliary obstruction (MBO).
Methods From January 2005 to June 2018, 1872 patients who visited emergency room (ER) and underwent ERCP for suspected biliary obstruction at Seoul National University Hospital were analyzed. In total, 567 patients with distal MBO were included and further classified as primary and secondary distal MBO groups, according to the tumor origin and status. Early ERCP was defined as ERCP performed within 48 hours after ER arrival. The primary outcomes were 30-day and 180-day mortality in the overall cohort. Secondary outcomes were differences in 30-day and 180-day mortality between patients with primary and secondary distal MBO.
Results Biliary drainage via ERCP was successful in 444 patients (78.3%), and clinical success rate was 90.8% (403/444). In total cohort, 30-day mortality (2.1% and 12.7%; p<0.001) and 180-day mortality (36.5% and 50.8%; p=0.043) were significantly lower in patients who underwent ERCP within 48 hours than those who did not. In primary distal MBO group, there was positive tendency toward ERCP within 48 hours in 30-day mortality (1.4% vs 7.1%; p=0.066) and 180-day mortality (27.2% vs 42.9%; p=0.057). In patients with secondary distal MBO, 30-day mortality was significantly lower in patients who underwent ERCP within 48 hours than those who did not (4.3% vs 23.8%; p=0.010), while there was no significant difference in 180-day mortality (64.9% vs 66.7%; p>0.999).
Conclusions Early ERCP clearly improves clinical outcomes in distal MBO patients regardless of the tumor origin, especially short-term outcomes including 30-day mortality.
Keywords Treatment outcomes; ERCP; Early intervention; Neoplasms; Extrahepatic cholestasis

Pancreatobiliary 4 EP-PB4-07

Usefulness and Safety of EUS-FNB Using a Franseen Needle for Pancreatic Lesions

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Background/Aims In endoscopic ultrasound (EUS)-guided fine needle aspiration (EUS-FNA), a Franseen needle has been developed and the concept of EUS-guided fine needle biopsy (EUS-FNB) has become established. More tissue samples are collected, and higher accuracy is achieved with fewer punctures, and fewer punctures are expected to reduce the incidence of adverse events. In this study, we evaluated the usefulness and safety of EUS-FNB with a Franseen needle for pancreatic masses.
Methods The study design was a single-center, retrospective study. Two hundred and sixty-eight consecutive patients (272 EUS-FNB) with pancreatic masses who underwent EUS-FNB with 22-gauge or 25-gauge Franseen needles were included in the study. ROSE was not performed, and the number of punctures was completed once if a white sample was obtained macroscopically, and additional punctures were performed if the amount of tissue collected was inadequate macroscopically.
Results The mean age was 64.5 years, and the puncture route was 157 cases by the transgastric and 115 cases by the transduodenal route. The mean tumor diameter was 25.3 mm. The final diagnosis was pancreatic cancer in 182 cases, NEN in 28 cases, AIP in 22 cases, chronic pancreatitis in 27 cases, SPN in five cases, metastatic pancreatic cancer in two cases, SCN in one case, and LEC in one case. In 262 patients with 22-gauge needles and 10 patients with 25-gauge needles, the mean number of punctures was 2.2 (range, 1 to 5) times. The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were 94.6%, 98.0%, 99.5%, 80.6%, and 95.2%, respectively. Adverse events occurred in 1.5% (4/272) of patients with pancreatitis in two patients (both pancreatic cancer, 15 mm and 19 mm in size), bleeding in one patient, and pancreatic leakage in one patient.
Conclusions EUS-FNB with a Franseen needle safely provides accurate pathological diagnosis for pancreatic masses with fewer punctures, and is useful in clinical practice.
Keywords Fine needle aspiration; Fine needle biopsy; Endoscopic ultrasound

Pancreatobiliary 4 EP-PB4-08

Endoscopic Ultrasound-Guided Biliary Drainage for Right Intrahepatic Bile Duct Obstruction

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Background/Aims Endoscopic ultrasound-guided biliary drainage (EUS-BD) has been developed as an alternative to failed endoscopic biliary drainage, percutaneous transhepatic biliary drainage or inaccessible papilla. Generally, this novel method, especially EUS-guided hepaticogastrostomy (EUS-HGS), was indicated for extrahepatic bile duct obstruction or isolated left intrahepatic bile duct (IHBD) obstruction because we can only puncture the left IHBD to access IHBD tree on transgastric imaging of EUS. Therefore, EUS-BD is not normally indicated for right IHBD. We evaluated the technical feasibility and clinical efficacy of novel EUS-BD for right IHBD obstruction.
Methods A total 34 patients who were histologically diagnosed unresectable carcinoma and obstructive jaundice due to right IHBD obstruction were included. From left IHBD route, after uncovered metallic stent was placed from right IHBD to left IHBD, EUS-HGS was performed. From right IHBD route, following deployment of the uncovered metallic stent from right IHBD to the hepatic parenchyma, we also placed fully covered metallic stent from uncovered metallic stent to the duodenal bulb or stomach.
Results The causes of obstructive jaundice were cholangiocarcinoma (n=29), pancreatic cancer (n=3), gastric cancer (n=1), and colon cancer (n=1). Twenty-seven patients underwent EUS-BD from left hepatic bile duct, and 11 patients underwent EUS-BD from right hepatic bile duct. Mean procedure time was 31.2±10.0 minutes. Technical success rate was 90%, and functional success was obtained in all patients who underwent EUS-BD, and adverse events were seen in only one patient (bile peritonitis).
Conclusions Presented novel method appears safely and effectively for right IHBD obstruction.
Keywords Endoscopic ultrasound-guided biliary drainage

Pancreatobiliary 4 EP-PB4-09

Preclinical Animal Test Using Novel Hydrophilic Plastic Stent System in Swine Models of Biliary Stricture

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Background/Aims Endoscopic retrograde biliary drainage (ERBD) is widely used as a drainage method for biliary obstruction. Biliary stents can be divided into plastic stent (PS) and metal stent. There are several limitations for PS including insufficient luminal diameter and short patency period. Up to date, many methods have been studied to improve the disadvantages of PS. The aim of this study is to evaluate the effect of advanced hydrophilic PS system using novel surface modification technique via vacuum plasma in swine model of biliary stricture.
Methods Using six *in vivo* swine bile duct stricture model made by using radiofrequency ablation electrode and stent insertion, we evaluated bio durability of hydrophilic PS. The advanced hydrophilic polyethylene (PE) PSs (10 Fr, 90 mm) using surface modification technique via vacuum plasma and PE PSs without hydrophilic surface modification were inserted in all swine models of biliary stricture.
Results Total of 12 PSs were inserted into the biliary stricture of six swine models, and all these PSs were successfully retrieved at 1-, 3- and 5-month later. PE PSs with hydrophilic characteristic (PS+HC) showed less biofilm formation for 1 month and 3 months than PE PSs without hydrophilic characteristic (PS-HC) ($p<0.05$). PS+HC showed better patency rates for 1 month and 3 months of implantation than PS-HC in both light microscopic and scanning electron microscopy examination ($p<0.05$). There was statistically significant difference in histologic inflammation scores between PS+HC and PS-HC during the 5 months of implantation ($p<0.05$).
Conclusions PS+HC using the new surface modification technique via vacuum plasma may reduce the biofilm formation and lumen stenosis. This may result less damage to surrounding tissues during PS implantation period and could be safer than PS-HC. To evaluate our results, future clinical studies for patients with biliary obstructive diseases should be required.
Keywords Endoscopic retrograde biliary drainage; Plastic stent; Swine models; Biliary stricture

Pancreatobiliary 4 EP-PB4-10

Impact of Balloon Inflation on the Insertion of Endoscopic Ultrasound: A Prospective, Randomized Controlled Trial

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Background/Aims During endoscopic ultrasound (EUS), patients may experience severe discomfort. The EUS has a balloon around its tip. Balloon inflation prior to insertion may reduce contact damage. The purpose of this study was to investigate the effect of balloon inflation on pharyngeal pain during insertion.
Methods Patients who underwent radial EUS for pancreatobiliary disease were randomized to standard insertion or balloon-inflated insertion. The primary outcome was the proportion of moderate-to-severe pharyngeal pain. The secondary outcomes were the degree of pharyngeal pain, risk factors for moderate pharyngeal pain, procedure-related adverse events, and pharyngeal pain depending on the experience of the endoscopist.
Results A total of 481 patients were randomized into two groups: standard insertion (238 patients) and balloon inflation (243 patients). No statistically significant differences in the proportion of moderate-to-severe pain were found (26.5% vs 20.2%, p=0.107). Balloon inflation (odds ratio, 0.65; 95% confidence interval, 0.42 to 0.98; p=0.041) was a protective factor against moderate pain. Balloon inflation reduced the proportion of patients with moderate-to-severe pain when performed by physicians with less than 3months of experience with EUS (44.7% vs 25.3%, p=0.012).
Conclusions Balloon inflation did not reduce the absolute degree of post-procedural pain with EUS, but it reduced the number of patients with moderate-to-severe pain when performed by physicians with less than 3 months of experience.
Keywords Endoscopic ultrasound; Complication; Pain; Insertion; Balloon

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Liver EE-LV-001

Spleen Stiffness Correlates Better with Presence of High-Risk Varices Than Portal Pressure: Multi-Center Retrospective Analysis

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Background/Aims There are many attempts to predict portal pressure and esophageal varices by noninvasive method. The spleen stiffness (SS) and liver stiffness are expected to be useful in noninvasive diagnosis. We evaluate the performance of SS measured by two-dimensional shear wave elastography (2D-SWE) for predicting portal hypertension and esophageal varices.
Methods From January 2017 to August 2019, 130 patients who measured SS and hepatic venous wedge pressure (HVPG) and esophagogastroduodenoscopy simultaneously were enrolled. Thirty-four patients who showed invalid measurement (n=31) and combined hematologic malignancy (n=3) and concurrent hepatocellular carcinoma (n=2) were excluded. SS was measured by three examiner using 2D-SWE (LOGIQ E9, GE healthcare) from three tertiary medical center.
Results Ninety-four patients were eligible for analysis. Most common etiology was alcoholic hepatitis (n=63, 67.0%) and followed by chronic hepatitis B (n=17, 18.1%). Patients were consisted of Child-Pugh class A (n=33), B (n=46), C (n=15). The mean value of HVPG was 14.6±5.1 mmHg and 83.0% and 58.5% of patients has esophageal varices and high-risk varices. The HVPG and SS did not showed significant correlation (r=0.197, p=0.057). The presence of varices appeared significant positive correlation with SS (r=0.212, p=0.043). High-risk varices showed stronger correlation with SS (r=0.324, p=0.002). The area under receiver operating characteristics showed 0.698 (confidence interval, 0.592 to 0.804; p=0.001)
Conclusions Whether SS is associated with HVPG is unclear, SS could be useful for evaluating high-risk varices. Further studies are needed to clarify the clinical implication.
Keywords Spleen stiffness; High risk varices; Portal hypertension; Hepatic venous wedge pressure

Liver EE-LV-002

Prognostic Factors for Survival in Patients with Hepatocellular Carcinoma Treated By Transarterial Radioembolization

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Background/Aims Transarterial radioembolization (TARE) is a form of radiation therapy performed by selective intra-arterial injection of microspheres loaded with Yttrium-90. TARE is known to be effective in the management of unresectable hepatocellular carcinoma (HCC). The aim of this study is to identify prognostic factors for overall survival (OS) and time to progression (TTP) in patients with HCC undergoing TARE.
Methods This study included 73 consecutive HCC patients who underwent TARE from July 2009 to January 2018. The tumor responses to TARE were assessed according to modified Response Evaluation Criteria in Solid Tumors.
Results The patients' baseline characteristics were as follows: median age was 66 years, 74% of male. The median tumor size was 9 cm and 41% of the patients had tumors larger than 10 cm. Multifocal HCCs identified in 58% and 26% of the patients showed infiltrative tumor. Sixty-three percent of the patients did not have portal vein tumor thrombus (PVTT), 10% had VP 1–2, and 27% had VP 3–4 of PVTT. Among 73 patients, five (7%) obtained complete response and 25 (34%) showed partial response at 3 months after TARE. Median OS was 27.6 months and TTP was 3.2 months. Multivariate analysis revealed that the absence of PVTT (hazard ratio [HR], 0.137; 95% confidence interval [CI], 0.057 to 0.331; p<0.001) was independent factor for OS. The absence of PVTT (HR, 0.330; 95% CI, 0.172 to 0.632; p=0.001) and tumor diameter ≤10 cm (HR, 0.287; 95% CI, 0.135 to 0.611, p=0.001) were independent prognostic factors for TTP.
Conclusions TARE is an effective therapy for patients with advanced HCC. Absence of PVTT before TARE is an independent predictive factor for both OS and TTP.

Liver EE-LV-003

Projection of 10-Year Liver, Bone, and Renal Outcomes Using Tenofovir Alafenamide for the Management of Chronic Hepatitis B in Taiwan

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Background/Aims Chronic hepatitis B (CHB) infection burden in Taiwan is high. Treatments goals are to suppress viral replication and achieve early normalization of alanine aminotransferase levels to decrease the liver damage risk and liver-related complications (i.e., hepatocellular carcinoma [HCC]). Notably, certain CHB treatments and increasing CHB patients' age can increase risk of bone and renal adverse events. In this study, we simulated 10-year liver and safety outcomes for 100,000 non-cirrhotic Taiwanese CHB patients comparing tenofovir alafenamide (TAF) to tenofovir disoproxil fumarate (TDF) and entecavir (ETV) treatments.
Methods A health outcomes model was developed using an individual patient simulation framework tracking treatment impact on liver complications, chronic kidney disease and major osteoporotic facture. The model assumed 90% of all patients were treatment-experienced, of which 10% had lamivudine experience. Patient demographics and other inputs were drawn from published randomized controlled trials, peer-reviewed Taiwanese literature, and Taiwanese hepatologists. The treatments considered were TAF, TDF and ETV. Patients received treatment in accordance with the latest Taiwanese National Health plan reimbursement criteria.
Results Over a 10-year horizon, TAF-treated patients had fewer hepatic (i.e., compensated cirrhosis-CC, decompensated cirrhosis-DCC, and HCC) events as compared to TDF and ETV (Table 1). In addition, TAF-treated patients had lower or similar rates of bone- and renal-related safety events as compared to TDF and ETV (Table 1).
Conclusions Utilizing clinical data from various first-line NA treatments, this model projects TAF-treated patients to have better liver outcomes and lower adverse events rates over a 10-year time horizon compared to TDF and ETV, driven by its improved efficacy and safety profile. As Taiwanese CHB patients are aging with increasing comorbidities, careful selection of treatment is warranted. Notably, a limitation of this analysis is that CC and HCC event risks are based on untreated population data given limited treated patient data to date.
Keywords Hepatitis B; Tenofovir alafenamide; Hepatocellular carcinoma

Table 1. Ten-Year Liver- and Safety-Related Outcomes

LIVER OUTCOMES	TAF	TDF	ETV
% OF PATIENTS WITH CC EVENT	13.004%	13.269%	13.680%
% OF PATIENTS WITH DCC EVENT	1.912%	1.926%	1.996%
% OF PATIENTS WITH HCC EVENT	5.696%	6.188%	6.834%
SAFETY OUTCOMES	**TAF**	**TDF**	**ETV**
CKD EVENTS PER 100 PERSON YEARS	1.88	4.13	1.96
ESRD EVENTS PER 100 PERSON YEARS	0.46	0.94	0.46
MOF EVENTS PER 100 PERSON YEARS	1.34	1.36	1.34

CC = compensated cirrhosis, CKD = chronic kidney disease, DCC = decompensated cirrhosis, ESRD = end-stage renal disease, HCC = hepatocellular carcinoma, MOF = major osteoporotic fracture

TAF, tenofovir alafenamide; TDF, tenofovir disoproxil fumarate; ETV, entecavir.

Liver EE-LV-004

Liver Fibrosis Score Predicts Cardiovascular Mortality in the Patients with History of Percutaneous Coronary Intervention

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Background/Aims The nonalcoholic fatty liver disease fibrosis score (NFS) is comprised of metabolic risk indicators that may accurately predict residual CV risk in patients with CAD and metabolic dysfunction.
Methods We performed a retrospective cohort study of 2,589 patients (median age, 64 years; interquartile range, 55 to 73) who underwent PCI from 2007 through 2018. We applied the NFS to the patients at baseline, using validated NFS cutoffs. Improvement of ejection fraction classified into three groups based on baseline and follow-up echocardiography: less than 10%, 10% to 20% and more than 20%. Primary endpoint included CV death, all-cause death. After propensity score matching, 230 vasodilating beta-blocker (VBB) users and 230 age, sex, and important risk-matched non-VBB users were compared.
Results Among 2,589 post PCI patients in a single center, 10.7% (n=277) were high-risk (NFS>0.67). The high-risk group had 3 folds increased risk of CV death, compared to the low-risk NFS group (hazard ratio [HR], for NFS>0.67 vs NFS <−1.455=3.08 [1.70 to 15.14]; p=0.001). The age-adjusted hazard ratio for NFS improvement comparing patients with LVEF increased by more than 10% with those without LVEF increase after PCI was 1.51 (95% confidence interval [CI], 0.93 to 2.46; p=0.095). In subgroup analysis of 460 PS matched patients enrolled in a registry, the VBB users in the low-risk group (NFS <−1.455) had a 72% decreased risk of CV death, compared to the non-VBB users (HR, 0.28; 95% CI, 0.09 to 0.88]; p=0.03). A similar benefit was not found in the high-risk group (HR, VBB vs conventional beta-blocker, 1.89; 95% CI, 0.51 to 6.99]; p-interaction=0.34).
Conclusions Stratification of cardiovascular risk by NFS identifies an independent population of patients who are at highest risk of CV death, and most likely to benefit from VBB.
Keywords Nonalcoholic fatty liver disease fibrosis score; Nonalcoholic fatty liver disease; Coronary artery disease

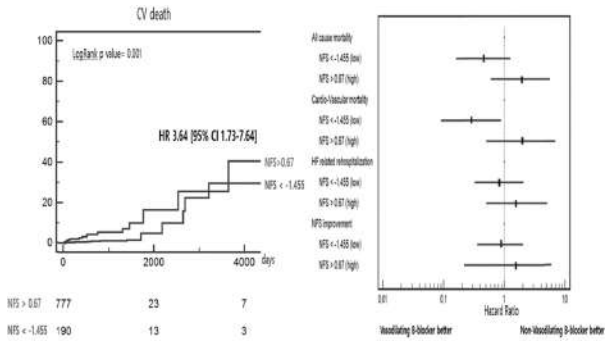

Fig. 1. KM curve and forest plot.

Liver EE-LV-005

Are *Helicobacter pylori* Infected Dyspeptic Patients Prone to Lean Nonalcoholic Fatty Liver Disease?: A Single Center Experience

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Background/Aims Fatty infiltration of the liver represents Intracytoplasmic accumulation of triglycerides in the hepatocytes. We determined if *Helicobacter pylori* infection contributes to fatty liver infiltration and if it was related to gastric mucosal changes and fatty liver disease in Pakistani population. Does it really represent lean nonalcoholic fatty liver disease (NAFLD)?
Methods In this cross-sectional study, patients underwent investigations for *H. pylori* infection. Body mass index (BMI) was calculated. Normal BMI was up to 22.9 kg/m^2 and abnormal 23 kg/m^2 and greater. Data was collected for age, gender, smoking, alcohol intake, hypertension, type II diabetes, ischemic heart disease, dyslipidemia and liver function tests. Ultrasound of liver diagnosed fatty liver infiltration.
Results Six hundred ninety-eight patients were enrolled with mean age 44±16 years. Male were 373 (53%). *H. pylori* infection was positive in 399 (57%). Fatty liver was documented in 153 (22%). In *H. pylori* infection, fatty liver was positive in 31 to 50 year 31 (35%) and in 51 to 65 year 37 (42%) and was absent in 127 (41%) and 88 (28%, p<0.001) in these groups, respectively. In patients with *H. pylori* infection, BMI greater than 23 kg/m^2, liver fatty infiltration was present in 84 (26%, p<0.001) compared to four (5%) in BMI less than 23 kg/m^2. *H. pylori* infection induced chronic active gastritis was associated with fatty liver infiltration in 62 (71%) and absent in 200 (64%, p=0.264).
Conclusions *H. pylori* infection was associated with an early onset of fatty liver infiltration in the 30 to 50 year age group. Patients with a BMI >23 kg/m^2, type 2 diabetes and dyslipidemia with *H. pylori* infection predisposed to fatty liver. The complex interaction of gut microbiota and *H. pylori* infection promotes NAFLD through gut-liver-axis. Despite the good number of patients, lean NAFLD or NASH was not seen in association with *H. pylori* infection.
Keywords Lean nonalcoholic fatty liver disease; *Helicobacter Pylori*; Gut liver axis; Dyslipidemia; Diabetes

Liver EE-LV-006

Dysbiosis and Resulting Monocytosis and immunomodulation as Key Determinants to Nonalcoholic Fatty Liver Disease pathogenesis in Non-obese Non-DM2 Patients: A Study Involving Ethnically Distinct Northeast Indian Population

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Background/Aims Present study focused on alterations in gut-microbiota and its clinical relevance with nonalcoholic fatty liver disease (NAFLD) pathogenesis in tribal cases enrolled from northeast India.
Methods Clinically characterized NAFLD cases (n=36) with clinical details and fibroscan based liver stiffness measurement (LSM)-score were enrolled along with healthy controls (n=52). Decidual aspirations based microbiome load and diversity analysis was performed by standard culture and microbial metagenomics methods for NAFLD and representative HC cases. Serum endotoxin levels were estimated using standard kit. Differential sCD14, mCD14, CD40, sTLR2, TLR2, TLR4, NK/NKT expression and cytokine panels were analyzed by enzyme-linked immunosorbent assay /flowcytometry. HepG2 cell line based microbial stimulation studies were performed for specificity of differential monocyte, cytokine and HSC activation.
Results Increased total and gram negative bacterial load was observed in NAFLD cases compared to HC. Metagenomic diversity profile data indicated a sharp difference in microbiota between NAFLD and HC subjects. Serum endotoxin and sCD14 levels were higher in NAFLD cases. Monocyte CD14 (p=0.019) and activation marker CD40 (p=0.043) was significantly increased in NAFLD cases. Average TLR4 (p=0.071) and TLR2 expression (p=0.137) on blood cells was also higher in NAFLD cases, while sTLR2 expression was significantly reduced in NAFLD cases (p=0.031) compared to HC. The CD40 and TLR4 levels significantly positively correlated with higher LSM scores. NK cell expression was higher in NAFLD. Distinct up-regulation of NFkBp65, tumor necrosis factor-α, interleukin (IL)-12 combined with significant downregulation of anti-inflammatory cytokine IL-10 and IL-4 was found to be significantly correlating with NAFLD pathogenesis and higher LSM-score (p<0.001). The hepG2 cell line (naïve and oleic acid stimulated) with NAFLD and HC microbial antigen stimulation and coculture study also indicated the increased monocyte activation, inflammatory cytokine expression and HSC activation markers on stimulation with microbes of NAFLD patient's origin.
Conclusions Dysbiosis and resulting altered monocytosis and hyper-immunomodulation is specific and detrimental to NAFLD pathogenesis.
Keywords Dysbiosis; Endotoxin; Nonalcoholic fatty liver disease; Monocyte activation; Immunomodulation

Liver EE-LV-007

Potential Effects of Dapagliflozin in the Management of Diabetic Patients with Nonalcoholic Fatty Liver Disease: Systematic Review and Meta-Analysis

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) is the most common liver disease worldwide. Diabetes and metabolic syndrome is one of the prominent cause of NAFLD. Current treatment aims for lifestyle medification and intervention for the underlying disorders such as insulin resistance, hyperglycemia, and dyslipidemia. Dapagliflozin is a potent and selective SGLT2 inhibitor. Many studies have shown that dapagliflozin can decreased liver enzyme, blood lipid, and hepatic fibrosis in mice model. This study conducted to find a beneficial effect of Dapagliflozin in diabetic patients with/at risk of NAFLD.
Methods Literature search was conducted using PubMed database until August 2019 to find randomized controlled trial, which assessed Dapagliflozin administration on blood lipid, insulin resistance, liver enzyme and body weight in diabetic patients with/at risk of NAFLD. Treatment effects were considered as mean and standard deviation difference from the baseline.
Results A total of three trials (154 participants) were included in the meta-analysis. The results suggested that dapagliflozin has significant effect improving aspartate aminotransferase (−4.47 U/L; 95% CI, −7.06 to −1.88; p=0.0007), alanine aminotransferase (−8.55 U/L; 95% CI, −12.22 to −4.87; p<0.00001), GGT (−7.66 U/L; 95% CI, −14.72 to −0.59; p=0.03), homeostasis model assessment-estimated insulin resistance (−0.92; 95%CI, −1.72 to −0.11; p=0.03), body weight (−2.24 Kg; 95% CI, −3.18 to −1.29; p<0.00001) and body mass index (−0.79 Kg/m^2; 95% CI, −1.32 to −0.27; p=0.003). Dapagliflozin has no significant effect on total cholesterol, low-density lipoprotein, high-density lipoprotein, and triglycerides.
Conclusions Dapagliflozin is beneficial for diabetic patient with/at risk of NAFLD by improving metabolic parameter and liver enzyme. However, further studies with larger scale and better designs are needed to confirm the results and eliminate the bias.
Keywords Dapagliflozin; Nonalcoholic fatty liver disease; Meta-analysis

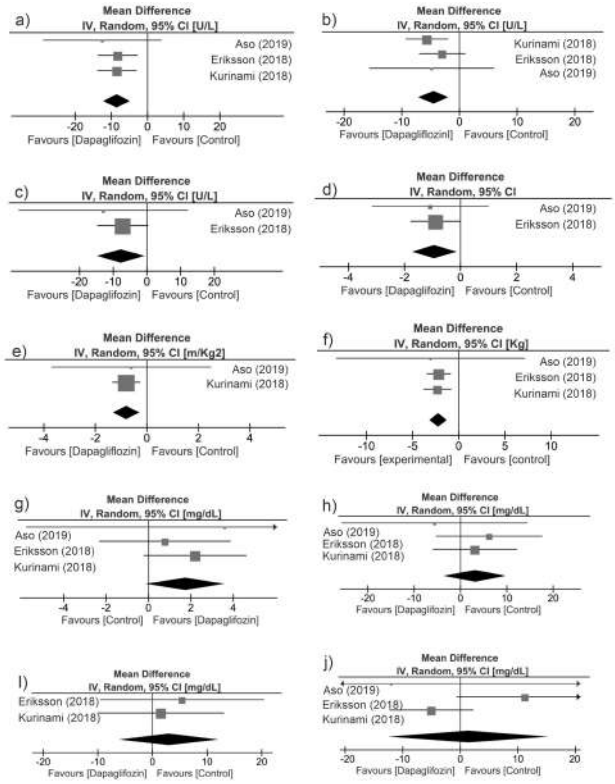

Figure 1. Forest plot of the significant results; a) ALT (U/L); b) AST (U/L); GGT (U/L); d) HOMA-IR; e) BMI (m/Kg); f) Body Weight (Kg); g) HDL (mg/dL); h) LDL (mg/dL); I)Total cholesterol (mg/dL); j) Triglycerides (mg/dl)

Liver EE-LV-008

Hepatocellular Carcinoma and Death and Transplantation in Chronic Hepatitis B Treated with Entecavir or Tenofovir

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Background/Aims Conflicting results have been reported regarding which of entecavir or tenofovir is associated with better outcomes.
Methods Chronic hepatitis B patients who started entecavir or tenofovir between 2010 and 2015 were analyzed. The primary outcomes were hepatocellular carcinoma and death and transplantation. The impact of the treatment on the primary outcomes was analyzed using Cox proportional hazards models in the entire, propensity score-matched, and inverse probability of treatment-weighed cohorts. Subgroup analyses were performed in cirrhotic or elderly patients.
Results Regarding death and transplantation, 404 patients (180 and 224 in the entecavir and tenofovir groups) were analyzed, and for hepatocellular carcinoma, 387 (173 and 214 in the entecavir and tenofovir groups) were assessed. Virological response (79.4% vs 68.4%, p=0.018) and sustained virological suppression after virological response (59.7% vs 45.2%, p=0.005) were significantly higher in the tenofovir group. Tenofovir was associated with lower hepatocellular carcinoma in the Cox proportional hazards model (hazard ratio [HR], 0.31,; 95% confidence interval [CI], 0.12 to 0.79; p=0.014). Statistical significance was not reached after adjusting sustained virological suppression using propensity score matching (HR, 0.36; 95% CI, 0.12 to 1.14; p=0.08). Subgroup analysis with cirrhotic (HR, 0.40; 95% CI, 0.13 to 1.28; p=0.12) or elderly (HR, 0.50; 95% CI, 0.09 to 2.73; p=0.42) patients showed consistent results. Death and transplantation outcome were comparable between the two groups in all analyses.
Conclusions The impact of tenofovir on the lower hepatocellular carcinoma was blunted after adjusting sustained virological suppression. Further analysis in a larger number of patients who show sustained virological suppression is needed.

Liver EE-LV-009

Outcome of Antiviral Treatment-Naïve Hepatitis B Virus-Related Hepatocellular Carcinoma Patients with Undetectable Serum Hepatitis B Virus DNA levels

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Department of Internal Medicine, Samsung Medical Center, Seoul, Korea

Background/Aims Currently available antiviral treatment (AVT) for hepatitis B virus (HBV) can suppress viral replication, but cannot eradicate the virus. Therefore, AVT is recommended for the patients with evidence of active viral replication. Prophylactic AVT is recommended only for special population, such as patients with hepatocellular carcinoma (HCC). To date, evidence to support prophylactic AVT for HCC without active HBV replication is limited.
Methods A total of 985 HBV-related HCC patients with undetectable serum HBV DNA levels at HCC diagnosis between 2008 and 2016 were analyzed for the development of viral flare. Eight hundred seventy-three patients were on AVT while 112 patients were AVT-naïve at the time of diagnosis. Incidence of viral flare were compared according to AVT status. We also assessed the impact of viral flare on overall survival.
Results During a median of 33.4 months of follow-up (range, 0.2 to 124.2 months), viral flare was observed in 279 patients. The viral flare rate was significantly higher for AVT-naïve patients than patients on AVT (5-year cumulative incidence rate, 65.7% vs 31.8%; p<0.001). AVT at the time of HCC diagnosis was an independent factor associated with viral flare. In multivariable analysis, viral flare was an independent factor associated with increased mortality (hazard ratio [HR], 1.77; 95% CI, 1.31 to 2.40; p<0.001), while use of AVT at the time of diagnosis was associated with lowered mortality (HR, 0.52; 95% CI, 0.35 to 0.78; p=0.002).
Conclusions Among AVT naïve, HBV-related HCC patients without detectable serum HBV DNA levels at diagnosis, about two thirds of patients will experience viral flare. Patients receiving AVT at the time of HCC diagnosis had lower rate of viral flare and better survival. This finding support AVT for HBV-related HCC patients from the beginning, even when serum HBV DNA is undetectable.
Keywords Hepatitis B virus; Hepatocellular carcinoma; Antiviral therapy; Viral flare

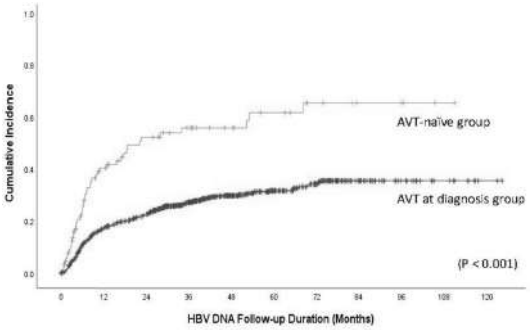
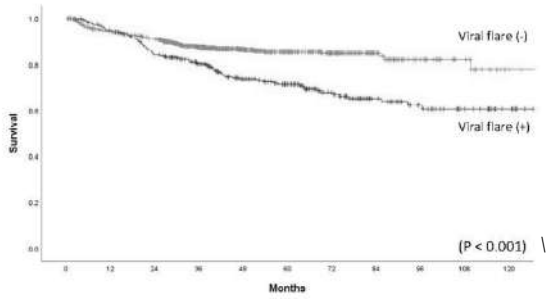


Fig.1. Incidence of viral flare and overall survival.

Figure 2. Overall survival according to viral flare status during follow-up



Liver **EE-LV-010**

Substantial Risk of Recurrence Even after 5 Recurrence-Free Years in Early-Stage Hepatocellular Carcinoma Patients

Jihye Kim, Wonseok Kang, Dong Hyun Sinn, Geum-youn Gwak, Yong-han Paik, Moon Seok Choi, Joon Hyeok Lee, Kwang Cheol Koh, and Seung Woon Paik
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Background/Aims Although hepatocellular carcinoma (HCC) is notorious for its high recurrence rate, some patients with early-stage do not experience recurrence for long period after curative treatment. In these long-term recurrence-free patients, the future risk of recurrence remains elusive. This study aimed to identify the risk and risk factors for recurrence among early-stage HCC patients initially treated with resection or radiofrequency ablation (RFA), with a special attention to those who did not experience recurrence for 5 years.
Methods A total of 1,451 consecutive patients with good liver function (Child-Pugh class A) who were diagnosed with early-stage HCC by the Barcelona Clinic Liver Cancer Staging and received resection or RFA as an initial treatment between 2005 and 2010 were analyzed.
Results During a median follow-up period of 8.1 years, 961 patients (66.2%) experienced HCC recurrence. The cumulative recurrence rates increased to 39.7%, 60.3%, and 71.0% at 2, 5, and 10 years, respectively, without reaching a plateau. Among 487 patients with 5-year recurrence-free period, the next 5-year cumulative recurrence rate (5–10 years after initial diagnosis) was 27.0%. Male sex, high fibrosis-4 score, and high alpha-fetoprotein level at 5-year were associated with further HCC recurrence after 5 years. The cumulative HCC recurrence rates over the next 5 years (5–10 years after diagnosis) were 10.3%, 24.5%, 45.0%, and 71.4% in patients with no, 1, 2, and, 3 risk factors, respectively (Fig. 1).
Conclusions The HCC recurrence rate was high following 5 recurrence-free years after curative treatment, indicating that HCC patients warrant continued secondary HCC surveillance, even after 5 recurrence-free years.
Keywords Hepatocellular carcinoma; Recurrence; Early-stage; Recurrence-free period

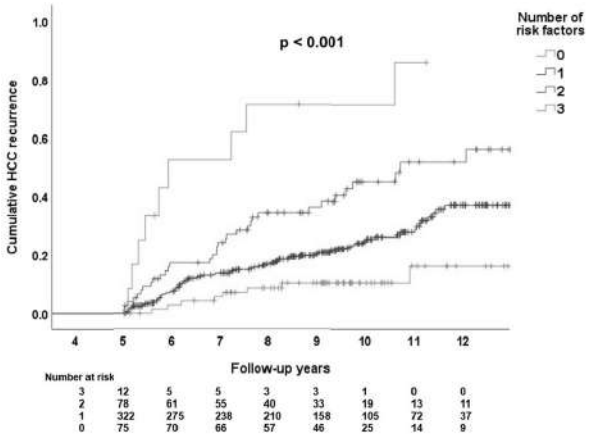

Fig. 1. Hepatocellular carcinoma (HCC) recurrence after 5 years.

Liver EE-LV-011

High Efficacy of Glecaprevir/Pibrentasvir in Patients Infected with Chronic Hepatitis C Virus Genotype 1 or 2 from South Korea

Jeong Heo[1], Yoon Jun Kim[2], Jin-woo Lee[3], Ji Hoon Kim[4], Young-suk Lim[5], Kwang-hyub Han[6], Sook-hyang Jeong[7], Mong Cho[8], Ki Tae Yoon[8], Si Hyun Bae[9], Eric D Crown[10], Linda M Fredrick[10], Wenjing Lu[10], Negar Niki Alami[10], Armen Asatryan[10], Yong Kyun Won[11], Seung Woon Paik[12], and Youn-jae Lee[13]

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Background/Aims The combination of glecaprevir and pibrentasvir (G/P) is the first pan-genotypic direct-acting antiviral agent therapy approved in South Korea. It is estimated that there are 300 thousand individuals with hepatitis C virus (HCV) antibody-positive in South Korea. Among chronic hepatitis C (CHC) patients, virus genotype (GT) 1 and 2 combined account for the vast majority (~99%) of CHC. We evaluated the efficacy and safety of G/P in South Korean CHC GT1 or 2 patients with or without compensated cirrhosis.
Methods We pooled the data from five Phase II/III trials for sub-analysis of patients from South Korea who received G/P for either 8 or 12 weeks. Efficacy was evaluated as the rate of sustained virologic response at 12 weeks posttreatment (SVR12).
Results The analysis included 265 patients (intention-to-treat population); 179 (67.5%) were HCV treatment-naïve, and 5 (1.9%) and 81 (30.6%) had previously received sofosbuvir or interferon-based treatment, respectively. A total of 262 of 265 patients (98.9%) achieved SVR12. There was one virologic failure (relapse at 12 weeks after treatment), one patient discontinued treatment due to adverse event (AE), which was assessed as not related to the treatment, and one patient had missing SVR12 result. G/P was safe and well-tolerated, with most of the AEs being grade 1 (mild) and eight of 265 patients (3.0%) reporting at least one AE of severity grade 3 or higher. Only two patients experienced grade 3 hepatic laboratory abnormalities; one hyperbilirubinemia and one alanine aminotransferase elevation.
Conclusions G/P combination therapy for 8 or 12 weeks achieved a high efficacy with SVR12 rate of 98.9% among patients with CHC GT1 or 2 infection from South Korea. G/P was safe and had a favorable safety profile, comparable to that observed in the G/P global clinical trials.
Keywords Hepatitis; Hepatitis C; Chronic; Liver disease; RNA virus infections

Liver EE-LV-012

Circulating Tumor Cells Are Associated with Poor Outcomes in Early-Stage Hepatocellular Carcinoma: A Prospective Study

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Background/Aims Previous studies evaluating association between circulating tumor cells (CTC) and clinical outcomes in hepatocellular carcinoma (HCC) have shown inconsistent results due to suboptimal detection methods and patient heterogeneity.
Methods Patients undergoing surgery for early-stage HCC were prospectively enrolled. The CTC numbers were determined using a tapered slit platform, which detects CTC based on the cell size and morphology. Survival and recurrence was evaluated, and Cox proportional hazards models were used to demonstrate the prognostic significance of CTC.
Results Of 105 patients, 25 had increased CTC numbers after surgery (Δ CTC>0, defined as positive) and a significantly higher level of recurrence (p=0.042). A positive Δ CTC was seen to be an independent predictor of recurrence (hazard ratio, 2.28), along with hepatitis B virus infection, alanine aminotransferase level, and the presence of satellite nodules (all p<0.05). Subgroup analyses showed a positive Δ CTC was associated with lower survival and higher recurrence among patients with low alpha-fetoprotein levels and cirrhosis (all p<0.05).
Conclusions Calculation of Δ CTC based on the physical properties of the cells is predictive of recurrence in patients with early HCC undergoing surgery.

Liver EE-LV-013

Decreased Expression of a Disintegrin and Metalloproteinase 9 (ADAM9) Was Significantly Associated with the Good Tumor Response to Nivolumab Therapy in Advanced Hepatocellular Carcinoma

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Background/Aims MHC class I-related chain A (MICA), a ligand for natural killer (NK) group 2 member D (a stimulatory receptor on NK cell), is expressed in human hepatocellular carcinomas (HCC). ADAMs are membrane anchored proteins. ADAM9 is involved in ectodomain shedding of MICA, and it is an important mediator of invasion and metastasis of HCC. This study aimed to investigate the roles of ADAM9 during HCC immunotherapy as well as molecular target therapy.
Methods Quantitative reverse transcriptase polymerase chain reaction was performed to measure the expression of ADAM9 mRNA using blood samples from 10 HCC patients (mean age, 57 years) and matched healthy controls. The HCC patients comprised eight chronic hepatitis B (CHB), one chronic hepatitis C (CHC) and one nonviral patients. Among those, four patients (two CHB, one CHC, one nonviral HCC) were treated with nivolumab more than two cycles, and the changes of ADAM9 mRNA were evaluated before and after the nivolumab treatment. Also, the blood samples which collected before and after nivolumab therapy, were used for flow cytometric analyses of the immune checkpoints molecules.
Results The mean value of pretreatment plasma ADAM9 mRNA levels in the advanced HCC patients (n=5) was significantly higher than that of healthy controls (n=5; 3.001+0.279 vs 1.00+0.005, p<0.05). Regarding the two HCC patients (one CHB and one nonviral HCC), who showed objective treatment response after nivolumab therapy, the posttreatment serum ADAM9 mRNA levels significantly decreased compared with that of pretreatment levels (262.58+20.13 vs 573.98+5.16, p<0.05 and 85.52+5.59 vs 323.88+10.67, p<0.05, respectively). In the same HCC patient, the TIM-3 and PD-1 inhibitory immune checkpoint molecules in the CD8+ cytotoxic T cells were also decreased after the nivolumab therapy. Simultaneously, the TIM-3 and LAG-3 immune checkpoint molecule expressions on CD56+ NK cells were significantly decreased after nivolumab therapy. However, in the other two HCC patients (one CHB and one CHC HCC), who did not have treatment response after nivolumab therapy, there was no significant decrease of serum ADAM9 mRNA levels after nivolumab administration (p>0.05).
Conclusions Decreased expression of ADAM9 was significantly associated with the clinical response to nivolumab therapy. Therefore, ADAM9 may serve as a biomarker predicting clinical response and as a therapeutic target of HCC immunotherapy.
Keywords A disintegrin and metalloprotease; Hepatocellular carcinoma; MHC class I-related chain A; Immune checkpoints; Nivolumab

Liver EE-LV-014

Significance of Inflammatory and Angiogenic Marker Profile in Alcoholic Liver Disease Pathogenesis: A Case Control Study Involving Northeast Indian Cohorts

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Background/Aims Alcoholic liver disease (ALD) encompasses a spectrum of hepatic injury, ranging from simple steatosis to cirrhosis. Limited literature suggests that pro-inflammatory conditions and hepatic angiogenesis influence the pathophysiology of ALD. This study aimed to explore the usefulness of plasma inflammatory and angiogenic biomarkers for noninvasive evaluation of susceptibility to ALD and progression to severity.
Methods Blood samples were collected from clinically proven ALD cases (n=150: chronic liver disease [CLD], 110; cirrhosis, 40), alcoholic without liver disease (AWLD; n=93) and healthy controls (HC; n=274). Key inflammatory markers tumor necrosis factor (TNF)-α and NF-kBp65 and their target iNOS along with eNOS and COX-2 was studied at mRNA level by real-time PCR. Serum TNF-α, NF-kBp65, VEGF and PDGF-BB concentrations were analyzed using enzyme-linked immunosorbent assay.
Results Serum TNF-α was increased in alcoholic-CLD (21.85±2.907 pg/mL) and cirrhosis (22.65±4.646 pg/mL) cases compared to HC (20.462±4.719 pg/mL) and AWLD (19.725±5.738 pg/mL; p=not significant). NFkBp65 was significantly increased in CLD compared to HC (p=0.034) and AWLD (p=0.048); and positively significantly correlated with higher fibroscan based liver stiffness measurement (LSM) score, SGOT levels and serum TNF-α expression. Vascular endothelial growth factor (VEGF) levels were significantly higher in CLD cases compared to HC (p=0.043) and AWLD (p=0.049) subjects showing the association with disease severity. iNOS mRNA expression fold change was higher in CLD (6.132±4.132 folds) and cirrhosis (1.272±0.937 folds) cases compared to HC, whereas it was comparable in AWLD (1.08±0.319 folds) subjects. COX-2 mRNA expression was also increased in CLD (2.431±1.395 folds) compared to AWLD subjects. The higher iNOS mRNA expression in ALD cases correlated significantly with increased TNF-α and NF-kBp65 expression. VEGF expression in turn correlated significantly with TNF-α levels in ALD cases, and LSM score.
Conclusions The present data underlines the specificity and importance of the state of oxidative stress mediated by chronic alcohol and resulting in inflammatory and angiogenic conditions relating to the pathogenesis of ALD, especially CLD conditions; and therefore the above panel of markers holds prognostic significance as well as therapeutic potentials.
Keywords Inflammatory; Angiogenic; Alcoholic liver disease; Northeast Indian

Liver EE-LV-015

Spleen Stiffness Using Elastography as Predictor of Esophageal Varices In Cirrhotic Patients

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Background/Aims Prediction of esophageal varices (EV) by the measurement of splenic stiffness by transient elastography in cirrhotic patients has been recently proposed. Splenomegaly and splenic stiffness in cirrhosis can be explained by enlargement and hyper activation of the splenic lymphoid tissue, increased angiogenesis, fibrogenesis and passive congestion due to portal hypertension. The aim of this study is to assess diagnostic accuracy of spleen stiffness as a predictor for the presence of esophageal varices in liver cirrhosis using esophagogastroduodenoscopy (EGD) as gold standard.
Methods Patients were enrolled from June 2018 to May 2019, all patient with cirrhosis undergoing screening EGD were offered to participate in the study. After informed consent blood sample for platelet count, international normalized ratio, Child-Turcotte-Pugh (CTP) and Model for End Stage Liver Disease (MELD) score was taken. Splenic stiffness was measured by fibroscan. All information along including age, gender, spleen stiffness, presence or absence of EV were entered in the Performa.
Results Total of 97 patients were included in the study, mean age of patients was 41.1±15.1 years, predominantly were males 61 (62.9%), while 55 (56.7%) belonged to urban areas of province. Common etiologies for cirrhosis includes 49 (50.5%) followed by hepatitis B virus (HBV) 16 (16.5%), HBV and HDV coinfection 10 (10.3%), autoimmune hepatitis 7 (7.2%) and others were 8 (8.2%). Most patients belonged to CTP class A 58 (59.8%), mean MELD score were 11.7±5.5. Mean platelets and albumin of patients were 128±86.3 and 3.3±0.7. Total 25 (25.7%) had ascites and 55 (56.7%) had esophageal varices. Student t-test showed a significant association of low platelets (p=0.0001, 118.3 vs 57.5) and high splenic stiffness (p=0.0001, 37.9 vs 23.0) with the presence of esophageal varices. Area under the receiver operating characteristic was calculated for alanine aminotransferase-to-platelet ratio index (APRI), fibrosis-4 (FIB-4) and splenic stiffness was 0.81, 0.79 and 0.93 respectively.
Conclusions Splenic stiffness can more reliably predict the presence of esophageal varices as compare to other noninvasive test like APRI and FIB-4.
Keywords Esophageal varices; Splenic stiffness; Esophageal noninvasive test; Portal hypertension

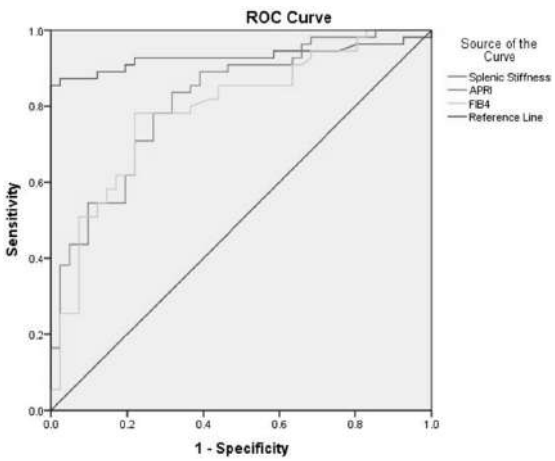

Fig. 1. Splenic stiffness and esophageal varices.
ROC, receiver operating characteristic; APRI, aminotransferase-to-platelet ratio index; FIB-4, fibrosis-4.

Liver EE-LV-016

Medium Not Too High Intensity versus Medium Not Too Low Intensity Exercise Effect on Fatty Liver-Diabetic Adults: A Comparison Study

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Background/Aims To measure the effectiveness of medium not too high (MNTH) and medium not too low intensity (MNTI) exercise using callisthenic method in adult with fatty liver and risk of metabolic syndrome.
Methods Two groups of each 25 adult with fatty liver and risk of metabolic syndrome were treated with two different method of exercise prescription, specifically in-group of MNTH and MTHI, for 12 weeks. To practice, the exercise prescription was structured and supervised by sports medicine specialist. The intensity was measured with heart rate during exercise with cutoff point 64% to 69% of maximum heart rate for MNTH and 69% to 74% for MNTI. Thus it contained strength, flexibility, balance and cardiorespiratory exercise that were suitable with patient conditions. A subjective Borgs' scale, blood pressure and GPT, HbA1C, fasting glucose, profile lipid, bodyweight examination were used as controlling parameter.
Results Exercise was done three times a week regularly with average duration of 58 minutes (SD, 4.66 minutes) on MNTH and 55 minutes (SD, 6.19 minutes) on MNTI. Borgs' scale obtained during of intervention (score 11; SD, 2.15 of 20) was in the target level, medium intensity. Subjectively and objectively no clinical symptoms, led to cardiovascular and complication of disease, were found. There was a significant improvement in the MNTL group on GPT (improvement, 27 U/L; SD, 4.73 U/L; p=0.031), HbA1C (improvement, 1%; SD, 0.81%; p=0.048) and bodyweight (improvement, 5 kg; SD, 2.84 kg; p=0.036). Fasting glucose, total cholesterol and low-density lipoprotein-cholesterol concentration were improved on both groups clinically.
Conclusions The MNTL exercise gives better significant results compared with MNTI exercise on GPT, HbA1C also bodyweight in adult patients with fatty liver and risk of metabolic syndrome. By applying exercise in both groups, patients' quality of life has been improved clinically.
Keywords Fatty liver; Exercise; Precise exercise; Medium intensity; Metabolic syndrome

Liver EE-LV-017

Comparative Efficiency of Ursodeoxycholic Acid and Combination of Vitamin E and Vitamin C in the Treatment of Nondiabetic Nonalcoholic Steatohepatitis

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Background/Aims Nonalcoholic steatohepatitis (NASH) is a frequent liver disease that can progress to cirrhosis and for which effective therapy is still lacking. Despite an important role of oxidative stress in the pathogenesis of NASH, antioxidant approaches have not been investigated sufficiently. The aim of the study was to compare the efficacy of ursodeoxycholic acid (UDCA) versus vitamin E plus vitamin C in nondiabetic patients with NASH.
Methods Patients with elevated aminotransferase levels and drinking, less than 40 g alcohol/wk with NASH diagnose were randomly assigned to receive either UDCA 15 mg/per kg/day (group A) or vitamin E 800 mg/day plus vitamin C 500 mg/day (group B) for 12 months and control group, which did not receive any medical treatment. Lifestyle modification was advised to all groups. The primary study endpoint was improvement in alanine aminotransferase (ALT) levels, secondary endpoints were improvement in steatosis score and improvement in fibrosis score.
Results Baseline characteristics were not significantly different between groups. After 12 months treatment with vitamin E plus C, as compared with UDCA, was associated with a significant reduction of mean ALT levels. Similarly, there was significant reduction of both mean steatosis score and fibrosis score.
Conclusions Vitamin E plus C combination is an effective, safe and inexpensive treatment option in patients with NASH and may be useful to reduce damage from oxidative stress and slow the process leading to cirrhosis.
Keywords Fatty liver disease; Nonalcoholic steatohepatitis; Fibrosis; Ursodeoxycholic acid; Vitamin E

Liver EE-LV-018

Use of Direct-Acting Antiviral Agents, Other Service Spending, and Patient Health Outcomes in Medicare in the United States

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Background/Aims Second-generation Direct Antiviral Agents (DAAs) to treat hepatitis C virus (HCV) are innovative but very expensive. Scarce real-world evidence exists on how much new DAAs reduce downstream service spending and improve health outcomes. We examined the effects of new DAAs on other service use/spending and patient outcomes in Medicare, the federal health insurance program for the elderly and disabled in the US.
Methods The study population was Medicare beneficiaries with chronic hepatitis C in 2014.The outcomes were hospitalizations, total health care spending, and death. We used International Classification of Diseases (ICD)-9 or ICD-10 codes from Medicare claims data to identify HCV patients and construct hospitalizations/spending related to HCV and liver conditions, and hospitalizations/spending for any cause. We obtained information on patient mortality from Medicare beneficiary files. We compared the outcomes between DAA users and non-users. We followed patients up to 30 months from the date of HCV diagnosis. We used multivariable regression analyses to examine the effect of DAA use on outcomes between DAA users and DAA non-users. We used propensity score matching based on a comprehensive set of patient characteristics including age, gender, race, human immunodeficiency virus coinfection, cirrhosis, liver cancer, and Charlson scores. We also accounted for patient heterogeneity using individual-patient fixed effects.
Results DAA users had 2.3% point lower mortality during the follow-up period (p<0.01). We found no significant differences in hospital admissions between users and non-users. Patients who used DAA therapy had significantly lower spending on medical services related to HCV or liver diseases but had significantly higher spending on overall medical services than non-users.
Conclusions DAAs prevented adverse health outcomes among chronic HCV patients who were at imminent risk of dying. Continuing assessment is needed to identify patient sub-groups that are most cost-effective (lowest costs needed to avert one death) to treat with new DAAs.
Keywords Direct acting antivirals; Chronic hepatitis C; Medicare

Liver EE-LV-019

Study on Validity of Biomarkers DKK1 and HBx-LINE1 in Diagnosis and Posttreatment Monitoring of Hepatocellular Carcinoma

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Background/Aims Evaluate validity of DKK1 and HBx-LINE1 in diagnosis and posttreatment of hepatocellular carcinomas (HCC)/hepatitis B virus and analyze relationship with clinical and paraclinical some characteristics.
Methods Study on 114 HCC patients at CMH108, MH103 and MH175 (1/2016-3/2018) with DKK1 and HBx-LINE1, re-examination after surgery.
Results With DKK1 ≥2.15 ng/mL, the positive rates of serum protein DKK1 were significant increased when compared with those of alpha-fetoprotein (AFP; 97.37% compared with 62.92%). The mean of serum protein DKK1 of HCC was significant higher than it in liver cirrhosis patients with p<0.05. Combination between AFP and DKK1 expression will improved positive rates and help more diagnosis in 12.3% of HCC cases. Logistic regression analysis showed the risk of HCC will increased about 18.5 times when DKK1 ≥ 2.15 ng/mL.
Conclusions Biomarkers serum protein DKK1 and DKK1 expression have validity in diagnosis and posttreatment of HCC, especially for AFP-negative patient. HBx-LINE1 fusion transcript was not identified in our study.
Keywords DKK1; HBx-LINE1; Hepatitis B virus

Liver EE-LV-020

Hepatoprotective Activity of *Hovenia dulcis* Thumb. on Paracetamol Induced Liver Toxicity in Mice

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Background/Aims This study was conducted to evaluate the hepatoprotective effects of *Hovenia dulcis* Thumb. in the liver damage induced by paracetamol in mice experiment. To evaluate acute hepatoprotective activity of ethanol extract of *H. dulcis* Thumb. on paracetamol induced liver toxicity in mice.
Methods Swiss albino mice weighing 25±2 g were divided into three groups of ten animals: group 1, oral distilled water of 0.2 mL/10 g; group 2, oral distilled water and take paracetamol 400 mg/kg; group 3, oral Silymarin at the dose of 140 mg/kg/day and take paracetamol 400 mg/kg; group 4, oral of ethanol extract of *H. dulcis* Thumb. at the dose of 10 g/kg/day and take paracetamol 400 mg/kg. Swiss albino mice were oral with a single dose of 400 mg/kg paracetamol to induce toxicity, while *H. dulcis* Thumb. administered in a dose of 10 g/kg/day. Animals were treated daily by oral route of administration of administration one a day in the morning for successive 8 days and observed once daily. On the 8th day after taking 2 hours of reagent, mice were given oral paracetamol dose of 400 mg/kg. Mice were sacrificed 48 hours after paracetamol oral to determine serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), and liver histopathology.
Results The 8 days pretreatment of *H. dulcis* Thumb. at the oral dose of 10 g/kg increases the detoxified function of liver and reduces the increasing level of AST, ALT, reduced the inflammation, hepatocellular necrosis which was induced by paracetamol.
Conclusions The ethanol extract of *H. dulcis* Thumb. at the dose of 10 g/kg body weight per 24 hours showed hepatic protective effect on paracetamol induced liver toxicity in mice.
Keywords Hepatoprotective; Hovenia dulcis Thumb.; Mice

Liver EE-LV-021

Measurement of Malondialdehyde Level and Superoxide Dismutase Activity in the Liver Tissue of the Hyperlipidemic Rats Model after Intervention of Synbiotic Drink from Kefir Milk and Jicama Concentrate (*Pachyrhizus erosus*)

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Background/Aims Hyperlipidemia conditions can make liver cell damage and can be marked with an increase of malondialdehyde (MDA) levels and a decrease of superoxide dismutase (SOD) activity. Synbiotic is a product that contains prebiotics and probiotics. One source of prebiotic is jicama and probiotic is kefir milk. The aim of this research is to know the effect of synbiotic drink from kefir milk and jicama concentrate on MDA level and SOD activity in the liver tissue of the hyperlipidemic rats.
Methods This research used 25 rats divided into five groups (K+, K–, P1, P2, and P3). Group of K+, P1, P2, P3 were given quail egg yolk for the first 4 weeks. For the next 4 weeks, K+ and K– group were only given fed ad libitum. Group of P1, P2, and P3 were given synbiotic with the formulation of P1: 85% kefir milk (K) and 15% jicama Concentrate (J); P2: 75% K, 25% J; and P3: 65% K, 35% J. The dose of quail egg yolks and synbiotic were 5 mL/200 grBW. In the end, the animal model was terminated to get liver organs to measure the MDA level and SOD activity.
Results Mean of MDA level (nmol/g) were 11.8±0.17 (K+), 2.5±0.12 (K–), 7.7±0.18 (P1) 5.7±0.10 (P2), 4.1±0.09 (P3). The result showed significant differences between all groups ($p<0.001$). Mean of SOD activity (%) were 21.43±2.52 (K+), 71.43±3.91 (K–), 30.71±1.53 (P1), 50.35±2.84 (P2), and 63.93±1.53 (P3). The result showed significant differences between all groups ($p<0.001$) except between K+ with P1 and K– with P3 ($p>0.05$).
Conclusions The intervention of synbiotic drink from kefir milk and jicama concentrate significantly decrease MDA level in all intervention groups and increase SOD activity in the P2 and P3 groups, with the P3 group clinically significant.
Keywords Hyperlipidemia; Liver tissue; Malondialdehyde; Superoxide dismutase; Synbiotic

Liver EE-LV-022

Hepatic Stem Cell-Like Subtypes of Hepatocellular Carcinoma Revealed from the Integrative Multi-omics Analysis Using Developmental Hierarchies of the Liver: Can We Detect and Treat an Aggressive Subtype in Resectable Early-Stage Hepatocellular Carcinoma?

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Background/Aims Hepatocellular carcinoma (HCC) is lethal malignancy showing high relapse rates after curative resection in early-stage. Genomic features of stem cell-like cancer cells contributing aggressive tumor biology in HCC remains unclear. The aim of this study is to understand underlying biology associated with HCC stemness to apply precise therapeutic strategies for resectable early-stage hepatocellular carcinoma.
Methods Using human fetal liver signatures, multi-omics dataset from multiple clinical HCC cohorts were analyzed comprehensively to reveal molecular mechanisms for HCC stemness as well as potential biomarkers to enhance therapeutic efficacy for molecular targeted therapy or immunotherapy in stem cell-like HCC subtypes.
Results The patients predicted to the hepatic stem cell (HS) subtype showed aggressive tumor features including large tumor size, high alpha-fetoprotein, vascular invasion, and extrahepatic metastasis as well as worst prognosis with early recurrence even in early-stage. The oncogenic pathways in terms of cell cycle, epithelial-mesenchymal transition, and transforming growth factor-β pathway were highly upregulated in the HS subtype. Higher mutations of TP53, RB1 with PTEN deletion were significantly identified in the HS subtype. We also demonstrated subtype-specific tissue biomarkers as well as serum biomarkers for the HS subtype. Predicted responders for immunotherapy were significantly lower in stem cell-like subtypes due to higher accumulation of tumor-associated macrophages and myeloid-derived suppressor cells. The HS subtype showed potential higher response to multi-tyrosine kinase inhibitors, especially sorafenib and lenvatinib.
Conclusions Stem cell-like HCC is not only associated with a significantly higher relapse rate after curative resection but also with molecular biology for the aggressive subtype of HCC. We identified subtype-specific serum and tissue biomarkers for the stem cell-like subtypes and precise therapeutic strategies for each subtype regarding immunotherapy and molecular-targeted treatment. Our findings may offer the theoretical foundation of biomarker-based clinical trials for new therapeutic approaches to resectable early-stage HCC patients.
Keywords Hepatocellular carcinoma; Hepatic stem cell; Integrative analysis; Biomarker

Liver EE-LV-023

Renal Resistive Index at the Level of Renal Arcuate Artery, as a Predictor of Natriuresis in Cirrhotic Patients

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Background/Aims It has been postulated that the vasoconstriction at the level of renal arcuate artery plays a key role in the development of Hepatorenal syndrome. However, the measure of renal resistive index at this level can provide a direct measure of renal hemodynamics among cirrhotics. The aim of this study is to determine the difference in the renal resistive index amongst compensated and decompensated cirrhosis and to evaluate its association with natriuresis.

Methods This prospective study included all consecutive cirrhotic patients visited gastroenterology clinic of from May 2018 to May 2019. After informed consent, the demographic and detailed drug history were noted. Ultrasound abdomen was and urinary sodium and potassium was checked. Chi-square test was applied and p-value was calculated.

Results A total of 60 patients were included in the study. The mean age of the patients was 40.3±18.1, and were predominantly males 31 (51.7%). Hepatitis C was the most common etiology for liver disease seen in 22 patients (36.7%).The mean Child-Turcotte-Pugh score, Model for End Stage Liver Disease (MELD), and MELD sodium score were as follows: 7.9±1.93, 15.2±6.6, and 13.3±4.2, respectively. Total 16 patients (26.7%) had compensated while 44 (73.3%) had decompensated cirrhosis. Mean renal resistive index of patient with compensated cirrhosis was 0.59±0.04, while with decompensated cirrhosis was 0.62±0.04. Patients with a higher RI had poor natriuresis as manifested by low urinary sodium potassium ratio <1.0 and AROC is 0.735 shown in table. At the cutoff value of RI=0.615 sensitivity, specificity, positive predictive value, and negative predictive value for natriuresis was 65.0%, 70.0%, 73.3% and 60.1%, respectively. Patient with higher RI value were having decompensated cirrhosis (0.62 vs 0.59, p=0.06).

Conclusions The renal resistive index at the level of arcuate artery were found to be higher among patients with decompensated cirrhosis. At a higher RI value (>0.615) patients had poor natriuresis.

Keywords Renal resistive index; Cirrhosis; Natriuresis; Sodium potassium ratio

Table 1. Renal Resistive Index in Cirrhotics

Characterstics	RI ≥ 0.61	RI ≤ 0.61	P-value
Compensated Cirrhosis	6	10	0.025
Decompensated Cirrhosis	33	11	
Na/K Ratio >1	14	14	0.032
Na/K Ratio <1	25	7	
Male	22	9	0.522
Female	16	12	

Liver EE-LV-024

Independent Predictors of Alanine Aminotransferase Improvement in Patients with Nonalcoholic Fatty Liver Disease: More Than Weight Loss Is Needed

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Background/Aims Changes in alanine aminotransferase (ALT) levels over time has not been characterized in patients with nonalcoholic fatty liver disease (NAFLD) in our population. We aimed to determine the factors that predict improvement in ALT levels in NAFLD patients.

Methods This is a cross-sectional study of consecutive adult patients with fatty liver on ultrasound from 2007 to 2017 with at least one follow-up. Normal ALT levels were pegged at 24 IU/mL and 19 IU/mL for male and female patients, respectively.

Results Four hundred sixteen patients were included, with 185 (44.5%) showing an improvement of –28.15+36.44 IU/mL in ALT levels after a median follow-up of 11 months. Compared to normal ALT, patients with elevated baseline levels were more likely to have ALT improvement (50.7%, p<0.001). Patients with diabetes (51.8%, p=0.006), hypertension (51.9%, p<0.001), dyslipidemia (49.3%, p=0.002), and metabolic syndrome (51.7%, p=0.001), and those with higher albumin (4.46+0.42, p=0.013), and uric acid (6.26+1.51, p=0.009) were more likely to have improved ALT on follow-up. There was no difference in ALT improvement between patients who lost or maintained/gained weight (p=0.413). On multivariate analysis, only hypertension (odds ratio [OR], 1.63; 95% confidence interval [CI], 1.041 to 2.553; p=0.033), metabolic syndrome (OR, 1.570; 95% CI, 1.004 to 2.455; p=0.48) and albumin (OR, 1.65; 95% CI, 0.388 to 0.944; p=0.027) were independent predictors of ALT improvement.

Conclusions Surprisingly, weight changes did not influence improvement in ALT levels in our population. The presence of baseline metabolic risk factors as a predictor of ALT improvement suggests that improvement of these factors over time may have influenced ALT. Further analysis factoring changes in metabolic factors is required.

Keywords Nonalcoholic fatty liver disease; Transaminases; Filipino

Liver EE-LV-025

Hepatoprotector Effect of *Moringa* Seed Extract Through Decreasing Interleukin-1b and Tumor Necrosis Factor-α Expression and Cholesterol Total Level in Hepatic Metabolic Syndrome Rats

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Background/Aims Metabolic syndrome related with high of cholesterol total level and tumor necrosis factor (TNF)-α, and interleukin (IL)-1β. They are some high risk factor of nonalcoholic fatty liver disease. *Moringa* oleifera have secondary metabolite that potentially can reduce cholesterol and inflammation process. This research intend to determine the effect of *Moringa* seed extract as hepatoprotector through decreasing TNF-α and IL-1 β expression and cholesterol total level in hepatic metabolic syndrome rats.

Methods This posttest only group design. Rats were divided into four groups: K1 were control group, K2 were metabolic syndrome rats, K3 and K4 were metabolic syndrome rats model and given *Moringa* seeds extract dose 150 mg/KgBW and 200 mg/KgBW. Effect of high fat fructose diet and *Moringa* seeds extract to the expression of TNF-α and IL-1β in hepatic tissue were analyzed with analysis of variance (ANOVA) continued with Tukey whereas effect to cholesterol total of rats were analyzed with Friedman test, Wilcoxon test, ANOVA test, and Tukey HSD.

Results One-way ANOVA test showed a significant difference of IL-1β and TNF-α expression between four group (p<0.05). Tukey HSD post hoc test showed a significant difference (p<0.05). But there were not significant difference in K1 and K4 (p>0.05). Cholesterol test with Friedman test continued with Wilcoxon test showed that there were significant (p<0.05) on day 0, day 54, and day 82 (p<0.05). One-way ANOVA test and pH Tukey HSD showed that there were significant (p<0.05).

Conclusions *Moringa* seeds extract can potentially reduce cholesterol level total and expression of IL-1β and TNF-α.

Keywords *Moringa*; Interleukin-1β; Tumor necrosis factor-α

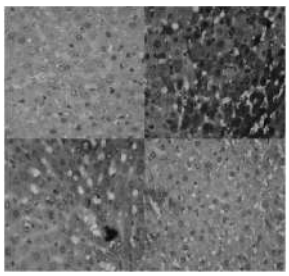

Fig. 1. Picture of hepatic tissue with IHC.

Liver EE-LV-026

Initial Results of Stereotactic Body Radiotherapy for Intrahepatic Hepatocellular Carcinoma Recurrence after Liver Transplantation

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Background/Aims To evaluate the safety and efficacy of stereotactic body radiotherapy (SBRT) for the treatment of graft hepatocellular carcinoma (HCC) recurrence after liver transplantation.
Methods A retrospective study was conducted. From 2012 to 2018, six patients with intrahepatic HCC recurrence after liver transplant were treated with SBRT at Queen Mary Hospital, the University of Hong Kong. The primary outcome was time to overall disease progression and secondary outcomes were time to local progression and best local response, as assessed with the modified Response Evaluation Criteria in Solid Tumors criteria. Patients were monitored for treatment related toxicities and graft dysfunction.
Results A total of nine treatment courses were given for 13 tumors. The median tumor size was 2.3 cm (range, 0.7 to 3.6 cm). Two patients (22%) had IVC tumor thrombus. The best local treatment response was five (55%) complete response; one (11%) partial response; and three (33%) stable disease. After a median follow-up duration of 15.5 months, no local progression or mortality was yet observed. The median time to overall disease progression was 6.5 month. There were six regional progression in the liver graft (67%) and two distant progression in the lung (22%). There was no grade 3 or above toxicity and there was no graft dysfunction after SBRT.
Conclusions SBRT appears to be safe in this context. Regional progression is the mode of failure. A combination of SBRT and additional regional therapy e.g., transarterial chemoembolization could be considered.
Keywords Liver transplant; Hepatocellular carcinoma; Stereotactic body radiotherapy

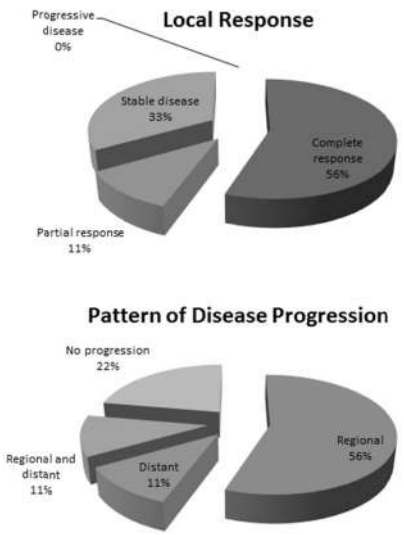

Fig. 1. Treatment response of stereotactic body radiotherapy.

Liver EE-LV-027

Passive Tobacco Smoking and Nonalcoholic Fatty Liver Disease: A Systematic Review and Meta-Analysis

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) is one of the most chronic liver diseases. Some risk factors are known to influence the development of NAFLD, but the effect of passive tobacco smoking on the progression of NAFLD is controversial. The main goal of this meta-analysis is to investigate the association between passive smoking and NAFLD.
Methods Electronic databases (PubMed, Scopus, and Embase) were searched to find published articles on NAFLD and passive smoking until September 2019. All relevant studies were screened by inclusion and exclusion criteria and compatible studies were chosen. The Newcastle-Ottawa Scale was used to assess the methodological quality of eligible articles. Subsequently, information was gathered based on the following: author, publication year, keywords, country, inclusion and exclusion criteria, main results, study design, conclusion, and confounder variables (body mass index, gender, age, ethnicity, and diabetes). Publication bias was assessed by funnel plot, Begg's test and Egger's test.
Results A total of 1,724 studies were retrieved and reviewed. Finally, two observational studies were included. The association between passive smoking and risk of NAFLD was 1.42 fold (adjusted odds ratio, 1.42; 95% confidence interval, 1.00 to 1.84). There was no appearance of heterogeneity (I^2, 0.00%; p-heterogeneity, 0.488) with no evidence of publication bias which detected by funnel plot, Begg's test (p=0.624) and Egger's test (p=0.725).
Conclusions Our meta-analysis demonstrated that passive smoking is trend to increase risk of NAFLD. Further prospective studies exploring the underlying mechanisms of this association should be warranted.
Keywords Passive smoking; Nonalcoholic liver disease; Liver; Fatty liver

Liver EE-LV-028

Changes of Acute Hepatitis A over 20 Years in a Hospital in Daejeon

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Background/Aims Acute hepatitis A was not commonly noticed before 1990. This is because all of the childhood passed through a inapparent infection. But, acute hepatitis A began to emerge in the late 1990s, centering on Daejeon and Gyeongin. Although it is currently managed as a legal infectious disease, it increased sharply again from the end of 2018. Therefore, we investigated the change of patients with acute hepatitis A who admitted in our hospital since 2001.
Methods Patients with acute hepatitis A who have been hospitalized since 2001 were surveyed. We retrospectively reviewed sex, age, hospital stay, anti-HAV IgM at admission and follow-up anti-HAV IgM.
Results As you see Table 1, In the past, the proportion of men was higher than women, but the gap narrowed. And the average age decreased from the early 40s to the late 30s. The youngest inpatients also fell from late twenties to late teens. The hospital stay was reduced. Among the 882 excluding the missing values, 75 were anti-HAV IgM negative at admission and turned positive at follow-up test.
Conclusions In the past, the prevalence of men was higher than women. This was thought to be because men had more social activity. In the recent results, the sex ratio is almost same. This may be due to increased social activity of women or changes in the pathway of HAV infection. The patient's age was contrary to expectations. We expected that over time, the age of high risk groups would increase. But the result was the opposite. Especially, the youngest patient ages fell to late teens. When diagnosing patients, acute hepatitis A should be considered even if they are late teens or anti-HAV IgM negative.

Table 1.

		Sex		Age		Hospital stay		Anti-HAV IgM, Admission		Anti-HAV(IgM), f/u	
		Male	Female	Average	SD	Duration	SD	negative	positive	negative	positive
Admission	2001	0	2	41.5	2.1	9.0	2.8	0	2	0	2
	2002	27	29	44.0	7.4	10.8	5.5	3	37	1	54
	2003	33	19	42.2	6.9	9.4	4.0	3	34	1	51
	2004	24	10	41.1	5.9	10.8	4.8	2	24	2	31
	2005	11	9	40.1	7.2	8.4	3.6	1	14	1	18
	2006	25	19	43.2	9.8	8.6	3.2	7	30	6	38
	2007	8	7	38.9	7.5	9.3	3.8	3	11	0	15
	2008	37	25	42.4	6.2	8.9	4.4	6	46	4	56
	2009	108	29	41.3	7.8	9.0	4.7	17	108	3	133
	2010	48	20	41.6	7.5	7.7	3.8	9	50	2	66
	2011	32	9	41.6	8.5	8.9	4.5	7	34	1	40
	2012	16	4	39.9	9.0	9.8	6.4	1	17	0	19
	2013	3	5	35.0	7.5	7.6	3.1	5	2	2	6
	2014	9	2	37.7	9.3	10.5	7.4	2	7	1	10
	2015	12	4	38.6	10.3	8.3	2.6	2	12	1	14
	2016	14	19	36.7	10.2	7.5	2.4	4	28	0	33
	2017	22	16	39.8	8.7	6.7	2.5	2	31	0	37
	2018	11	13	41.1	10.5	6.9	2.9	2	21	0	24
	2019	111	100	38.4	8.5	6.3	1.8	19	178	1	209

Liver EE-LV-029

Real State of Antiviral Therapy in the Patient with Hepatitis C-Related Hepatocellular Carcinoma

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Background/Aims In spite of the great improvement of antiviral therapy with highly effective and safe direct-acting antiviral (DAA) agents, real state of DAA treatment in patients with hepatitis C virus (HCV)-related hepatocellular carcinoma (HCC) has not been investigated so far.
Methods Until December 2018, all patients with HCV related HCC have been investigated for the types and outcome of antiviral therapy, modalities for HCC treatment, status of HCC during antiviral treatment and change of liver function after antiviral therapy.
Results Total 278 were treated with HCC associated with HCV. Of them, 124 have not been treated for HCV due to advanced HCC (n=32), not covered by medical insurance (n=59), poor medical condition (n=16) and follow up loss (n=17). The others (n=154) were treated with interferon (IFN; n=44) or DAA (n=110). Of 44 with IFN, 31 were treated median 64 months (range, 8 to 243 months) before development of HCC (sustained virologic response [SVR], 64.5%) and 13 were treated after complete remission (CR) with HCC treatment (SVR, 69.2%). Of 110 with DAA, 34 were treated for HCV median 12 months (range, 3 to 43 months) before development of HCC (SVR, 88.2%) and 76 were treated after CR after (n=54; SVR, 88.8%) or during HCC treatment (n=22; SVR, 86.3%). After DAA treatment, liver function was improved from Child-Pugh class B to class A in 38.5%. In patients with CR, HCC recurrence rate was 61.5% in IFN and 57.4% in DAA. Median time to HCC recurrence is 33 month after IFN and 7 months after DAA (p=0.131).
Conclusions Treatment in patients with HCC was not inferior to those without in terms of efficacy and safety. Close HCC surveillance would be needed in patients with cirrhosis soon after DAA treatment.
Keywords Hepatocellular carcinoma; Hepatitis C virus; Direct acting antiviral; Interferon

Liver EE-LV-030

Regression of Liver Fibrosis Assessed by Transient Elastography after Asunaprevia and Asunaprevir Combined Treatment in Advanced Fibrotic/Cirrhotic Patients with Chronic Hepatitis C with Genotype 1b Infection: Interim Analysis of Prospective Cohort Study

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Background/Aims We evaluate the change of liver fibrosis over time assessed by transient elastography (TE) after Daclatasvir/Asunaprevir treatment.
Methods Primary endpoint of this cohort study is to evaluate the change of liver fibrosis, and secondary endpoint is to investigate the incidence of hepatocellular carcinoma during 5-year observation period. We are planning to measure the liver stiffness annually after sustained viral response (SVR) achievement. It is an interim analysis from 2-year follow-up data of this study. One hundred five patients with chronic hepatitis C genotype 1b with significant fibrosis as defined by TE ($\geq$6 kPa) were prospectively enrolled. Five patients lost to follow up. The improvement of fibrosis was defined as a reduction of at least one stage of fibrosis.
Results The SVR was 96%. Eighty patients were available for analyze 1-year follow-up data and 72 patients for 2-year tracing data. Among patients with SVR, the mean value of liver stiffness before and 1 year after the treatment were 19.5$\pm$1.4 kPa and 14.6$\pm$10.5 kPa. Respectively. The change of liver stiffness was significant 1 year after direct-acting antivirals (DAAs) treatment (p<0.001). After 2 years from the end of DAA treatment, the liver stiffness showed further reduction from 19.8$\pm$12.4 to 12.1$\pm$7.9 (p<0.001). The regression of fibrosis stage was seen in 34 patients (42.5%). The decrease in fibrosis stage was associated with lower baseline liver stiffness, higher platelet count and albumin level in univariate analysis. Four patients developed to HCC during 2-year follow-up.
Conclusions Eradication of hepatitis C virus with DAA showed the improvement in liver stiffness and regression of fibrosis continued 2 years after the treatment. We will continue to follow up patients to clarify long-term clinical implication.
Keywords Direct-acting antiviral; Hepatitis C virus; Daclatasvir; Transient elastography; Asunaprevir

Liver EE-LV-031

Real-Life Effectiveness and Safety of Glecaprevir/Pibrentasvir for Korean Patients with Chronic Hepatitis C at Single Institution

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Background/Aims Glecaprevir/pibrentasvir (G/P) is a pangenotypic direct-acting combination of antiviral agents used to treat chronic hepatitis C. There are limited real-life data on G/P for Korean patients. We evaluated the real-life effectiveness and safety of G/P at single institution in Korea.
Methods This was a prospective, observational cohort study. The primary effectiveness endpoint was sustained virological response at 12 weeks after treatment completion (SVR12). Safety and tolerability were assessed.
Results A total of 223 patients who received G/P were examined. There were 128 females (57.4%) and the median age was 63 years. Sixty-nine patients (30.9%) had hepatitis C virus (HCV) genotype-1 and 152 (68.2%) had HCV-2, 175 (78.5%) were HCV treatment-naive; 45 (20.5%) had cirrhosis; 164 (73.5%) received the standard 8-week treatment; 10 (4.5%) had prior treatment for hepatocellular carcinoma; and 29 (13.0%) had chronic kidney disease stage 3 or more. Intention-to-treat (ITT) analysis indicated that 215 patients (96.4%) achieved SVR12. A modified ITT analysis, which excluded patients lost to follow-up, indicated the SVR12 was 98.1%. In modified ITT analysis, SVR was significantly lower in patients with prior sofosbuvir treatment (p=0.002), higher baseline HCV RNA titer (p=0.021) and detectable HCV RNA at week 4 (p=0.023) on univariate analysis. On multivariate analysis, baseline HCV RNA titer was significantly associated SVR in overall population (p=0.029). Sixty-two patients (27.8%) experienced at least more than one adverse event (AE), which were mostly mild in severity. The most common AEs were gastrointestinal discomfort (8.5%). No patients experienced serious AEs or AEs leading to treatment discontinuation.
Conclusions This examination of a real-life cohort of Korean patients indicated that G/P had high effectiveness and was well-tolerated, regardless of viral genotype and renal function.
Keywords Hepatitis C virus; Direct acting antivirals; Glecaprevir/pibrentasvir; Real-life; Effectiveness

Liver EE-LV-032

Changes in Body Composition, Bone Mineral Density and Pulmonary Function in the Patients with B-Viral Liver Cirrhosis after Therapy with Tenofovir Disoproxil Fumarate: A Pilot Study

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Background/Aims Tenofovir disoproxil fumarate (TDF) is one of the best antivirals for treatment of chronic hepatitis B (CHB). As one's viral load decrease with TDF therapy, the liver function is expected to be improved. Bone marrow density (BMD), body composition (skeletal muscle mass and body fat mass) and pulmonary functions are also expected to be improved as a result of systemic effect of improved liver function.
Methods The fourteen cirrhotic patients with hepatitis B virus on TDF therapy were enrolled. We checked their blood chemistry, hepatitis B virus DNA, PFT and body composition every 6 month and BMD every 12 month. Patients' Child-Pugh scores were calculated every 6 month. Using Wilcoxon signed-rank test, we analyzed baseline, 6 month and 12 month values of all the tests.
Results Alanine aminotransferase normalization rate was 93% and virological response was 78.6% after using TDF for a year. The Child's score also improved. BMD was decreased significantly in the femur but not in the whole lumbar spine. The renal function was significantly worse than the baseline value, but not enough to reduce or discontinue the drug. Body weight was decreased significantly at 12 months compared to baseline. Muscle weight and fat content also showed a tendency to decrease. Diffusion capacity was improved compared to baseline, but not statistically significant.
Conclusions Liver cirrhosis due to CHB was treated with TDF for 1 year, and good biochemical and virological responses were observed. Diffusion capacity of lung was improved, body weight decreased, and femur bone density decreased. Long-term studies with larger numbers of patients will be needed in the future.
Keywords Liver cirrhosis; Tenofovir disoproxil fumarate; Body composition; Bone mineral density; Pulmonary function

Liver EE-LV-033

Cost-Effectiveness of Screening and Treatment of All Korean Chronic Hepatitis C Patients

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Background/Aims To investigate the cost-effectiveness of screening with subsequent direct-acting antiviral (DAA) treatment for all chronic hepatitis C (CHC) patients in South Korea in patients aged 40 and older as compared to the current practice of screening high-risk patients only.
Methods A published Markov model was used in conjunction with a screening and treatment decision tree to model CHC patients, aged 40–49, 50–59, 60–69, and 70 and older, to evaluate the cost-effectiveness of a "screen-all" vs "high-risk" only screening strategy followed by treatment. CHC patients were distributed across genotypes 1 (53.6%) and 2 (46.4%). Across all cohorts, 72% of patients were assumed to accept screening and 63.7% of hepatitis C virus RNA-positive patients were assumed to accept treatment. Upon accepting screening as well as treatment, patients were treated either with ledipasvir/sofosbuvir (LDV/SOF), SOF+ribavirin (SOF+RBV; GT2 only), or glecaprevir/pibrentasvir (GLE/PIB). Model inputs were sourced from published literature and costing databases, and validated by Korean hepatologists.
Results Risk-based screening was found to be cost-effective versus no screening for any DAA scenario (Table 1). Screening once was found to be cost-effective versus risk-based screening for any DAA scenario. Screening twice is cost-effective compared to screening once for any DAA scenario. When comparing within all screening scenarios using LDV/SOF for all GT's as reference, LDV/SOF dominates (i.e., is more effective and less costly) LDV/SOF in GT1 and SOF+RBV in GT2. Assuming a willingness-to-pay threshold of 1xGDP per capita (₩36,415,909/QALY), GLE/PIB is less cost-effective in any scenario vs LDV/SOF.
Conclusions Screening all South Korean patients once or twice followed by DAA treatment is cost-effective compared to high-risk screening. Treating with LDV/SOF in all GT's was a dominant strategy compared to SOF+RBV. GLE/PIB is less cost-effective strategy than LDV/SOF.
Keywords Hepatitis C virus; Cost-effectiveness; Direct-acting antiviral; Ledipasvir/sofosbuvir

Table 1. Health and Economic Outcomes of Screening and Treatment Strategies in South Korea

	NO SCREENING	RISK-BASED SCREENING		SCREEN ONCE			SCREEN TWICE		
GT1 TREATMENT	N/A	LDV/SOF	LDV/SOF	GLE/PIB	LDV/SOF	LDV/SOF	GLE/PIB	LDV/SOF	LDV/SOF	GLE/PIB
GT2 TREATMENT	N/A	LDV/SOF	SOF+RBV	GLE/PIB	LDV/SOF	SOF+RBV	GLE/PIB	LDV/SOF	SOF+RBV	GLE/PIB
CC	8,264	7,691	7,690	7,676	4,703	4,701	4,615	4,155	4,152	4,056
DCC	5,929	5,571	5,571	5,567	3,705	3,706	3,679	3,400	3,402	3,372
HCC	15,555	14,538	14,541	14,501	9,241	9,262	9,200	8,330	8,354	8,264
LT	64	60	60	60	40	46	40	37	37	36
EM	16,510	15,044	15,469	15,457	9,919	9,935	9,864	9,015	9,083	8,965
SCREENING COSTS	₩0.0 bn	₩9.8 bn	₩9.8 bn	₩9.8 bn	₩73.7 bn	₩73.7 bn	₩73.7 bn	₩82.7 bn	₩82.7 bn	₩82.7 bn
TREATMENT COSTS	₩0.0 bn	₩39.9 bn	₩40.3 bn	₩40.7 bn	₩247.8 bn	₩249.6 bn	₩250.3 bn	₩270.3 bn	₩278.1 bn	₩323.3 bn
TOTAL COSTS	₩479.0 bn	₩528.4 bn	₩529.1 bn	₩535.1 bn	₩799.1 bn	₩800.4 bn	₩840.2 bn	₩820.0 bn	₩828.8 bn	₩885.7 bn
QALYs	548,626	598,087	598,671	598,566	667,499	667,287	667,879	612,498	612,308	612,949
LYs	708,947	716,738	716,730	716,817	757,338	757,296	757,852	760,873	760,820	761,401
ICER (vs. NO SCREEN)	REFERENCE	₩ 5,225,670	₩ 5,313,754	₩ 5,881,769	₩ 3,441,771	₩ 5,530,434	₩ 6,096,501	₩ 5,364,400	₩ 5,428,162	₩ 6,012,035
ICER (vs. HIGH RISK SCREEN)	N/A	REFERENCE	DOMINATED	₩ 95,567,165	₩ 3,483,280	₩ 5,583,084	₩ 6,241,927	₩ 5,365,185	₩ 5,363,536	₩ 6,147,804
ICER (SCREEN ONCE vs. SCREEN TWICE)	N/A	N/A	N/A	N/A	REFERENCE	DOMINATED	₩ 95,567,165	₩ 4,209,357	₩ 5,263,447	₩ 22,111,031
							ICER (WITHIN SCREEN TWICE)	REFERENCE	DOMINATED	₩99,845,537

Key: CC, compensated cirrhosis; DCC, decompensated cirrhosis; EM, extra mortality; GLE/PIB, glecaprevir/pibrentasvir; GT, genotype; HCC, hepatocellular carcinoma; ICER, incremental cost-effectiveness ratio; LDV/SOF, ledipasvir/sofosbuvir; LT, liver transplant; LY, life-years; QALY, quality-adjusted life-years; RBV, ribavirin

Liver EE-LV-034

Comparative Analysis of Intrahepatic Infiltration of Activated T Cells and Macrophages between Autoimmune Hepatitis and Drug-Induced Liver Injury

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Background/Aims In this study, we aimed to identify the amount and patterns of immune cell infiltration in autoimmune hepatitis (AIH), and to compare them with those of drug-induced liver injury (DILI).
Methods From March 2016 to December 2018, 15 patients with AIH were prospectively enrolled in this study. For comparison, 22 patients with DILI in the same period were analyzed in the same way. Liver biopsy was performed, and immunohistochemical stain for CD3, CD68, CD20, and CD38 was done. For some patients, immune cells were harvested from fresh liver biopsy samples, and multicolor flow cytometry was used for the immunophenotyping of the infiltrated immune cells.
Results First, we identified that activated CD8 and CD4 T cells were more infiltrated in the livers from patients with AIH than those from healthy controls by multicolor flow cytometry. The amounts of T cells, macrophages, and B cells infiltration had no associations with serum aspartate aminotransferase, alanine aminotransferase (ALT), alkaline phosphatase or gamma glutamyltranspeptidase in patients with AIH. Furthermore, serum levels of IgG and IgA were not correlated with the amounts of immune cells infiltrations, either. Next, we compared the infiltration of the immune cell subsets between patients with AIH and those with DILI. Baseline serum ALT was significantly higher in patients with DILI, but the levels of activated T cells (CD3+CD38+) infiltration were not significantly different between AIH and DILI. However, a larger number of macrophages were infiltrated in the livers in DILI than those in AIH, suggesting that drug-induced injury of hepatocytes triggers innate immunity more vigorously.
Conclusions Both patients with AIH and DILI have activated T cells and macrophages infiltrated in the injured liver. Higher ALT and more macrophages infiltration in DILI suggest that drug-induced injury of hepatocytes might trigger innate immunity more vigorously than autoimmunity-mediated mechanisms.
Keywords Autoimmune hepatitis; T cell; B cell; Macrophage

Liver EE-LV-035

A Phase 3, Stable Switching from Tenofovir Disoproxil Fumarate to Tenofovir Alafenamide in Chronic Hepatitis B patients: 48w Results

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Background/Aims Tenofovir alafenamide (TAF), a novel prodrug of tenofovir (TFV), has greater plasma stability and reduced circulating levels of TFV compared to tenofovir disoproxil fumarate (TDF) at approved doses. TAF has shown efficacy noninferior to TDF with improved renal and bone safety in viremic chronic hepatitis B (CHB) patients. We evaluated efficacy and safety in stable, virally-suppressed patients who were switched from TDF to TAF versus continued TDF for an additional year.
Methods In this phase 3 study (NCT02979613), CHB patients on TDF for ≥48w with hepatitis B virus (HBV) DNA <LLOQ (local laboratory) for ≥12w and <20 IU/mL at screening were randomized (1:1) to TAF 25 mg QD or TDF 300 mg QD, each with matching placebo, and treated for 48w. After this, all patients received open-label TAF for an additional 48w. The primary efficacy analysis was the proportion of patients with HBV DNA ≥20 IU/mL at 48w based on the modified US Food and Drug Administration-defined Snapshot algorithm. Key prespecified secondary safety endpoints were changes in hip and spine bone mineral density (BMD), and changes in $eGFR_{CG}$.
Results Four hundred eighty-eight patients were randomized and treated at 42 sites in eight countries. At baseline the groups were similar: median age 52 years (22% ≥60y), 71% male, 82% Asian, 68% HBeAg-negative, and median ALT 23 U/L. Median $eGFR_{CG}$ was 90.5 mL/min; 45% and 50% had low BMD by T scores at hip and spine, respectively. Median (Q1, Q3) duration of prior TDF was 222 weeks (range, 145 to 305 weeks). TAF demonstrated noninferior efficacy to TDF and TAF treatment resulted in increases in hip/spine BMD with less impact on bone turnover makers; switching from TDF to TAF also resulted in increased $eGFR_{CG}$ and decreases in markers of tubular function.
Conclusions Virologically-suppressed CHB patients who were switched to TAF demonstrated noninferior efficacy to continued TDF with improved bone and renal safety.
Keywords Hepatitis B virus; Tenofovir alafenamide; Tenofovir disoproxil fumarate; 108/110

Table 1. Efficacy and Safety Data

n/N (%)	TAF (N=243)	TDF (N=245)	P value
Efficacy			
HBV DNA ≥20 IU/mL[a]	1/243 (0.4)	1/245 (0.4)	0.95[b]
HBV DNA <20 IU/mL	234/243 (96.3)	236/245 (96.3)	0.98
No virologic data in Week 48 window	8/243 (3.3)	8/245 (3.3)	-
ALT normal (2018 AASLD criteria)[c,d]	192/243 (79)	184/245 (75.1)	0.31
HBeAg seroconversion[e]	2/78 (2.6)	0	0.13
HBsAg seroconversion	0	0	-
Bone safety			
Hip BMD, mean (SD) % change	+0.66 (2.08)	-0.51 (1.91)	<0.001
Spine BMD, mean (SD) % change	+1.74 (3.46)	-0.11 (3.13)	<0.001
CTX, median (Q1, Q3) % change (ng/mL)[f]	-29.4 (-44.2, -14.3)	+7.1 (-14.8, 32)	<0.001
P1NP, median (Q1, Q3) % change (ng/mL)[g]	-19.4 (-32.2, -7.5)	+1.70 (-12.5, 17)	<0.001
Renal safety			
$eGFR_{CG}$, median (Q1, Q3) change (mL/min)	+0.99 (-4.47, 6.31)	-2.74 (-7.87, 1.98)	<0.001
RBP/Cr, median (Q1, Q3) % change[h]	-17.7 (-41.3, 17.2)	+18.6 (-15.3, 67.3)	<0.001
β2MG/Cr, median (Q1, Q3) % change[i]	-36.0 (-61.9, -1.1)	+10.7 (-33.9, 90.6)	<0.001

[a]HBV DNA results by modified US FDA Snapshot algorithm, other efficacy data are missing=failure. [b]Stratified Cochran-Mantel-Haenszel test. [c]ALT normal is the proportion with ALT ≤ULN at Week 48, regardless of baseline status. [d]ULN 35 U/L males, 25 U/L females. [e]HBeAg-positive at baseline. [f]C-type collagen sequence (bone resorption marker); [g]Procollagen type I N-terminal propeptide (bone formation marker); [h]Retinol binding protein/creatinine (tubular marker); [i]Beta-2 microglobulin/creatinine (tubular marker).

Liver EE-LV-037

Diagnostic Performance of the Liver Imaging Reporting and Data System v2017 in Computed Tomography and Magnetic Resonance Imaging for Hepatocellular Carcinoma: A Meta-Analysis

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Background/Aims We performed a meta-analysis to determine the diagnostic performance of LR-5 category for the hepatocellular carcinoma (HCC) and the pooled proportions of HCC in each Liver Imaging Reporting and Data System (LI-RADS) category, using computed tomography (CT)/magnetic resonance imaging (MRI) LI-RADS v2017.
Methods We searched Medline, Embase, Cochrane Central, and Scopus databases for original studies published before April 7, 2019 reporting the diagnostic accuracy of CT/MRI LI-RADS v2017. Random-effects models were used to determine summary estimates of diagnostic performances of LR-5 category and the pooled proportions of HCC for each LI-RADS category. Risk of bias and concerns regarding applicability were evaluated with the Quality Assessment of Diagnostic Accuracy Studies-2 tool.
Results Fourteen studies (three prospective studies and 11 retrospective studies) were included in the final analysis, consisting of 2,059 patients, 2,592 observations, and 1,695 HCCs. The pooled per-observation sensitivity was 67% (95% confidence interval [CI], 62% to 72%) with specificity of 91% (95% CI, 87% to 94%) in LR-5 category of CT/MRI LI-RADS v2017 for diagnosing HCC. The pooled proportions of HCC were 0% (95% CI, 0% to 0%) for LR-1, 4% (95% CI, 0% to8%) for LR-2, 34% (95% CI, 23% to 44%) for LR-3, 67% (95% CI, 53% to 81%) for LR-4, and 91% (95% CI, 87% to 96%) for LR-5, respectively. The proportions of HCCs were significantly different among the LI-RADS categories 1–5 (p=0.034).
Conclusions CT/MRI LI-RADS v2017 shows moderate sensitivity and high specificity in LR-5 category for diagnosing HCC. Higher LI-RADS categories contained higher proportions of HCCs.

Liver EE-LV-038

Pure Laparoscopic versus Open Left Hepatectomy Including the Middle Hepatic Vein for Living Donor Liver Transplantation

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Background/Aims Pure laparoscopic donor hepatectomy (PLDH) has become increasingly accepted in the minimally invasive surgery era. However, the outcomes of pure laparoscopic donor left hepatectomy (PLDLH) are relatively less known than left lateral sectionectomy or right hepatectomy. The present study aimed to report the experience and outcomes of PLDLH including the middle hepatic vein and to compare them with conventional donor left hepatectomy (CDLH).
Methods The medical records of live liver donors between January 2010 and January 2018 at Seoul National University Hospital were retrospectively reviewed. Donors who underwent left hepatectomy including the middle hepatic vein were included. To minimize selection bias, donors who underwent CDLH after the initiation of PLDH program were excluded. Subsequently, there were 18 donors who underwent CDLH and eight who underwent PLDLH.
Results The warm ischemic time (4 minutes; interquartile range [IQR], 2 to 7 minutes vs 11 minutes; IQR, 10 to 16 minutes; p=0.001) was longer in the PLDLH group compared with CDLH group. The total operation time (265 minutes; IQR, 255 to 308 minutes vs 333 minutes [IQR 281-376 minutes]; p=0.090) and time to remove the liver (182 minutes; IQR, 172 to 205 minutes vs 245 minutes; IQR, 196 to 276 minutes; p=0.081) were also longer in PLDLH but not statistically significant. The length of postoperative hospital stay was significantly shorter in the PLDLH group (9 days; IQR, 8 to 10 days vs 7 days; IQR, 7 to 8 days; p=0.006). There was no postoperative complication in PLDLH group. The rate of complications in recipients was similar in both groups.
Conclusions PLDLH including the middle hepatic vein appears to be safe and feasible. Further analysis including long-term outcome is needed.

Liver EE-LV-039

Risk Factors of Liver Function Deterioration after Transarterial Chemoembolization without Response in Child-Pugh Class A Hepatocellular Carcinoma Patients

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Background/Aims For patients who were refractory to transarterial chemoembolization (TACE), the switch to systemic therapy such as sorafenib should be considered. However, if liver function worsens to Child-Pugh class B or C, it is difficult to change the treatment. Therefore, if the risk factors for deteriorating liver function and patients who do not respond to TACE can be predicted in advance, it may be helpful for treatment. In this retrospective study, we attempted to determine the risk factors and statistical methods of predicting patients who had worsened Child-Pugh scores among patients who did not respond to TACE.
Methods Newly diagnosed Child-Pugh class A-hepatocellular carcinoma (HCC) patients who underwent TACE (2012–2018) were included. One year after receiving TACE, we evaluated whether there was a response to TACE and whether the Child-Pugh score worsened after TACE.
Results Among the 121 patients finally selected, 65 patients had refractory to TACE and 56 patients had response to TACE. Of the 65 patients who did not respond to TACE, 27 patients had worsened to Child-Pugh class B or C after TACE, and 38 patients remained in Child-Pugh class A. Multivariable logistic regression analysis of the patients who did not respond to TACE revealed statistically significant HCC size (p=0.03), HCC number (p=0.007) and serum albumin (p=0.005) at the time of diagnosis. As with the previous method, only serum bilirubin (p=0.001) were statistically significant in patients with liver function deterioration. Using this result, a predictive calculation formula was created, and the negative predictive value was 90.9% (Table 1).
Conclusions Using this prediction method, in patients at low risk, TACE can be considered first. And, in case of patients at high risk, if there is no response after TACE, a rapid switch to other treatments such as sorafenib can be considered before the liver function deteriorates.
Keywords Transarterial chemoembolization; Child-Pugh; Hepatocellular carcinoma; Response; Refractory

Table 1. Prediction of Deterioration

		No TACE response & deteriorated liver function to child B , C	
		Positive (27 patients)	Negative (94 patients)
Calculation using regression formula	Positive (44 patients)	True positive (20 patients)	False positive (24 patients)
	Negative (77 patients)	False negative (7 patients)	True negative (70 patients)

- Sensitivity = 20/27 = 74.1%
- Specificity = 70/94 = 74.5%
- Positive predictive value = 20/44 = 45.5%
- Negative predictive value = 70/77 = 90.9%

Liver EE-LV-040

Response and Safety of Direct-Acting Antiviral in Hepatitis C Related-Hepatocellular Carcinoma Patients

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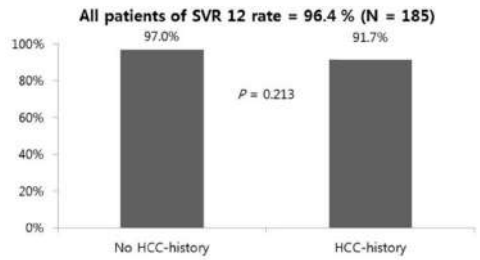
Background/Aims Chronic hepatitis C (CHC) has been dramatically treated since direct-acting antiviral (DAA) treatment was introduced. However, the DAA treatment in CHC patients with hepatocellular carcinoma (HCC) is still controversy. We investigated DAA treatment response in CHC patients with HCC.
Methods We retrospectively analyzed CHC patients treated with DAA from 2016 to 2018. Patients were divided into two groups: those with and without HCC before DAA treatment. Baseline characteristics, sustained virologic response at 12 weeks (SVR 12), and HCC recurrence after DAA treatment were evaluated.
Results A total 192 patients enrolled. Seventy-eight point one percent were treatment naïve and liver cirrhosis (LC) were 34.9%. One hundred sixty-eight patients had no HCC and 24 patients had HCC. HCC group was older (57.0 vs 72.0, p<0.001), higher incidence of LC (26.2% vs 95.8%, p<0.001), higher aspartate aminotransferase (51.0 vs 98.5, p<0.001), higher total bilirubin (0.7 vs 0.9, p=0.009), higher prothrombin time international normalized ratio (1.0 vs 1.1, p=0.002), lower albumin (4.2 vs 3.8, p<0.001), lower platelet (185.5 vs 125.5, p<0.001). SVR 12 rate was 97.0% in the non-HCC group and 91.7% with HCC group (p=0.213). HCC recurrence was observed in 14 patients (58.3%) in HCC group.
Conclusions DAA treatment efficacy in CHC patients with and without HCC were not different of treatment response and HCC recurrence rate was 58.3%, relatively common.
Keywords Chronic hepatitis C; Hepatitis C virus; Hepatocellular carcinoma; Direct acting antiviral



Liver EE-LV-041

Portal Vein Sclerosis Relates to Cholangitis Episodes in Biliary Atresia after Kasai Portoenterostomy

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Background/Aims Progressive portal hypertension (PHT) in biliary atresia (BA) is seen irrespective of the success of Kasai portoenterostomy (KPE). We hypothesize that PHT is related to progressive portal vein sclerosis which happens secondary to recurrent and difficult to treat cholangitis. Hence the present study was designed to establish this link.
Methods From January 2011 to June 2019 all subjects with BA who underwent KPE and were screened for portal vein (PV) diameter and hepatic artery resistive index (HARI) were enrolled. Cholangitis episodes were characterized based on presence of systemic inflammatory response syndrome/sepsis, refractoriness to antibiotics after 14 days and recurrences, and an index from 0 to 6 was derived. Variceal screening was done in children with splenomegaly or platelet count <100,000/mm^3 and were classified into large or small as per American Association for the Study of Liver Diseases classification. An association between PV size, HARI, presence of varices and variceal bleed, with cholangitis index was studied.
Results There were 91 children (59 males) with BA with median age at KPE of 85 days. PV and HARI were assessed at a median age of 6 months (range, 2 to 204 months). Median PV diameter was 5.3 mm (mean±SD, 5.7±2.0 mm); 20 had PV size </=4 mm. Median HARI was 0.78 (mean±SD, 0.76±0.13); 42% had HARI >/=0.8. There was no correlation between PV size and HARI (R^2=0.008, p=not significant [NS]). 51% had a cholangitis index >/=4. PV diameter was significantly less in those with cholangitis index >/=4 than those with <4 mm (5.5±1.8 vs 6.5±2.3 mm, p=0.04). However, there were no differences in HARI (0.79±0.08 vs 0.75±0.08, p=NS), presence of varices or variceal bleed with respect to cholangitis index.
Conclusions BA infants and children with recurrent and refractory cholangitis had a smaller PV size, which may be a precursor to PV sclerosis and subsequent PHT.
Keywords Portal vein sclerosis; Cholangitis; Portal hypertension; Biliary atresia

Liver EE-LV-042

Real-World Single-Center Experience with Direct-Acting Antivirals for Improvement of the Liver Fibrosis after Chronic Hepatitis C Treatment

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Background/Aims Recently, new direct-acting antivirals (DAAs) are known to eradicate chronic hepatitis C (CHC) virus infection and prevent the progression of liver fibrosis. Liver fibrosis may predispose to liver cirrhosis or hepatocellular carcinoma. We investigated the effect of DAAs on liver fibrosis using noninvasive methods, and evaluated the correlations of these methods.
Methods We retrospectively analyzed 68 patients with CHC who were treated with DAAs and reached sustained virologic response at 12 weeks posttreatment from January 2016 to October 2018. The degree of liver fibrosis was assessed using serum biomarkers, such as aspartate aminotransferase-to-platelet ratio index (APRI) and fibrosis-4 (FIB-4) index. Liver stiffness was assessed using two-dimensional shear-wave elastography (2D-SWE). The pre- and posttreatment serum biomarker levels and SWE findings were evaluated and compared.
Results A total of 68 patients with CHC were enrolled. The median age was 58 years (range, 52.3 to 73 years) and 37 patients (54.4%) were female. After treatment with DAAs, the APRI was decreased from 0.701 (range, 0.391 to 1.705) to 0.328 (range, 0.208 to 0.497; p<0.0001), and the FIB-4 was decreased from 2.355 (range, 1.436 to 5.095) to 1.860 (range, 1.267 to 3.391; p<0.0001). The median kPa in 2D-SWE significantly reduced from 6.85 (range, 5.63 to 11.45) to 5.66 (range, 4.83 to 7.43; p=0.013). APRI and FIB-4 were significantly correlated pre- and posttreatment; however, the correlation between the serum biomarkers and 2D-SWE was partially significant.
Conclusions The serum fibrosis biomarkers and liver stiffness on 2D-SWE were shown to be improved after the treatment with DAAs. Further research including larger number of patients is needed to compare the efficacy of each evaluating method.
Keywords Direct-acting antivirals; Chronic hepatitis C; Liver fibrosis

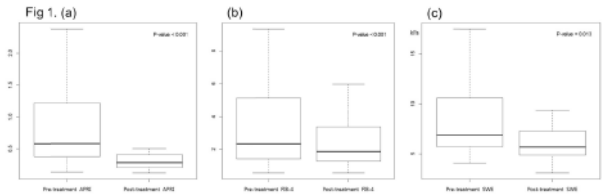

Fig. 1. Changes in liver stiffness assessment.

Liver EE-LV-043

Significance of RANTES Balance in Nonalcoholic Fatty Liver Disease Susceptibility and Severity in Non-obese Non-DM2 Cases: A Pilot from Assam, India

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Background/Aims Role of specific chemokine-chemokine receptor(s) axis involvement has been increasingly realized in many pathophysiological conditions involving inflammatory states, including sporadic reports in nonalcoholic fatty liver disease (NAFLD) pathogenesis. The present study aimed to evaluate the significance of chemokine RANTES and associated immunomodulation and modulations of key HSC signaling regulators in the susceptibility and severity of NAFLD in non-obese subjects.

Methods Clinically characterized NAFLD cases (n=58; NAFL, 45; nonalcoholic steatohepatitis [NASH], 13) with clinical details and fibroscan based liver stiffness measurement (LSM)-score were enrolled along with healthy controls (HC, n=90). Serum RANTES and cytokine panels were evaluated by enzyme-linked immunosorbent assay. Chemokine receptors (CCR5, CCR1), monocyte (sCD14, mCD14) and its activation (CD40, HLA-DR), T-cell activation (CD25) profile were analyzed using various molecular tools. All statistical analysis was performed using SPSS version 13.0 software.

Results The serum RANTES levels were significantly higher in NASH cases compared to NAFL cases (p=0.29) and HC subjects (p=0.047). Expression of RANTES (CCL5) ligands CCR5 and CCR1 mRNA and cellular protein expression was increased in NASH cases compared to both HC and NAFL cases. Both significant monocyte and T-cell activation profile was observed in NASH compared to NAFL cases and HC cases, and nonsignificantly increased in NAFL cases compared to HC subjects. A sharp Th1 biased cytokine profile with upregulation of tumor necrosis factor (TNF)-α , interleukin (IL)-12 and IL-2 was observed in NASH cases compared to NAFL cases. The profile of regulators of HSC activations viz., TNF-α, transforming growth factor-β1, PDGF-BB and vascular endothelial growth factor was significantly activated in NAFLD cases, and correlated positively with serum RANTES expression, monocyte activation markers (CD40 and CCR5), higher alanine transaminase, GGTP, and LSM-score.

Conclusions RANTES levels possibly contributes to chronic inflammatory microenvironment in NAFL subjects through increased immunomodulation and increased expression of regulators associated with HSC activation in non-obese NAFL cases thereby augmenting progression to NASH. Therefore RANTES-chemokine receptor axis therefore holds both prognostic and therapeutic importance in NAFLD.

Keywords Nonalcoholic fatty liver disease; RANTES; Immunomodulation; HSC regulators; Cytokines

Liver EE-LV-044

End-of-Treatment Viremia: The Role on Sustained Virological Response in Direct-Acting Antivirals Era

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Withdrawn

Background/Aims The hepatitis C virus (HCV) viral level of the end-of-treatment (EOT) is considered an very important predictor for the sustained virological response (SVR). With the progress of the treatment for HCV infection, the direct-acting antivirals (DAAs) have been the standard of care recently. The aims of the study is to elucidate the role of the EOT viremia on the response of the DAAs for HCV patients in Taiwan.

Methods In Taiwan, the Nati… and the cost of pegylated interferon plus ribavirin (PegIFN/R… January 2017. From January 2017 to March 2019 in Kaohs… retrospectively evaluate the patients with EOT viral levels … ate response to DAAs therapy.

Results We have experienced 127 patients and 10 patients had detectable but unquantifiable and quantifiable HCV RNA at EOT assessment, respectively. Of the 127 patients, 32 (25.2%) remained having detectable but unquantifiable HCV RNA, 93 (73.2%) had undetectable HCV RNA and importantly two patients (1.6%) have positive HCV RNA (9,079 and 110,685 IU/mL, respectively) at the end-of-follow up. Of the 10 patients with quantifiable viremia, eight patients were with HCV RNA level between 30–89 IU/mL, one was 238 IU/mL and two had 27,431 and 66,794 IU/mL, respectively. After cessation of DAAs for 12 weeks, all four patients with HCV RNA>89 IU/mL failed to achieve SVR and the other seven patients with HCV RNA <67 IU/mL at the EOT achieved SVR.

Conclusions We observed the unpredictability of the EOT viral level for the SVR. The role of measuring the HCV RNA level at the EOT seems to remain uncertain with the DAAs therapy which may not be recommended currently.

Keywords Hepatitis C virus; Viremia; Sustained virological response

Liver EE-LV-045

Anti-HBc IgG Level in Prediction of Hepatitis B Surface Antigen Seroclearance in Chronic Hepatitis B Patients with Nucleos(t)ide Analogue Induced HBeAg Seroclearance

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Background/Aims Although a low level of hepatitis B surface antigen (HBsAg) is a marker of hepatitis B virus (HBV) seroclearance, qualification of anti-HBc can be an additional biomarker for more accurate prediction. We investigated whether the indirect ratio of anti-HBc IgG can predict HBsAg seroclearance among patients with nucleos(t)ide analogue induced HBeAg seroclearance.

Methods We performed a retrospective study from two tertiary hospital. A total of 355 chronic hepatitis B patients were included for analysis from January 2006 to December 2016. They were HBsAg seropositive, and experienced nucleos(t)ide analogue (entecavir, or tenofovir) induced HBeAg seroclearance. The indirect ratio of light absorbance of anti-HBc IgG levels was measured with chemiluminescent microparticle immunoassay using Architect Anti-HBc assay (Abbott Laboratories) before HBeAg seroclearance. We calculated cumulative incidences of HBsAg seroclearance. Effects of time on the association between anti-HBc level and HBsAg seroclearance were examined by area under the receiver operating characteristic curves with combined anti-HBc, and HBV DNA.

Results After 10-year follow-up period, 59 patients experienced HBsAg seroclearance (16%). Higher proportions of 181 patients with the indirect ratio of light absorbance of anti-HBc <11 (relative light unit [RLU]) had HBsAg seroclearance (n=39, 21.5%) than 185 patients with higher levels of anti-HBc ≥11 RLU (n=20, 10.8%) (p=0.005). For patients with levels of anti-HBc <11 RLU, the relative risk of HBsAg seroclearance was 1.70 (95% confidence interval, 0.985 to 2.925), compared to patients with higher levels of anti-HBc (p=0.054).

Conclusions Even if current diagnostic tool of anti-HBc IgG level is the indirect method, levels of anti-HBc <11 RLU were associated with HBsAg seroclearance within 10 years among patients with nucleos(t)ide analogue induced HBeAg Seroclearance. New quantification techniques of anti-HBc IgG are needed to verify these results.

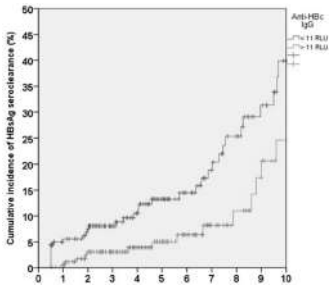

Fig. 1. Confidence interval of hepatitis B surface antigen seroclearance.

Liver EE-LV-046

Profiling of Micro RNA in the Nonalcoholic Fatty Liver Disease *In Vivo* and *In Vitro* Model

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) is a metabolic-related disorder ranging from steatosis to steatohepatitis which may progress to fibrosis, cirrhosis and hepatocellular carcinoma. Micro RNAs (miRNAs) are important posttranscriptional regulators of gene expression, and the dysregulation of miRNAs is involved in various biological processes in the liver, including lipid homeostasis, inflammation, apoptosis, and cell proliferation. This study aimed at suggesting the miRNAs may be a biomarker of the fat accumulation and inflammation in NAFLD.
Methods We use male mice of 6- to 8-week old had fed normal diet or 60% high fat diet for 3 months and 6 months. The accumulation of lipid in liver was examined by hematoxylin and eosin stain (H&E stain). We used human liver cell lines loaded with free fatty acids. And we performed quantitative real-time reverse transcriptase polymerase chain reaction and Western blotting for the validation of miRNAs and lipid droplets formation markers.
Results miRNAs levels were identified in NAFLD *in vivo* and *in vitro* model. In the high fat diet group, liver index and body weigh were increased. H&E stain results show that high fat diet groups had accumulated lots of fat. And in the high fat diet group, lipid droplets formation markers and inflammation markers were increased. In NAFLD *in vitro* model, lipid droplets formation markers and inflammation markers were increased. miRNA level of miR-26a, miR-26b, let-7f and miR-22 was increased in the NAFLD *in vivo* and *in vitro* model. But, level of miR-101 was decreased in the NAFLD in vivo ad *in vitro* model.
Conclusions In this study we evaluated the level of miRNAs on lipid metabolism using the *in vitro* and *in vivo* NAFLD model. Our results demonstrate that miRNAs may be a biomarker in NAFLD.
Keywords Micro RNA; Fatty liver; Liver metabolism; Biomarker

Liver EE-LV-047

Clinical Characteristics of Foreign Chronic Hepatitis C Patients

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Background/Aims The number of foreigners living in Korea has increased more recently, and the survey on chronic hepatitis C among foreigners is still almost nonexistent. The authors wanted to analyze foreign chronic hepatitis C patients to find out their clinical characteristics.
Methods From January 2000 to December 2018, foreign chronic hepatitis C patients who visited six hospitals in the Daejeon Chungcheong area were analyzed.
Results Total 217 patients were enrolled which is consisted of 90 male patients and 127 female patients. Their mean age was 49.3±12.6 years. By country, China topped the list with 109 people (50.2%), followed by North Korea with 48 (22.1%), Mongolia with 18 (8.3%), Uzbekistan with 10 (4.6%) and Russia with six (2.8%). Genotype 2 were the most common with 99 patients (45.6%) and genotype 1 was the second largest with 91 patients (41.9%). Genotype 3 was the third largest with 14 patients (6.5%), while genotype 6a was found in one patient (0.5%). Of the 217 patients, 154 patients (71.0%) received treatment. Eighty-four patients (54.5%) treated with interferon agents and 70 patients (45.5%) with direct-acting antivirals drugs. Sovaldi+ribavirin (29 patients) was used most, followed by daklinza+sunvepra (16 patients) and zepatier (16 patients). Viekirax+exviera, harvoni and maviret were used in three patients each. Of the 154 patients treated, 103 tested for sustained virologic response at 12 weeks (SVR12) and 83 patients showed positive SVR12. Eighteen patients used interferon agents and one each used daklinza+sunvepra and zepatier, respectively, for 20 patients who failed to achieve SVR12.
Conclusions The number of foreign chronic hepatitis C patients has increased significantly, especially since 2013. Unlike Korea, genotype 2 has more than genotype 1 and genotype 3 also takes up a certain portion, which requires publicity and education.
Keywords Chronic hepatitis C; Foreigner; Genotype

Liver EE-LV-048

Experimental Toxicological Activity of *Saraca asoca* Barks Extract on Male Charles Foster Rats

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Background/Aims *Saraca asoca* (Roxb. De.wild) has been mentioned in Ayurveda for its diverse medicinal properties as bark is used in metrorrhagia, menorrhagia, chronic lymphadenitis, inflammation, skin cancer and chemoprevention. The present study was conducted to evaluate and scientifically validate pharmacological effect on currently available animal models. Moreover extraction and phytochemical analysis have been also performed to get proper correlation between biological activity and phytochemical.
Methods Soxhlet extractor has been used for extraction process of *S. asoca* bark in the current research with ethanol as solvent. Further all the phytochemical analysis including detection of chemical test, determination of total phenol and flavonoid content of the extract was also done to know the chemical composition of extract. Acute toxicity of ethanol extract has been performed in male Charles foster rats to know the safe and effective dose for human being. Effect of extract on various enzymes in the liver was estimated to know the detailed toxicity of extract on liver.
Results Extraction of the *S. asoca* bark has been done and found to have significant percentage yield. Phytochemical analysis revealed the presence of different phytochemicals but tannin was found to be the most among all the phytochemical. Total phenolic and flavonoidal content have been determined in the ethanol extract and was found to be significant in the ethanol extract. Toxicity study was performed and found to have no toxicity in Charles foster rats acute animal study model. Further all the enzymes level in liver were also measured and found to be normal range which signified no toxicity.
Conclusions Phytochemical analysis and acute toxicity study revealed that, ethanol extract of *S. asoca* bark is safe and consumable as it doesn't elevate enzymes level in the rat liver and blood.
Keywords Animal study; Phytochemical; Enzymes; Liver; *Saraca asoca*

Liver EE-LV-049

Artificial Neural Network to Predict Nonalcoholic Fatty Liver Disease in Metabolic Syndrome Patients

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) can progress from simple steatosis to carcinoma. Our previous clinical score provides good prediction indices for NAFLD in metabolic syndrome (MetS) patients. This study aimed to determine whether the back-propagation artificial neural network (BP-ANN) model could be constructed to accurately in predicting a NAFLD in MetS patients.
Methods A total of 445 patients with MetS who diagnosed by clinicians with ultrasonography-confirmed whether they were patients with NAFLD. Body mass index (BMI), aspartate aminotransferase (AST)/alanine aminotransferase (ALT), ALT, type 2 diabetes, HbA1C were selected by moving range chart and analyzed by multiple linear regression (MLR). Based the MLR results, we developed a BP-ANN model by selecting tansig as the transfer function of the hidden layers nodes, and purelin for the output layer nodes. The predictive accuracy of the BP-ANN for predicting NAFLD was measured by the area under the curve (AUC) on receiver operating characteristic (ROC) curve analysis.
Results There was significant correlation between NAFLD with BMI, AST/ALT, ALT, type 2 diabetes, and HbA1C ($p<0.05$). The results of MLR analysis indicated that these parameters are five independent variables related to NAFLD. Based on these parameters, the BP-ANN model was performed well with sensitivity 93.75%, specificity 66.67%, and AUROC 96.34%.
Conclusions NAFLD was predictable using the proposed BP-ANN model based on five related parameters (BMI, AST/ALT, ALT, type 2 diabetes, and HbA1C) in MetS patients. This may help clinicians for early prediction and rapid management to take further appropriate action.
Keywords Neural network; Nonalcoholic fatty liver; Metabolic syndrome

Liver EE-LV-050

Sarcopenia Determines Postprogression Outcomes in Advanced Hepatocellular Carcinoma after Sorafenib Failure

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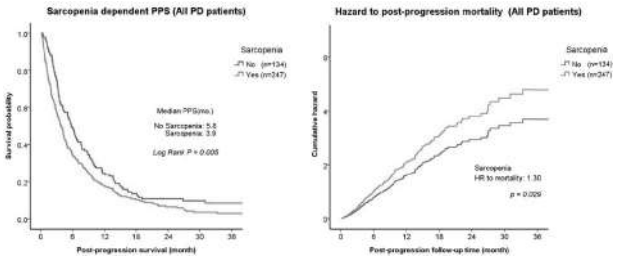
Background/Aims Sarcopenia, an objective surrogate for performance status, is associated with the outcomes of cirrhosis and hepatocellular carcinoma (HCC). Most patients with advanced HCC who failed sorafenib treatment had poor performance status. In this study, we aimed to determine the role of sarcopenia in advanced HCC patient after sorafenib treatment.
Methods From August 2012 to March 2017 in Taipei Veterans General Hospital, 381 sorafenib-failed HCC patients who experienced radiology-proved progressive diseases were retrospectively analyzed. Sarcopenia was defined as transverse psoas muscle thickness per height less than 16.8 mm/m.
Results The prevalence of sarcopenia was 64.8% at the time of sorafenib failure. Sarcopenia was female predominant and was associated with lower body mass index, chronic hepatitis C infection, larger tumor size, prolonged prothrombin time, lower serum albumin level, more ascites, and higher albumin-bilirubin (ALBI) grade. Patients with sarcopenia had significantly shorter postprogression survival (PPS) compared with the counterparts (median PPS, 3.9 vs 5.8 months; p=0.005). In multivariate analyses, large tumor size (>10 cm), high alpha-fetoprotein level (>400 ng/mL), ALBI grade, early PD within 4 months, presence of new extrahepatic metastasis, and sarcopenia were independent risk factors to postprogression mortality. After adjustment of other factors, sarcopenia remained a significant predictor to a poor PPS in sorafenib-failed HCC (hazard ratio, 1.30; p=0.029).
Conclusions Sarcopenia significantly differentiates PPS and is an independent prognostic factor to determine mortality in sorafenib-failed HCC. Building muscle mass is important for advanced HCC patients after sorafenib failure before entry into second-line systemic therapy to prolong survival.
Keywords Hepatocellular carcinoma; Sorafenib; Sarcopenia



Liver EE-LV-052

Organ Failures Due to Variceal Bleed in Cirrhotic Children Awaiting Liver Transplantation

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Background/Aims Variceal bleeding (VB) is seen both with childhood cholestatic as well as hepatocellular disorders. There is limited data on morbidity related to VB in infants and children. We aimed to study the organ failures and outcome of cirrhotic children with VB necessitating liver transplantation (LT).
Methods We retrospectively collected and analyzed data of all infants and children with presence of cirrhosis and variceal bleed who presented between December 2010 and March 2019. Severity scores, organ failures and outcome were analysed.
Results We identified 101 variceal bleeding episodes in 79 children (30.4% females)—median one episode (range, 1 to 8) and >/=3 VB happened in 14 children. The commonest etiologies were biliary atresia (35.4%), autoimmune hepatitis (21.5%), hepatic venous outflow tract obstruction (11.4%) and other genetic and cholestatic conditions (25.3%). Sixteen of these episodes were tolerated well without development of second decompensation. One or more organ failure was present in 98 episodes—median Pediatric CLIF-SOFA score was 6 (interquartile range, 4 to 10). Seven children developed advance (grade 3–4) hepatic encephalopathy while stage 3–4 acute kidney injury was seen in 11 children. By 90 days, 12 children received living donor LT, while 11 died. On univariate analysis, mortality at day-90 was associated with presence of Hepatopulmonary syndrome, hepatic encephalopathy, pneumonia and spontaneous bacterial peritonitis and with high bilirubin, creatinine, international normalized ratio, PELD/Model for End Stage Liver Disease, Child-Pugh and pediatric CLIF-SOFA scores and low sodium. On multivariate analysis, pediatric CLIF-SOFA (Wald, 10.593; p=0.001) and Hepatopulmonary syndrome (Wald, 4.079; p=0.043) were associated with poor outcome. There was recurrence of VB in 31 children over a median duration of 36 months.
Conclusions Variceal bleeding in children is associated with organ failures which affect short term prognosis. Hepatopulmonary syndrome also relates to poor outcome in these children.
Keywords Variceal bleed; Children; Cirrhosis; Organ failures; Liver transplantation

Liver EE-LV-053

Hepatitis B Virus X Protein Stimulates Expression of PD-L1 in Hepatocellular Carcinoma via a MyD88-Dependent Pathway

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Background/Aims Hepatitis B virus (HBV) X protein (HBx) has been implicated in HBV-related hepatocellular carcinoma (HCC). Recently, immune checkpoint inhibitors have showed effective in solid cancers. However, the expression of immune checkpoint proteins has not been clarified, especially in HCC with HBV. We aimed to investigate the mechanism for expression of immune checkpoint proteins in HBx expressing HCC cell lines via myeloid differentiation factor 88 (MyD88) pathway.
Methods We compared HBx-expressing HCC cell lines (SNU354, SNU368) with HCC cell lines (Hep3B, HepG2) through measuring expression of immune checkpoint proteins including programed death-ligand1 (PD-L1), CD80/86, and galectin9 by western blotting. The role of MyD88 in these processes was analyzed by MyD88 siRNA.
Results HBx-HCC cell showed high expression of PD-L1 compared HCC cell. Expression of CD80/86 and galectin9 also showed more in HBx-HCC cell. HBx expression activated downstream signaling proteins of MyD88 including STAT3, interleukin(IL)-6. Inactivation of MyD88 reduced IL-6 synthesis and PD-L1 and CD86, and galectin9, respectively.
Conclusions In HBx-HCC cells, HBx stimulates the immune checkpoint proteins including PD-L1, CD86, and galectin9 in a MyD88 dependent pathway. MyD88 could be involved in HBV-related HCC. Further study of clinical feature according to expression of PD-L1 in HBV related HCC tissue by immunochemical stain may be necessary.
Keywords Hepatitis B virus X protein; Hepatocellular carcinoma; Programmed death-ligand1; Myeloid differentiation factor 88

Liver EE-LV-054

The Epidemiology and Etiology of Cholangitis after Kasai Portoenterostomy in Patients with Biliary Atresia

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Background/Aims We investigated the incidence and characteristics of cholangitis after Kasai portoenterostomy (KPE) in patients with biliary atresia. We also examined the distribution and antimicrobial susceptibility patterns of the causative pathogens, which were isolated in a blood culture.
Methods A retrospective chart review was performed in patients with biliary atresia who underwent KPE at Severance Children's Hospital in Korea from 2006 to 2015. The Kaplan-Meier method was used to assess the cumulative incidence of cholangitis.
Results Among the 160 included patients, there were 494 episodes of cholangitis in 126 patients (78.8%) during the study period. The cumulative incidence of cholangitis at 1 year and 5 years after KPE was 75.5% and 84.2%, respectively, and cholangitis recurred in most cases (76.2%). The cumulative incidence of blood-culture-proven cholangitis at 1 year and 5 years after KPE was 22.1% and 23.9%, respectively. Enterococcus faecium (27.7%) was the most prevalent pathogen, followed by *Escherichia coli* (14.9%), *Enterobacter cloacae* (10.6%), and *Klebsiella pneumoniae* (8.5%). Gram-positive isolates (n=19) showed low susceptibility to ampicillin (42.1%) and gentamycin (66.7%), and only 38.1% of gram-negative isolates (n=21) were susceptible to cefotaxime.
Conclusions The present study is the largest to show the high incidence and characteristics of cholangitis after KPE in patients with biliary atresia. Enterococcus is a common pathogen of cholangitis after KPE and should be considered when choosing empiric antimicrobial therapy.
Keywords Biliary atresia; Kasai portoenterostomy; Cholangitis; Empiric antimicrobial therapy

Table 1. Culture Results and Antimicrobials Susce

Pathogens	No of episodes (%)	Antimicrobial susceptibility							
Bacteria	45 (95.7)								
Gram-positive bacteria	**19 (42.2)**	**AMP**	**Gent**	**CIP**	**Vanco**	**LZD**	**TMP-SMX**	**OXA**	
Enterococcus faecium	13 (27.7)	1/13(100)	11/13(85)	5/13(38)	13/13(100)	13/13(100)			
Enterococcus faecalis	2 (4.3)	2/2(100)	0/2(0)	1/2(50)	2/2(100)	2/2(100)			
Enterococcus spp.	1 (2.1)	1/1(100)	0/1(0)	0/1(0)	1/1(100)	1/1(100)			
Staphylococcus aureus	3 (6.4)	0/3(0)	1/2(50)	3/3(100)	3/3(100)	3/3(100)	0/3(0)		
Gram-negative bacteria	**25 (53.2)**	**AMK**	**Gent**	**CTX**	**Ceftaz**	**PIP-TZ**	**MER**	**Levo**	**TMP-SMX**
Escherichia coli	7 (14.9)	6/7(86)	2/7(29)	1/7(14)	4/7(57)	4/7(57)	0/6(100)	2/6(33)	1/7(14)
Enterobacter cloacae	5 (10.6)	5/5(100)	5/5(100)	5/5(100)	5/5(100)	4/4(100)	5/5(100)	5/5(100)	5/5(100)
Klebsiella pneumoniae	4 (8.5)	3/4(75)	2/4(50)	0/4(0)	3/4(21)	3/4(75)	3/4(75)	3/4(75)	2/4(50)
Pseudomonas aeruginosa	3 (6.4)	3/3(100)	3/3(100)		1/3(33)	1/3(33)	3/3(100)	3/3(100)	
Acinetobacter baumannii	2 (4.3)	2/2(100)	2/2(100)	0/2(0)	2/2(100)	2/2(100)	2/2(100)	2/2(100)	2/2(100)
Klebsiella oxytoca	1 (2.1)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)
Enterobacter asburiae	1(2.1)	1/1(100)	1/1(100)	0/1(0)	0/1(0)	0/1(0)	1/1(100)	1/1(100)	1/1(100)
Serratia marcescens	1 (2.1)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)	1/1(100)
Stenotrophomonas maltophilia	1 (2.1)							1/1(100)	1/1(100)
Fungi	**3 (6.4)**	**AmphoB**		**Flucyt**		**Flu**		**Vori**	
Candida albicans	2 (4.3)	1/1(100)		1/1(100)		1/1(100)		1/1(100)	
Candida parapsilosis	1 (2.1)	1/1(100)		1/1(100)		1/1(100)		1/1(100)	
Total	47(100)								

Strains with sensitivity to antimicrobials with four levels of intensities: high susceptibilities (> 75%) are in the lightest shades, intermediate susceptibilities (51-75%) are in lighter shades, low susceptibilities (≤50%) are in darker shade, and not tested susceptibilities are in the darkest shade with a diagonal line.

Abbreviation: *AMK* amikacin, *AMP* ampicillin, *AmphoB* amphotericin B, *CIP* ciprofloxacin, *Ceftaz* ceftazidime, *CTX* cefotaxime, *Flu* fluconazole, *Flucyt* flucytosine, *Gent* gentamicin, *Levo* levofloxacin, *LZD* linezolid, *MEM* meropenem, *OXA* oxacillin, *PIP-TZ* piperacillin/tazobactam, *TMP-SMX* trimethoprim-sulfamethoxazole, *Vanco* vancomycin, *Vori* voriconazole

Liver EE-LV-055

Low Psoas Muscle Mass Is Associated with Advanced Fibrosis in Patients with Biopsy-Proven Nonalcoholic Fatty Liver Disease

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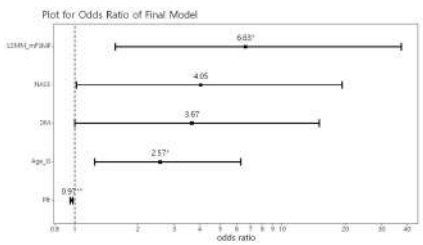
Background/Aims Association of low skeletal muscle mass (LSMM) and liver fibrosis in patients with nonalcoholic fatty liver disease (NAFLD) is widely evaluated using indirect and noninvasive modality. Our study is aim to investigate the association between LSMM and advanced liver fibrosis in patient with NAFLD using direct measurement of psoas muscle mass and liver histology.
Methods We analyzed 146 NAFLD patients who underwent percutaneous liver biopsy and computed tomography, retrospectively. A receiver operating characteristic curve analysis was performed to evaluate optimal cutoff value of psoas muscle index (PMI) for LSMM to predict advanced fibrosis (F3).
Results The optimal cutoff value of PMI to predict advanced fibrosis was 5.132 cm^2/m^2. On the multivariate analysis, age (odds ratio [OR], 2.57; 95% confidence interval [CI], 1.25 to 6.30; p=0.020), LSMM (OR, 6.63; 95% CI, 1.56 to 37.62; p=0.017), and platelet counts (OR, 0.97; 95% CI, 0.95 to 0.99; p=0.000) was associated with advanced fibrosis. The progression of liver fibrosis was negatively correlated with PMI (r=−0.364, p=0.002).
Conclusions Low psoas muscle mass is independently associated with advanced fibrosis in patients with biopsy-proven NAFLD.



Liver EE-LV-056

Validation of American Joint Committee on Cancer 8th Staging System in Patients with Resected Hepatocellular Carcinoma

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Background/Aims The American Joint Committee on Cancer (AJCC) 8th edition staging manual introduced several significant changes to the staging system for hepatocellular carcinoma (HCC). Our study aimed to validate the latest staging system and compare the performance to the previous 7th edition.
Methods We retrospectively reviewed database of 778 patients with pathologically confirmed stage I-III HCC between year 2003 and 2016 from three institutes. Overall and cancer-specific survival (OS, CSS) analysis were performed using Kaplan-Meier method and compared using log-rank tests. The Harrell concordance index (c index) and Akaike information criterion (AIC) were calculated to compare prognostic powers.
Results A total 698 patients who had undergone hepatic resection were available for the analysis. The cohort were comprised of T1a (22.5%), T1b (38.4%), T2 (30.1%), T3 (4.2%), T4 (4.9%) stages according to AJCC 8th staging system while T1 (58.3%), T2 (32.7%), T3a (4.2%), T3b (2.9%), T4 (2%) stages according to AJCC 7th staging system. When the AJCC 8th staging system was applied for OS, p-values of pairwise comparisons among all T stages differed significantly (p<0.005) except for T3 and T4 (p=0.137). The AIC value of OS 8th edition staging system were lower than 7th edition (2,493.85 and 2,500.19, respectively) while c-indices were higher (0.63 and 0.66, respectively; p=0.005). The AJCC 8th system also performed better for CSS, the AIC value for the 8th edition was 1638.27 while it was 1651.96 for 7th edition and the c-indices were 0.7 and 0.65, respectively (p<0.001).
Conclusions The latest prognostic stage provided more accurate prognostic information than the previous edition but further validation if required for the staging system between T3 and T4.
Keywords American Joint Committee on Cancer staging; Hepatocellular carcinoma; Prognosis

Liver EE-LV-057

Gender Difference in the Relationship between Serum Zinc Level and Liver Fibrosis in Patients with Nonalcoholic Fatty Liver Disease

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Background/Aims This study aimed to investigate the relationship between serum zinc level and liver fibrosis in patients with nonalcoholic fatty liver disease (NAFLD).
Methods A cross-sectional study was conducted using nationally representative samples from the Korean National Health and Nutrition Examination Survey 2010. A total of 1,366 adults were enrolled in the study. NAFLD was defined as NAFLD liver fat score ¤Ã–0.640. Liver fibrosis was assessed using fibrosis-4 (FIB-4) index. Zinc was measured using inductively coupled plasma mass spectrometry using PerKinElmer ICP-MS. The change of FIB-4 index according to increases of serum zinc level were analyzed. All analyses were done based on gender.
Results Of 1,366 adults, a total of 300 patients with NAFLD (197 males and 103 females) were finally analyzed. The mean levels of serum zinc level increases in male and female were 144.3±30.3 and 131.3±27.2 ug/dL, respectively. FIB-4 index was significantly decreased as serum zinc level increases in male patients with NAFLD (FIB-4: 1.21±0.90, 1.06±0.64, and 0.84±0.45 in serum zinc level <120, 120–160, and ≥160 ug/dL, respectively; p=0.007). On the other hand, there is no significant difference in FIB-4 index in female patients with NAFLD according to serum zinc level (FIB-4: 0.89±0.47, 0.96±0.48, and 0.81±0.38 in serum zinc level <120, 120–160, and ≥160 ug/dL, respectively; p=0.521).
Conclusions The relationship between serum zinc level and liver fibrosis in NAFLD is different according to gender. Liver fibrosis in NAFLD is decreased as serum zinc level increases in male patients but not female patients. Further studies are needed clarity the effect of zinc on liver fibrosis in NAFLD.
Keywords Nonalcoholic fatty liver disease; Liver fibrosis; Serum zinc

Liver EE-LV-058

Cumulative Incidence of Hepatocellular Carcinoma and Hepatitis B Surface Antigen Seroclearance after Nucleos(t)ide Analogue Induced Hepatitis B e Antigen Seroclearance

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Background/Aims Hepatitis B e antigen (HBeAg) seroclearance in the long term has been viewed as a treatment endpoint and a measurement of treatment success. We tried to determine the clinical outcomes for hepatocellular carcinoma (HCC), and hepatitis B surface antigen (HBsAg) seroclearance of patients undergoing nucleos(t)ide analogue induced HBeAg seroclearance.
Methods The current study included patients who required antiviral treatment (entecavir or tenofovir) before and/or after HBeAg seroclearance, within a tertiary care setting. Patients with documented HBeAg seroclearance were followed up 6 monthly. Baseline characteristics and longitudinal laboratory results were recorded.
Results Cumulative incidence for HCC and HBsAg seroclearance were derived from Kaplan-Meier method. A total of 203 patients underwent HBeAg seroclearance with a mean age and follow-up of 40 and 5 years, respectively. The cumulative incidence of HCC and HBsAg seroclearance was 11.5% and 18.7% at 8 years after HBeAg seroclearance, respectively.
Conclusions A significant proportion of patients developed HCC after NA-induced HBeAg seroclearance. The presence of liver cirrhosis at the time of HBeAg seroclearance is an independent factor for HCC development. Some patients with NA-induced HBeAg seroclearance experienced HBsAg seroclearance. Therefore, HCC surveillance is advocated for HCC detection at early stages, and antiviral therapy must be continued to achieve functional cure even after achieving HBeAg seroclearance in HBeAg-positive patients with CHB.
Keywords Chronic hepatitis B; Hepatocellular carcinoma; Hepatitis B e antigen seroclearance; Hepatitis B surface antigen seroclearance

Liver EE-LV-059

Stability Analysis and Computer Simulation of MSIR Mathematics Model to Prevent Hepatitis B Virus Spread by Vaccination

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Background/Aims This research will discuss about hepatitis B Virus spread by vaccination model and simulations using M-S-I-R model.
Methods The analysis technique involves the equilibrium point, basic reproduction number (Ro) determining, and the stability around the equilibrium point analysis. After that, the simulations uses computer program based on the data or parameter values which are related in mathematics model that represent the conditions for each subpopulation class.
Results Based on the results of the stability analysis, obtained to equilibrium point of fress disease stable if value of basic Ro with vaccination (Rv) less than 1 which means of diseases will be disappeared and equilibrium point of endemic stable if Ro with Rv more than 1 which means of diseases will be become an epidemic.
Conclusions Numerical simulations show that velocity of minimum of vaccination who needed to make disease can be prevented and controlled in the population with 0.324%.
Keywords Hepatitis B; Mathematical model; Numerical simulations; Vaccinations

Liver EE-LV-060

Real-World Effectiveness and Safety of Glecaprevir/Pibrentasvir in Patients with Chronic Hepatic C

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Background/Aims In Korea, hepatitis C virus (HCV) has a difference between the world and the Korean genotype distribution. Data on the effectiveness of glecaprevir/pibrentasvir (G/P) treatment demonstrated only in clinical trials, and no real-world data is available in Korea. The aim of this study is to identify the experience of G/P treatment in the real world in Korea.
Methods This study was conducted a single center retrospective study for all patients who received G/P treatment from October 2018 to August 2019 at Samsung Changwon Hospital. G/P treatment was administered according to the Korean Association for study of the Liver's guidelines. Sustained virological response (SVR) was undetectable HCV-RNA 12 weeks after the end of treatment (EOT).
Results Fifty-four patients were treated with G/P treatment. Males are 42% and median age was 60 years; six patients was Interferon-experienced. Initial HCV-RNA was 2,922,066 IU/mL, and HCV genotype was type 1b in 22 patients, type 2 in 28 patients, type 3 in four patients. Twenty patients had liver cirrhosis and treatment duration was 8 weeks in 35 patients, 12 weeks in 19 patients, 16 weeks in one patient (Table 1). Forty-nine patients ended treatment, 24 of them were checked HCV RNA levels after 12 weeks and SVR was achieved in 96%. One patient failed to acquire SVR and failed treatment. HCV genotype was type 3a, initial HCV-RNA level was 2,510,000IU/mL, child A cirrhosis and peritoneal dialysis. The patient had a history of stop interferon (IFN) treatment due to severe side effects of IFN treatment. The patient received 16 weeks of G/P treatment. HCV RNA was still detected at the EOT. Adverse events were reported in 12 patients, most were mild event like fatigue, headache, itching.
Conclusions In a real world setting of Korean patients, G/P treatment for HCV patients was safe and effective.
Keywords hepatitis C virus; Direct-acting antiviral; Glecaprevir; Pibrentasvir; Sustained virological response

Table 1. Patient Characteristics

	All patients (n=54)	Type 1 (n=22)	Type 2 & Type3 (n=32)	P-value
Sex				0.361
Female	31 (57.41)	11 (50.00)	20 (62.50)	
Male	23 (42.59)	11 (50.00)	12 (37.50)	
Age	59.83 ± 11.82	62.36 ± 9.19	58.09 ± 13.19	0.195
IFN	6 (11.11)	3 (13.64)	3 (9.38)	0.624
LC				0.288
No	34 (62.96)	12 (54.55)	22 (68.75)	
Yes	20 (37.04)	10 (45.45)	10 (31.25)	
Duration				0.190
8 weeks	35 (64.81)	12 (54.55)	23 (71.88)	
≥12 weeks	19 (35.19)	10 (45.45)	9 (28.18)	
Baseline HCV-RNA	2,778,363 ± 3,817,441	3,421,034 ± 4,247,531	2,336,189 ± 3,566,950	0.315
ESRD	4 (7.41)	2 (9.09)	2 (6.25)	0.695
DM	11 (20.37)	8 (36.36)	3 (9.38)	0.010
HTN	10 (18.52)	6 (27.27)	4 (12.50)	0.170
Initial lab				
Hb	13.44 ± 1.78	13.43 ± 2.05	13.45 ± 1.60	0.928
PLT	209.81 ± 70.54	203.95 ± 77.21	213.50 ± 66.55	0.650
T bil	0.70 ± 0.91	0.95 ± 1.37	0.53 ± 0.25	0.093
ALT	62.22 ± 69.58	78.86 ± 97.24	52.16 ± 40.19	0.203
AST	66.28 ± 68.22	80.32 ± 93.47	56.63 ± 42.45	0.213
PT	1.06 ± 0.18	1.09 ± 0.24	1.02 ± 0.08	0.290
Creatinine	1.28 ± 2.10	1.29 ± 1.81	1.28 ± 2.31	0.986
Albumin	4.38 ± 0.48	4.28 ± 0.49	4.45 ± 0.47	0.211
γ-GTP	94.62 ± 120.13	82.14 ± 78.67	104.62 ± 146.18	0.531
ETR (n=54)	49 (98.00)	21 (100.00)	28 (96.55)	0.390
SVR (n=27)	24 (96.00)	8 (100.00)	16 (94.12)	0.484
Adverse event	12 (22.22)	4 (18.18)	8 (25.00)	0.554

Liver EE-LV-061

The Association between Atrial Fibrillation and Advanced Liver Fibrosis in Patients with Nonalcoholic Fatty Liver Disease

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Background/Aims Although nonalcoholic fatty liver disease (NAFLD) has been reported to be independently associated with increased incidence of atrial fibrillation (AF), the association of advanced liver fibrosis with AF in NAFLD patients has not been established. Advanced liver fibrosis in patients with NAFLD is related to all-cause, cardiovascular, and liver-related mortality. We aimed to investigate association between AF and advanced liver fibrosis in patients with NAFLD.
Methods From January 2010 to December 2017, 6,293 NAFLD patients aged 35 years and older were enrolled. All electrocardiograms were diagnosed after a review by a skilled cardiologist. The stage of liver fibrosis is assessed by new adjusted, noninvasive scoring model including NAFLD fibrosis score (NFS) and fibrosis-4 (FIB-4) index, which was determined as the both low and high cutoff value (COV).
Results Of 6,293 patients with NAFLD, 59 (0.9%) were diagnosed with AF. The AF patients were older (52.0 vs 64.6 years, p=0.001), had higher body mass index (25.2 vs 26.6 kg/m^2, p=0.001) and waist circumference (84.0 vs 89.9 cm, p=0.001) compared to non-AF patients. AF was an independent risk factor for advanced fibrosis, assessed by both COVs of NFS (adjusted for obesity, hypertension, high sensitivity C reactive protein, lipid profile, and sex, odds ratios [OR], 2.48 to 3.38; p<0.01 in the low-COV group; OR, 10.79 to 14.55; p<0.01 in the high-COV group, respectively) (Table 1).
Conclusions AF may be an independent risk factor for advanced liver fibrosis in patients with NAFLD.
Keywords Atrial fibrillation; Advanced liver fibrosis; Nonalcoholic fatty liver disease

Table 1. Adjusted Odds Ratio of Atrial Fibrillation for Advanced Liver Fibrosis Defined as the Dual Cutoff Values of NAFLD Fibrosis Score

	Atrial fibrillation	
	OR (95% CI)	*P*-value
OR for advanced fibrosis (F3-4) by low COV of NFS		
Unadjusted	3.38 (2.01-5.67)	<0.001
Gender adjusted	3.20 (1.90-5.37)	<0.001
Model 1	2.92 (1.72-4.96)	<0.001
Model 2	2.58 (1.49-4.45)	0.001
Model 3	2.48 (1.43-4.30)	0.001
OR for advanced fibrosis (F3-4) by high COV of NFS		
Unadjusted	14.55 (4.97-42.62)	<0.001
Gender adjusted	16.71 (5.61-49.81)	<0.001
Model 1	14.77 (4.90-44.51)	<0.001
Model 2	12.16 (3.95-37.47)	<0.001
Model 3	10.79 (3.40-34.27)	<0.001

NAFLD, non-alcoholic fatty liver disease; OR, odds ratio; COV, cut-off value; NFS, NAFLD fibrosis score; CI, confidence interval

The multivariable model was not adjusted for age, BMI level, presence of diabetes mellitus, aspartate aminotransferase, alanine aminotransferase, platelet, and albumin, which were used for calculation of NAFLD fibrosis score.

Model 1: Gender, presence of hypertension and obesity
Model 2: Further adjusted for fasting plasma glucose and high sensitivity C reactive protein
Model 3: Further adjusted for total cholesterol, triglyceride, high-density lipoprotein, low-density lipoprotein

Liver EE-LV-062

A New Treatment of Nonalcoholic Steatohepatitis

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Background/Aims Recovery effect of glutamine hepatocellular damage in patients with different stages of nonalcoholic steatohepatitis (NASH). Nonalcoholic fatty liver disease is becoming the most common liver disorder worldwide. Specifically NASH and fibrosis pose an enormous burden for patients and health-care systems. In the absence of approved pharmacological therapies, effective lifestyle interventions for NASH, such as dietary strategies and exercise training, are currently the therapeutic strategies of choice.
Methods Sixty-six nondiabetic patients admission 2019 internal medicine clinic. Patient diagnosed non-NASH with liver ultrasonography and elevated alanine aminotransferase (ALT). NASH patients are treated with diet, exercise and added 1,000 mg/daily L-glutamine. After 3 months, liver enzyme levels are performed again and enzyme changes are statistically meaningful or not.
Results The study population included 66 patients with NASH (t-test, SPPS version 25.0). ALT level are statistically analyzed and p<0.01 is statistically meaningful. After 3 months, patient's ALT level are decreased with L-glutamine treatment 1,000 mg per daily statistically meaningful (p=0.001).
Conclusions The hepatocellular metabolic functions were altered in a manner that was dissociated both by different effects on different liver functions and by different effects of different stages of NASH. Thus, NASH has widespread consequences for metabolic liver function, even in simple steatosis. In this study , other effect (sex, other medication etc.) motivation of patient (diet and exercise performance) are not considered. Besides of these factors, glutamine effect has got to see the light at the end of the tunnel. Hepatic enzymes decreasing could be prevent chronic liver insufficiency and cirrhosis depends on NASH.
Keywords Nonalcoholic steatohepatitis; Glutamine effect; A new treatment

Table 1. Statistically ALT Level Changes

	$\bar{x}$	N	Standart Deviation	Standart Error	t	p	OR %95 CI
ALT(before)	60,348	66	15,553	1,914	11,878	0,001**	1,26(0,541-3,187)
ALT(after3months with glutamine)	35,212	66	10,590	1,303			

Liver EE-LV-063

Validation of the Updated Version of Korean Stroop Test in the Screening of Minimal Hepatic Encephalopathy

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Background/Aims We aimed to validate the updated version of Korean stroop test for MHE screening.
Methods Liver cirrhosis (LC) patients without history of overt HE were recruited prospectively from 13 centers. All participants completed Korean paper-pencil test (KPPT) and the Korean stroop test. Korean stroop test consisted of two stroop-off states (color and word) and two stroop-on states (inhibition and switching). Four types of "on time+off time"s were analyzed (color-plus-inhibition, color-plus-switching, word-plus-inhibition, and word-plus-switching). MHE was diagnosed when KPPT scores ≥ 2.
Results A total of 119 LC patients and 792 healthy controls were enrolled. The most common etiology of LC was alcohol (62.8%). Mean Model for End Stage Liver Disease (MELD) score of LC patients was 11. Prevalence of MHE was 39.5% by KPPT. Four types of "on time+off time" significantly differed among healthy controls, cirrhosis patients without MHE, and cirrhosis patients with MHE. All types of "on time+off time" showed positive correlation with PHES scores (all p<0.01). The highest area under the curve (AUC) among "on time+off time"s, was for word-plus-inhibition (AUC, 0.699; 95% confidence interval, 0.603 to 0.795; p<0.001) in discrimination of MHE. Ln prothrombin time (international normalized ratio; odds ratio [OR), 197.33; p=0.008) and word-plus-inhibition (OR, 1.012; p=0.011) were significant in multivariate analysis for MHE diagnosis. The cutoff point for the highest Youden's index value was 155 seconds for word-plus-inhibition time with 78.8% of sensitivity and 60.6% of specificity. In the subgroup of patients with MELD score less than 11, on time+off time for word-plus-inhibition was the only prognostic factor in the diagnosis of MHE (OR, 1.008; p=0.037).
Conclusions The Korean Stroop Test is simple and valid for screening of MHE.
Keywords Minimal hepatic encephalopathy; Screening; Stroop test; Liver cirrhosis; Validation

Liver EE-LV-064

Knowledge Attitude and Practices of Hepatitis B Virus and Hepatitis C Virus Infections among Population of Dornod Province, Mongolia

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Background/Aims In Mongolia, 95% of the patients with liver cancer have chronic viral hepatitis and its 53% of patients infected with hepatitis B, 38.9% infected with hepatitis C and 5.6% infected with hepatitis B, C viruses. This survey was conducted among a population of the Dornod province with an aim to evaluate knowledge of population on hepatitis B, C virus infections and to define their attitudes, behaviors and practices. Our aim to assess the knowledge, attitude and behaviors of the population of Dornod province on hepatitis B virus (HBV), hepatitis C virus (HCV) infections.
Methods The survey recruited 600 people, which are randomly selected from 50,864 populations of the Dornod province, aged 15 to 64 years. The survey was carried out by analytical descriptive study design.
Results In total 600 people were randomly selected for the survey in order to evaluate knowledge, attitude and behaviors of the population of Dornod province on HBV, HCV infections. In the total participants aged 15 to 64 years, 49.7% (298) were male and 50.3% (302) were women. Most of the participants (77.2%) have "meanly level" of knowledge and only 1.8% of the participants evaluated as they have "good" knowledge on HBV, HCV infections. We conclude that study population have relatively positive attitudes towards the HBV, HCV infections, such as 76.39% of the population worry on HBV, HCV infections and 92.1% of them prefer diagnostic tests for HBV, HCV and 27.8% of them involved for voluntary vaccinations and 55.0% of them examined for diagnostic tests. Young people are more likely to share of a razor blade or nail clipper with another people and damaging of skin by tattoo or piercing.
Conclusions Knowledge level of the population of Dornod province on HBV, HCV infections is "average." There was only 1.8% of the population has good knowledge among the population of Dornod province.
Keywords KAP; Dornod province; Hepatitis B virus; Hepatitis C virus; Knowledge

Liver EE-LV-065

Sustained Response without Nucleos(t)ides after Pegylated Interferon Represent Favorable Outcome: Up to 13 Years Follow-up

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Background/Aims Pegylated interferon (PEG-IFN) treatment with a high rate of off-therapy host immune control is still an attractive treatment for chronic hepatitis B virus (HBV) infection. There remains uncertain about the prognosis of sustained responder after PEG-IFN treatment who do not need nucleos(t)ides (NAs). We investigated the long-term outcomes of PEG-IFN treatment focused on tolerant patients without NAs up to 13 years.
Methods A consecutive 172 patients treated with PEG-IFN for chronic hepatitis B or compensated liver cirrhosis between 2005 and 2014 were enrolled and finally 122 patients who fully completed PEG-IFN treatment were analyzed. The definition of response for PEG-IFN treatment at 6months posttreatment were as follows: hepatitis B e antigen (HBeAg) positive patients, achieve both virologic response (VR; <2,000 IU/mL of HBV DNA) and serologic response (HBeAg loss or seroconversion); HBeAg negative patients, reach VR. During follow-up period, we analyzed the number of patients with HBsAg loss, starting NAs due to viral activation and disease progression including liver cirrhosis and hepatocellular carcinoma (HCC).
Results The median follow-up period of 122 patients were 7.2 years (range, 1.1 to 13.2 years). Of 122 patients, 43 patients (35.2%) had a response at 6 months posttreatment. During follow-up, 69 patients (56.6%) started NAs and the patients who had a response for PEG-IFN significantly lower rate of starting NAs (14/43 vs 55/79, p<0.001). HBsAg loss occurred in nine patients (7.4%) and sustained responders without further NAs treatment had significantly high rate of HBsAg loss compared to the patients with starting NAs (13.2% vs 2.9%, p=0.01). Eight patients (6.6%) developed disease progression including HCC (n=3). All of them were nonsustained responders who started NAs after PEG-IFN therapy compared to sustained responders (p=0.03).
Conclusions Sustained responders without further NAs treatment after PEG-IFN treatment had a favorable clinical outcome in HBsAg loss and no disease progression up to 13 years.
Keywords Interferon; Hepatitis B; Hepatocellular carcinoma; Nucleos(t)ide; Liver cirrhosis

Liver EE-LV-066

Effect of Naringin on Hepatic Steatosis in Fructose-Fed Rats

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Background/Aims High fructose consumption leads to increased hepatic lipogenesis resulting in hepatic steatosis and the development of nonalcoholic fatty liver disease (NALFD). Naringin, a flavanone glycoside found in citrus fruit, has been reported to have antioxidant, anti-inflammatory and hypolipidemic properties. The aim of this study was to determine the effect and underlying mechanism of naringin treatment on hepatic steatosis in fructose-fed rats.
Methods Male Sprague-Dawley rats were given 10% (w/v) fructose in drinking water for 12 weeks. Naringin (100 mg/kg/day)was administered orally to rats for the last 4 weeks of fructose overload. After 12 weeks, the contents of total cholesterol (TC) and triglyceride (TG) in liver homogenates were evaluated. Hepatic steatosis was evaluated using histological staining with hematoxylin and eosin (H&E) and Oil Red O staining. Hepatic expressions of lipogenesis-related proteins were detected by Western blotting.
Results Results indicated that treatment of fructose-fed rats with naringin decreased TC and TG contents in liver. Naringin treatment also reduced high fructose-induced hepatic lipid accumulation, as indicated by H&E and Oil Red O staining. In addition naringin decreased the expression of lipogenesis-related proteins, including sterol regulatory element-binding protein 1c and fatty acid synthase in liver of fructose-fed rats.
Conclusions The present study suggests that naringin treatment reduces high fructose-induced hepatic steatosis in rats by suppressing hepatic lipogenesis.
Keywords High fructose; Hepatic steatosis; Naringin; Nonalcoholic fatty liver disease

Liver EE-LV-067

Assessment of Recurrence Factor for Treated Hepatocellular Carcinoma by Using Intraoperative Radiofrequency Ablation

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Background/Aims Despite the highly complete tumor necrosis rate of radiofrequency ablation, tumor recurrence, either locoregional or newly developing lesion, was regarded as significant issue. Recurrence reduction through appropriate procedure selection as well as patients' selection could improve survival. Therefore, we analyzed the conditional factor for recurrence after intraoperative radiofrequency ablation (RFA) treatment on hepatocellular carcinoma (HCC).
Methods We investigated 98 patients who were treated with intra-operative RFA as initial treatment for HCC. The mean follow-up period was 33±14.5 months. We evaluated the disease-free survival of recurred patients, including local tumor progression (LTP) and intrahepatic distant recurrence (IDR). For these patients, multiple factors were assessed to their significance for recurrence and survival.
Results Almost baseline characteristics were not shown statistically significant difference, except for few factors between the groups. The incidence of overall recurrence was 47.9%. LTP was found in 20 of 47 patients (20.4%) and occurred 4 to 33 months (median period, 14 months) after RFA. IDR was found in 27 of 47 patients (27.5%) and occurred 6 to 88 months (median period, 22 months) after RFA. Interestingly, on multivariate analysis for whole recurred patients, serum α-fetoprotein was significantly associated factor with recurrence of the tumor (p=0.006; 95% CI, 1.001 to 1.007; hazard ratio [HR], 1.004). In addition, international normalized ratio and Child-Pugh scores, factors representing severity of underlying liver status, were significantly associated with survival of the patients (p=0.039, p=0.046). Especially, AFP was also significantly associated factor with patients' survival (p=0.016; 95% CI, 1.001 to 1.006;HR, 1.004]. After subgroup analysis for recurred patients, we found that patients with higher AFP levels had more recurrence patterns of LTP rather than IDR.
Conclusions Patients with high AFP level received intraoperative RFA for HCC should be carefully followed-up and considered more active radical treatment modality because of higher risk of recurrence and mortality.
Keywords Radiofrequency ablation; Hepatocellular carcinoma; Recurrence

Liver EE-LV-068

Genomic and Clinical Significance of the Thioredoxin System and TXNDC Family in Hepatocellular Carcinoma

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Background/Aims Oxidative stress occurs due to the excessive generation of cellular reactive oxygen species and antioxidant system dysfunction. The thioredoxin (TXN) system and TXN-domain-containing protein (TXNDC) family form networks maintaining the cellular reducing environment. Recently, the importance of these genes in the tumor environment has been emphasized. To investigate the clinical significance of TXNs and TXNDC family members in hepatocellular carcinoma (HCC).
Methods Genomic data from 367 HCC patients whom underwent hepatic resections were analyzed to determine genetic alterations in mRNA and protein levels between patients and healthy controls. In addition, functional enrichment and survival analyses were performed.
Results HCC patients were shown to have the enhanced expression of TXN, TXNRD1, TXNDC7/9/14 mRNA and protein compared with that of controls. In accordance to the survival analyses, strong associations were found that patients with TXN, TXNRD1, and TXNDC1/7/9 alterations were proven to have poor prognosis in overall survival. Moreover, gene set enrichment analyses and network analyses revealed that positive correlations were found in mRNA expression of TXN, TXNRD1, and TXNDC7/9 genes with upregulation of the genes to tumor promoting genes, specifically mTORC1, E2F targets, and Myc targets. On the other hand, elevated expressions of TXNIP and TXNDC11 genes were correlated with suppression of the above tumor promoting genes.
Conclusions TXN system and TXNDC family gene panel obtained from the resected tissue of the HCC patients could be used to predict survival prognosis of HCC and these genes could be considered as potential therapeutic targets for improving HCC survival.
Keywords Thioredoxin system; Thioredoxin-domain-containing protein; Hepatocellular carcinoma

Liver EE-LV-069

Validation of the Aims65 Score in Variceal Upper Gastrointestinal Hemorrhage Because of Portal Hypertension

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Background/Aims Validation of the AIMS65 score to predict 30-day mortality and 30-day rebleeding in variceal upper gastrointestinal hemorrhage.
Methods Descriptive and prospective study of 247 patients diagnosed with variceal upper gastrointestinal hemorrhage because of portal hypertension at Bach Mai Hospital and Hanoi Medical University hospital from December 2018 to June 2019. AIMS65 scores are evaluated to determine the predicted value. AIMS65 scores were calculated by allotting 1 point each for albumin (A) levels <30 g/L, international normalized ratio (I) >1.5, alteration in mental status (M), systolic blood pressure (S) ≤90 mmHg, and age >65 years.
Results A total of 247 patients (mean age, 52.86±10.69 years), mostly diagnosed with alcoholic cirrhosis (190, 76.9%), presented with variceal UGIH during the study period. Rebleeding occurred in 33 patients (13.4%) and 30-day mortality was 16 (6.5%). Initial hemostasis was achieved with endoscopic variceal ligation (186, 75.3%), and N-butyl cyanoacrylate (24, 9.7%). Median hospital stay was 5.28±2.77 days. The mean AMIS65 scores were 1.26±0.97. The predictive accuracy of AIMS65 scores ≥2 was high for blood transfusion (area under the receiver operator characteristic curve [AUROC], 0.727), fresh frozen plasma transfusion (AUROC, 0.783), 30-day mortality (AUROC, 0.76) and 30-day rebleeding (AUROC, 0.625). The overall mortality was 6.5% (n=16), and was 0%, 3.8%, 8.9%, 22.2% and 0% for AIMS65 scores of 0, 1, 2, 3, and 4, respectively; these values were significantly higher in those with scores ≥2 (12%) than in those with scores <2 (2.2%, p=0.02).
Conclusions Although not reliable in predicting 30-day rebleeding, the AIMS65 score seems to be useful in predicting 30-day mortality in patients with variceal bleeding. Therefore, we suggest that assessment of AIMS65 score should be performed early in the management of all the patients with suspected variceal bleeding.
Keywords Gastrointestinal bleeding; Portal hypertension; Aims65 score; Recurrent gastrointestinal bleeding; Recurrent hemorrhage

Liver EE-LV-070

Assessments of Frailty as a Predictor of Mortality in Hepatocellular Carcinoma Patients with Transarterial Chemoembolization

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Background/Aims Currently available prognostic indices for functional status of patients with hepatocellular carcinoma (HCC) who underwent transarterial chemoembolization (TACE) such as Child-Pugh-Turcotte (CTP) class, or Model for End Stage Liver Disease (MELD) provide an incomplete picture of a given patient's risk of death. Herein, we test the hypothesis of whether frailty indices can be added to conventional prognostic indices to improve the predictive capability for prognosis in HCC patients with TACE.
Methods Four hundred fifty-five HCC patients who received TACE treatment in our institution from January 2006 to March 2016 were enrolled in this retrospective cohort study. The admitting nurse performed three functional assessments: activities of daily living (ADL), Braden scale, and Morse fall risk score. The primary outcome measures were 1-year mortality and overall survival assessed from the time of a patient's first admission.
Results The 1-year liver-related mortality for all enrolled patients was 25.7% (117/455). Cox regression analyses with forward stepwise selection reveals that number of TACE >2 (hazard ratio [HR], 0.692; 95% confidence interval [CI] 0.523 to 0.917; p=0.01), ADL class score (12–14: HR, 3.278; 95% CI, 2.092 to 5.135; p<0.01; <12: HR, 4.063; 95% CI, 1.687 to 9.782; p<0.01), Braden scale score (16–18: HR, 3.445; 95% CI, 2.128 to 5.576; p<0.01); <16: HR, 9.292; 95% CI, 3.669 to 23.530; p<0.01)], modified Response Evaluation Criteria in Solid Tumors (SD; HR, 1.645; 95% CI, 1.085 to 2.492; p=0.019; PD: HR, 1.964; 95% CI, 1.215 to 3.173; p<0.01), New Japanese TNM Staging criteria (III: HR, 2.171; 95% CI, 1.265 to 3.727; p<0.01; IVA: HR, 2.129; 95% CI, 1.239 to 3.658; p<0.01; IVB: HR, 2.779; 95% CI, 1.514 to 5.102, p<0.01), CTP class C (HR, 4.578; 95% CI, 1.926 to 10.879; p<0.01), and MELD score ≥20 (HR, 2.83; 95% CI, 1.092 to 7.299; p=0.032), were independent and significant prognosticators for overall survival in HCC patients with TACE treatment.
Conclusions Simple assessment of frailty indices at admission has a powerful impact on the prediction of prognosis for patients with HCC who subsequently underwent TACE treatment.
Keywords Frailty indices; Transarterial chemoembolization; Hepatocellular carcinoma; Activities of daily living; Braden scale

Liver EE-LV-071

Association between Magnetic Resonance Imaging-Measured Pancreatic Fat and Metabolic Risk Factors in Children with Liver Histology-Proven Nonalcoholic Fatty Liver Disease

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Background/Aims The aim of this study was to examine the contribution of pancreatic fat fraction (PFF) and hepatic fat fraction (HFF) to metabolic risk factors in children with liver biopsy proven Nonalcoholic fatty liver disease (NAFLD).
Methods This study recruited 55 children with biopsy-proven NAFLD. Patients underwent anthropometry, clinical evaluation, laboratory tests and MRI and liver biopsy. The liver biopsy assessment was performed using the nonalcoholic steatohepatitis-CRN scoring system and liver and pancreas fat quantification was performed using a validated magnetic resonance imaging (MRI) proton density fat fraction methods. Total body fat contents and total body muscle contents were measured by bioelectrical impedance analysis.
Results The average MRI-measured HFF and PFF in children with NAFLD was 24.7% and 5.0%, respectively. Both HFF and PFF of boys were significantly higher than those of girls. Total body muscle contents and total body muscle percentage were negatively correlated with HFF in children with NAFLD. Total body fat contents and total body fat percentage were positively correlated with HFF in boys but not in girls. Fasting, fasting glucose and homeostasis model assessment-estimated insulin resistance of boys was significant higher compared to those of girls. PFF of children with both NAFLD and hypertension was significantly higher than children with only NAFLD. However, both HFF and PFF were not directly associated with lipid profile or diabetic factors. NAFLD activity score was positively correlated. Children with PFF >10% in any part of pancreas showed that HFF was significantly higher than children with PFF <10%.
Conclusions In children with NAFLD, increased PFF is associated with hepatic steatosis. PFF is associated with hypertension in children with NAFLD. However, because lipid profile and diabetic variables were not associated with HFF or PFF, further studies are required to determine if pancreatic steatosis affects metabolic risk factors in children with NAFLD.
Keywords Nonalcoholic fatty liver disease; Pancreatic fat; Hepatic fat; Metabolic risk; Children

Liver EE-LV-072

Is It Necessary to Follow Up Surveillance of the Extra-hepatic Metastasis after Radiofrequency Ablation for Hepatocellular Carcinoma?: A Retrospective Study of 661 Patients in Two Tertiary Hospitals

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Background/Aims Characteristics of extrahepatic metastasis (EHM) of hepatocellular carcinoma (HCC) after radiofrequency ablation (RFA) are not fully understood and guidelines for adequate surveillance for detection of EHM is still lacking. Therefore, we aimed to elucidate the characteristics of EHM of HCC and the need for follow up surveillance of EHM following RFA.
Methods We enrolled 661 patients who underwent RFA as a first-line treatment for HCC between January 2008 and December 2017.
Results EHM was diagnosed in 44 patients (6.7%) during median follow-up period of 1,204 days. Extra-hepatic recurrence at initial recurrence was only 1.2%. Median time to diagnosis of EHM was 2.68 years and 68.2% of patients developed EHM within 2 years at first recurrence, irrelevant to recurrence free survival duration. The locations of EHM were as follows; intra-abdominal lymph nodes (36.3%), bone (25.0%), lung (29.5%) and peritoneum (27.3%). Abdomen computed tomography (CT)/magnetic resonance imaging (MRI) was used for diagnosis of EHM for 33 patients (75.0%) and chest CT was only used for three patients (6.8%). Thirty patients (30/38, 78.9%) had increment of tumor marker at the time diagnosis of EHM. At multivariate analysis, recurrence free survival less than 2 years, ratio of ablation zone by RFA and tumor size less than 2 and AFP >400 IU/mL at 1st recurrence were associated with high risk of EHM.
Conclusions Only 1.2% was diagnosed with EHM at first recurrence and it was possible to detect most of EHM with abdomen CT and chest X-ray combined with tumor marker, and the role of chest computed tomography for EHM after RFA was limited.
Keywords Hepatocellular carcinoma; Radiofrequency ablation; Metastasis; Surveillance

Liver EE-LV-073

Association between the Use of Proton Pump Inhibitor Therapy and the Occurrence of Spontaneous Bacterial Peritonitis: A Meta-Analysis

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Background/Aims Proton pump inhibitors (PPIs) are commonly prescribed to cirrhotic patients to treat gastroesophageal reflux or peptic ulcer, and to prevent variceal bleeding. However, PPI therapy in cirrhotic patients has been hypothesized to be associated with higher incidence of spontaneous bacterial peritonitis (SBP). Several studies including case controls, cohorts, randomized controlled trials and meta-analyses were done to determine the association, however these studies provided inconsistent results. This is a follow-up meta-analysis study done to re-evaluate the association of PPI therapy and SBP incidence with larger study population and better data quality.
Methods Databases of PubMed, Medline, Cochrane, and Google Scholar were used to search for eligible studies. Two reviewers independently assessed the quality of each included study. Disagreements were resolved by the third author. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement was followed. Pooled odds ratios (ORs) with 95% confidence intervals (CIs) were calculated.
Results A total of 25 studies: 10 case-control, fourteen cohort, and one randomized controlled trial, involving 15,401 patients were evaluated. The pooled data (Fig. 1) showed that PPI use in patients with cirrhosis and ascites was significantly associated with an increased risk of SBP (pooled OR, 2.09; 95% CI, 1.62 to 2.68). However, substantial heterogeneity was observed.
Conclusions This meta-analysis showed that there is a weak association between PPI therapy and incidence of SBP. Nevertheless, although PPI therapy have significant therapeutic benefits, cautious use of PPIs with proper indication in cirrhotic patients with ascites must still be practiced.
Keywords Proton pump inhibitor; Spontaneous bacterial peritonitis; Ascites; Cirrhosis

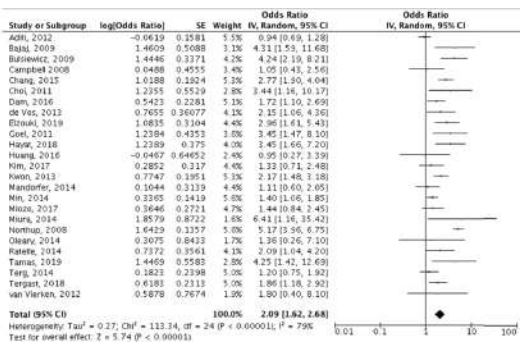

Fig. 1. Forest plot of pooled studies.

Liver EE-LV-074

Safety and Effectiveness of HARVONI (Ledipasvir/Sofosbuvir) from the 3rd Year Post-marketing Surveillance Data in Korea

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Background/Aims In Korea, ledipasvir (LDV)/sofosbuvir (SOF) has been approved for the treatment of GT1/2/4/5/6 hepatitis C virus infections in adults and adolescents aged 12 to <18 years. Manufacturers in Korea are required to conduct post-marketing surveillance (PMS) and submit annual safety reports to MFDS. This study analysed the results from the 3rd LDV/SOF PMS report.
Methods In this open-label, non-interventional study, case report forms of 61 patients were collected from 13 institutions in Korea from October 13, 2017 to October 12, 2018. Of these, 60 were included for safety analysis; one was excluded due to violation of the usage. Fifty-three out of the 60 patients were included in the effectiveness analysis; seven with missing information were excluded.
Results Al 60 patients included were GT1-infected; 53.3% were aged ≥65 years; 51.7% were male; 35% were treatment-experienced; 40.0% and 10.0% had compensated and decompensated cirrhosis, respectively. Eighty percent had ≥1 comorbidity like history of cardiovascular disease, diabetes and hepatocellular carcinoma. Sixty-six point seven percent were on ≥1 comedication and the most commonly used medications were amlodipine, ursodeoxycholic acid and metformin. The LDV/SOF+RBV group (n=11) had more advanced liver diseases than the LDV/SOF group (n=49). The rate of adverse events (AEs) was 43.3% and was higher in the LDV/SOF+RBV (81.8%) groups. The rate of adenoma detection rates (ADRs) was 16.7% and was comparable. The most common ADRs were fatigue, headache, and nausea (n=2, respectively). Three and two patients discontinued LDV/SOF and RBV due to AEs, respectively. LDV/SOF was effective across patient subgroups; 52 out of 53 achieved SVR.
Conclusions The 3rd year PMS data demonstrated a good safety profile and high effectiveness in Korean patients without significant safety signals. More cases with further information on safety and effectiveness will be collected for subsequent reports.
Keywords Ledipasvir/sofosbuvir; Chronic hepatitis C; Post-marketing surveillance; Sofosbuvir; Ledipasvir

Liver EE-LV-075

Ledipasvir/Sofosbuvir for 12 Weeks Is Safe and Effective in Hepatitis C Virus-Infected Asian Patients with Difference Stages of Liver Fibrosis: Integrated Analysis of Four Clinical Studies

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Background/Aims Ledipasvir (LDV)/sofosbuvir (SOF) fixed-dose combination is approved as a 12-week regimen for patients with hepatitis C virus (HCV) genotype 1, 2, 4-6 infection in several Asian countries. This integrated analysis describes the efficacy and safety of LDV/SOF treatment in HCV-infected genotype (GT) 1 and 2 Asian patients across the spectrum of fibrosis stages.
Methods This is a retrospective analysis from 797 Asian patients with GT 1 or 2 HCV infection treated with LDV/SOF for 12 weeks in four phase 2 and phase 3 studies. Fibrosis stages were defined by liver biopsy, transient elastography, or Fibrotest. Efficacy was assessed by sustained virologic response 12 weeks after treatment (SVR12). Safety data was analyzed.
Results Seven hundred ninety-seven Asian subjects were treated with LDV/SOF for 12 weeks. Fifty-six percent were female, 70% had IL28B CC genotype, 45% had prior treatment failure, and 78% were infected with genotype 1 .Overall 70% were F0-F2, 13% were F3, and 17% were F4. The overall SVR rate was 99% (789/797), and was 99% (551/554), 97% (103/106), and 99% (133/135) in subjects with F0-F2, F3, and F4 fibrosis, respectively. Among previously treated subjects, the SVR rate was 99% (228/229), 95% (55/58), 99 % (72/73) in F0-F2, F3, and F4 subjects, respectively. The treatment was well tolerated with 2% (9/797, six in F0-F2 and three in F4 subjects) severe adverse events and 0.4% (three in F0-F2 subjects) discontinuations due to adverse event.
Conclusions Twelve weeks of LDV/SOF treatment is highly efficacious and well tolerated in Asian patients with GT1 and GT2 HCV infection regardless of fibrosis stages.
Keywords Ledipasvir/sofosbuvir; HARVONI; Chronic hepatitis C; Sofosbuvir; Ledipasvir

Liver EE-LV-076

The Quality of Life Indices of Diabetic Patients with Nonalcoholic Fatty Liver Disease

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) is a major cause of chronic liver disease worldwide. Type 2 diabetes mellitus (T2DM) is an important risk factor for advanced fibrosis in NALFD and causes higher mortality. NAFLD patients have nonspecific symptoms and previously reported poorer quality of life (QOL). We aim to study the prevalence of NAFLD in T2DM patients and evaluate their QOL.
Methods Subjects with T2DM were recruited from a public primary care clinic in Singapore and the Endocrinology Clinic of the Singapore General Hospital from November 30, 2015 to October 19, 2017. Patients with significant alcohol consumption, viral hepatitis or known chronic liver disease were excluded. All subjects underwent transient elastography and completed Chronic Liver Disease Questionnaire (CLDQ). Patients were divided into three groups (on-fatty liver group, fatty liver without advanced fibrosis group, and fatty liver with advanced fibrosis group) based on transient elastography results. Demographics, blood test results and CLDQ scores from three groups were compared. Statistical analysis was performed using IBM SPSS version 22.0.
Results A total of 440 T2DM patients were included: 79.3% (349/440) had NAFLD of which 13.5% (47/349) had advanced fibrosis. There were significantly more males, smokers and hypertensive patients in advanced fibrosis group, with higher body mass index, alanine aminotransferase, aspartate aminotransferase levels and lower platelet counts. The average CLDQ score was 5.9 of 7 in all patients. No significant differences were found among three groups in all CLDQ domains.
Conclusions Our study demonstrates a high prevalence of NAFLD in T2DM patients. The QOL of NAFLD patients was not significantly different from patients with T2DM alone. Clinicians must be vigilant of the high prevalence of NAFLD in T2DM patients and actively screen for advanced fibrosis, as they are largely asymptomatic.
Keywords Nonalcoholic fatty liver disease; Quality of life; Diabetes mellitus; Chronic liver disease

Liver EE-LV-077

Serum Level of Growth Differentiation Factor 15 Reflects the Aggressiveness of Hepatocellular Carcinoma Including Metastasis

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Background/Aims Growth differentiation factor (GDF15) is one of the transforming growth factor β superfamily and increased in several cancers including hepatocellular carcinoma (HCC). However, the level of GDF15 according to the characteristics of HCC has not been investigated. We examined the serum level of GDF15 in HCC patients and correlated with the clinical tumor characteristics.
Methods A total of 80 patients diagnosed with HCC between 2013 and 2017 were analyzed in our study. In 80 enrolled patients, 20 patients for each modified UICC stage (I–IV) were included. The 15 healthy patients were also included as control group. The serum level of GDF15 and programmed death-1 ligand 1 (PD-L1) were checked by enzyme-linked immunosorbent assay at the time of initial diagnosis of HCC. The level of GDF15 were analyzed with tumor characteristics including tumor stage, size, presence of portal vein thrombosis (PVT) and metastasis.
Results The mean age of whole patients were 59.9 years and 54 patients (67.5%) were HBV-related HCC. The median level of GDF15 and PD-L1 were 782.7 pg/mL (range, 624.1 to 909.1 pg/mL) and 35.4 pg/mL (range, 15.7 to 63.4 pg/mL), respectively. The serum level of GDF15 were significantly higher in HCC patients than healthy control ($p<0.001$). However, PD-DL1 level were significantly lower in HCC patients ($p=0.001$). Moreover, advanced stage (III–IV) had higher level of GDF15 than stage I–II ($p<0.05$) and PD-L1 level were not differ between tumor stage. The size of tumor had a significantly positive correlation with the level of GDF15 ($r=0.50$, $p<0.001$). The patients with metastasis or PVT had higher GDF15 level with significance ($p<0.003$, $p=0.001$, respectively).
Conclusions The serum level of GDF15 is high in HCC patients and higher level represent the aggressiveness of HCC including tumor size, PVT and metastasis.
Keywords Hepatocellular carcinoma; Growth differentiation factor; Portal vein thrombosis; Metastasis

Liver EE-LV-078

Tumor Lysis Syndrome in Hepatocellular Carcinoma after Transarterial Chemoembolization: Case Report and Review of Literature

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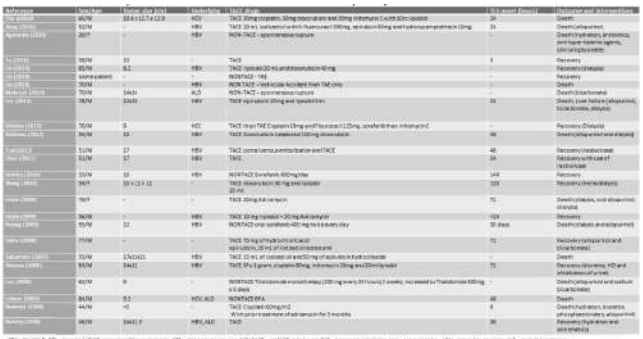
Background/Aims Tumor lysis syndrome (TLS) in solid tumors is rare. Few cases are documented in patients with hepatocellular carcinoma (HCC) resulting in TLS after transarterial chemoembolization (TACE). A review of patient characteristics can help in predicting patients with HCC at risk of developing TLS.
Methods Case report and systemic review.
Results This is a case of a 66 year old male with HCC with a mass size of 13x12 cm admitted for TACE. Twenty-four hours post-TACE, he developed loss of urine output, acidotic breathing and deranged electrolytes where he was then diagnosed with TLS. Vigorous hydration and allopurinol were initiated together with airway and inotropic support. A review of current literature of patients with HCC that had TLS yielded a total of 21 studies (Table 1). Sixteen patients included in the studies cases were post-TACE and a common risk factor is the size of the liver mass found to be more than 5 cm in diameter.
Conclusions Patients with HCC more than 5 cm who undergo TACE are at high risk for development of TLS. Evaluation of post-TACE patients with >5 cm mass include monitoring for decrease in urine output and evaluation of serum electrolytes, creatinine and uric acid up to 72 hours posttreatment. Prompt management with vigorous hydration and allopurinol should be started once with suspicion of TLS.
Keywords Hepatocellular carcinoma; Tumor lysis syndrome; Transarterial chemoembolization; Hepatocellular carcinoma

Table 1. Cases of Hepatocellular Carcinoma with Tumor Lysis Syndrome



Liver EE-LV-079

Real Time Two-Dimensional Shear Wave Elastography in Patients with Acute Hepatitis

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Background/Aims Two-dimensional shear wave elastography is one of noninvasive methods to measure tissue stiffness using ultrasonography. It is useful to assess advanced fibrosis or cirrhosis in chronic liver disease. However, the role of shear wave elastography is not clear in acute hepatitis. This study was aimed to investigate the role of real time two-dimensional shear wave elastography in patients with acute hepatitis.
Methods A total of 81 patients with acute hepatitis between January 2015 and June 2016 were analyzed in Bundang Jesaeng Hospital, Korea. Acute hepatitis was defined as an increase of more than five times on serum alanine aminotransferase (ALT) with no evidence of chronic liver disease or liver cirrhosis. Real time two-dimensional shear wave elastography using ultrasonography was performed to assess quantitative stiffness measurement at baseline and the recovery state from acute hepatitis (6 months later). We compared liver stiffness measurement (LSM) at baseline and the recovery state.
Results The LSM was significantly correlated with total bilirubin (correlation coefficient: $r=0.399$, $p<0.001$), prothrombin time ($r=0.333$, $p=0.002$), albumin ($r=-0.299$, $p=0.002$), and ALT ($r=0.166$, $p=0.099$). However, there was no significant relationship between aspartate aminotransferase (AST) to platelet ratio index or fibrosis-4 index (FIB-4) and LSM (AST-to-platelet ratio index: $r=0.107$, $p=0.342$ and FIB-4: $r=0.111$, $p=0.325$). After the patients recovered from acute hepatitis, total bilirubin, AST, ALT, and LSM were decreased (0.9±0.4 mg/dL, 24.2±5.7 U/L, 27.0±18.9 U/L, and 4.9±1.3 kPa, respectively).
Conclusions In acute hepatitis, LSM measured by real time two-dimensional shear wave elastography is associated with liver function and hepatic necroinflammation rather than fibrosis marker. The high level of LSM is decreased after the recovery from acute hepatitis.
Keywords Two-dimensional shear wave elastography; Acute hepatitis

Liver EE-LV-080

ω-3 Fatty-Acid–Based Parenteral Nutrition Shortens Hospital Stay in Acute Variceal Bleeding Cirrhotic Patients

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Background/Aims Acute variceal bleeding, a crucial complication of liver cirrhosis associated with high mortality, requires high energy expenditures but gastrointestinal bleeding limits enteral feeding in the acute stage. We investigated the safety and efficacy of ω-3 fatty acid-based parenteral nutrition in acute variceal bleeding patients with cirrhosis.
Methods A total of 208 cirrhotic patients with acute variceal bleeding who underwent parenteral nutrition in the absence of enteral nutrition between January 2013 and December 2017 were enrolled. Among the patients, 86 patients had parenteral nutrition containing ω-3 fatty-acid while 122 patients had parenteral nutrition devoid of ω-3 fatty-acid. The primary endpoint was to evaluate the presence of clinical complications of liver cirrhosis and the duration of hospital stay.
Results The mean age of the patients enrolled was 54.9 years and 185 patients (88.9%) were male. The cause of liver cirrhosis, grade of Child-Pugh score and comorbidities were statistically not different in patients with or without ω-3 fatty-acid in the parenteral nutrition. Compared to the patients without ω-3, patients with ω-3 containing parenteral nutrition had a significantly lower systolic blood pressure (101.6±23.3 mm Hg vs 93.5±23.1 mm Hg, p=0.013) and total bilirubin levels (3.8±5.4 mg/dL vs 2.4±2.9 mg/dL, p=0.023). The difference in the in-hospital mortality (p=0.813) or rate of complications (p=0.880) was not statistically significant between the two groups. The duration of hospital stay was significantly shorter in the patients who underwent ω-3 fatty acid-based parenteral nutrition (10.7±7.3 days vs 7.9±4.2 days, p=0.001).
Conclusions In liver cirrhosis patients with acute variceal bleeding, ω-3 fatty acid-based parenteral nutrition significantly decreased the length of hospital stay.
Keywords Liver cirrhosis; ω-3 Fatty acid

Liver EE-LV-081

Comparative Effectiveness and Safety of Trientine and D-Penicillamine in Pediatric Wilson Disease Patients

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Background/Aims Wilson disease is an autosomal recessive inherited disorder of copper metabolism. Wilson disease symptoms usually start in childhood or adolescence. However, there is few data of comparing efficacy and side effect of penicillamine and trientine in pediatric Wilson patients. The objective of this study is to evaluate long-term outcomes of chelating agents (D-penicillamine, trientine) in pediatric Wilson disease patients.
Methods We retrospectively evaluated efficacy, treatment discontinuation due to adverse effect from 2003 to 2019 in the department of pediatrics of Seoul national university hospital. Chelating agents were analyzed to evaluate their effect on hepatic and neurologic symptoms. Events of changing treatment were analyzed using Kaplan-Meier analysis.
Results There was no difference in sex, initial presentation (hepatic, neurologic), initial King's Wilson index between penicillamine and trientine group. In penicillamine group, 22 of 27 patients (81.5%) showed improvement of King's Wilson Index, and 19 of 24 patients (79.2%) observed improvement in trientine group. There was no difference of effectiveness between penicillamine and trientine treatment (p=0.835). Eight out of 27 patients (29.6%) were treated with penicillamine and one in 25 patients (4%) with trientine were discontinued due to side effects. Kaplan-Meier curve showed significant difference of treatment discontinuation between penicillamine and trientine (p=0.048).
Conclusions Trientine and D-penicillamine showed comparable outcomes in reducing hepatic or neurologic symptoms among childhood Wilson disease patients. However, in terms of safety, trientine has fewer side effects than penicillamine. Therefore, trientine is recommended over penicillamine for first line treatment.
Keywords Wilson disease; Trientine; Penicillamine

Liver EE-LV-082

Independent Association of Physical Activity with Nonalcoholic Fatty Liver Disease and Alanine Aminotransferase Levels

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Background/Aims The aim of the current study was to examine the independent association of physical activity with nonalcoholic fatty liver disease (NAFLD) and aminotransferases while adjusting for obesity and diet.
Methods Cross-sectional data from 32,391 participants aged ≥20 years in the Korea National Health and Nutrition Examination Surveys (KNHANES) was analyzed by logistic regression models and general linear models. Physical activity was assessed from the questionnaire by health-enhancing physical activity (HEPA).
Results The physical activity was negatively associated with NAFLD and lean NAFLD after adjustment for multiple factors with an odds ratio of 0.7 (95% confidence interval [CI], 0.6 to 0.8) and 0.5 (95% CI, 0.4 to 0.7) comparing the most active (HEPA active) and the least active (inactive) participants. Among the participants with NAFLD, physical activity also showed an independent negative association with alanine aminotransferase (ALT) levels but not with aspartate aminotransferase levels. These independent associations were not observed when comparing the minimally active and inactive participants except for the risk of lean NAFLD.
Conclusions Physical activity is independently associated with the degree of hepatocellular injury in patients with NAFLD as well as the risk of NAFLD and lean NAFLD in the general population. Sufficiently active physical activity greater than a minimally active level may be needed to lower the risk of NAFLD and ALT levels.
Keywords Non-alcoholic fatty liver disease; Nonalcoholic steatohepatitis; Transaminases; Physical activity; Exercise

Liver EE-LV-083

Nonalcoholic Fatty Liver Disease and Carotid Artery Intima-Media Thickness in Diabetes Type 2 Patients

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Background/Aims Nonalcoholic fatty liver disease (NAFLD) is the most prevalent cause of chronic liver disease and considerably more frequent in patients with type 2 diabetes mellitus (T2DM) than in the general population. While several studies have identified the association between NAFLD and enhanced cardiovascular risk, the mechanisms have not been fully explored. We aimed to assess the association between NAFLD and the characteristics of carotid atherosclerosis in T2DM.
Methods One hundred eighty-five patients both sexes with type 2 diabetes aged 54.69±11.07 years were studied. The carotid artery intima-media thickness (cIMT) was measured as the distance between the lumen-intima interface and the media-adventitia interface by B-mode ultrasound. NAFLD was diagnosed by abdominal ultrasonography.
Results T2DM subjects with NAFLD had significantly higher median body mass index, waist circumference, alanine aminotransferase, triglycerides, insulin, homeostasis model assessment-estimated insulin resistance, C-reactive protein (p<0.05), leptin (p=0.03), interleukin-6 (p=0.02), systolic blood pressure (p=0.02), HbA1c (p=0.001) and diastolic blood pressure (p=0.002) than subjects without NAFLD. There were no significant differences in total cholesterol, low density lipoprotein cholesterol by fatty liver disease status. cIMT was higher in T2DM patients with NAFLD than in those without NAFLD (mean IMT, 0.817 mm; 95% confidence interval [CI], 0.809 to 0.825 mm vs 0.695 mm; 95% CI, 0.692 to 0.697 mm; p<0.001). Univariate analysis showed that the presence of NAFLD, increased waist circumference, systolic and diastolic blood pressure, alanine aminotransferase, leptin, interleukin-6, and C-reactive protein were associated with increased cIMT. After adjustment for confounders in the multivariate analysis, only NAFLD, body mass index, interleukin-6 remained significantly associated with cIMT.
Conclusions We found that NAFLD, body mass index, interleukin-6 are independent markers of increased cIMT in patients with diabetes type 2. Thus, type 2 diabetes patients with NAFLD may have a higher risk of developing coronary atherosclerosis.
Keywords Nonalcoholic fatty liver disease; Diabetes; Atherosclerosis

Liver EE-LV-084

Portal Biliopathy Characteristics in Children with Extrahepatic Portal Venous Obstruction

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Background/Aims Portal biliopathy (PB) is seen in 70% to 90% of children and adults with extrahepatic portal venous obstruction (EHPVO). We conducted this study to define the PB characteristics in these children.
Methods From January 2012 to June 2019, all children with a diagnosis of EHPVO and an magnetic resonance cholangiopancreatography (MRCP) study were enrolled. Diagnosis of EHPVO was based on the presence of portal cavernoma on doppler ultrasound in absence of liver disease. MRCP was studied blindly by single observer and classified as extrahepatic and intrahepatic. Llop's classifications was used to grade the changes as 1 (parietal irregularities), 2 (strictures without dilatation), and 3 (strictures with dilatation).
Results There were 53 children (17 females) with median age of 10 years (range, 7.5 to 14.3 years). Variceal bleed was present in 34 (66.1%) with median 1 (range, 0 to 2) episodes prior to presentation. One or more PB feature was present in all, however only one patient was symptomatic at the age of 12 months. Extrahepatic and intrahepatic abnormalities were seen in 45 and 37 children, while both were present in 34. Indentations, wavy changes, gall-bladder varices, pericholecystic collaterals and cholelithiasis were present in 49, 48, 39, 38 and six children. Llop grade 3 (stricture with bilobar dilatation) was present in 29 children and this was associated with higher alanine aminotransferase (31.4±15.5 IU/L vs 21.5±8.7 IU/L, p=0.005) and alkaline phosphatase (201±98 IU/L vs 142±92 IU/L, p=0.03) in comparison to grades 1 and 2. There was no difference between Llop grades 3 versus 1/2 with regard to age at presentation, variceal bleed, spleen size, prothrombotic risk profile and angulation of CBD (p>0.05).
Conclusions Portal biliopathy is universally present, although rarely causes symptoms, in children with EHPVO. Long term follow-up studies are needed to look for the progression of PB in these children.
Keywords Portal biliopathy; Extrahepatic portal venous obstruction; Children; Llop grade

Liver EE-LV-085

Application of Serological Biomarkers and Hepatic Fibrosis Scoring Systems for Noninvasive Screening of Hepatic Fibrosis in Obese Children with Nonalcoholic Steatohepatitis

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Background/Aims The prevalence of nonalcoholic steatohepatitis (NASH) increases as childhood obesity increases. NASH has a high risk of progression to liver fibrosis and cirrhosis, but there are few studies about noninvasive markers for predicting hepatic fibrosis in children. This study aimed to evaluate diagnostic accuracy of serological biomarkers and scoring systems for hepatic fibrosis in obese children with NASH.
Methods A total of 99 children were diagnosed with NASH on liver biopsy and divided into two groups according to liver fibrosis; mild (stage 0–1) versus advanced fibrosis (stage 2–4). Serum levels of liver enzymes, hyaluronic acid, collagen type IV were measured and aspartate aminotransferase/platelet ratio index and fibrosis-4 (FIB-4) were calculated.
Results The area under receiver operating curve (AUROC) of each biomarker and scoring system were hyaluronic acid was 0.57 (95% confidence interval [CI], 0.45 to 0.70) at optimal cutoff 13.5 (sensitivity 75%, specificity 42.9%); collagen IV, 0.50 (95% CI, 0.41 to 0.66) at optimal cutoff 158 (sensitivity 60%, specificity 56.1%); FIB-4, 0.62 (95% CI, 0.50 to 0.74); and alanine aminotransferase-to-platelet ratio index (APRI; 0.62 (95% CI, 0.50 to 0.74).
Conclusions Both noninvasive serological markers (hyaluronic acid, collagen 4) and scoring systems (FIB-4, APRI) may be helpful in determining the implementation of proper diagnosis and treatment strategies before fibrosis progresses in obese children with NASH.
Keywords Noninvasive screening markers of hepatic fibrosis

Liver EE-LV-086

Balanced Propofol Sedation with Midazolam during Endoscopy Could Worsen Hepatic Encephalopathy in Patients with Liver Cirrhosis

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Background/Aims The aim of this study is to find a sedation strategy during endoscopy, which can induce sufficient sedation and minimize hepatic encephalopathy after the procedure in cirrhotic patients.
Methods Forty-six patients with liver cirrhosis were observed retrospectively and they were divided into three groups according to the types of sedative agents which were given; propofol only, propofol with midazolam and midazolam only, respectively. We administered sedatives to the patients until they were reached to moderate sedation. We evaluated hepatic encephalopathy using Number Connection Test (NCT), before esophagogastroduodenoscopy (EGD) and two hours after sedative EGD.
Results In enrolled 46 patients, the mean of age was 53.78 years (SD, 9.84 years), the mean body mass index (BMI) was 24.21 kg/m^2 (SD, 5.03 kg/m^2). Male and female patients were 33 (71.74%) and 13 (28.26%); the number of patients in each group was 21 of propofol only, 16 of propofol with midazolam, and nine of midazolam only, respectively. The mean of Model for End Stage Liver Disease score in each group was 9.00 (SD, 7.15), 8.88 (SD, 8.48) and 8.44 (SD, 4.98; p=0.856). In addition, there was no differences between groups regarding age, sex, BMI, and serum albumin (p=0.098, p=0.484, p=0.626 and p=0.783). In the patients who were administered propofol only, the mean time of NCT before and two hours after endoscopy were 52.28 seconds (SD, 35.95 seconds) and 48.51 seconds (SD, 21.76 seconds; p=0.970); in the patients who were given propofol with midazolam, the mean time of NCT before and two hours after endoscopy were 41.99 (SD, 15.75) and 51.42 (SD, 12.17; p=0.005); in the patients with midazolam only, the mean time of NCT before and two hours after endoscopy were 57.27 (SD, 23.96) and 67.56 (SD, 37.81; p=0.066), respectively.
Conclusions Moderate sedation during endoscopy with a combination of propofol and midazolam could exacerbate hepatic encephalopathy in patients with liver cirrhosis.
Keywords Minimal hepatic encephalopathy; Sedative endoscopy; Liver cirrhosis

Liver EE-LV-087

Procalcitonin as a Marker for Cholangitis in Infants and Children with Biliary Atresia after Kasai Portoenterostomy

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Background/Aims Post-Kasai portoenterostomy (KPE) cholangitis is seen in up to 70% to 90% of biliary atresia (BA) children. High index of suspicion is required for early intervention and avert liver transplantation. We studied the role of procalcitonin as a marker of cholangitis in these children.
Methods From January 2011 to June 2019 all subjects with BA who underwent KPE with a suspicion of cholangitis and had procalcitonin levels were enrolled. Diagnosis of cholangitis was based on presence of fever (>100.4 F) in absence of any septic focus and/or increase in bilirubin by at least 50% from the baseline over 48 hours. Cholangitis index was derived based on presence of severe infection, refractoriness to antibiotics after 14 days and recurrence (≥2 episodes in a year). An index ≥4 was used to discriminate the episodes.
Results There were 72 episodes of cholangitis in 52 children. Mean age at KPE was 86±28 days. Type 3 BA was present in 48 and 4 had BA splenic malformation. The median age at cholangitis was 5 (range, 1.5 to 204) months post KPE. Thirty-sight (52.8%) of these episodes were recurrent and 39 (54.2%) had systemic inflammatory response syndrome or shock. Six episodes responded to first line and 27 (37.5%) to second line antibiotics. Remaining 39 episodes (54.2%) were refractory to antibiotics and considered for liver transplantation. Overall, 41 episodes (56.9%) had a cholangitis index ≥4. Median procalcitonin levels were 0.63 ng/mL (range, 0.50 to 3.73 ng/mL). Levels were higher with blood culture positivity (n=12, 16.7%, 12.80±28.49 ng/mL vs 3.59±8.95 ng/mL, p=0.041) and with recurrent episodes (8.12±19.0 ng/mL vs 1.77±3.42 ng/mL, p=0.05), however there was no difference regarding severity, responsiveness to treatment or cholangitis index (p>0.05). There was no correlation between procalcitonin levels and bilirubin, white blood cell, aspartate aminotransferase, alanine aminotransferase, SAP, GGT or albumin (R2 <0.3, p>0.05).
Conclusions Procalcitonin levels are associated with culture positivity but not with severity or refractoriness to treatment.
Keywords Biliary atresia; Cholangitis; Procalcitonin

Liver EE-LV-088

Correlation of Clinical and Histopathologic Parameters with Ultrasonographic Grades in Pediatric Nonalcoholic Fatty Liver Disease

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Background/Aims Liver biopsy is the gold standard for diagnosing nonalcoholic steatohepatitis, but liver biopsy in children is not available in many institutes and many parents are reluctant to agree with the procedure. We investigated the correlation of clinical and pathologic parameters with the severity of nonalcoholic fatty liver disease (NAFLD) in pediatric patients using ultrasonographic examination methods and measured the prevalence of fatty pancreas in pediatric NAFLD.
Methods Liver biopsy and abdominal ultrasound examinations were performed in 58 children (42 boys, 16 girls; mean age, 12 years; range, 4 to 19 years) between March 2006 and August 2017. Fatty liver and fatty pancreas were evaluated by two independent radiologists using ultrasound according to 4- and 3-point scales, respectively. We then analyzed the correlations of clinical, laboratory, and histopathologic parameters with the ultrasonographic grade of steatosis.
Results Forty-two children showed simple steatosis (NAFLD activity score [NAS] $\leq$5) while 16 showed nonalcoholic steatohepatitis (NAS >5). Higher body mass index percentile, waist circumference, hematocrit, insulin resistance, and lower insulin sensitivity index were significantly positively correlated with the grade of fatty liver. NAS, amount of steatosis, and fibrosis significantly worsened as the fatty liver grade increased. Higher body mass index, lower insulin sensitivity index, and boy were significantly positively correlated with the fatty pancreas grade.
Conclusions Altogether, ultrasonographic severity of fatty liver shows good correlation with that of clinical parameters and hepatic pathology.
Keywords Nonalcoholic fatty liver disease; Ultrasound; Pathology; Fatty pancreas; Children

Liver EE-LV-089

Poor Preoperative Enteral Nutrition Is a Risk Factor for Readmission Due to Infection after Liver Transplantation

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Background/Aims Most patients who undergo liver transplantation (LT) have advanced cirrhosis and poor nutritional status. The aim of this study was to investigate the effect of nutritional status on the incidence of complications after LT and the effect of oral nutrition on LT outcomes.
Methods From January 2015 to May 2019, the medical records of patients who underwent LT at Kosin University Gospel Hospital were retrospectively reviewed, focusing on nutritional status, perioperative enteral nutrition, and readmission due to infection within 3 months of LT.
Results A total of 37 patients underwent LT. Nineteen patients underwent living donor liver transplantation (LDLT) and 18 patients underwent deceased donor liver transplantation (DDLT). One LDLT patient was excluded because follow-up was less than 3 months. Five DDLT patients were excluded either because they died within 1 month (n=4) or were followed up for less than 3 months (n=1). Therefore, 31 patients were analyzed. Baseline Model for End Stage Liver Disease score (p=0.001), prothrombin time international normalized ratio (p=0.028), and serum creatinine (p=0.006) were statistically different between the LDLT and DDLT groups. However, psoas-muscle index (p=0.840) and serum albumin (p=0.111) were not different. Four patients (4/31) were readmitted because of infection. One LDLT patient was diagnosed with genitourinary infection. The three DDLT patients were diagnosed with pulmonary tuberculosis (n=1), diverticulitis (n=1), and sepsis (n=1). Readmission caused by infection was not statistically different between LDLD and DDLT patients (p=0.284). Preoperative enteral nutrition <25% of the recommended amount (p=0.016) was significantly associated with readmission related to infection. In multivariate analyses, pre-operative enteral nutrition <25% was an independent risk factor for readmission due to infection after LT regardless of psoas-muscle index, baseline Model for End Stage Liver Disease score, or LT type.
Conclusions Preoperative poor enteral nutrition is significantly associated with readmission risk due to infection within 3 months of LT.
Keywords Liver transplantation; Enteral nutrition; Infection; Readmission; Psoas-muscle Index

Liver EE-LV-090

Comprehensive Analysis of Cytochrome P450 Family 4 Gene Expression in Hepatocellular Carcinoma

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Background/Aims Cytochrome P450 family 4 (CYP4) enzymes are known as microsomal omega (ω)-hydroxylases that metabolize fatty acids, eicosanoids, vitamin D and carcinogens. Thus, CYP4 enzymes may influence tumor development and progression. The aim of this study was to evaluate the CYP4 expression profile in hepatocellular carcinoma (HCC) and its clinical relevance.
Methods We obtained CYP4 mRNA expression data for 377 HCC cases from The Cancer Genome Atlas cohort and performed Kaplan-Meier survival, gene ontology functional enrichment, and gene set enrichment (GSEA) analyses. In addition, we evaluated the level of CYP4F2 protein expression in matched pairs of HCC and non-tumor tissue samples and correlated the results with the clinicopathological characteristics of HCC (n=113).
Results HCC survival analyses indicated better overall survival in patients with high CYP4F2, CYP4F12 and CYP4V2 mRNA expression levels; the results for histologic grade and Tumor-Node-Metastasis stage supported these data. GSEA revealed high levels of CYP4F2, CYP4F12, and CYP4V2 mRNA expression to be negatively correlated with expression of cell cycle-related genes.CYP4F2 protein expression was higher in non-neoplastic liver tissue than in HCC tissue and positively correlated with favorable pathological tumor stage (I vs II–IV) (p=0.022) and was a good independent prognostic factor for overall survival (p=0.004).
Conclusions These findings demonstrate that the expression levels of genes CYP4F2, CYP4F12 and CYPV2 are favorable prognostic factors in HCC and suggest the potential predictive diagnostic and prognostic roles of CYP4F2, CYP4F12 and CYPV2 gene expression in HCC.
Keywords Hepatocellular carcinoma; Cytochrome P450 family 4; The Cancer Genome Atlas; Gene set enrichment

Liver EE-LV-091

Cytochrome P450 4A11 Expression in Hepatocellular Carcinoma

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Background/Aims Elevated cytochrome p450 (CYP) 4A gene expression has been linked to the aggravation of various cancers and affects various regulated metabolites. In hepatocellular carcinoma (HCC), the clinicopathological value of CYP4A has not yet been explored, although CYP4A is expressed at high levels in the liver. The goal of this study was to evaluate the clinicopathological value of CYP4A11 expression in HCC.
Methods We performed immunohistochemical analysis of CYP4A11 and correlated the results with clinicopathological features of HCC (n=155). Western blotting and reverse transcription-polymerase chain reaction against CYP4A11 and CYP4A22 were also performed for 15 and 20 pairs of fresh-frozen primary HCC and non-neoplastic liver tissue, respectively. Moreover, we analyzed the underlying mechanism by comparing the high and low CYP4A11 mRNA expression groups using gene set enrichment analysis.
Results CYP4A11 expression level was higher in nonneoplastic hepatocytes than those in HCC cells (p<0.001), and CYP4A11 expression positively correlated with favorable prognostic factors, including tumor size, histological grade, and pathological tumor stage (p=0.007, p=0.005, and p=0.007). Multivariate analysis revealed that CYP4A11 expression was an independent prognostic factor of overall and disease-free survival (p=0.002 and p=0.033). Based on gene set enrichment analysis, high CYP4A11 mRNA expression negatively correlated with the expression of cell cycle-related genes.
Conclusions These findings support the notion that CYP4A11 expression is a favorable prognostic factor of HCC and suggest potential predictive diagnostic and prognostic roles of CYP4A11 expression in HCC.
Keywords CYP450; 4A11; Hepatocellular carcinoma

Liver EE-LV-092

Capsanthin: A Capsicum Plant Capsaicinoids with Their Anticancer Potential, Biological Application and Analytical Aspects

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Background/Aims Carotenoids are hydrocarbons which play an important role in photomorphogenesis, photosynthesis, photoprotection, development and defense of plants. Capsanthin is a crystalline red color pigment found as main components of Capsicum annuum fruits during the ripening. Capsanthin is also found in Lilium, Aesculus, Berberis and Asparagus officinalis.
Methods Various literature databases have been searched to collect all the information of capsanthin particularly for their anti-cancer potential.
Results Chemically capsanthin contains cyclopentane ring, 11 conjugated double bonds and a conjugated keto group. Capsanthin is a powerful antioxidant and anti-tumor activities, attenuates obesity-induced inflammation and raises plasma high-density lipoprotein cholesterol levels.
Conclusions The purpose of this work is to collect all the data of beneficial aspects of capsanthin. In this paper, medicinal importance and pharmacological activities of capsanthin are discussed and found that it has significant anti-cancer potential. This work aims to highlight all the literature support of capsanthin in the drug discoveries with special reference to their anti-cancer properties.
Keywords Anti-cancer properties; Capsaicinoid; Capsanthin; Capsicum annuum; Carotenoid

Liver EE-LV-093

High-Grade Hepatic Neuroendocrine Cancer Presenting as Hepatocellular Carcinoma in a Neurofibromatosis Patient: A Case Report

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Background/Aims Hepatic neuroendocrine cancers are rare, representing 0.3% of all carcinoids, and are more rarely, diagnosed as high-grade malignancies.
Methods Case report .
Results We report the case of a male patient with congenital neurofibromatosis (NF) who presented with a large solitary right lobe liver mass. He had no clinical evidence of chronic liver disease and had a normal serum α-fetoprotein. Two previous fine needle biopsies of the liver mass showed hepatocellular carcinoma (HCC). On computed tomography scan, a concomitant left upper abdominal mass which was possibly matted lymphadenopathies led to repeat biopsy of the liver mass along with the left upper abdominal mass (Figs. 1, 2). Immunohistomorphologic features lead to the diagnosis of a high-grade neuroendocrine carcinoma in both tumors (Figs. 3, 4). This patient did not have symptoms of carcinoid syndrome but had an elevated serum chromogranin A which supported the diagnosis of a primary hepatic neuroendocrine cancer. The liver mass was considered unresectable as it encased the superior mesenteric artery, mimicking the hypervascularity of a locally advanced hepatocellular carcinoma. A 68Ga-DOTATATE positron emission tomography scan determined the masses to be non DOTATATE-avid, hence palliative salvage chemotherapy was the therapeutic consideration.
Conclusions Primary hepatic neuroendocrine cancer presenting as hepatocellular carcinoma involves diagnostic and therapeutic dilemmas. Repeated biopsies and advanced imaging should be considered in unusual presentations of HCC and/or advanced HCC with mesenteric lymph node involvement that do not respond to conventional therapies.
Keywords Hepatocellular carcinoma; Net

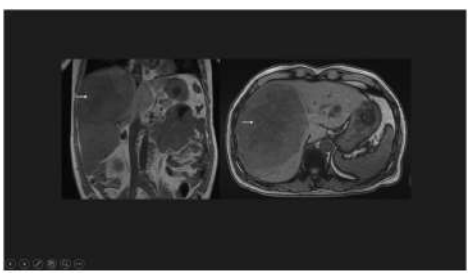

Fig. 1. Computed tomography scan of liver mass.

Liver EE-LV-094

Large Spontaneous Portovenous-Hepatic Shunt Complicated by Hepatic Encephalopathy in a Non-cirrhotic Adult Treated with Direct Closure: A Case Report

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Background/Aims Intrahepatic shunts are rare malformations of the vessels supplying the liver. They are usually congenital and seen in young males. The disproportionate shunting of the blood from the portal vein can lead to development of hepatic encephalopathy. Non-traumatic spontaneous development of these shunts in an adult are rare and the etiopathogenesis has not been known. Previous case reports were treated with either interventional radiologic occlusion or liver resection.
Methods Case report.
Results We report the case of a 56-year-old woman who presented with new onset hepatic encephalopathy with a noncirrhotic liver and no known liver disease. Computed tomography showed a dilated and tortuous right main portal vein showing communication with a dilated middle hepatic vein measuring 1.7 cm in caliber consistent with a portosystemic shunt. Due to the size of the shunt, endovascular embolization was not viable. Patient underwent hepatotomy with dissection and closure of the portovenous-hepatic vein shunt. A doppler ultrasound done two months postoperatively showed reduction in the size of the main portal vein with normal velocity and good flow to the liver.
Conclusions Spontaneous intrahepatic shunts should be considered in the diagnosis of new onset hepatic encephalopathy in an adult with no identifiable liver etiology. Symptomatic large calibre spontaneous intrahepatic shunts, not amenable to endovascular interventions may be successfully treated with modest dissection and closure.
Keywords Hepatic shunt; Encephalopathy

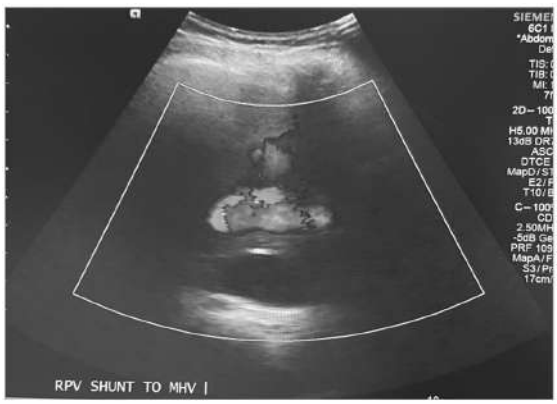

Fig. 1. Ultrasound doppler.

Liver EE-LV-095

Portal Vein Thrombosis Treated by Direct Oral Anticoagulants: A Single Center Experience

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Background/Aims Portal vein thrombosis (PVT) is associated with the progression of chronic liver disease such as cirrhosis. Low-molecular-weight heparin and warfarin have showed frequent complete recanalization of PVT and prevention of PVT progression. Direct oral anticoagulant (DOAC) is a new drug which is available for the prevention of thromboembolic event in atrial fibrillation. However, there is limited data about the efficacy and safety of DOAC for the management of PVT.
Methods Among all the patients who had a bland thrombosis in portal vein, its main branch, superior mesentery vein, and splenic vein, the patients who have been treated by DOAC were selected. Then, the efficacy was evaluated by resolution of PVT, and the bleeding complication was assessed.
Results Fifteen patients who were treated by DOAC (13 by dabigatran, two by rivaroxaban). Eleven patients had cirrhosis, in which three were in child A, and eight in child B. According to endoscopic exam, eight patients showed the low risk for variceal bleeding (F0-1). And two patients showed the high risk for variceal bleeding. Main portal vein was involved in 13 patients. Two patients presented the thrombosis in left portal vein and SMV, respectively. After treatment of 1 to 18 months, there were four in complete resolution, seven in partial resolution, two in no response, and two in unknown response. Bleeding complications occurred in four patients (two in variceal and two in non-variceal GI bleeding). All the patients with variceal bleeding were in the high risk of bleeding group on the previous endoscopic exam.
Conclusions Although the patients in child B were dominant in the treatment population, DOAC showed the high efficacy for the resolution of PVT. However, it is required to perform the endoscopic exam to exclude the high bleeding risk on anticoagulation before the treatment initiation.
Keywords Portal vein thrombosis; Anticoagulation; Complication

Liver EE-LV-097

Discussion Accepting Patients with Liver Cirrhosis Palliative Care Readmission of the Time Difference?

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Background/Aims Few researches discussed the relationship between receiving palliative care and reduced readmission time in cirrhotic patients. This retrospective study investigated readmission time in Taiwanese cirrhotic patients receiving palliative care during the period of 2013 to 2018.
Methods This retrospective study was based on electronic medical records at a medical center in Taiwan from October 1, 2013 to September 30, 2018. The subject included had met the following criteria: patient who was over 20 years old, had been diagnosed with liver cirrhosis for over 3 months and had received palliative care. We aimed to analyze the time before their next hospitalization.
Results The statistics of the patients with liver cirrhosis who received hospice care revealed no difference between both genders. Patients having hepatitis C virus infection had high rate of accepting hospice care, as well as patients complicated with ascites, spontaneous bacterial peritonitis, hepatorenal syndrome and hepatic encephalopathy. The time period before the second hospitalization had no significant difference whether or not the patient had received hospice care.
Conclusions We discovered that the proportion of patients liver cirrhosis who received hospice care was relatively low. Among the patients with advanced liver disease, receiving hospice care could prolonged the time before next hospitalization. Therefore, early hospice transfer should be suggested to help prolong next hospitalization and lower medical expense.
Keywords Extend time; Expense; Liver cirrhosis

Liver EE-LV-098

Polyethylene Glycol versus Lactulose for the Treatment of Overt Hepatic Encephalopathy: A Meta-Analysis

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Background/Aims Hepatic encephalopathy (HE) is one of the most common causes of hospitalization in patients with liver cirrhosis associated with high risk of recurrence and poor survival. It develops in 30% to 45% of cirrhotic patients which is an increasingly recognized burden on the health care system impairing quality of life. Lactulose has been the standard pharmacologic treatment for overt HE for a long time. Until recently, polyethylene glycol (PEG) electrolyte solution, a safe and commonly used purgative has been hypothesized as a probable alternative; however, the number of studies that have investigated the positive effects of PEG are limited.
Methods A comprehensive literature search from the PubMed Central, Embase, Cochrane Library, and Clinical Trials Registry was performed with the following search terms: PEG, lactulose, and HE. Two studies were selected and validated using the Cochrane risk of bias assessment tool by two authors. Trial results were analyzed using Cochrane Review Manager Software version 5.0 with a fixed-effects model. The aims of this study are the rate of improvement of HE scoring algorithm (HESA) and time to HE resolution.
Results Two trials comprising of 148 patients met the inclusion criteria. PEG showed a higher rate of improvement in the HESA compared to those given lactulose (93.15% vs 65.33%; risk ratio, 1.42; 95% confidence interval [CI], 1.19 to 1.69; p<0.0001) (Fig. 1). The mean time needed for HE resolution was 2 days for PEG and 3 days for the standard treatment (MD, −1.27; 95% CI, −1.58 to −0.96; p<0.00001).
Conclusions PEG is an effective treatment for more rapid resolution of HE. It significantly increased the rate of improvement in the HESA and decreased time to HE resolution compared with lactulose, suggesting that it may be a better alternative than the standard therapy.
Keywords Meta-analysis; Overt hepatic encephalopathy; Polyethylene glycol; Lactulose; Hepatic Encephalopathy scoring algorithm

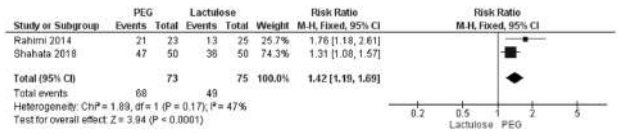

Fig. 1. Hepatic encephalopathy resolution.

Liver EE-LV-099

Influenza Virus Infection Is an Induced Episode of Liver Decompensation: In South Taiwan Analysis

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Background/Aims Influenza is also currently the greatest pandemic disease, influenza can cause complications ranging from liver decompensation disease to severe respiratory failure or even death. For the most severely affected influenza patients, intensive care units (ICUs) can provide supportive care. However, there was a large outbreak of influenza in Taiwan in 2015, and a high portion of these patients required ICU admission for intensive care. Herein, we investigate the clinical outcome of patients with severe influenza infection admitted to ICU and identify the risk factor of death among this population.
Methods We recorded clinical lab data, such as liver function and coagulopathy. We chose features that are consistent for each patient and are known to predict patient mortality, which yielded good results according to this study. In future studies, recurrent neural networks can be used to observe whether models based on time-sensitive information like clinical lab data will produce similar results to those in this study.
Results The multivariate Cox regression model would examine the impacts of demographic, clinical, and laboratory predictors on the risk of patients suffering from influenza infections during ICU, hazards ratio (HR). HR and 95% confidence intervals regarding the mortality were also estimated.
Conclusions The higher number of organ failures was independently associated with mortality in the present study. Finally, we found that 74% of our patients developed co-infections in the ICU, and co-fungal infections was noted in 17.6%. All of these findings should suggest that clinicians be alert the high possibility of co-infection in patients with severe influenza. In conclusion, the mortality of severe influenza patients admitted to the ICU remains high and the mortality was associated with more organ failures.
Keywords Liver decompensation; Influenza virus Infection

Liver EE-LV-100

miR-99b-5p Alleviates Liver Ischemia/Reperfusion Injury by Inhibiting Mitochondrial Oxidative Stress via Targeting Fibroblast Growth Factor 21

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Background/Aims Mitochondrial dysfunction is a major cause of hepatic ischemia/reperfusion (I/R) injury. Fibroblast growth factor 21 (FGF21), serving as a sensitive biomarker in patients with liver transplantation, enhances the mitochondrial capacity by increasing mitochondrial antioxidants and stimulating mitochondrial respiratory capacity. Here, we investigate the potential role of FGF21-targeting microRNAs in regulating mitochondrial function in liver I/R and the important role of FGF21 involved in.
Methods C57BL/6 mice were subjected to 70% partial liver ischemia, followed by reperfusion. AML12 cells were incubated under hypoxia/reoxygenation condition to mimic I/R *in vivo*.
Results We find that FGF21 is upregulated radically in mice with liver I/R, accompanied with mitochondrial ROS production and apoptosis. Using bioinformatics analysis and real-time PCR, we demonstrate that miR-99b-5p are significantly decreased that can target FGF21. miR-99b-5p overexpression attenuates liver I/R injury, as demonstrated by further upregulation of FGF21, the increased expression of mitochondrial antioxidants cytochrome c, TRX2, SOD1, combined with cleaved caspase-3 repression *in vivo* and *in vitro*, which was accompanied by decreased mitochondrial oxidative damage, apoptosis, and enhanced mitochondrial respiratory capacity. FGF21 activation by miR-99b-5p further alleviates systemic injury, as evidenced by reducing inflammatory cytokines release, and improving survival. Meanwhile, inhibition of miR-99b-5p has the opposite effect.
Conclusions FGF21 is a key regulator of liver I/R by contribution to mitochondrial function. miR-99b-5p attenuates liver I/R injury through promoting FGF21 upregulation, which may represent a novel prophylactic approach to liver I/R injury.
Keywords Fibroblast growth factor 21; Mir-99b-5p; Liver Ischemia/reperfusion; Mitochondrial oxidative stress

Liver EE-LV-101

Endoscopic Ligation of Esophageal Varices in Children: Preliminary Results of a Prospective Study of Adult Endoscopy Unit

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Background/Aims Digestive hemorrhage by rupture of oesophageal varices is a serious complication of portal hypertension. Endoscopic examination, in addition to its diagnostic value, has an inescapable therapeutic interest. We report through this work our experience as an adult digestive endoscopy unit in the ligation of esophageal varices (EVL) in children.
Methods Were included from March 2016 to April 2019 all children under the age of 16 years, presenting portal hypertension complicated rupture of EVL, addressed to benefit from EVL of the pediatric hospital. The endoscope and ligation kit used was the same as that used in adults.
Results Of the 115 EVL performed during this period, 47 EVL were performed in children, or 40%. They were 20 children with an average age of 10 years, and a sex ratio of 3.The etiology of portal hypertension was dominated by the hepatopathy of undetermined etiology (six patients), followed by the portal cavernoma (five patients), hepato-renal polycystic disease (four patients) and fibrosis Hepatic congenital (three patient). EVL were classified as grade II in 13% of patients, grade III in 87%. Red signs were present in 14 patients and cardiac varicose veins in 10 patients. The average number of EVL sessions was 3:1 session in four patients (20%), 2 sessions in seven patients (35%), 3 sessions in four patients (20%), 4 sessions in three patients (15%), 5 sessions in one patient (5%) and 6 sessions at one patient (5%). No complication occurred. Three children died: 2 by a recurrent bleeding hemorrhagic and one of his polycystosis hepatorenal .
Conclusions The EVL remains the treatment of first intention to be realized after hemodynamic stabilization in case of rupture of VO whatever the age of the child. Our preliminary results have shown that OVL can be performed under the same technical conditions as the adult.
Keywords Esophageal varices; Ligation; Children

Liver EE-LV-102

A Rare Case of Small Duct Primary Sclerosing Cholangitis

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Background/Aims Small duct primary sclerosing cholangitis is a rare clinical condition that may remain unrecognized. Diagnosis rests on clinical, biochemical, and histologic features consistent with primary sclerosing cholangitis but with normal cholangiogram findings. We report here a case of small duct primary sclerosing cholangitis in a patient who presented with jaundice.
Methods Clinical Presentation. A 22-year-old Filipino gentleman with no known comorbids came in due to a 2-week history of jaundice with elevated transaminases, bilirubin and alkaline phosphatase. No other symptoms were noted. Hepatitis markers were all normal. Physical examination was unremarkable except for jaundice.
Results Management. Magnetic resonance cholangiopancreatography was normal with no evidence of dilated intra- and extrahepatic ducts. Liver biopsy showed intrahepatic cholestasis with periductal fibrosis. Ursodeoxycholic acid was started which showed significant decrease in jaundice with improvement in biochemistries.
Conclusions Recommendation. Small duct primary sclerosing cholangitis appears to have a more favorable prognosis than classic primary sclerosing cholangitis. However, further studies with long-term follow up are recommended to determine disease progression.
Keywords Primary sclerosing cholangitis; Small duct

Liver EE-LV-103

Invasive Endophthalmitis in a Diabetes Patients Associated with Pyogenic Liver Abscesses

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Background/Aims Klebsiella pneumoniae is the major cause of endophthalmitis associated with liver abscess, accounting for up to 60% of cases. Acute bacterial endophthalmitis is a vision-threatening condition and must be managed as an emergency.
Methods The clinical complained of decreased vision and pain, eyelid edema, photophobia, and the presence of floaters. By characteristic ocular findings on detailed ophthalmoscopic examination in the setting of positive blood cultures or by positive vitreous or aqueous cultures difficult. Multiple clinic visits may be required to confirm the diagnosis.
Results This 65-year-old male had past history of type 2 diabetes, hypertension, chronic kidney disease. This time, suffered from intermittent fever with chill for 4 to 5 days, drowsiness consciousness, and general weakness for 1 day, also with epigastric pain and poor intake. The laboratory data showed hyperglycemia, elevated blood osmolality, ketone body and C-reactive protein. The abdomen computed tomography revealed Liver abscess at lateral segment (about 4x2.6 cm) and probably small hepatic abscess or cyst at S7. However, sinus tachycardia with dyspnea were developed, emergency intubation was performed and transfer to intensive care unit. Initially strong antibiotic with meropenem and consult OPH to exclude endophthalmitis and the diagnosis with Senile cataract, nonproliferative diabetic retinopathy and chronic conjunctivitis. *K. pneumonia* bacteremia was noted later and we had kept antibiotic use. However, the patient had complained vision loss and consult OPH again for exclude endophthalmitis and bilateral retinal detachment and vitreous opacity was found. Orbital magnetic resonance imaging (MRI) was performed and revealed left intraocular linear diffusion restriction and increased bilateral scleral enhancement, in favor of endophthalmitis. OPH arrange intravitreal injection of antibiotic. After treatment, his condition was got improving and transfer to ward later but still vision loss oculus uterque.
Conclusions In Taiwan, and other East Asian nations *K. pneumoniae* is the major cause of endophthalmitis associated with liver abscess, accounting for up to 60% of cases. Including decreased vision (the most common reason for visiting doctor) and pain, eyelid edema and the presence of floaters. Determined by the need to treat the underlying source of bacteremia. All patients also require IV of antibiotic, vitrectomy debrides the vitreous and leads to better visual outcome in severe cases of endophthalmitis. Span >OPH to exclude endophthalmitis and the diagnosis with senile cataract, nonproliferative diabetic retinopathy and chronic conjunctivitis. *K. pneumonia* bacteremia was noted later and we had kept antibiotic use. However, the patient had complained vision loss and consult OPH again for exclude endophthalmitis and bilateral retinal detachment and vitreous opacity was found. Orbital MRI was performed and revealed left intraocular linear diffusion restriction and increased bilateral scleral enhancement, in favor of endophthalmitis. OPH arrange intravitreal injection of antibiotic. After treatment, his condition was got improving and transfer to ward later but still vision loss oculus uterque.
Keywords Endophthalmitis; *Klebsiella pneumoniae* liver abscess; Diabetes

Liver EE-LV-104

Effect and Results Regarding Home Exercise Methods Using Traditional Indonesian Martial Arts on Fatty Liver-Diabetic Adults: A Case Report

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Background/Aims To measure the effect of home exercise using traditional Indonesian culture dance in elderly with high lipid concentration.
Methods A 33-year-old patient with fatty liver, diabetes mellitus, high lipid concentration on total cholesterol (TC) and low-density lipoprotein (LDL) was given exercise prescription for 12 weeks. To practice, the exercise prescription was translated to Indonesian culture and the patient habits. The traditional Indonesian martial arts, pencak silat, was restructured. Thus it contained strength, flexibility, balance and cardiorespiratory exercise that were suitable with patient conditions. A subjective Borgs' scale, blood pressure and GPT, HbA1C, fasting glucose (FG), profile lipid examination were used as controlling parameter .Prescribed diabetic medicine for patient was continued during the exercise intervention.
Results Exercise was done three times a week regularly with average duration of 56 minutes (SD, 6.56 minutes). The intensity of exercise was medium to low with heart rate measurement of mean heart rate before (83 bpm; SD, 10.44 bpm), during (134 bpm; SD, 8.36 bpm), and after exercise (100 bpm; SD, 8.22 bpm).Borgs' scale was obtained at the beginning period of intervention (score 16 of 20) and the 12th week, 8 of 20. BP during exercise was: mean of systole (135 mm Hg [SD, 5.62 mm Hg])–diastole (85 mmHg [SD, 2.33 mm Hg]) before exercise and systole (131 mm Hg [SD, 4.76 mm Hg])–diastole (82 mmHg [SD, 3.63 mm Hg]) after exercise. Subjectively and objectively no clinical symptoms, led to cardiovascular and complication of disease, were found. GPT during the intervention was improved 52 U/L. HbA1C improved 1.1%. FG was controlled in desirable range (108 mg/dL; SD, 5.17). TC and LDL were improved 31 mg/dL and 10 mg/dL.
Conclusions The exercise method using Indonesian martial arts, pencak silat, on adults with fatty liver, diabetes mellitus, high lipid concentration on TC and LDL not only helps to manage the disease but also increase the compliance.
Keywords Fatty liver; Exercise; Diabetes mellitus; Sports medicine; Martial arts

Liver EE-LV-105

Helicobacter pylori Infection in Patients with Liver Cirrhosis: Prevalence with Portal Hypertensive Gastropathy

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Background/Aims *Helicobacter pylori* infection has been recognized as one of the most common chronic bacterial infections in humans and is associated with peptic ulcer disease and gastric adenocarcinoma. The role of *H. pylori* in the pathogenesis of portal hypertensive gastropathy (PHG) in cirrhotic patients is poorly defined. The aim of this study was to investigate the prevalence of *H. pylori* infection and its association with PHG in patients with liver cirrhosis.
Methods We performed the retrospective study was conducted in the Internal Medicine Department, Dornod Medical Center from 2017 to 2018. We examined the prevalence of *H. pylori* infection in 54 cirrhotic patients with PHG and using an anti-*H. pylori* IgG enzyme-linked immunosorbent assay.
Results Out of the 54 cirrhotic patients with PHG, men were 34, women were 20 mean age was 43 years. The presence of *H. pylori* was observed in 38 (72%) cirrhotic patients with PHG. Out of the 38 patients with PHG and *H. pylori* infection, 17 (44%) had severe PHG and 12 (31%) had mild PHG.
Conclusions We concluded that *H. pylori* infection is a high prevalence of cirrhotic patients with PHG in Mongolia, which is may also be related to the severity of PHG.
Keywords *Helicobacter pylori*; Portal hypertensive gastropathy

Liver EE-LV-106

Hemoperitoneum Secondary to Rupture of Retroperitoneal Varix

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Background/Aims Symptomatic portosystemic uncommon collateral circulation were rare. And hemoperitoneum due to a ruptured retroperitoneal varix is especially very rare condition.
Methods We present a unique case of 80-year-old male with cirrhosis secondary to alcoholism who presented with acute abdominal pain, distension and hypovolemic shock. Physical examination was consistent with ascites, pallor and hypotension (70/40 mmHg). Laboratory evaluation showed intense anemia (hemoglobin, 3.9 g/dL, hematocrit, 11.1 L%). Diagnostic ascites tapping was done and bloody ascitic fluid was obtained by paracentesis (RBC count 990,000/uL).
Results He diagnosed with a ruptured retroperitoneal varix after computed tomography scanning. Patient refuse to surgical treatment. So he received medical treatment in intensive care unit with mechanical ventilator care, iv vasopressin, packed red cell transfusion. After 12 days of hospital care(including 5 days of intensive care unit care), he discharged hospital with improved condition.
Conclusions Retroperitoneal varix bleeding has poor prognosis with catastrophic and life threatening complication. But early recognition affords appropriate management and can decrease the mortality.
Keywords Hemoperitoneum; Variceal bleeding; Portal hypertension

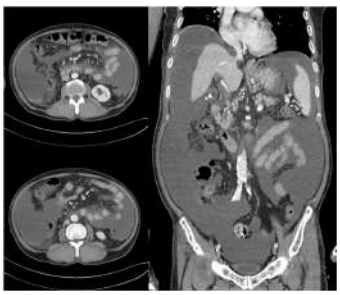

Fig. 1. Computed tomography imaging.

Liver EE-LV-107

Association with Liver Complications in Severe Dengue Infection Case

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Background/Aims The results of dengue-infected adult patients requiring admission to the intensive care unit (ICU) remain unclear. We evaluated clinical outcomes and prognostic factors in patients with severe dengue fever. The predictors of liver complications and the associations with failure of other organs were reviewed; for example, age, gender, clinical manifestations, disease severity scores, underlying conditions, laboratory examinations, and outcomes. The primary endpoint was to find the predictors of ICU mortality.
Methods In this retrospective study, all patients with laboratory-confirmed severe dengue infections were admitted to the ICU during the large outbreak period. Data is collected periodically and analyzed retrospectively.
Results Overall, the minimum platelet count was 35,000 (SD, 43,000)/mm^3 and was restored to 151,000 (SD, 107,000)/mm^3 before the patient was discharged from the ICU. The highest levels of aspartate aminotransferase (AST/GOT) and alanine aminotransferase (ALT/GPT) were 1,126.4 IU/L (SD, 2,488.5 IU/L) and 395.7 IU/L (SD, 739.8 IU/L), respectively, with survivors. Compared to the activated part of the death group, thromboplastin time, lactic acid, AST/GOT and ALT/GPT levels were significantly elevated. However, the death of patients with albumin, hemoglobin and hematocrit was significantly reduced, and the trough and recovery platelet counts before they were discharged from the ICU were lower than survivors.
Conclusions In conclusion, the mortality of severe dengue patients admitted to the ICU remains high, and the mortality was associated with lower GCS scores, lower platelet count before being discharged from the ICU discharge, and more organ failures. In addition, a significant portion of patients with severe dengue who die in the ICU have bacterial infections. These new treatment modalities should be considered for use on a case by-case basis, and more data is needed to support their usage.
Keywords Severe dengue infection; Liver complications

Liver EE-LV-108

Survival Analysis of Type II Censored Data Using Regression Models Based on the Weibull Distribution in Hepatitis C Patients

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Background/Aims Each individual has different abilities to survive in the face of disease. The time required for each individual to survive until death is called survival time. Survival time can be in the form of complete data, type I censored data, and type II censored data. Type II censored data is more often used because it saves more money and time than the other two forms of data. The purpose of this study is to analyze the survival of patients with Hepatitis C based on the Weibull distribution and estimate the parameters.
Methods This research was conducted by re-reducing the survival time model based on the Weibull distribution, determining the parameter estimation using maximum likelihood estimation as well as simulating the generation of type II censored data in patients with hepatitis C and interpreting it.
Results The results of this research are in the form of a holding time function which includes three functions, namely the opportunity density function, the survival function, and the hazard function. Obtained parameter values of α=0.002927443 and β=3.282639 in the data on the survival time of patients with hepatitis C. Substitution of the parameter values on the function of survival time was obtained that the number of hepatitis C sufferers who died increased to t=307 months with a chance of 0.37%.
Conclusions Chances of hepatitis C sufferers to survive for a long time are getting smaller.
Keywords Hepatitis C; Survival analysis; Type Ii censored data; Weibull distribution

Liver EE-LV-109

Impact of Acute Kidney Injury for Prediction If Mortality in Patients with Variceal Bleeding

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Background/Aims Acute kidney injury (AKI) is a common complication in cirrhotic patients, but little is known of the impact of AKI in patients with variceal bleeding. This study evaluated the incidence of AKI using the International Club of Ascites-AKI criteria and their association with the prognosis of patients with variceal bleeding.
Methods We performed a retrospective cohort study using the data of cirrhotic patients with acute variceal bleeding evaluated at Gyeongsang National University Changwon Hospital in Korea between January 2015 and June 2019. The association between AKI and mortality was examined via univariate and multivariate analyses using the cox proportional hazard model.
Results A total of 134 episodes of acute variceal bleeding in 103 patients were enrolled. The sources of variceal bleeding were esophageal varices in 111 (82.8%) and gastric varices in 23 (17.2%). The mean age was 56.0 years. Over a mean follow-up period of 253.3 days, 57 patients (42.5%) of all the episodes developed AKI. At the diagnosis of AKI, 23 patients had stage 1a (40.4%), nine (15.8%) had stage 1b, 17 (29.8%) had stage 2, and eight (14.0%) had stage 3. In multivariate analysis, the independent factors for AKI were age per year (hazard ratio [HR], 1.03; 95% confidence interval [CI], 1.03 to 1.06) and Model For End-Stage Liver Diseases score (HR, 1.08; 95% CI, 1.03 to 1.14). The 42-day mortality rate was significantly higher in patients (n=20, 35.1%) with AKI than in patients without AKI (n=2, 2.6%, p<0.001). In addition, the presence of AKI was independent factor for 42-day mortality (HR, 5.58; 95% CI, 1.15 to 27.11).
Conclusions AKI occurred frequently in patients with acute variceal bleeding. Our study proposes that AKI predicts mortality in patients with variceal bleeding.
Keywords Acute kidney injury; Liver cirrhosis; Variceal bleeding; Mortality

Liver EE-LV-110

Helicobacter pylori Infection Is Not Associated With Portal Hypertension-Related Gastrointestinal Complications: A Meta-Analysis

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Background/Aims Despite the importance of *Helicobacter pylori* infection and portal hypertension (PH)-associated gastrointestinal (GI) diseases such as esophageal varices and portal hypertensive gastropathy (PHG), the impact of *H. pylori* infection on PH-related GI complications had not been fully understood. This meta-analysis was performed to summarize articles that estimate the association of *H. pylori* infection with the risk of PH-related GI complications.
Methods An electronic search for original articles published before December 2018 was performed using PubMed, Embase, and Cochrane Library.
Results A total of 802 cases of *H. pylori* infection and 776 uninfected controls were included from nine studies. *H. pylori* infection had no significant association with esophageal varix (relative risk [RR], 0.96; 95% confidence interval [CI], 0.86 to 1.07 for the all selected studies; RR, 0.94; 95% CI, 0.82 to 1.09 for the cohort studies; odds ratio [OR], 0.96; 95% CI, 0.60 to 1.54 for the case-control studies). Although *H. pylori* infection was significantly associated with PHG in the case-control studies (OR, 2.22; 95% CI, 1.30 to 3.79), no significant differences were found in the cohort studies (RR, 0.98; 95% CI, 0.90 to 1.07), or any of the studies (RR, 1.02; 95% CI, 0.94 to 1.10). Heterogeneity in any meta-analysis was no found (P_H>0.10), and publication bias assessed by Begg's test and Egger's test was unremarkable.
Conclusions *H. pylori* infection is not associated with the risk of PH-related GI complications. This date can be used in the development of treatment strategies for PH-related GI complications in patients with cirrhosis.
Keywords *Helicobacter pylori*; Cirrhosis; Esophageal varix; Portal hypertensive gastropathy

Table 1. Main Characteristics of Studies in the Mata-Analysis (Ordered by Publication Year and Study Design)

Study	Country	Study design	Diagnostic tool for *H.pylori*	Etiology of LC‡	Endpoints	Male (%)	Mean age†	*H. pylori* -infected n. (pos vs. neg)	NOS
Wu CS 1995[1]	Taiwan	Case-control	Serum IgG	HBV, HCV, HBV-HDV	EV	73.3	51.5	82 vs. 120	6
Rulan KK 1996[2]	UK	Cohort	Histology	Alc, PBC	PHG	58	53†	20 vs. 30	8
Tsai CJ 1998[3]	Taiwan	Cohort	Serum IgG, histology, CLO test	HBV, HCV, Alc, HBV-HCV, HBV-HDV	EV	66.2	54.4	99 vs. 22	8
Yeh JL 2001[4]	Taiwan	Cohort	13C-UBT	HBV, Alc, HCV, HBV-HCV	EV, PHG	72.5	57.4	57 vs. 52	8
Chen CT 2002[5]	Taiwan	Case-control	Serum IgG	HBV, HCV, Alc	EV	76.6	64.8†	42 vs. 57	5
Urso G 2006[6]	Italy	Cohort	Histology, 13C-UBT	HCV	PHG	58.7	69.7	26 vs. 83	7
Abbas Z 2014[7]	Pakistan	Cohort	Histology, PCR	HCV, HBV, HBV-HDV	EV, PHG	65.7	50.3	87 vs. 53	8
Suthar SA 2014[8]	India	Case-control	Serum IgG	Alc, HBV, HCV, AIH	PHG	68.55	53.45	50 vs. 90	6
Huang J 2017[9]	China	Case-control	13C-UBT	HBV	PHG	59.9	52.5	339 vs. 269	5

† Median age

‡ Etiologies are sorted by largest number of patients.

§ *H. pylori*, *Helicobacter pylori*; LC, liver cirrhosis; n., number of patients; pos, positive; neg, negative; NOS, Newcastle-Ottawa scale; UK, United Kingdom; IgG, immunoglobulin G; CLO, *Campylobacter*-like organism; UBT, urea breath test; Alc, Alcohol; PBC, primary biliary cholangitis; AIH, autoimmune hepatitis; EV, esophageal varix; PHG, portal hypertensive gastropathy

Liver EE-LV-111

Noninvasive Test for Estimation of Liver Fibrosis

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Background/Aims In 2015, the digestive disorders were the second leading cause of morbidity among Mongolian population. Furthermore, the digestive disease related death accounts for 4.7% of all mortality. Recently many noninvasive markers for assessing liver fibrosis have been developed.
Methods A total of 120 patients were enrolled in this study including 40 healthy individuals, 40 patients with chronic viral liver disease (CVLD) and 40 patients with alcoholic liver disease (ALD). Complete blood count (PLT), biochemistry (aspartate aminotransferase, alanine aminotransferase), abdominal ultrasonography were performed. Alanine aminotransferase-to-platelet ratio index (APRI), fibrosis-4 scores were calculated and compared with the results of the laboratory tests.
Results A total of 120 patients were enrolled in this study; 40% of patients were males. Their mean age was 43.43±10.93 years. Liver fibrosis stages that are determined by APRI score: F0-1 mild fibrosis, 54.3%; F2-3 moderate fibrosis, 40.6%; F4-cirrhosis, 11.5%; by fibrosis-4 (FIB-4) score: 62.8% was in F0-1, 20.3% was in F2-3, 11.5% was in F4stage among ALD group. In CVLD liver fibrosis stages that were evaluated by APRI score were 36.2%, F0-1 mild fibrosis; 32.4%, F2-3 moderate fibrosis; 31.4%, F4 severe fibrosis. Statistically significant difference were observed between ALD and CVLD groups in liver fibrosis stages that was determined with APRI score ($p<0.05$).
Conclusions The APRI F2-3, the FIB-4 F0-1 and F4 scores showed high sensitivity for the diagnosis of alcohol related liver fibrosis. The FIB-4 F2-3, F4 score showed high sensitivity for the diagnosis of virus related liver fibrosis. These measures also demonstrated significant correlation with the stage of liver fibrosis in patients with viral hepatitis. For noninvasive diagnosis of liver fibrosis F2-3, using FIB-4 was related to necroinflammation, F4 was related with necroinflammation, cholestasis, hypersplenism, liver failure syndromes.
Keywords Liver fibrosis; Alcoholic liver disease; Alanine aminotransferase-to-platelet ratio index; Fibrosis-4

Upper GI EE-UGI-001

Application of Convolutional Neural Network in the Diagnosis of Gastric Neoplasms Surrounded by Intestinal Metaplasia for Real Clinical Practice

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Background/Aims Since some early gastric cancer (EGC) and adenoma are only diagnosed based on very delicate changes in the mucosa, intestinal metaplasia (IM) or chronic inflammation in the surrounding mucosa make diagnosis difficult. However, in real clinical practice, it is crucial to detect neoplastic lesions regardless of the surrounding mucosa. The aim is to apply a lesion-based convolutional neural network (CNN) in the diagnosis of gastric neoplasms surrounded by IM and to analyze related factors.
Methods We have previously developed a lesion-based CNN for detection and depth prediction of EGC and used in the present study. We collected a total of 1,157 endoscopic images from 285 gastric neoplasms (183 EGC, 102 adenoma) for an independent test set of neoplastic lesions surrounded by IM. The presence and extent of IM were confirmed by white light endoscopy. If the extent of IM is greater than 30% in the area where the lesion is located, it is classified as severe and if less than 30%, it is classified as mild. The performance was evaluated by sensitivity, specificity, positive predictive value (PPV), and the area under the curve (AUC). The diagnostic accuracy was compared according to clinicopathologic characteristics.
Results The sensitivity, specificity, PPV and AUC for detection of neoplastic lesions were 0.91%, 0.97%, 0.96% and 0.988, respectively. Especially, the values for EGC were 0.96%, 0.97%, 0.95% and 0.993, respectively. Among the clinicopathologic factors, small size ($p<0.001$) and severe grade of IM ($p=0.001$) were significantly associated with lower accuracy for the detection of neoplasms. As the size of the lesions decreased, the sensitivity for the detection also reduced gradually ($\leq$3 mm, 53%; $\leq$5 mm, 70%; $\leq$10 mm, 75%).
Conclusions A lesion-based CNN may be a useful tool for the detection of gastric neoplasms, even surrounded by IM. However, further research for validation is necessary.
Keywords Early gastric cancer; Artificial intelligence; Intestinal metaplasia; Gastric neoplasm; Convolutional neural network

Upper GI EE-UGI-002

The Association of Neuropilin-1 Expression with Prognosis According to the Histology of Gastric Cancer

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Background/Aims Neuropilin-1 (NRP-1) is known to be related with various types of cancer and considered as a novel tumor marker or a therapeutic target. The aim of the study is to identify the clinical implication of NRP-1 expression in terms of prognosis in gastric cancer.
Methods A total of 265 patients who underwent radical gastrectomy for the treatment of gastric cancer from 2008 to 2011 were included. NRP-1 expression of tumors was determined by immunohistochemistry. Patients' clinicopathologic characteristics, operation details, and long-term outcomes were retrospectively analyzed.
Results One hundred and eighty-one patients (68.3%) showed NRP-1 expression; 84 (65.6%) was in gland formation (GF) type and 97 (70.8%) were in no gland formation (nGF) type. There was no survival difference according to the NRP-1 expression in all patients. In the group of GF, NRP-1 expression was not independent prognostic factor, although patients with NRP-1 expression had better survival outcome. In contrast, patients with NRP-1 expression had worse 5-year survival rate in the group of nGF ($p=0.027$) and it was an independent prognostic factor multivariate analysis (hazard ratio, 1.923; 95% confidence interval, 1.041 to 3.551).
Conclusions NRP-1 expression in the nGF type gastric cancer predicts a poor prognosis.
Keywords Stomach neoplasms; Neuropilin-1; Prognosis, Survival; Histology

Upper GI EE-UGI-003

Diagnostic Validity and Therapeutic Effect of 23S Ribosomal RNA Point Mutation Test for Predicting Clarithromycin Resistance and *Helicobacter pylori* Eradication

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Background/Aims We evaluated the diagnostic validity of dual priming oligonucleotide (DPO)-based multiple polymerase chain reaction (PCR) method for predicting clarithromycin resistance and the efficacy of tailored therapy based on point mutation presence identified with the dual-priming oligonucleotide (DPO)-based multiplex PCR method compared with concomitant therapy for *Helicobacter pylori* eradication.
Methods For evaluating the diagnostic validity of DPO-based multiplex PCR method, culture/antibiotic sensitivity test were used for diagnostic gold standard. Subjects were randomly assigned concomitant therapy (amoxicillin 1 g, clarithromycin 500 mg, metronidazole 500 mg, and lansoprazole 30 mg twice/day for 14 days) or tailored therapy (amoxicillin 1 g, clarithromycin 500 mg, and lansoprazole 30 mg twice/day for 14 days in point mutation-negative subjects; and amoxicillin 1 g, metronidazole 500 mg, and lansoprazole 30 mg twice/day for 14 days in point mutation-positive subjects).
Results The sensitivity, specificity and overall accuracy of DPO-based multiplex PCR method for predicting the clarithromycin resistance were 76.4%, 90.1% and 87.5%, respectively. A total of 269 and 227 subjects were included in the intention-to-treat (ITT) and per-protocol (PP) analyses, respectively. Point mutations were identified in 26.8% of the subjects. The overall eradication rate was not significantly different between the groups by ITT and PP analyses. There was no significant difference in the eradication rates between the groups in both the point mutation-negative subjects and the point mutation-positive subjects. The eradication rates were significantly lower in the point mutation-positive subjects than in the point mutation-negative subjects in both the concomitant and tailored therapy groups.
Conclusions Diagnostic validity of DPO-based multiplex PCR method was acceptable. Tailored therapy based on point mutation presence identified with the DPO-based multiplex PCR method was as effective as concomitant therapy. The eradication rates of both therapy regimens were suboptimal in point mutation-positive subjects.
Keywords Concomitant therapy; Eradication; Point mutation; Tailored therapy

Table 1. Eradication Rates of Both Group

	Concomitant therapy	Tailored therapy	P
Overall			
Intention-to-treat analysis	169/196 (86.2%)	164/201 (81.6%)	.132
(95% CI, %)	(81.6% - 91.3%)	(75.6% - 86.6%)	
Per-protocol analysis	157/174 (90.2%)	154/178 (86.5%)	.179
(95% CI, %)	(85.6% - 94.3%)	(81.5% - 91.6%)	
Point mutation (-)			
Intention-to-treat analysis	132/144 (91.7%)	131/150 (87.3%)	.154
Per-protocol analysis	124/130 (95.4%)	123/134 (91.8%)	.174
Point mutation (+)			
Intention-to-treat analysis	37/52 (71.2%)	33/51 (64.7%)	.312
Per-protocol analysis	33/44 (75.0%)	31/44 (70.5%)	.406

Abbreviation: CI, confidence interval.

Upper GI EE-UGI-004

Efficacy and Tolerability of Two Quadruple Regimens: PTMB, PTAB Treatment for Eradication of *Helicobacter pylori* in Patients with Duodenal Ulcer

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Background/Aims This study aimed to evaluate the *Helicobacter pylori* eradication rate of PTMB, PTAB regimen, rate of side effects.
Methods This randomized, 338 patients with *H. pylori* infection and duodenal ulcer without a history of *H. pylori* treatment. Patients were randomly divided into two groups. The PTMB received proton pump inhibitor (PPI), tetracycline 2 g, metronidazole 1 g, bismuth 480 mg, for 14 days. The PTAB received PPI, tetracycline 2 g, amoxicillin 2 g, bismuth 480 mg, for 14 days. Six to eight weeks after the end of treatment, the rate of *H. pylori* eradication was assessed by the ^{13}C urea breath test.
Results A total of 338 patients with *H. pylori* infection were recruited. Eradication rate was higher with PTMB regimen than the PTAB regimen: 127 out of 151 (84.1%) and 119 out of 187 (63.6%). Adverse effects in both groups were 34% and the rate of patients experiencing mild and moderate were 99.1%. The common side effects were fatigue, anorexia and nausea, black stools. The compliance rate was 97.4% (PTMB), 94.6% (PTAB).
Conclusions Fourteen-day PTMB regimen eradication of *H. pylori* >80%, according to Maastricht IV recommendations, with rare serious side effects. PTMB as the first-line regimen for *H. pylori* therapy.
Keywords Bismuth-containing quadruple regimen; Eradication; *Helicobacter pylori* infection; PTMB; PTAB

Upper GI EE-UGI-005

Intensive Endoscopic Surveillance Does Not Improve the Prognosis of Patients Who Received the Endoscopic Resection for Early Gastric Cancer

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Background/Aims Patients who received endoscopic resection for early gastric cancer (EGC) or high-grade dysplasia (HGD) are at high risk of subsequent development of metachronous gastric cancer. The aim of this study is to compare the prognosis of patients between biannual and annual endoscopic surveillance in patients after endoscopic resection of EGC or HGD.
Methods From September 2009 to August 2019, a total of 826 patients who underwent endoscopic submucosal dissection for the treatment of EGC or HGD were analyzed. Patients received endoscopic surveillance twice a year (intensive group) or annually (annual group). Exclusion criteria were patients who received the surgical resection due to non-curative resection, endoscopic follow-up period less than 5 years.
Results Total 388 patients were enrolled in this study (194 in intensive group and 194 in annual group). During a mean follow-up of 5.7±1.5 years, local recurrence was found in six patients in intensive group and eight patients in annual group (3.1% and 4.1%, p=0.586). Metachronous gastric cancer in 20 patients (10.3%) in intensive group and 14 patients (7.2%) in annual group (p=0.281). Most stomach cancers of patients who received additional treatment including endoscopic or surgical resection were stage I EGC. Only one patient in intensive group was diagnosed as stage IIIA advanced gastric cancer.
Conclusions Annual endoscopic surveillance after endoscopic resection of EGC or HGD is more cost effective than biannual endoscopic examination.
Keywords Stomach cancer; Endoscopy

Upper GI EE-UGI-006

The Practice Patterns of Pediatric Endoscopy in South Korea: A Nationwide Survey

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Background/Aims Endoscopic procedures are important for diagnosis and treatment of gastrointestinal disease even in children. As indications are different and cases are not common, pediatric endoscopic procedures might be trickier than those of adults. The aim of the study is to comprehend and analyze the current status of pediatric endoscopy practice pattern in South Korea.
Methods A questionnaire was developed by 12 members of the Korean Society of Pediatric Gastroenterology, Hepatology and Nutrition. The questionnaires were sent to pediatric gastroenterologists by e-mails who are working in general and tertiary hospitals in South Korea.
Results The response rate was 80% (50/60). Three of them (6%) were not performing endoscopy currently. Among the 47 responders who were performing endoscopy, all of them were doing esophagogastroduodenoscopy and 42 (89%) were doing colonoscopy. Other therapeutic procedures such as endoscopic foreign body removal (98%), colonoscopic polypectomy (66%) were performed by pediatric gastroenterologist in many centers. However, some procedures such as endoscopic retrograde cholangiopancreatography (ERCP; 2%), double-balloon enteroscopy (2%) were performed by pediatrician only in limited centers and adult endoscopists were doing such procedures for pediatric endoscopy cases in most of the centers. Thirty-four of the responders (72.3%) were conducting endoscopic biopsies depending on the patient's clinical conditions even from grossly normal mucosa. Eight (17%) responded that they are performing routine biopsies for all patients who are undergoing diagnostic endoscopy. Majority of the endoscopies were done under sedation in most centers and the most frequently used sedatives were midazolam and ketamine.
Conclusions Most of the pediatric endoscopy specialists were performing esophagogastroduodenoscopy, colonoscopy and endoscopic foreign body removal by themselves. However, relatively rare procedures such as ERCP or double balloon enteroscopy were dependent on adult endoscopy specialist. These results should be considered for pediatric endoscopic training. Furthermore, close communications with endoscopy specialist of internal medicine are required.
Keywords Endoscopy; Children; Survey

Upper GI EE-UGI-007

Difference in the Eradication Rate of *Helicobacter pylori* Infection According to the Period of Treatment Start after Diagnosis of Bleeding Peptic Ulcer

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Background/Aims The eradication rate of *Helicobacter pylori* infection in peptic ulcer bleeding (PUB) could be affected by various factors. Timing of *H. pylori* eradication in PUB has not been determined to date. The aim of this study was to evaluate the eradication rates of *H. pylori* infection according to the time of treatment start in patients with PUB.
Methods A total of 259 *H. pylori*-infected patients with PUB between January 2012 and December 2018 in Kangdong Sacred Heart Hospital were included. The treatment of *H. pylori* was proton pump inhibitors, amoxicillin and clarithromycin for 7 days and confirmation of eradication was identified by urease breath test. We investigated independent factors influencing *H. pylori* eradication rate.
Results Mean age was 52.8±14 years and 79.8% was male patients. Gastric ulcer was 59.7% of PUB patients. Mean interval to treatment was 9.8±18.3 days. We defined early eradication group as subjects who started *H. pylori* eradication within 10 days of admission and late eradication group as treatment start after 10 days of admission. We conducted multivariate analysis to investigate the independent factors for successful *H. pylori* eradication. In multivariate analysis, early eradication group (<10 days) was only significant factor for successful eradication of *H. pylori* infection (181/211 [85.8%] vs 31/44 [70.5%], p=0.009; odds ratio, 2.385; 95% confidence interval, 1.248 to 4.557).
Conclusions In patients with *H. pylori*-infected PUB, early start of *H. pylori* treatment was significant factor for successful eradication. Future prospective study including antibiotic resistance could be needed to confirm our hypothesis.
Keywords *Helicobacter pylori*; Eradication; Peptic ulcer bleeding

Classification Table[a]

Observed			Predicted eradication 0	Predicted eradication 1	Percentage Correct
Step 1	eradication	0	0	43	.0
		1	0	212	100.0
	Overall Percentage				83.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B) Lower	Upper
Step …	치료10	.869	.330	6.917	1	.009	2.385	1.248	4.557

a. Variable(s) entered on step 1: 치료10.

Upper GI EE-UGI-008

The Difference between Preprandial and Postprandial Rabeprazole Dosing on *Helicobacter pylori* Eradication Efficacy

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Background/Aims Thirty minutes preprandial dosing has been considered a prerequisite for proper proton pump inhibitor (PPI) effect. Preprandial intake is quite bothersome. Rabeprazole has recently been proved to use postprandially as well as preprandial dosing. We investigated the Helicobacter eradication efficacy of postprandial rabeprazole dosing compared to preprandial PPI regimen.
Methods Study was conducted by review of electronic medical record of patients who received triplet regimen (rabeprazole, amoxicillin, and clarithromycin) at an academic institute, Seoul, from January 2016 to January 2019.
Results A total of 340 subjects were enrolled consecutively. Eight-six subjects were excluded due to incomplete data profiles. Finally, 254 subjects were included in the analysis. One hundred and thirty-five subjects (control group) were treated with pre-prandial rabeprazole and 119 subjects (test group) were with postprandial dose. The mean ages were 52.6±12.5 years old for the control group and 56.1±11.9 for the test group. The male to female ratios were 1.65 (84/51) for the control group and 1.90 (78/41) for the test group. *Helicobacter pylori* eradication was successful in 79.2% in total. In control group 79.3% was successful and in test group 79.2% was successful (p=0.474). In subgroup analysis, the 14-day regimen showed better eradication success rate than 7-day regimen, 85.5%, and 72.8% respectively, but statistical significance was not achieved (p=0.55). Gender, smoking, alcohol, and comorbidities have no impact on eradication efficacy.
Conclusions For *H. pylori* eradication, postprandial rabeprazole dosing results in a comparable success rate to pre-prandial dosing in a rabeprazole-amoxicillin-clarithromycin combination regimen.
Keywords Rabeprazole; *Helicobacter pylori*; Eradication

Upper GI EE-UGI-009

Impact of *Helicobacter pylori* Eradication Timing on the Risk of Metachronous Lesions after the Treatment of Early Gastric Cancer: A Population-Based Cohort Study

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Background/Aims Impact of *Helicobacter pylori* eradication timing on metachronous recurrence after the treatment of early gastric cancer has not been clarified.
Methods Data of patients who underwent endoscopic resection or partial gastrectomy for early staged-gastric cancer and who received *H. pylori* eradication therapy were obtained from the Korean National Health Insurance Service database. *H. pylori* eradication timing was classified into the following three groups: group A, eradication before treatment of gastric cancer; group B, eradication within 1 year from the treatment; and group C, eradication after 1 year from the treatment.
Results Among 19,767 participants, 7,452 and 12,315 underwent endoscopic resection and surgery, respectively. Five-year cumulative incidence of metachronous lesion in patients who underwent endoscopic resection were 14.0%, 12.3%, and 16.9% in the groups A, B, and C, respectively, and those in patients who underwent surgery were 1.2%, 1.3%, and 2.9% in the groups A, B, and C, respectively. Early eradication after the treatment of gastric cancer was associated with a lower risk of metachronous lesions compared to late eradication (hazard ratio [95% confidence interval]: after endoscopic resection, 0.79 [0.66 to 0.96]; after surgery, 0.40 [0.29 to 0.54]). Risk of metachronous lesions did not differ between patients who received eradiation therapy within 1 year and those who already underwent eradication therapy before gastric cancer treatment.
Conclusions *H. pylori* eradication therapy within 1 year from the treatment of gastric cancer reduces the risk of metachronous gastric neoplasms compared to late eradication therapy in both patients who undergo endoscopic resection and those who undergo surgery.
Keywords *Helicobacter pylori*; Gastric cancer; Recurrence; Endoscopic resection; Gastrectomy

Upper GI EE-UGI-010

The Association between Serum Pepsinogen Levels and Improvement of Intestinal Metaplasia after *Helicobacter pylori* Eradication

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Background/Aims Only a few studies have evaluated the correlations between serum pepsinogen (PG) and histology after eradication of *Helicobacter pylori*. The aim of this study is to evaluate the effect of *H. pylori* eradication on intestinal metaplasia correlated with serum PG with a long-term follow-up.
Methods From December 2006 to February 2019, we prospectively enrolled 347 subjects with successful *H. pylori* eradication. *H. pylori* tests (Giemsa stain, CLOtest, and culture) were performed to evaluate *H. pylori* status. Histological assessment was performed in the antrum and corpus by Sydney classification. Subject without histological intestinal metaplasia (IM) (grade=0) was excluded. Serum PG levels were measured using a Latex-enhanced Turbidimetric Immunoassay (Shima Laboratories) before and after eradication, compared by using linear mixed model. The follow-up points were classified as less than 12 months, 12 to 23 months, 24 to 35 months and more than 36 months.
Results In *H. pylori*-eradicated group mean serum PG I (65.4 vs 53.0, p<0.001) became significantly lower and mean PG I/II ratio (3.35 vs 5.07, p<0.001) became higher at less than 12 months after eradication compared to those at baseline (Table 1). This improvement of PG values after eradication maintained during all follow-up points. The mean IM grade in the antrum (1.73 vs 1.21, p<0.001) and body (1.63 vs 0.94) became significantly lower at less than 12 months after eradication compared to those at baseline (Table 1). This improvement was also maintained during all follow-up points.
Conclusions There was an association between serum PG levels and improvement of IM grade at the long-term follow-up after *H. pylori* eradication.
Keywords Pepsinogen; Eradication; Intestinal metaplasia; *Helicobacter pylori*

Table 1. Changes in Serum Pepsinogen and Intestinal Metaplasia Grade at Each Follow-up Compared to Baseline in the *Helicobacter pylori*-Eradicated Group

		Helicobacter pylori-eradicated								
		Before eradication	After eradication							
			<12m	*p*-value*	12-23m	*p*-value*	24-35m	*p*-value*	≥36m	*p*-value*
		(n = 347)	(n = 174)		(n = 154)		(n = 73)		(n = 76)	
PG	PG I	65.403	53.053		47.687		41.308		45.406	
	Mean (SE)	(2.114)	(2.645)	**<0.001**	(2.897)	**<0.001**	(4.014)	**<0.001**	(4.227)	**<0.001**
	PG II	22.126	11.221		9.735		8.941		10.522	
	Mean (SE)	(0.625)	(0.848)	**<0.001**	(0.917)	**<0.001**	(1.312)	**<0.001**	(1.316)	**<0.001**
	PG I/II ratio	3.352	5.073		4.864		4.856		4.396	
	Mean (SE)	(0.106)	(0.133)	**<0.001**	(0.146)	**<0.001**	(0.202)	**<0.001**	(0.212)	**<0.001**
IM grade	Antrum	1.73±0.06	1.21±0.08	**<0.001**	1.18±0.08	**<0.001**	1.33±0.11	**0.015**	1.36±0.11	**0.024**
	Mean (SE)	(n=211)	(n=98)		(n=105)		(n=49)		(n = 52)	
	Corpus	1.63±0.07	0.94±0.11	**<0.001**	0.95±0.10	**<0.001**	0.73±0.14	**<0.001**	1.19±0.14	**0.047**
	Mean (SE)	(n=134)	(n=60)		(n=69)		(n=35)		(n=34)	

PG, pepsinogen; IM, intestinal metaplasia; SE, standard error.
*p-value compared to before eradication.

Upper GI EE-UGI-011

Comparing the Efficacy among Concomitant, Sequential, and Tailored Therapy as the First-Line Therapy for *Helicobacter pylori* Eradication

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Background/Aims The *Helicobacter pylori* eradication rate of clarithromycin-based triple therapy has decreased to an unacceptably low level, and novel therapeutic strategies are necessary. The aim of the study is to compare the efficacy of concomitant, sequential, and tailored therapy as the first-line therapy of *H. pylori* eradication.
Methods A total of 1,290 patients infected with *H. pylori* were divided into three groups, and each group was treated with a different eradication therapy. The first group was simultaneously treated with rabeprazole, amoxicillin, clarithromycin, and metronidazole (concomitant therapy group). The second group was treated with rabeprazole and amoxicillin, followed by rabeprazole, clarithromycin, and metronidazole (sequential group). The final group was devised in which amoxicillin, rabeprazole, and clarithromycin were given in the absence of a mutation in a 23S rRNA, while clarithromycin was replaced by metronidazole when the mutation was detected (tailored group). In the case of a failure to eradicate *H. pylori*, second-line quadruple and third-line eradication therapies were administered. Six weeks after the treatment period, the patients underwent ^{13}C-Urea breath test (UBT) to confirm *H. pylori* eradication.
Results The eradication rates were 92.0% (312/339) in the concomitant group, 85.1% (285/335) in the sequential group, and 91.2% (176/193) in the tailored group (p=0.135). The second-line therapy was applied to 94 patients, and the eradication rate was 79.8% (71/89). The eradication rate for the third-line therapy was 47.1% (8/17).
Conclusions No statistical difference was found in eradication rates among the three groups. However, in areas where resistance of clarithromycin is high, concomitant and tailored therapy may be more effective than sequential therapy for *H. pylori* eradication.
Keywords *Helicobacter pylori*; Eradication; Drug resistance; Concomitant therapy; Sequential therapy

Upper GI EE-UGI-012

Correlation between *Helicobacter pylori* Infection and Autoimmune Thyroid Disease

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Background/Aims *Helicobacter pylori* infection may be associated with extra-digestive diseases such as coronary artery disease, nonalcoholic fatty liver disease and autoimmune disease. Many studies used serological tests to diagnose of *H. pylori* infection, but these methods detected past and current infection. The aim of this study was to determine the correlation between current infection of *H. pylori* and autoimmune thyroid disease.
Methods A retrospective, cross-sectional study was conducted with those who received screening esophagogastroduodenoscopy between January 1, 2010 and December 31, 2018. The subjects were categorized into two groups that were *H. pylori* infected group and no *H. pylori* infected group. Anti-thyroid peroxidase (anti-TPO) antibody was compared as the primary outcome between two groups. Also, thyroid-stimulating hormone, free thyroxine, rheumatoid factor (RF) levels and thyroid function were compared.
Results A total of 43,321 subjects were included in the analysis. The number of *H. pylori* positive subjects was 15,927 and *H. pylori* negative was 27,394. Anti-TPO antibodies positive rate of *H. pylori* positive group was 8.27% (n=1,317) and *H. pylori* negative group was 9.47% (n=2,595) in the univariate analysis (p<0.0001). In the multivariate analysis, the positive rate of anti-TPO antibody in the *H. pylori* positive group was significantly lower (odds ratio, 0.877; 95% confidence limits, 0.818 to 0.941; Pr >chi-square 0.0002) than in the *H. pylori* negative group and RF positive rate in the *H. pylori* positive group was significantly lower (odds ratio, 0.898; 95% confidence limits, 0.74 to 0.86; Pr >chi-square <0.0001) than in the *H. pylori* negative group when age, sex and body mass index were adjusted as covariates.
Conclusions Current *H. pylori* infection had a statistically significant effect on the positive rate of anti-TPO antibody and RF inversely.
Keywords *Helicobacter pylori*; Autoimmune thyroid disease; Anti-thyroid peroxidase antibody; Autoantibody; Rheumatoid factor

Upper GI EE-UGI-013

The Usefulness of Endoscopic Hill Grade in the Evaluation of Children with Suspected Gastroesophageal Reflux

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Background/Aims Most adults with gastroesophageal reflux disease (GERD) are diagnosed with typical symptoms, but in children, it is often difficult to diagnose GERD based on symptoms alone. Hill grade is a grading system made of the endoscopic appearance of a gastroesophageal valve. Many adult studies have been linked to Hill grade, GER, and hiatal hernia, but studies in children are still lacking. The aim of this study is to investigate the relationship between hill grade and gastroesophageal reflux in children.
Methods Retrospective review of 149 children and adolescents who underwent endoscopy and 24-hour multichannel intraluminal impedance-pH monitoring at Seoul National University Bundang Hospital from March 2013 to July 2019. Gastroesophageal flap valves were evaluated by reviewing endoscopy findings as defined by the hill classification, and the results were statistically analyzed with 24-hour multichannel intraluminal impedance-pH monitoring test.
Results Hill grade 1, 2, 3, and 4 groups were identified in 81 patients (54.4%), 34 patients (22.8%), 21 patients (14.1%), and 13 patients (8.7%), respectively. Hill grade and 24-hour multichannel intraluminal impedance-pH monitoring results were analyzed by linear regression analysis. An increase in Hill grade by 1 increased the acid exposure index by 1.7% (p<0.001), the bolus exposure index by 0.5% (p<0.001), the DeMeester score by 4.2 points (p<0.001), the number of Reflux episodes by 14.2 episode (p<0.001), and the number of GER reaching proximal extent increased by 7.4 episodes (p<0.001) on average, which was statistically significant.
Conclusions Hill grade through endoscopy in children is associated with gastroesophageal reflux. Estimating the degree of gastroesophageal reflux through endoscopy findings, which are relatively easy to perform compared to the 24-hour multichannel intraluminal impedance-pH monitoring test, can be very useful in the treatment of pediatric GERD.
Keywords Gastroesophageal reflux disease; Hill grade

Upper GI EE-UGI-014

Distribution of Somatostatin-Secreting Delta Cells in the Stomach in Children Presenting with Gastrointestinal Symptoms

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Background/Aims Gastric delta cell (D-cell), somatostatin-secreting cell, is main paracrine inhibitor of acid secretion. The number of D-cell was studied in the children presenting with upper gastrointestinal (UGI) disease.
Methods We retrospectively investigated the number of the D-cells in the stomach body and antrum through immunofluorescent examinations according to the symptoms, endoscopic findings and *Helicobacter pylori* (HP) infection in the 75 children, who visited Hanyang University Hospital Pediatrics.
Results Patient's mean age was 12.2±3.3 years. The male to female ratio was 1:1.4. D-cell's mean number per high power field (HPF) was 20.5 in antrum, 12 in body when the children had substernal pain; 18.3 in antrum, 10.3 in body with vomiting; 22.3 in antrum, six in body with diarrhea. The number was very low in the children with abdominal pain, 9.3 in antrum and six in body (p>0.05). D-cell's mean number (in antrum, in body) according to the endoscopic findings was as follows: gastritis (14.3, 6), reflux esophagitis (14, 9.3), duodeno-gastro reflux (16.7, 8.7), gastric ulcer (19.3, 12.7), duodenitis (16, 13.7) and duodenal ulcer (12.3, 4) (p>0.05). The mean number of D-cell was 2.7 in the body of in the children with current HP infection compared to 8.7 in the noninfected children (p=0.01), but that in the antrum was 15.5 in the HP-infected and 14 the noninfected with no statistical significance.
Conclusions D-cell number was lower in the body in the children with current HP infection than HP-negative group. The findings concerning peptide-secreting cells in the stomach may explain more about the pathogenic pathways of HP-induced gastric disorder. Further control studies and studies with large population would provide detail information.
Keywords Somatostatin-secreting cell; Children; Stomach; *Helicobacter pylori*

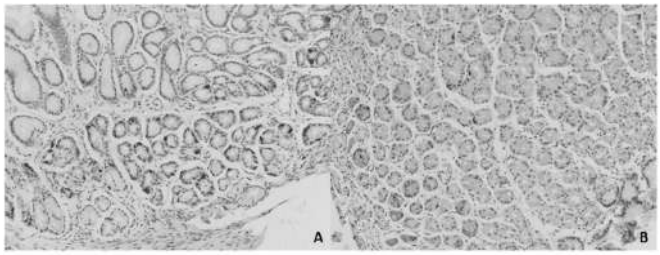

Fig. 1. Somatostatin-immunoreactive cells in the human stomach (×200). (A) Pyloric mucosa and (B) body mucosa.

Upper GI EE-UGI-015

Modified E-Vac Technique Modified through the Overtubes for Patients with Esophageal Anastomotic Leaks

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Background/Aims Endoscopic vacuum-assisted closure (E-VAC) therapy is safe and effective for esophageal anastomotic leaks. However, the repetitive exchange of sponge tubes is technically demanding.
Methods We designed an E-VAC technique, modified through the use of overtube, to make E-VAC therapy safer and more comfortable for both endoscopists and patients. Intraluminal E-VAC therapies were used for the treatment of postoperative thoracic esophageal leaks in five cases of esophageal cancer. After overtube insertion, sponge tube was inserted through the overtube, while keeping biopsy forcep inside the nasogastric tube (NGT), and was positioned at intraluminal leakage site under endoscopic guidance. NGT was repositioned from the mouth to the nostrils using carrier tube and a controlled negative pressure was applied. Sponge tube was regularly changed twice a week until the complete closure of leaks. Technical and clinical success rates were analyzed to evaluate the safety and efficacy of this technique.
Results The modified E-VAC therapy was applied in five selected cases for a mean of 13.8 days (range, 7 to 28 days) with a mean of 3.2 sponge tube changes (range, 2 to 6 changes) for anastomotic leaks that were, on average, 1.0 cm (range, 0.5 to 2 cm). The mean procedural time was 14.9 minutes (range, 12 to 30 minutes) and no E-VAC therapy-related complications occurred. All patients were discharged, on average, after 44.4 days (range, 14 to 95 days) of hospitalization and two cases were treated with additional esophageal metal stents after six and two sponge tube changes, respectively (Table 1).
Conclusions Our E-VAC therapy technique, modified via inserting sponge tubes through overtube, is effective and safe for patients with thoracic esophageal anastomotic leaks.
Keywords Vacuum-assisted; Esophageal; Leakage; Overtube

Table 1. Characteristics and Outcomes of Five Patients Treated with E-VAC Therapy

Patients	Age/ Sex	Perforation size, cm	Distance of leak from incisor, cm	Sponge Exchanges (n)	E-VAC duration (days)	Combined therapy	E-VAC results	Clinical outcome	Compli cations
1	69/M	2	22	5	28	None	Closure	Improved	None
2	66/M	1	30	2	7	Stent	Closure	Improved	None
3	64/M	0.5	24	6	20	Stent	Closure	Improved	None
4	68/M	1	27	2	7	None	Closure	Improved	None
5	72/M	0.6	25	2	7	None	Closure	Improved	None

Upper GI EE-UGI-016

Optimal Endoscopy Timing According to the Severity of Underlying Liver Disease in Patients with Acute Variceal Bleeding

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Background/Aims Current guidelines recommend endoscopic therapy to be performed within 12 hours for acute variceal bleeding (AVB). However, the optimal timing of endoscopic therapy for AVB remains unclear. To examine the relationship between the endoscopy timing and clinical outcomes in AVB, with emphasis on liver function and endoscopy timing.
Methods From January 2010 to June 2017, cirrhotic patients with AVB confirmed by endoscopy were evaluated. The primary outcome was a composite of 6-week rebleeding and mortality. We stratified patients according to the Model for End-Stage Liver Disease score.
Results In 411 patients, the overall composite outcome rate was 30.9% (n=127) at 6 weeks. Patients who underwent urgent endoscopy (≤12 hours) had a significantly higher composite outcome than patients who underwent nonurgent endoscopy (>12 hours) (34.4% vs 19.1%; p=0.005). Low-risk patients who underwent urgent endoscopy were more likely to reach the composite outcome (adjusted odds ratio, 0.84 per 4 hours; 95% confidence interval, 0.73 to 0.98; p=0.027). These findings persisted even after adjustment for baseline characteristics between the urgent and nonurgent groups.
Conclusions Urgent endoscopy is significantly associated with a poorer outcome in patients with AVB, especially in low-risk patients. Our result provides a treatment strategy according to the severity of underlying liver disease in patients with AVB.
Keywords Endoscopy timing; Liver function; Mortality; Rebleeding; Variceal bleeding

Upper GI EE-UGI-017

Ambient Air Pollution in Gastrointestinal Endoscopy Unit

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Background/Aims The gastrointestinal endoscopy unit is frequently exposed to gastrointestinal gas expelled from patients and electrocoagulated tissue through carbonation. This can be potentially harmful to the health of not only the healthcare personnel but also patients who undergo endoscopy. This study aimed to measure the air quality in the endoscopy unit.
Methods We measured indoor air quality indices using portable passive air quality monitoring sensors in the procedural, recovery area, and cleansing-of-equipment area, at 1-minute intervals for 1 week, and the type and number of endoscopic procedures were recorded.
Results CO_2, $PM_{2.5}$, NO_2, and ozone levels were the highest in the cleansing area, followed by the procedural and recovery areas, and volatile organic compound (VOC) level was highest in the procedural area. The proportion of poor-quality level of CO_2 and VOCs was highest in the procedural area and that of NO_2 was highest in the cleansing area. The proportion of tolerable to poor-quality (exceeding acceptable level) level of CO_2 and total VOCs in the procedural area was 26% and 19.2%, respectively. The proportion of tolerable to poor-quality level of NO_2 in the cleansing area of the endoscopy unit was 32.1% in all measurement times. Multivariate analyses revealed that tolerable to poor-quality level of VOCs was associated with the number of endoscopic procedures (odds ratio [OR], 1.79; 95% confidence interval [CI], 1.42 to 2.27) and $PM_{2.5}$ level (OR, 1.27; 95% CI, 1.12 to 1.44). Moreover, tolerable to poor-quality level of CO_2 was associated with the number of colonoscopy (OR, 5.35; 95% CI, 1.19 to 24.02), especially with electrocoagulation procedures (OR, 24.31; 95% CI, 1.31 to 452.44) in the procedural area.
Conclusions Healthcare personnel and patients who undergo endoscopy are exposed to ambient air pollution. Health-related protective strategies for ambient air pollution in the endoscopy unit are warranted.
Keywords Air pollution; Indoor; Endoscopy; Gastrointestinal; Particulate matter; Volatile organic compounds

Upper GI EE-UGI-018

Helicobacter pylori vacA, babA2 and oipA Associated with Clinicopathological Outcomes: A Cross-Sectional Study in Northeast Thailand

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Background/Aims To determine the presence of *Helicobacter pylori* virulence genes including cagA, vacA, iceA2, babA2 and oipA and to evaluate the associations between virulence genotypes and clinicopathological outcomes in Thai patients.
Methods Patients were enrolled during January 2017 to December 2018. All patients were subjected to esophagogastroduodenoscopy, was carried out using an upper gastrointestinal video endoscope. A total of 200 gastric specimens, *H. pylori* infection was confirmed and virulence genes (cagA, vacA, iceA2, babA2, and oipA) were determined by real time polymerase chain reaction. Multivariate Cox proportional hazards regression model was used to evaluate the associations between virulence genes and clinicopathological outcomes as well as virulence genotype combinations and risk of development of gastric cancer.
Results *H. pylori* infection was confirmed in 166 patients consisting 44 patients with chronic gastritis, 52 patients with precancerous lesions and 70 patients with gastric cancer. The most frequently presented virulence gene, vacA (73%) in chronic gastritis, babA2 (62%) in precancerous lesions, and babA2 and oipA (91%) in gastric cancer. The presence of vacA, babA2, and oipA was exhibited significantly differences among chronic gastritis, precancerous lesions and gastric cancer (p=0.047, p=0.041 and p=0.038, respectively). The vacA, babA2, and oipA was increased risk of gastric cancer (odds ratio [OR], 1.23; 95% confidence interval [CI], 1.13 to 3.32; p=0.033 and OR, 2.64; 95% CI, 1.44 to 4.82, p=0.024 and OR, 2.79; 95% CI, 1.58 to 5.41; p=0.031, respectively). Interestingly, patients who were infected with *H. pylori* $vacA^+/babA2^+/oipA^+$ genotype have increased risk of gastric cancer (OR, 3.85; 95% CI, 1.67 to 5.77; p=0.014) (Table 1).
Conclusions This cross-sectional study provided an important information regarding the presence of virulence genes in different clinicopathological outcomes. *H. pylori* genotype determination might help to predict the clinical outcomes as well as early prevention of gastric cancer in Thai population.
Keywords *Helicobacter pylori*; vacA; babA2; oipA; Gastric cancer

Table 1. Virulence Genotype Combinations in Association with Development of Gastric Cancer

Pattern			Precancerous (n=52)	Gastric cancer (n=70)	OR (CI 95%)	*P* value
VacA	BabA2	OipA				
+	+	-	2(3.85)	2(2.86)	0.72(0.42-0.97)	0.634
+	-	+	2(3.85)	2(2.86)	0.72(0.42-0.97)	0.634
-	+	+	14(26.92)	24(34.29)	0.73(0.37-0.96)	0.091
+	+	+	6(11.54)	36(51.43)	4.28(1.82-7.41)	**0.021**

Multivariate Cox regression model analysis used to analyze the data. OR, odds ratio; CI, confidence interval.
*Significant is set at $p < 0.05$.

Upper GI EE-UGI-019

The Efficacy of Modified Bismuth Quadruple Therapy for *Helicobacter pylori* Infection in Korea: A Single Arm Prospective Observational Study

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Background/Aims Recently, we reported that modified bismuth quadruple therapy in which tetracycline was replaced by amoxicillin (PAM-B therapy) showed excellent clinical results in Korea. Further prospective longitudinal analysis with larger number was performed in our hospital. The aim of this study was to evaluate the effectiveness of a first line 14-day PAM-B therapy and investigate the optimal rescue treatment for the first-line treatment failure.
Methods A prospective observational study of *Helicobacter pylori* eradication was conducted in a single institute. A total of 324 treatment-naïve patients with active *H. pylori* infections, who were positive for *H. pylori* between April 2016 and January 2019, were included for analysis. All enrolled patients were treated with 14-day PAM-B therapy (rabeprazole 20 mg, amoxicillin 1 g, metronidazole 750 mg, and tripotassium dicitrato bismuthate 600 mg (elemental bismuth 240 mg twice daily). Six weeks after treatment, *H. pylori* eradication was assessed.
Results Among the 324 participants, 30 patients were lost to follow-up and nine patients consumed less than 80% of prescribed medication. So, the overall eradication rates by intention-to-treat (ITT) and per-protocol (PP) analyses were 83.0% (269/324) and 94.4% (269/285). All 298 patients who received a dose and for whom an outcome measure is available, 19 patients including three patients of low compliance were failed to eradicate *H. pylori* with PAM-B therapy (modified ITT= 93.6% [279/298]). In 16 patients of treatment failure despite of good compliance, 11 patients were agreed to treat with 2nd line treatment with conventional bismuth-containing quadruple therapy. Among them, eradication rate was 88.9% (8/9) except two follow-up loss patients.
Conclusions PAM-B therapy was highly effective as a first line therapy for *H. pylori* eradication. Conventional bismuth quadruple therapy is thought to be sufficient as a rescue therapy.
Keywords *Helicobacter pylori*; Eradication; Bismuth; Quadruple therapy

Upper GI EE-UGI-020

Comparison of the Efficacy and Safety of Midazolam, Propofol, or Etomidate for Maintenance of Sedative Upper Gastrointestinal Endoscopy

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Background/Aims For more safe and effective upper gastrointestinal endoscopy, sedative drugs including propofol or midazolam have used wildly. However, these drugs have associated with various adverse events. Etomidate is a new emerging drug that has stability and efficacy. In this study, we tried to compare the efficacy and safety of etomidate, midazolam, and propofol for sedative endoscopy.
Methods This was a double-blinded, randomized controlled study. All patients were divided into three groups randomly and received midazolam as induction and subsequently received additional midazolam (M+M group), propofol (M+P group), or etomidate (M+E group) as maintenance. The primary outcome was an overall cardiopulmonary adverse event.
Results Between October and November 2018, a total of 100 patients underwent sedative endoscopic examination. Overall cardiopulmonary adverse events were occurred in 10 patients (33.3%) of the M+M group, in seven patients (20.6%) of the M+P group, and in 11 patients (30.6%) of the M+E group. The incidence of oxygen desaturation was identified in one patient of the M+M group (3.3%), three patients of the M+P group (8.8%), and four patients of the M+E group (11.1%), respectively. However, there was no statistically significant difference. Of the M+E group, myoclonus was occurred in three patients with a median 60 seconds, however self-limited. Although the satisfaction of patient and endoscopist were not significantly different between each group, dissatisfaction of patient and endoscopist were more identified in M+E group compared to other groups.
Conclusions Additional administration of etomidate to midazolam in sedative endoscopy was not inferior to additional midazolam or propofol to midazolam regarding safety and efficacy.
Keywords Sedative; Endoscopy; Etomidate; Propofol; Etomidate

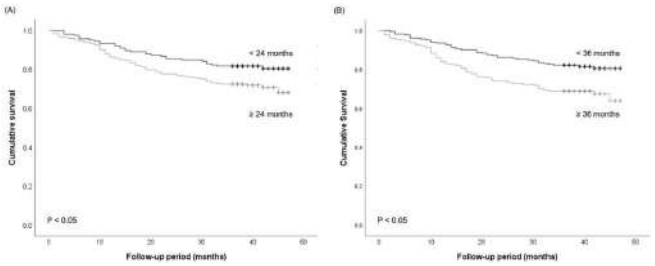

Fig. 1. Cancer-related mortality.

Upper GI EE-UGI-021

The Impact of Interval of Previous Endoscopic Exam on Mortality and Treatment Modality in Undifferentiated-Type Gastric Cancer

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Background/Aims The impact of interval of previous endoscopy on the treatment modality or mortality for undifferentiated-type gastric cancer is unclear. This study aimed to investigate the effect of endoscopic screening interval on stage, cancer-related mortality, and treatment methods for undifferentiated-type gastric cancer.
Methods We reviewed the medical records of patients who were newly diagnosed with undifferentiated gastric cancer in 2013 and in whom the interval of previous endoscopy to diagnosis could be determined. The patients were classified according to the period from interval of endoscopy before diagnosis (<12, 12–23, 24–35, ≥36 months, and no history), and the outcomes were compared between the groups. Patients who underwent endoscopic and surgical treatment were re-classified based on the final treatment results.
Results Totally 440 patients were enrolled. The male was 64.1%. There were 11.8% who reported to have received endoscopy for the first time in their cancer diagnosis. The rate of stage I at diagnosis decreases as the interval from previous endoscopy to diagnosis increase with significant difference (65.4%, 63.2%, 64.2%, 45.9% and 35.2%, p<0.01). Cancer-related mortality was significantly lower in the 3-year interval of endoscopy (p<0.001) (Fig. 1).
Conclusions A 3-year interval in endoscopic screening reduces mortality in gastric cancer, particularly in cases of undifferentiated histology. A biennial check-up could increase the likelihood of endoscopic cure.

Upper GI EE-UGI-022

Risk Factors of Rebleeding among Patients with Nonvariceal Upper Gastrointestinal Bleeding with Anticoagulant Therapy

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Background/Aims Acute upper gastrointestinal bleeding (UGIB) is a severe complication associated with oral anticoagulants. However, little is known about the risk factors of rebleeding among anticoagulant users with a history of UGIB. We aimed in this study to evaluate the risk factors of rebleeding after successful endoscopic hemostasis for UGI bleeding in patients taking oral anticoagulants.
Methods Between July 2007 and July 2019, 68 patients with oral anticoagulants were hospitalized due to nonvariceal UGIB and followed up at a tertiary hospital. We retrospectively reviewed the clinical characteristics and compared them between patients with and without rebleeding.
Results he most common cause of UGIB was peptic ulcer in 46 patients (70.6%), followed by Dieulafoy lesion in four patients (20%), Mallory-Weiss syndrome, advanced gastric cancer (three patients, 15% respectively). Rebleeding after hemostasis occurred in 16 patients (23.5%). There was no 30-day mortality among patients with rebleeding. Univariate analysis revealed that duodenal location (43.8% vs 17.3%, p=0.029) and presence of major comorbidities (81.3% vs 23.1%, p<0.001) were significantly more frequent in rebleeding group. By multivariate analysis, major comorbidities (odds ratio [OR], 95.2; 95% confidence interval [CI], 4.4 to 2,056.8; p=0.004), duodenal location (OR, 19.5; 95% CI, 1.5 to 249.4; p=0.022) and *Helicobacter pylori* infection (OR, 24.1; 95% CI, 1.7 to 333.8; p=0.018) were significant risk factors for rebleeding.
Conclusions Despite of successful endoscopic hemostasis for UGIB, the rebleeding rate was considerable. Therefore, physicians need to be cautious about rebleeding if patients have a duodenal lesion, comorbidities or *H. pylori* infection.
Keywords Anticoagulant; Upper gastrointestinal bleeding

Upper GI EE-UGI-023

Long-term Outcomes of Endoscopic Submucosal Dissection for Superficial Esophageal Cancer: A Comparison Study to Surgery Using Propensity Score-Matched Analysis

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Background/Aims Endoscopic submucosal dissection (ESD) is widely accepted treatment option for superficial esophageal squamous cell carcinoma (ESCC). But there are few studies that compare long-term outcomes of ESD with surgical result. Aim of this study was to compare overall survival (OS), disease-specific survival (DSS), recurrence-free survival (RFS) of such patients underwent ESD or surgery.

Methods We retrospectively reviewed patients who underwent ESD (n=157) or surgery (n=228) for stage Tis-T1 ESCC in Seoul National University Hospital from 2005 to 2017. Propensity score-matched (PSM) analysis was used to minimize selection bias. PSM produced 36 patient pairs were used to compare OS, DSS, RFS, rate of recurrence and adverse event.

Results In overall study population, there were significant differences in histologic differentiation, tumor size, depth of invasion, lymphovascular invasion, R0 resection, follow up duration, overall adverse event, hospital stay and rate of recurrence in the two treatment groups. In a matched cohort of 36 pairs, OS (94.4% vs 88.9%, p=0.674), DSS (100.0% vs 100.0%, p=NA), rate of recurrence (8.3% vs 2.8%, p=0.614) were comparable between the ESD group and the surgery group. However, the ESD group showed a lower adverse event (22.2% vs 55.6%; p=0.004) and shorter hospital stay (mean, 3.6 days vs 29.0 days, p<0.001). The Kaplan-Meier survival curves for OS, DSS and RFS also showed comparable long-term outcomes between ESD and surgery group (OS, p=0.577; DSS, p=1.000; RFS, p=0.279) (Fig. 1).

Conclusions Long-term outcomes of ESD comparable with surgery in patients with superficial ESCC. This results support ESD as an alternative to esophagectomy in superficial ESCC.

Keywords Superficial esophageal squamous cell carcinoma; Endoscopic submucosal dissection; Esophagectomy; Propensity score-matched analysis

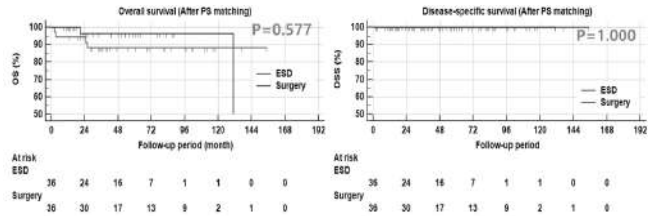

Fig. 1. Kaplan-Meier survival curves.
ESD, endoscopic submucosal dissection; PS, propensity score; OS, overall survival; DSS, disease-specific survival.

Upper GI EE-UGI-024

Automated Classification of Gastric Neoplasms in Endoscopic Images Using a Convolutional Neural Network

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Background/Aims Visual inspection, lesion detection, and differentiation between malignant and benign features are key aspects of an endoscopist's role. The use of machine learning for the recognition and differentiation of images has been increasingly adopted in clinical practice. This study aimed to establish convolutional neural network (CNN) models to automatically classify gastric neoplasms based on endoscopic images.

Methods Endoscopic white-light images of pathologically confirmed gastric lesions were collected and classified into five categories: advanced gastric cancer, early gastric cancer, high grade dysplasia, low grade dysplasia, and nonneoplasm. Three pretrained CNN models were fine-tuned using a training dataset. The classifying performance of the models was evaluated using a test dataset and a prospective validation dataset.

Results A total of 5,017 images were collected from 1,269 patients, among which 812 images from 212 patients were used as the test dataset. An additional 200 images from 200 patients were collected and used for prospective validation. For the five-category classification, the weighted average accuracy of the Inception-Resnet-v2 model reached 84.6%. The mean area under the curve (AUC) of the model for differentiating gastric cancer and neoplasm was 0.877 and 0.927, respectively. In prospective validation, the Inception-Resnet-v2 model showed lower performance compared with the endoscopist with the best performance (five-category accuracy 76.4% vs 87.6%; cancer 76.0% vs 97.5%; neoplasm 73.5% vs 96.5%; p<0.001). However, there was no statistical difference between the Inception-Resnet-v2 model and the endoscopist with the worst performance in the differentiation of gastric cancer (accuracy: 76.0% vs 82.0%) and neoplasm (AUC: 0.776 vs 0.865).

Conclusions The evaluated deep-learning models have the potential for clinical application in classifying gastric cancer or neoplasm on endoscopic white-light images.

Keywords Artificial Intelligence; Endoscopy; Neural networks; Stomach neoplasms

Upper GI EE-UGI-025

Research on *Helicobacter pylori* Test and Eradication Rate in Surgically Treated Gastric Cancer Patients: A Retrospective Study

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Background/Aims *Helicobacter pylori* (HP) infection is well known to contribute to the development of gastric cancer (GC). Eradication after endoscopic treatment of early GC is recommended to prevent metachronous cancer in the remnant stomach. In addition, HP eradication therapy after surgical treatment of GC can improve the survival rate of GC patients. In this study, we aimed to investigate the rate of HP diagnosis and eradication treatment after GC surgery in a tertiary institute in Korea.

Methods Patients who received surgical treatment after diagnosis of GC at Seoul National University Bundang Hospital from 2003 to 2017 were retrospectively analyzed using Electronic Medical Recording and Clinical Data Warehouse (CDW). HP examinations (histology, CLO test, and urea breath test) before and after surgery, prescription for eradication, and follow-up examination results are reviewed in detail.

Results Figure shows the examination for HP and eradication status of GC patients. Total 3,734 patients were diagnosed with GC and received surgical treatment. The 2,272 patients (60.8%) were tested (1,372 patients preoperatively and 905 patients after surgery). The 1,283 patients (56.5%) were positive for HP infection. Among HP+GC patients 354 patients (27.6%) received eradication treatment, and finally 237 patients were successfully eradicated. Seventy-one patients showed fluctuation of test results without eradication (dynamic changes for HP), and 989 patients were persistently negative for HP (Fig. 1).

Conclusions Both diagnostic test and eradication treatment rates in patients received GC surgery were significantly low, about one-third patients were not tested even once, and only about 20% of HP-positive patients were successfully eradicated. Considering the high prevalence of GC in Korea and potential benefits of eradication therapy in GC patients, these low rates are disappointing. More attentions and interests of clinicians for GC patients with surgery are needed in terms of HP eradication.

Keywords *Helicobacter pylori*; Gastric cancer; Metachronous gastric cancer

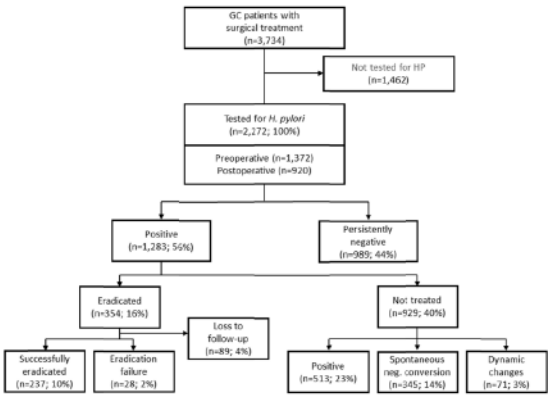

Fig. 1. A flowchart of patient enrollment.
GC, gastric cancer; *H. pylori, Helicobacter pylori.*

Table 1. The Dual Resistance of Isolated *Helicobacter pylori* Strains Based on previous *H. pylori* Eradication

	Dual resistance (%)								
	AMX CLA	AMX MET	AMX LEV	CLA MET	CLA TC	CLA LEV	MET TC	MET LEV	TC LEV
Primary resistance (n=66)	1 (1.5%)	3 (4.6%)	1 (1.5%)	8 (12.1%)	0 (0.0%)	4 (6.1%)	0 (0.0%)	8 (12.1%)	2 (3.0%)
1st eradication failure (n=7)	1 (14.3%)	1 (14.3%)	1 (14.3%)	4 (57.1%)	0 (0.0%)	3 (42.9%)	0 (0.0%)	3 (42.9%)	0 (0.0%)
2nd and more eradication failure (n=9)	1 (11.1%)	1 (11.1%)	1 (11.1%)	8 (88.9%)	1 (11.1%)	3 (33.3%)	1 (11.1%)	3 (33.3%)	0 (0.0%)

AMX, amoxicillin; CLA, clarithromycin; MET, metronidazole; TC, tetracycline; LEV, levofloxacin

Table 2. The Multi Antibiotics Resistance of Isolated *Helicobacter pylori* Strains Based on previous *H. pylori* Eradication

	Multiple drug resistance (%)		
	CLA+MET+TC	CLA+MET + LEV	AMX + CLA + MET+ LEV
Primary resistance (n=66)	0 (0%)	5 (7.6%)	0 (0%)
1st eradication failure (n=7)	0 (0%)	3 (42.9%)	1 (14.3%)
2nd and more eradication failure (n=9)	1 (11.1%)	3 (33.3%)	1 (11.1%)

AMX, amoxicillin; CLA, clarithromycin; MET, metronidazole; TC, tetracycline; LEV, levofloxacin

Upper GI EE-UGI-026

The Current *Helicobacter pylori* Antibiotic Resistance Based on Previous Eradication History

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Background/Aims As the prevalence of antibiotic resistance is increasing, the effectiveness of traditional *Helicobacter pylori* therapies is gradually declining. In particular, the effectiveness of the triple regimen containing clarithromycin (CLA) or metronidazole (MET), proton pump inhibitor, and amoxicillin (AMX) has decreased with a corresponding increase in CLA or MET resistance. In this study, we evaluated the current status of antibiotic resistance of *H. pylori* in Daegu and Kyungpook province.
Methods Patients who revealed *H. pylori* infection were prospectively enrolled from June 2016 to April 2019 in Daegu and Kyungpook province. The patients' clinical data and *H. pylori* culture and antibiotic susceptibility tests were evaluated. For antibiotic susceptibility of *H. pylori*, minimum inhibitory concentrations (MICs) of AMX, CLA, MET, tetracycline (TC), and levofloxacin (LEV) were determined according to the agar dilution method.
Results Of 101 consecutive patients, the *H. pylori* strains of 82 patients (81.2%) were successfully cultured. Total antibiotic resistance to AMX, CLA, MET, TC, and LEV was 7.3%, 36.6%, 35.4%, 3.9% and 32.9%. The prevalence of antibiotic resistance based on previous eradication showed in Fig. 1. In these patients, 27 patients' *H. pylori* strains (32.9%) showed two or more antibiotic resistance. The dual and multi drug resistance of these patients based on previous eradication history showed in Tables 1 and 2. The prevalence of antibiotic resistance was significant different between primary resistance and failure of 1st or more eradication group (p<0.001).
Conclusions Primary antibiotic resistance in Daegu and Kyungpook province was lower compared to other area in Korea, especially Seoul and Gyeonggi province. However, the multi drug resistance was the main cause of in failure of *H. pylori* eradication.
Keywords *Helicobacter pylori*; Antibiotic resistance; Previous eradication history

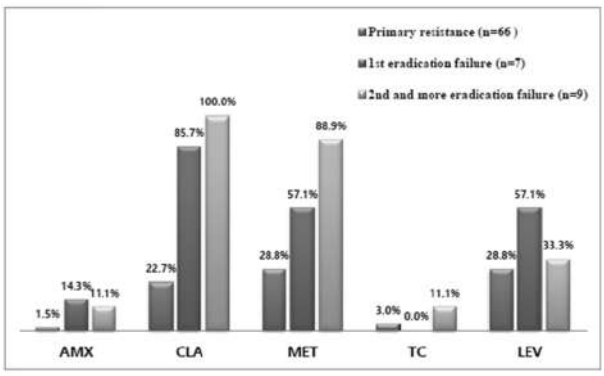

Fig. 1. The antibiotic resistance based on previous *Helicobacter pylori* eradication history.

Upper GI EE-UGI-027

Clarithromycin Resistance Test before First Line Treatment Could Improve the Eradication Rate of *Helicobacter pylori*

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Background/Aims The eradication rate with standard triple therapy has gradually decreased recently due to the increased prevalence of clarithromycin (CAM) resistant *Helicobacter pylori*. The aim of this study is to evaluate the effectiveness of treatment with CAM resistance test.
Methods We performed PCR-based sequencing to detect CAM resistance-associated mutations using biopsy specimen that were positive in the CLO test (Campylobacter-like organism test). Patients who did not have CAM resistance mutation were treated with standard triple therapy for 7 days: PPI, amoxicillin and clarithromycin. And patients with CAM resistance mutation were treated with Bismuth contained quadruple therapy for 7 days: PPI, Bismuth, metronidazole and tetracycline. Eradication was confirmed using the CLO test or ^{13}C-labelled urea breath test. And then we estimated the success rate of *H. pylori* eradication.
Results A total of 395 patients infected by *H. pylori* were tested for clarithromycin resistance. Except for the 122 patients lost to follow-up, total 273 patients completed the evaluation of the success of eradication. The 172 of 273 patients (62.5%) did not have any clarithromycin resistance mutation, 101 of 273 patients (37.5%) had clarithromycin resistance mutation. Of the 172 patients without mutation, 170 patients were treated with conventional triple therapy and two patients were treated with bismuth quadruple therapy because of side effect (headache) of fist line therapy. Except twelve patients treated with conventional triple therapy, all patients without mutation were successful in eradication. And 101 patients with mutation, patients were treated with bismuth quadruple therapy and all but three of them were eradicated. Overall intention-to-treat eradication rates were 94.5% (258/273).
Conclusions As compared with 75% to 80% success rate of conventional treatment of eradication, the 94.5% success rate with CAM resistance test is remarkable. Therefore, the patient-tailored treatment strategy through the CAM resistance test is promising.
Keywords *Helicobacter pylori*; Clarithromycin resistance rate; Eradication rate

Upper GI EE-UGI-028

Management of Type 2 Intestinal Failure: Experience of a Korean Intestinal Rehabilitation Team

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Background/Aims Type 2 (acute) intestinal failure (IF) is caused by complications of abdominal surgery resulting in enteric fistulas or proximal stomas and usually requires parenteral nutrition (PN) for several months. This study aimed to evaluate clinical management and outcome of type 2 IF patients in a single center.
Methods Medical records of patients referred to the Intestinal Rehabilitation Team (IRT) at Samsung Medical Center (Seoul, Korea) were retrospectively analyzed.
Results From June 2014 to May 2019, 29 patients with IF were referred. Nineteen patients were type 2 IF and were included in the analysis. There were 11 males and eight females. Mean age of patients was 55.1 years. Underlying disease were malignant cancer in eight patients, cardiac disease in six patients, trauma in three patients, type 1 diabetes mellitus in one patient, and in one patient there were no known underlying diseases. All patients underwent laparotomy and bowel resection: due to mechanical obstruction with ischemia related to prior abdominal surgery in nine cases, superior mesenteric artery embolic infarct in five cases, traumatic bowel injury in three cases, and ischemic enteritis in two cases. Fifteen patients had proximal jejunostomies, three patients had enterocutaneous fistulae, and one patient had jejunoileal anastomosis done. Following medical and surgical rehabilitation, seven patients were weaned off PN, six patients went on to type 3 IF, and one patient is in the process of PN weaning after surgery. Seven patients died due to underlying malignancy (four patients) and IFALD (three patients). Eleven patients underwent surgery to restore bowel continuity. Median time from initial surgery to restorative surgery was 6.0 months (range, 2.3 to 19.8 months).
Conclusions Standardized care including restorative surgery resulted in successful outcomes in type 2 IF patients in this cohort.
Keywords Intestinal failure; Short bowel syndrome

Upper GI EE-UGI-029

Circular RNA DNA2 Promotes Cell Proliferation of Gastric Cancer by Regulating the miR-149-5p/CCDC6 Axis

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Withdrawn

Background/Aims Non-coding RNAs (ncRNAs) involve in tumor progression by regulating gene expression. Coiled Coil Domain Containing 6 (CCDC6), functions as fused partner of multiple oncogenes and promotes cell proliferation. However, the underlying molecular mechanisms of how ncRNAs regulate CCDC6 expression in gastric cancer (GC) are unclear.
Methods The expression level of CCDC6 gene and correlation analysis with clinicopathological characteristics of GC patients were clarified with TCGA RNA-sequencing data. A novel circular RNA_DNA2 (circ[illegible]R-149-5p were identified by circRNA profiling and bioinf[illegible]elationship between miR-149-5p and CCDC6 or circDN[illegible]emonstrated by dual luciferase assay and rescue experim[illegible]A2 and miR-149-5p and their correlation with clinicopathological characteristics and overall survival (OS) of 78 paired GC tissues were verified by fluorescence in situ hybridization. CCK8, colony formation and EdU assays were used to evaluate the effects of circDNA2 and miR-149-5p on proliferation in GC cell lines.
Results The expression levels of circDNA2 and CCDC6 were increased in GC patients and GC cell lines. Increased CCDC6 expression was associated with shortened OS in GC patients. High expression of circDNA2 promoted the proliferation of GC cells by sponging miR-149-5p. Furthermore, the level of miR-149-5p was lower in GC tissues than in adjacent normal tissues, and these with decreased miR-149-5p had shorter OS and higher risk of chemotherapy resistance compared with GC patients with increased miR-149-5p.
Conclusions circDNA2 may promote the proliferation of GC and lymphatic metastasis, and its sponging miR-149-5p may be a prognostic indicator for OS of GC patients.
Keywords Circular RNA_DNA2; miR-149-5p; CCDC6; Proliferation; Gastric cancer

Upper GI EE-UGI-030

Interim Report on the Comparison of Triple versus Concomitant Therapy for *Helicobacter pylori* Infection Eradication: A Prospective Randomized Controlled Trial

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Background/Aims Eradication of *Helicobacter pylori* has become interest for research for the optimal regimen which are composed of both antibiotics and gastric acid-reducing agents as a standard of treatment. Challenges arise from bacterial antibiotic resistance, lack of follow-up to confirm treatment success/failure, as well as poor compliance due to adverse effect and high pill burden. This study aims to compare the efficacy of triple therapy versus concomitant therapy in eradicating *H. pylori* infection.
Methods This is a prospective, open label, randomized controlled trial wherein 110 subjects with symptoms of dyspepsia and esophagogastroduodenoscopy findings of peptic ulcer disease or gastritis were enrolled. The diagnoses of *H. pylori* infection were confirmed using rapid urease test, histology or Giemsa stain. Patients with previous *H. pylori* eradication therapy, allergies to medications used, previous gastric surgery, presence of serious comorbidities and pregnant women were excluded from the study. Patients were randomized to triple therapy (40 mg omeprazole, 500 mg clarithromycin, and 500 mg two capsule amoxicillin twice daily for 14 days) or concomitant therapy (40 mg omeprazole, 500 mg clarithromycin, 500 mg two capsule amoxicillin, and 500 mg metronidazole twice daily for 14 days). *H. pylori* infection eradication were determined using stool antigen testing after a month free of antibiotics and proton pump inhibitor.
Results The eradication rate of each therapy was evaluated by intention-to-treat and per-protocol analyses. Eighty-five percent eradication rate of *H. pylori* was achieved with CT (compared to 71.05% in TT) was significant with a p-value of 0.0386. Lower adverse effect profile (45.5% vs 69.7%, p=0.0274) and higher compliance rate (88.63% vs 82.6%, p=0.0441) were also noted.
Conclusions The eradication rate for the concomitant therapy was much higher than those of the standard triple therapy.
Keywords *Helicobacter pylori*; Eradication; Randomized clinical trial

Upper GI EE-UGI-031

Outcome of Bleeding after 2-Octylcyanoacrylate Injection in Gastric Varices

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Background/Aims Gastric variceal hemorrhage is linked with significant morbidity and mortality, limited endoscopic therapeutic options and lack of consensus regarding optimal management. Cyanoacrylates have been shown to be effective and safe in gastric varices in Europe. An alternative to N-butyl-2-cyanoacrylate, 2-octylcyanoacrylate (2-OCA) has been used off-label in the United States. The aim of this study was to evaluate the efficacy, safety, and predictors of bleeding in patients with gastric varices after injection of 2-OCA.
Methods A single center retrospective analysis was performed among patients who underwent 2-OCA injection due to either active bleeding, stigmata of recent bleeding, history of bleeding or high-risk varices for gastric variceal obturation over a 4-year and a half period (May 2014 to November 2018). Rates of hemostasis, predictors of bleeding or rebleeding and cyanoacrylate-injection related adverse events were assessed.
Results A total of nineteen patients all with cirrhosis underwent a total of 28 2-OCA injection during the study period. Mean age was 60 years and 57% were males. The median Child Pugh classification was 8B, while the median MELD sodium score was 12. Mean volume injected was 1.3 mL and median number of varices injected per session was 2. Gastric varices were categorized as GOV-1 (42.11%), GOV-2 (26.31%) and isolated gastric varices type 1 (31.48%) per Sarin classification. A successful GVO, which was defined as sustained hemostasis within 1 month after injection, was achieved in all 19 patients (100%). Immediate hemostasis was achieved in three (15%) active bleeders; while eight patients (42%) were done for primary prophylaxis and eight patients (42%) for secondary prophylaxis. There were no reported in-hospital re-bleeding and no associated glue related adverse events.
Conclusions Endoscopic injection with 2-OCA was effective, safe and cheaper in achieving hemostasis, as primary and secondary prophylaxis in patients with high risk gastric varices and recent bleeding, respectively.
Keywords Gastric varices; 2-Octylcyanoacrylate; GOV

Upper GI EE-UGI-032

LGR5 and CD133 Expression Predict a Poor Prognosis in Gastric Cancer Patients

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Background/Aims Many researchers have investigated prognostic markers for gastric cancer. However, no specific or robust gastric cancer biomarkers have been found at present. LGR5 and CD133 have been identified as a cancer stem cells (CSCs) marker and prognostic marker in several cancers. The aim of this study was to determine the association between CSCs marker LGR5 and CD133 expression in patients with gastric cancer and their clinicopathological outcomes; to analyze the efficacy of combined expression of both markers in evaluating the prognosis of gastric cancer.
Methods Four hundred gastric cancer tissues were collected from three study centers in Thailand, and immunohistochemistry was performed. Specimens were correlated with patient characteristics and outcomes. Overall survival was performed by Kaplan-Meier Curve analysis.
Results LGR5 and CD133 were found positive in 219 out of 400 (54.75%) and 251 out of 400 (62.75 %) respectively in gastric cancer tissues. Expression of LGR5 and CD 133 was significantly associated with poor clinicopathological outcomes, including lymphatic invasion, vascular invasion, high pathological T stage and higher TNM staging (stage IV) ($p<0.05$). The overall survival of patients who were positive for LGR5 and CD133 had a shorter than that of LGR5 and CD133-negative gastric cancer, especially in patients who were positive for both markers (p=0.001) (Fig. 1).
Conclusions Our finding indicates that LGR5, CD133 and combined expression of these markers could be used as a marker indicating poor prognosis and can provide useful information for selection of treatment and performance of intensive follow-up of gastric cancer.
Keywords Cancer stem cells; Gastric cancer; LGR5; CD133

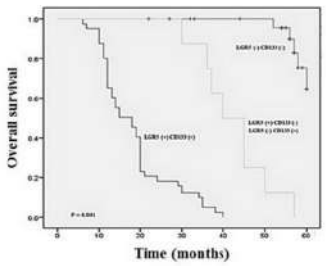

Figure 1: Kaplan-Meier survival curves of overall survival in patients with gastric cancer according to LGR5, CD133 and LGR5/CD133 expression. Combined expression of LGR5 and CD133 (blue line) showed significantly worse overall survival time than those with negative expression (green line; p=0.001).

Upper GI EE-UGI-033

Gastric Peroral Endoscopic Myotomy in Antrum and Pylorus: Short-term Results

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Background/Aims Peroral endoscopic myotomy (POEM) was designed to treat esophageal motility disorders such as achalasia. Furthermore, recently, cases of applying gastric POEM (G-POEM) in the treatment of gastroparesis or pyloric stenosis have been reported. We present the results of G-POEM with various situations.
Methods All 12 patients (eight men, four women; median age, 73 years) successfully underwent G-POEM.
Results Three patients presented post-vagotomy gastroparesis because of esophageal cancer surgery and one patient had vomiting with delayed gastric emptying after proximal gastrectomy for gastric cancer. Their symptoms improved after pyloric POEM. Three patients received G-POEM during endoscopic submucosal dissection (ESD) of neoplasia resecting more than 75% of the circumferential extent of antrum and five patients with pyloric mass underwent G-POEM following endoscopic resection to prevent stricture and improve visualization. Microperforation was observed in one case and was treated conservatively. All patients presented in the case are following up without recurrence of symptoms or delayed complications.
Conclusions G-POEM is expected to be a safe and effective strategy in a variety of situations such as post-vagotomy gastroparesis, obtaining a visual field during endoscopic procedure with limited vision and prevention of stenosis after ESD of antrum or pylorus mass.
Keywords Gastric peroral endoscopic myotomy; G-POEM; Post-vagotomy gastroparesis; Prevention of stenosis after endoscopic submucosal dissection; Pyloric stenosis

Table 1. Clinical Characteristics of Patients in This Study and Treatment Outcomes

Case No.	Age	Sex	Diagnosis	Myotomy site	specimen size (mm)	Acute complication	Follow-up times (months)
1	75	M	Post vagotomy gastroparesis*	Pylorus	0	No	38
2	67	M	Post vagotomy gastroparesis*	Pylorus	0	No	39
3	70	M	Post vagotomy gastroparesis*	Pylorus	0	Microperforation with endoscopic clipping	3
4	71	M	Gastric cancer	Pylorus	0	No	8
5	73	F	Gastric cancer	Middle antrum	30 *25	No	24
6	69	F	Gastric adenoma	Middle antrum	72 *52	No	19
7	72	M	Gastric cancer	Pylorus	38*26	No	16
8	82	F	Gastric adenoma	Pylorus	35 *24	No	22
9	83	M	Gastric cancer	Pylorus	25 *22	Mallory-Weiss tear Bleeding with endoscopic hemostasis	19
10	71	F	Gastric cancer	Pylorus	35 *28	No	13
11	76	M	Gastric adenoma	Middle antrum	55 *45	No	9
12	77	M	Gastric adenoma	Pylorus	35*32	No	1

*, esophagectomy with gastric pull-up and vagotomy for esophageal cancer

Upper GI EE-UGI-034

Clinical Outcomes of Endoscopic Resection in Remnant Stomach Focused on Comparison between Proximal Gastrectomy and Distal Gastrectomy

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Background/Aims Endoscopic submucosal dissection (ESD) or endoscopic mucosal resection (EMR) in remnant stomach is technically difficult procedure. The aim of this study was to assess clinical outcomes of ESD or EMR in remnant stomach.
Methods Between June 2006 and June 2018, patients who underwent endoscopic resection (ESD or EMR) after gastrectomy were reviewed and clinical outcomes were evaluated.
Results Endoscopic resection (ESD or EMR) was performed in 43 lesions in 42 patients (male, 85%; median age, 70 years old) after proximal gastrectomy (7/43), distal gastrectomy (30/43), gastric wedge resection (4/43). The indication for endoscopic resection was gastric adenoma in 23 cases (53.5%), early gastric cancer in 18 cases (41.9%), hyperplastic polyp in two cases (4.7%). *En bloc* resection rate of ESD and EMR after proximal gastrectomy and gastric wedge resection were 100%. However, *en bloc* resection rate of ESD and EMR after distal gastrectomy was 92% (13/14) and 81% (13/16), respectively. Mean procedure time of ESD and EMR after proximal gastrectomy was 31 and 48.5 minutes, ESD and EMR after distal gastrectomy was 42.3 and 34.7 minutes, respectively. There was only one micro-perforation during ESD after distal gastrectomy. Recurrence was found only in EMR cases after distal gastrectomy (2/16, 12.5%).
Conclusions Endoscopic resection in remnant stomach is feasible and safe. There was no significant difference in the *en bloc* rate and recurrence rate of endoscopic resection between in patients with proximal gastrectomy and those with distal gastrectomy.
Keywords Remnant stomach; Endoscopic resection; Endoscopic submucosal dissection; Endoscopic mucosal resection

Upper GI EE-UGI-035

The Effect Proton Pump Inhibitor Preloading on *Helicobacter pylori* Eradication Outcome

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Background/Aims Intragastric acid suppression is a key factor in successful *Helicobacter pylori* eradication. Proton pump inhibitors (PPIs) require about 5 days to fully saturate acid pumps on parietal cells and to achieve maximal and steady effect. We investigated the effect of 5 or more days rabeprazole pre-administration on *H. pylori* eradication efficacy.
Methods Study was conducted by retrospective review of the electronic medical record of patients who received triplet regimen (rabeprazole, amoxicillin, and clarithromycin) at an academic institute, Seoul, from January 2016 to January 2019.
Results A total of 340 subjects were enrolled consecutively. Sixty-six subjects were received PPI ≥5 days before eradication regimen for various reasons including patients' wishes, pre-existing acid related symptom control, possibility of other drug interaction, and so on (test group). One hundred and seventy subjects who took eradication regimen without pre-administration of PPI were enrolled during the study period (control group). In control group, the eradication success rate was 69.9% (58/83) for 7-day regimen and 87.4% (76/87) for 14-day regimen, respectively (p=0.004). In test group, the eradication success rate was 75.8% (25/33) for 7-day regimen and 81.8% (27/33) for 14-day regimen, respectively (p=0.382). In those who received 7-day regimen, there was a tendency of higher eradication rate in PPI pre-administered subjects, however, power did not reach the statistical significance. Gender, smoking, alcohol, and comorbidities have no impact on eradication efficacy.
Conclusions For *H. pylori* eradication, PPI pre-administration ≥5 days abolishes the difference between 7-day and 14-day regimen.
Keywords *Helicobacter pylori*; Rabeprazole

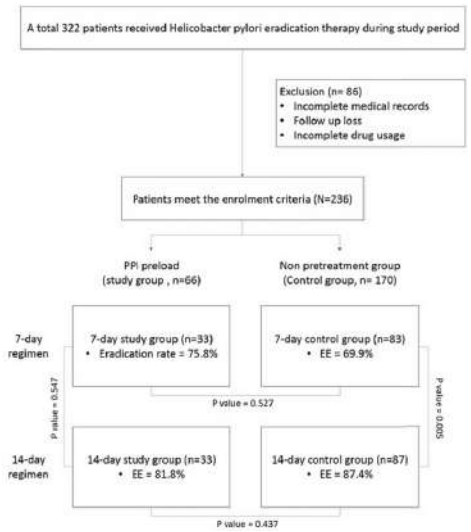

Fig. 1. Flow of the study.
PPI, proton pump inhibitor.

Upper GI EE-UGI-036

Allicin as an Add-on Therapy for *Helicobacter pylori*: A Systemic Review and Meta-Analysis of Randomized Controlled Trials

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Background/Aims The present study aims to perform a systemic review of allicin as an add-on treatment for *Helicobacter pylori* infection and assess its efficacy in randomized controlled trials (RCTs).
Methods Electronic databases including Medline, Embase, Web of Science, etc. were searched. A meta-analysis was performed using the fixed effect model for low heterogeneity and the randomized effect model for high heterogeneity with sensitivity analysis. Trial Sequential Analysis (TSA) was used to evaluate information size and treatment benefits. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) was used to assess the level of quality.
Results A total of eight RCTs consisting of 867 participants were included. Eradication rates in the allicin group (93.33%) were significantly higher than those of the control group (83.56%) (I^2=0%, p<0.001) (Fig 1). The healing rates of ulcers following *H. pylori* therapy in the allicin group (86.17%) were significantly higher than those of the control group (75.87%) (I^2=0%, p<0.001). The total remission rates of peptic ulcers across all allicin groups were 97.16%, which were significantly higher than controls (I^2=0, p=0.015). No significant differences in side effects were observed. TSA analysis suggested that the trials were of a sufficient standard to draw reliable conclusions. The quality of outcomes including eradication rates and side effects were graded as "very low." Other outcomes such as ulcer healing rates and total ulcer remission rates were graded as "low" due to downgraded of "risk of bias."
Conclusions Allicin may improve eradication rates, healing rates, the remission of peptic ulcers, and the remission of abdominal pain, but does not influence side effects when used as an add-on therapy for *H. pylori* infection and *H. pylori* related ulcers.
Keywords Allicin; *Helicobacter pylori*; Randomized clinical trials; Add-on therapy

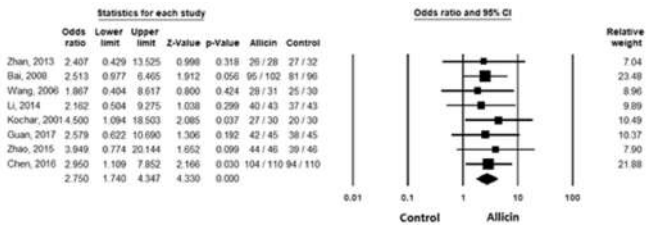

Fig. 1. Eradication rate.

Upper GI EE-UGI-037

Reflux Esophagitis and Fatigue: Is There a Connection?

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Background/Aims Fatigue is a condition characterized by a lessened capacity for work and reduced efficiency of accomplishment, usually accompanied by a feeling of weariness and tiredness. Reflux esophagitis could interfere with sleep due to acid reflux. This could cause daytime sleepiness or fatigue, but less is known about the association with reflux esophagitis and fatigue. We evaluate the association between fatigue and reflux esophagitis in health check-up patients.
Methods A total of 302 individuals who underwent a screening endoscopy were enrolled prospectively. Surveys including MFI-K (Multidimensional Fatigue Inventory-Korean version), ESS (Epworth Sleepiness Scale) and HADS (Hospital Anxiety and Depression Scale) were conducted to assess fatigue, daytime hypersomnolence, anxiety and depression. The presence and severity of reflux esophagitis were classified using the Los Angeles classification.
Results We investigated 302 consecutive eligible cases. The reflux and non-reflux groups comprised 43 (14.2%) and 259 (85.8%) cases. The mean age was 47.9 and 48.5 years, respectively. Total MFI-K score, ESS score, HADS-A and HADS-D of reflux and non-reflux groups were 50.34 versus 50.76 (p=0.255), 6.69 versus 6.18 (p=831), 6.04 versus 5.34 (p=0.464) and 6.97 versus 6.31 (p=0.651). There was no statistical difference between the two groups. But, HADS-D were correlated with MFI-K score, statistically (p<0.05).
Conclusions There was no evidence of reflux esophagitis causing daytime sleepiness, fatigue, anxiety and depression. However, depression was associated with fatigue. Further studies should be carried out to find out the association between fatigue and reflux esophagitis.

Upper GI EE-UGI-038

Combined Rapid Urease Test and Histology for the Diagnosis of *Helicobacter pylori* Infection

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Background/Aims Accurate detection of *Helicobacter pylori* (HP) is essential for the diagnosis of HP infection. The use of proton pump inhibitors (PPI) may result in false-negative rapid urease test (RUT) results. We aimed to determine the sensitivity and specificity of RUT compared with histology and assess the diagnostic yield of combined RUT and histology for HP infection.
Methods Retrospective data collection was performed on 192 patients who were tested for both RUT and histology at the time of endoscopy from 2017 to 2018. At least two gastric biopsies (one from corpus, one from antrum) were taken each for RUT and histology. The endoscopy was performed by a single gastroenterologist and a single pathologist was responsible for interpreting the histology with H&E and Giemsa stain. Demographic profile, RUT and histology results were reviewed. Tests for diagnostic accuracy were computed using SPSS ver. 23.
Results One hundred and ninety-two patients were tested for RUT and histology. Fifty-two patients (27.1%) were males and 140 (72.9%) were females with a mean age of 54±17 years. Twenty-four patients (12.5%) tested positive for HP infection. Among these; 16 (8.3%) tested positive for both RUT and histology (true-positive), while eight (4.2%) tested negative for RUT but had positive histology(false-negative). Six out of eight patients with false-negative results had PPI use. The sensitivity and specificity of RUT for the diagnosis of HP infection were 66.7% and 98.2%, respectively. While the positive and negative likelihood ratio were 37.3 and 0.34, respectively with a diagnostic odds ratio of 110.
Conclusions The HP detection rate of RUT combined with histology increased by 33% compared with RUT alone (p<0.001). RUT is a highly specific test for diagnosing HP infection. Given its modest sensitivity, histology plays an important role in the diagnosis of HP infection, especially in patients taking PPIs.
Keywords Retrospective; *Helicobacter pylori*; Rapid urease test; Histology; Giemsa stain

Table 1. Tests for Diagnostic Accuracy of RUT Test versus Histology

	Histology positive	Histology negative
RUT positive	16	3
RUT negative	8	165

RESULT:		
Sensitivity:	0.6667	CI: 0.4671 to 0.8203
Specificity:	0.9821	CI: 0.9488 to 0.9939
Positive likelihood ratio:	37.333	CI: 11.744 to 118.683
Negative likelihood ratio:	0.339	CI: 0.193 to 0.598
Diagnostic odds ratio:	110.000	CI: 26.517 to 456.308

RUT, rapid urease test; CI, confidence interval.

Upper GI EE-UGI-039

Optimal Endoscopy Timing in Patients with Acute Variceal Bleeding: A Systematic Review and Meta-Analysis

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Background/Aims Although current guidelines recommend performing endoscopy within 12 hours for acute variceal bleeding (AVB), the optimal timing of endoscopy for AVB remains controversial. To perform a systematic review and meta-analysis of all eligible studies to assess the effect of endoscopy timing on mortality and rebleeding in AVB.
Methods PubMed, Cochran Library, and EMBASE through January 2019 were searched for relevant publications. Overall mortality rate, rebleeding rate, and other clinical outcomes (successful hemostasis, need for salvage therapy, length of hospital stay, and number of blood transfusions) were determined. For Non-randomized studies, the risk of bias assessment tool was used to assess methodological quality of included publications. Mantel-Haenszel random effect model of RevMan software (Cochrane) was used to analyze binary endpoints and inverse variance method was used to analyze continuous outcomes.
Results This meta-analysis included five studies with 854 and 453 participants undergoing urgent endoscopy (≤12 hours) and nonurgent endoscopy (>12 hours), respectively. There was no significant difference in overall mortality rate between urgent and nonurgent groups (odds ratio [OR], 0.72; 95% CI, 0.36 to 1.45; p=0.36). Rebleeding rate was similar between urgent and nonurgent groups (OR, 1.21; 95% CI, 0.76 to 1.93; p=0.41). Other outcomes were also similar between the two groups.
Conclusions This study demonstrated that endoscopy timing did not affect mortality or rebleeding rate of patients with AVB. Therefore, an appropriate timing of endoscopy would be more important than an urgent endoscopy depending on each patient's condition.
Keywords Acute variceal bleeding; Endoscopy timing; Mortality; Rebleeding

Upper GI EE-UGI-040

Endoscopic Ultrasonography-Guided Sampling of Mediastinal Lymphadenopathy: 19-Gauge Trucut Biopsy versus 22-Gauge Aspiration Biopsy

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Background/Aims Endoscopic ultrasonography (EUS)-guided transesophageal fine needle biopsy has been used as a method for histologic evaluation of mediastinal lymph nodes (LNs). This study aimed to compare the outcomes of EUS-guided sampling with mediastinal lymphadenopathy using a 19-gauge trucut needle and 22-gauge fine needle aspiration (FNA) needle.
Methods From May 2006 to January 2011, patients with mediastinal lymphadenopathy, who received an EUS-guided trucut biopsy or a FNA biopsy, were retrospectively reviewed. Demographic data, endosonographic characteristics of LNs including size, shape, border, echotexture, and echogenicity, diagnostic yield, and adverse events between the trucut needle group and aspiration needle group were compared.
Results A total of 69 patients (trucut group, n=33 vs aspiration group, n=36) were identified. There were no significant differences in demographic data, indication for an EUS-guided biopsy, location of LNs, number of needle passes, and endosonographic features of LNs between the two groups. The sizes of LNs were larger in the trucut group than in the aspiration group (28.9±14.0 mm vs 21.1±8.8 mm, p=0.007). However, there was no significant difference in the ratio of LNs that were ≥10 mm in both groups. The overall accuracy of EUS-guided biopsy for the diagnosis of malignant lesions was 79.7% (55/69). There were no significant differences in the histological diagnostic yield of malignant LNs between the two groups. There were no significant procedure-related adverse events in both groups.
Conclusions EUS-guided biopsy can be a useful method for histologic evaluation of mediastinal nodal lesions.
Keywords Endoscopic ultrasonography; Trucut biopsy; Fine needle aspiration; Mediastinum; Lymphadenopathy

Upper GI EE-UGI-041

Predictors to Develop Side Effects during Bismuth Based Quadruple Therapy as First-Line Eradication for *Helicobacter pylori* Infection Patients

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Background/Aims Even though patients' compliance is one of major factors to achieve successful Helicobacter eradication, side effects during bismuth based quadruple therapy often lead to patients' incompliance, and even eradication failure. However, there is limited data which factors are associated with side effects during bismuth based quadruple therapy among patients in *Helicobacter pylori* infection.
Methods We retrospectively reviewed the medical records of the patients who confirmed *H. pylori* infection and received bismuth based quadruple therapy as the first line eradication regimen between May 2016 and June 2018. Demographic characteristics, medical history, eradication rates, drug compliance, and type and severity of side effects were collected. Type of side effects includes abdominal discomfort, nausea/vomiting, diarrhea/constipation, dyspepsia, general weakness, and taste disturbance. According to the patients' reported side effects, patients were divided into two groups; no side effect group and side effect group. Univariate and multivariate analysis were done to confirm which factors were associated with the side effect development during bismuth based eradication therapy.
Results After exclusion of patients who did not follow up after taking drugs, finally 184 patients were enrolled. In univariate analysis, female gender were more prevalent in side effect group (20.9% [18/86] vs 8.2% [8/98], p=0.01) and body mass index were lower in side effect groups (23.7±2.9 kg/m^2 vs 24.0±3.3 kg/m^2, p=0.06). In multivariate analysis, female gender (odds ratio, 2.9; 95% confidence interval, 1.2 to 7.3; p<0.01) was the independent risk factors to develop side effects during therapy.
Conclusions Female gender is the only determinant factors to develop side effects during bismuth based quadruple therapy. When prescribing quadruple eradication regimen as first line therapy to female patients, it is necessary for clinicians to educate more carefully regarding side effects during treatment.
Keywords Predictors; Side effects; Bismuth based quadruple therapy; *Helicobacter pylori*

Upper GI EE-UGI-042

Characteristics of the Duodenal Microbiota Composition in Patients with Functional Abdominal Bloating: A Pilot Study

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Background/Aims Functional abdominal bloating is a common and troublesome symptom, but its pathogenic mechanisms have not been fully understood to date. In this study, we characterized the mucosa-associated microbiota in the duodenum of patients with bloating and compared with healthy-controls.
Methods Males and females, 20 to 70 years old, with a diagnosis of functional abdominal bloating (Rome IV) and the absence of any relevant structural disease by endoscopy were recruited. The duodenal biopsy samples were obtained by aseptic technique from 10 patients with bloating and 10 control subjects. Microbiota compositions were analyzed by the 16S ribosomal RNA gene sequencing.
Results *Proteobacteria* and *Firmicutes* were the first and second most predominant phyla in the duodenal mucosa of both bloating-patients and healthy-controls. *Proteobacteria* and *Firmicutes* accounted for 58.8% and 25.2% of microbial counts in the bloating-group and 60.0% and 15.9% in the control-group, respectively. The third most common *Microbacterium* was Bacteroidetes in the bloating-group and Actinobacteria in the control-group. *Acidobacteria* were observed in more proportion in bloating patients (1.6%) than in healthy controls (0.6%). There was no difference in the Shannon's index between bloating-patients (3.22±0.71) and healthy-controls (2.53±1.03).
Conclusions In this pilot study, the composition of duodenal microbiota in bloating patients was slightly different from the controls. More studies are needed to determine the role of duodenal microbiota in functional abdominal bloating.
Keywords Duodenum; Microbiota; Abdominal bloating

Upper GI EE-UGI-043

A New Endoscopic Submucosal Dissection Method Which Is Named Zhang's Method Is a Better Choice for Gastrointestinal Neoplasm

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Background/Aims Endoscopic submucosal dissection (ESD) is an important method for the treatment of early and precancerous lesions of the digestive tract. It has many advantages, for example, it can completely remove the lesion, and the excised specimen can be accurately evaluated by pathology. However, its disadvantages are also obvious, such as its long learning curve, more complications, longer operation time, more difficult operation and so on. So far, though ESD has been around for more than 20 years, it has not been widely used worldwide. So, Chinese doctor Jianguo Zhang has designed a new ESD method.
Methods Forty patients with early gastric cancer from our center were randomly assigned to the experimental and control groups. Twenty-three cases of experimental group, using Zhang's method, this method does not need to wear transparent cap at the end of endoscopy. Endoscopy also do not need to dive into the submucosa, but the endoscopic end is about 1 to 3 cm away from the lesion. Using of a new knife which is named Zhang knife, the Zhang knife is deformation and the flexible, can easily dive into the submucosa and continuous cut. In the control group, 17 patients were treated with traditional ESD method and using the Dual knife. Operative time, immediate perforation, delayed perforation and postoperative bleeding were recorded in the two groups, and the recurrence rate was followed up for 2 years.
Results The size of the resected specimens in the experimental group was about 40.1 mm, and that in the control group was 31.2 mm (p>0.05). The operation time was 17.5 minutes in the experimental group and 48 minutes in the control group (p<0.05). There were no perforations in the experimental group and three cases of delayed perforation in the control group (P<0.05). Delayed bleeding occurred in one patient in the experimental group and 1 patient in the control group. No recurrence was found in the two groups (p>0.05).
Conclusions Our results show that the new method is safer, more effective and faster, but it needs to be validated by a randomized controlled trial with a larger sample size in multiple centers.
Keywords Endoscopic submucosal dissection; Gastric early cancer; Gastrointestinal neoplasm; Endoscopic resection

Upper GI EE-UGI-044

Fatty Liver and metabolic Syndrome in Gastric Cancer Survivors and Colorectal Cancer Survivors: A Propensity Analysis in a Health Promotion Center

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Background/Aims Cancer survivors are increasing rapidly. We aimed to compare fatty liver and metabolic syndrome in gastric and colorectal cancer survivors compared to non-cancer subjects.
Methods The 17,498 non-cancer subjects, 219 gastric and colorectal cancer survivors who visited Gangnam Severance Hospital from 2014 to 2019 for health check-up were enrolled. After age sex matched 1:4 propensity score matching, 875 non-cancer subjects, 145 gastric cancer survivors, 74 colorectal cancer survivors were analyzed. They were divided into 104 operated gastric cancer survivors (opGC), 41 non-operated gastric cancer survivors (non-opGC), 49 operated colorectal cancer survivors (opCC), 25 non-operated colorectal cancer survivors (non-opCC). Fatty liver was assessed by ultrasound.
Results Fatty liver was seen 21.1% in opGC, 43.9% in non-opGC, 44.5% in non-cancer subjects (p<0.01). Metabolic syndrome was seen 12.5% in opGC, 31.7% in non-opGC, 33.3% in non-cancer subjects (p<0.01). The odds of fatty liver in opGC (odds ratio [OR], 0.335; p<0.01) was significantly low compared to non-cancer subjects. The odds of metabolic syndrome were significantly low in opGC compared to non-cancer subjects (OR, 0.280; p=0.001). The odds of fatty liver and metabolic syndrome of non-opGC was not significant compared to non-cancer subjects. Fatty liver was seen 48.9% in opCC, 44.0% in non-opCC, 44.5% in non-cancer subjects (p=0.82). Metabolic syndrome was seen 40.8% in opCC, 48.0% in non-opCC, 33.3% in non-cancer subjects (p=0.18). The odds of fatty liver and metabolic syndrome of opCC and non-opCC were not significant compared to non-cancer subjects.
Conclusions Operated gastric cancer survivors showed low odds of fatty liver and metabolic syndrome compared to non-cancer subjects. The odds in gastric cancer survivors may differ by operated and non-operated cancer survivors. Further researches including associated factors are needed.
Keywords Cancer survivors; Fatty liver; Metabolic syndrome

Upper GI EE-UGI-045

Recent 4-Year Results of *Helicobacter pylori* Eradication Rates by Second-Line Therapy

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Background/Aims Resistance rates of *Helicobacter pylori* to clarithromycin, metronidazole, and quinolone are over 30% in South Korea. The aim of this retrospective study was to identify the eradication rate of *H. pylori* after second-line therapy in Bucheon and Southwest Gyeonggi-do and investigate baseline and clinical factors related to the eradication rate.
Methods In the present retrospective single-center study, Bucheon Saint Mary's Hospital, a total of 329 patients were enrolled this study who were diagnosed by urea breath test (UBT) from 2015 to 2018. Among these patients, we calculated the eradication rate after second-line therapy and investigated baseline and clinical factors. These patients were almost outpatients, so we conducted UBT.
Results A total of 329 patients were done UBT test from 2015 to 2018 at Bucheon Saint Mary's Hospital. The 269 patients (men 128, women 141; mean age, 57) were treated second line *H. pylori* eradication (bismuth, metronidazole, tetracycline, and proton pump inhibitor) and 177 patients (78.0%) were successfully eradicated. The rest of the patients were eradication failure group (50 patients, 22.0%) and loss of follow-up group (42 patients, 15.6%). Additionally, six patients who were treated third line *H. pylori* eradication were all eradicated. Next, we compared body mass index (BMI) between successfully eradicated (second line) group and non-eradicated group. There was no difference in BMI between the two groups (eradicated group 24.7 kg/m^2 vs non-eradicated group 24.3 kg/m^2). The patients with underlying DM in both groups were 16.9% (eradicated) and 12% (non-eradicated).
Conclusions Recent *H. pylori* eradication rate of Bucheon and Southwest Gyeonggi-do population is 78% after second line *H. pylori* eradication. And there was no difference in BMI between two groups. In the eradication failure group, a lot of patients failed to take the all scheduled drug due to poor compliance (e.g., nausea, diarrhea and abdominal discomfort).
Keywords *Helicobacter pylori*; Eradication therapy; Second line; Compliance; Korea

Upper GI EE-UGI-046

Long-term Outcomes of Endoscopic Submucosal Dissection for Undifferentiated Early Gastric Cancer, Beyond Expanded Criteria

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Background/Aims Preoperative measurement of the tumor was completely not as same as postoperative one and if the postoperative tumor size would be a little more than 2 cm with R0 resection, additional surgery recommended absolutely. The aim of this retrospective study was to analyze the long-term outcomes of endoscopic submucosal dissection (ESD) carried out to treat undifferentiated EGC in two groups (group A, up to 2 cm; group B, 2–3 cm).
Methods Between January 2001 and March 2015, 104 patients with undifferentiated early gastric cancer (EGC) including poorly differentiated adenocarcinoma (PD, n=66) or signet ring cell carcinoma (SG, n=38) on preoperative biopsy underwent ESD (group A, 71 cases; group B, 33 cases).
Results Ratio of male to female was 40:31 and 17:16 in group A and B. Mean follow-up period in group A and B were 61.10±38.12, 60.79±47.75. Mean age in group A and B were 52.90±13.62, 57.00 ±12.25 years. *En bloc* in group A and B were achieved in 92.9%, 90.9 % of patients, respectively (NS). R0 resection in were achieved in 87.3 %, 51.5% of patients, respectively (p<0.05). Curative resection was 83.0 % in group A and group B was not include this definition. Recurrence in group A and B were 5.6 % (n=4), 18.1 % (n=6), retrospectively (p<0.01). All cases with lateral margin positive required additional ESD (n=2), destructive therapy (n=3), or surgery (n=4) and no recurrence happened.
Conclusions In group B, R0 resection rate was lower than group A but R0 resection in both group were not different recurrence rate with long-term follow up. Carefully, undifferentiated EGC with 2 to 3 cm in a size recommended ESD.
Keywords Undifferentiated; Endoscopic submucosal dissection

Upper GI EE-UGI-047

Long-term Clinical Outcomes of Non-Curative Resection in Patients with Early Gastric Cancer Treated by Endoscopic Submucosal Resection: A Single Center Experience

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Background/Aims Endoscopic submucosal dissection (ESD) is accepted as a standard treatment in early gastric cancer (EGC). The purpose of this study was to investigate the long-term clinical outcomes of non-curative resection in patients with EGC treated by ESD.
Methods We retrospectively analyzed the clinical data of 644 patients who underwent ESD of EGC from November 2006 to December 2017 in Yeungnam University Hospital. We divided into curative resection group (n=546), non-curative resection with additional surgery group (n=45), and non-curative resection without additional surgery group (n=53). Then, the recurrence rate, overall survival rate (OS) and disease-specific survival rate (DSS) were compared in each group.
Results In this study, non-curative resection rate was 15.2% (98/644). The recurrence rate at the ESD site was significantly higher in the non-curative resection without additional surgery group than in the curative resection group (18.9% vs 1.3%, p<0.001). The recurrence rate at the other sites did not differ between three group, and distant metastasis occurred only in the non-curative resection without additional surgery group. In the Kaplan-Meier analysis, 10 years OS and DSS in the curative resection group, non-curative resection with additional surgery group, and non-curative resection without additional surgery group were 86.9%, 88.2%, and 61.2%, respectively and 100%, 100%, and 82.7%, respectively. Both OS and DSS were significantly lower in the non-curative resection without additional surgery group, however, there was no difference in curative resection group and non-curative resection with additional surgery group.
Conclusions Patients with EGC who underwent non-curative resection with additional surgery showed better survival outcome than those without additional surgery. Therefore, after non-curative resection, it is recommended to consider further treatment if possible.
Keywords Early gastric cancer; Endoscopic submucosal dissection; Clinical outcome

Upper GI EE-UGI-048

Positive Rate of *helicobacter pylori* on Gastric Biopsy

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Background/Aims *Helicobacter pylori* has been studied as an original bacteria to attack gastric mucosa and cause chronic infections such as gastritis, ulcer and cancer. The clinic has analyzed positive rate of *H. pylori* by CLOtest conducted with biopsy about abnormal lesion observed during transnasal endoscopy because it is important to understand *H. pylori* in Korea where is high rate of gastric cancer and *H. pylori* infection.
Methods We had examined *H. pylori* positive or negative on CLOtest 1,627 cases conducted with biopsy of gastric lesion using transnasal endoscope from February 3, 2016 to July 31, 2019. The used equipments were EG-530N, 5.9 mm diameter, transnasal endoscopy and CLOtest kit.
Results The 52.5% rate of positive was reported since 855 cases out of 1,627 cases on CLOtest were positive. Gastric cancer 0.67% and gastric atypia 5.16% were reported since 11 cases and 84 cases out of 1,627 cases.
Conclusions The existence of *H. pylori* or not from the analysis of relation between biopsy result and *H. pylori* infection on CLOtest conducted with gastric lesion during gastric endoscopy will be an important factor for the follow up observation to find gastric cancer early and prevent cancer through *H. pylori* eradication.
Keywords Transnasal endoscopy; *Helicobacter pylori*; Gastric cancer prevention

Upper GI EE-UGI-049

Factors Influencing the Long-term Outcome of Caustic Esophageal Stricture Dilatation using Savary Dilators

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Background/Aims Less is known in the literature about the management and long-term outcome of caustic esophageal stricture (CES). Mostly reported from developing countries particularly in pediatric age group. Study is aimed to assess the long-term outcome of CES dilatation using Savary Gilliard dilator and also the factors associated with better outcome.
Methods We retrospectively reviewed record of patients who underwent CES dilatation using Savary Gilliard dilatators from July 2009 to July 2019. Data is expressed in frequency, percentage, mean and standard deviation. Mann-Whitney U test is used to determine the factors associated with better outcome.
Results Twenty-one patients were included in study, mean age of patients was 21±19.4. Twelve out of 21 (57.1%) were males. More than half of them were in pediatric age group 11 (52.4%). Acid ingestion was seen in 14 (66.7%) while seven patients (33.3%) had alkali ingestion. Accidental corrosive intake was in 16 (76.2%), however five patients (23.8%) had suicidal intent. Most of patient had Zargar class IIA 12 (57.1%) injury. Mean length of stricture was 7.3±4.5 cm and range of number of dilatation required was 4 to 59 sessions. Over all pediatric patients required less number of session as compare to adults (p=0.008). Complex stricture (p=0.018) and stricture longer than 10 cm (p=0.028) required more sessions of dilatations. Complete resolution of stricture was noted in 18 patients (85.7%) while three patients (14.5%) with complex stricture still require dilatations. Six patients had associated pyloric stenosis, managed via CRE balloon dilatation and while two required gastrojejunostomy. One patients developed minor perforation during the procedure.
Conclusions CES can be successfully managed via Savary dilatations, long and complicated stricture required more sessions of dilatations while pediatric patients are better responders to treatment.
Keywords Esophageal stricture; Esophageal dilatation; Savary Gilliard dilator

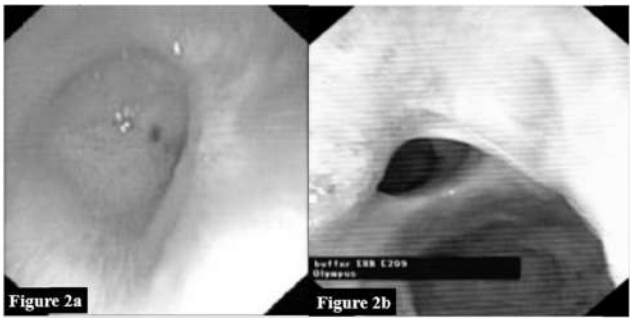

Fig. 1. Esophageal stricture dilatation.

Upper GI EE-UGI-050

IGIC Endoscopic Center Mongolia: Upper Gastrointestinal Bleeding/Emergency Bleeding Control Experience in Ulaanbaatar City and Countryside for Last 4 Months

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Background/Aims upper gastrointestinal bleeding (UGIB) is a frequent and potentially severe complication of most digestive diseases of the upper gastrointestinal tract. Upper endoscopy has a crucial role in the diagnosis and treatment of UGIB, however epidemiological studies and additional guidelines are still limited in our country.
Methods IGIC endoscopic center has started operating since April, 2019 and providing 24 to 07 hours of emergency care services for UGIB and other emergency calls among nine districts of the capital city and remote areas.
Results During the last 4 months, total 42 emergency cases of UGIB were received. Of these, 19 cases in IGIC Endoscopic Center, 12 cases within the city, four cases in Tuv province, four cases in Darkhan, two cases in Khuvsgul, one cases in Uvs were received emergency services. Varicose bleeding-29, and non-varices bleeding-13 registered. Gender ratio was 1:1, including 52.3% male (n=22) and 47.6% female (n=20). According to the age, 7.14% (n=3) was 20-29 years, 14.2% (n=6) was 30-39 years, 21.4% (n=9) was 40-49 years, 19.0% (n=8) was 50-59 years, 26.1% (n=11) was 60-69 years, and 11.9% (n=5) was over 70 years. Of total emergency call, active bleeding was 38.0% (n=16) whereas with thrombus which meaning the history of bleeding in last 12 hours was 62% (n=26). According to the procedure 23 had EVL, 6 had EIS, 9 had Hemoclip, and 4 had no procedure.
Conclusions In our country, UGIB and its mortality rates are high, therefore majority of varicose bleeding is associated with the liver diseases. Prioritize the availability of emergency care services to ensure timely delivery of services, as well as access and quality of care, and the need to develop and implement statistics and guidelines on urban and remote areas.
Keywords Upper gastrointestinal bleeding; Bleeding control

Upper GI EE-UGI-051

Endoscopic Surveillance after Total Gastrectomy for Gastric Cancer: Is It Necessary?

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Background/Aims Endoscopic surveillance after total gastrectomy (TG) for gastric cancer is routinely performed for detecting tumor recurrence or adverse effects of surgery. But, there were only a few reports for clinical benefits of endoscopic surveillance. We investigated the necessity for endoscopic surveillance after TG for gastric cancer.
Methods We enrolled 388 patients with early gastric cancer and 461 with advanced gastric cancer who underwent TG with R0 resection for gastric cancer between 2011 and 2012, and received regular surveillance programs after TG including endoscopy and abdominopelvic computed tomography (CT) with contrast.
Results Median follow-up period of abdominopelvic CT was 52± 22.5 months and endoscopy was 53.4 23.4 months. Tumor recurrence occurred in 167 patients (19.6%). Of 167 patients, only locoregional recurrence was observed in five patients (2.9%). All only locoregional recurrence was detected by both endoscopy and abdominopelvic CT. Of detectable postoperative adverse effects by endoscopic or radiologic studies, benign stricture in the anastomotic site was observed by endoscopy in only three patients.
Conclusions Endoscopic surveillance after TG with R0 resection for gastric cancer is a limited role for the oncologic outcome or postoperative adverse effects.
Keywords Endoscopy; Surveillance; Gastric cancer; Total gastrectomy; Locoregional recurrence

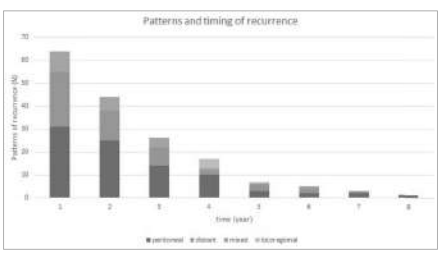

Fig. 1. Patterns and timing of recurrence.

Upper GI EE-UGI-052

Safety of Delayed Surgery after Non-Curative Endoscopic Resection in Patients with Early Gastric Cancer: A Matched Analysis

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Background/Aims When non-curative resection is confirmed after endoscopic resection (ER) in patients with early gastric cancer (EGC), delayed curative gastrectomy is recommended because of the risk of lymph node metastasis. There was no previous study comparing the long-term outcome and lymph node metastasis between delayed (secondary) and primary surgery, we planned to compare this.
Methods Patients who underwent R0 curative gastrectomy for EGC from May 1, 2005 to December 31, 2013 were included and divided into primary surgery and secondary surgery. The propensity score matching of two groups was performed. Primary outcome was 5-year disease-free survival, lymph node metastasis. Secondary outcome was 5-year overall survival, and 5-year cancer specific survival.
Results Between two groups, 5-year disease-free survival (hazard ratio [HR], 0.256; 95% confidence interval, 0.06 to 1.095; p=0.0662) and 5-year overall survival (HR, 0.608; 95% CI, 0.314 to 1.176; p=0.1391) did not differ. Lymph node metastasis (HR, 0.423; 95% CI, 0.244 to 0.731; p=0.0021) and 5-year cancer specific survival (HR, 0.039; 95% CI, 0.018 to 0.902; p=0.039) were different.
Conclusions In this study, we confirmed that secondary surgery was non-inferior in 5-year survival and lymph node metastasis risk compared with primary surgery. Based on our data, we can reduce the burden of non-curative resection after ER for EGC and make a decision to perform ER satisfying the absolute and expanded indication for EGC.

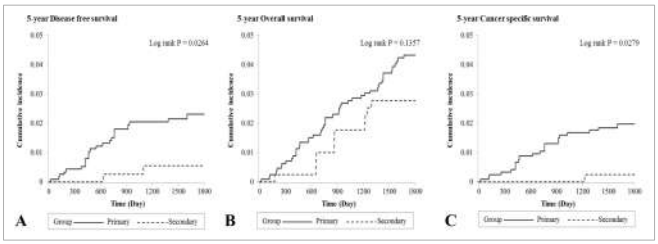

Fig. 1. Cox proportional hazards model.

Upper GI EE-UGI-053

Lack of Association between Past *Helicobacter pylori* Infection and Diabetes: A Two-Cohort Study

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Background/Aims *Helicobacter pylori* may be involved in diabetes and other insulin-related processes. This study aimed to investigate the associations between *H. pylori* infection and the risks of type 2 diabetes, impaired glucose tolerance (IGT), diabetic nephropathy, and poor glycemic control.
Methods We retrospectively evaluated 16,091 subjects without diabetes at baseline who underwent repeated health examinations. Subjects were categorized according to whether they were seropositive and seronegative for *H. pylori* infection. Hazard ratios (HRs) and 95% confidence intervals (CIs) were calculated using Cox proportional hazard models. The serological results were validated using an independent cohort (n=42,351) based on a histological diagnosis of *H. pylori* infection.
Results During 108,614 person-years of follow-up, 1,338 subjects (8.3%) developed newly diagnosed diabetes, although the cumulative incidence of diabetes was not significantly related to serological *H. pylori* status. The multivariate Cox proportional-hazards regression models revealed that *H. pylori* seropositivity was not significantly associated with diabetes (HR, 1.01; 95% CI, 0.88 to 1.16; p=0.854), IGT (HR, 0.98; 95% CI, 0.93 to 1.04; p=0.566), diabetic nephropathy (HR, 0.99; 95% CI, 0.82 to 1.21; p=0.952), or poor glycemic control (HR, 1.05; 95% CI, 0.90 to 1.22; p=0.535). Similarly, histopathological findings of *H. pylori* infection were not significantly associated with diabetes (p=0.311), diabetic nephropathy (p=0.888), or poor glucose control (p=0.989).
Conclusions The findings from these large Korean cohorts indicate that there does not appear to be a role for past *H. pylori* infection in the development of diabetes, IGT, diabetic nephropathy, or poor glycemic control.
Keywords *Helicobacter pylori*; Diabetes mellitus; Impaired glucose tolerance; Diabetic nephropathy; Poor glycemic control

Upper GI EE-UGI-054

HER2 Positivity Is a High Risk of Recurrence in Node-Negative EGCa

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Background/Aims The treatment of gastric cancer remains unsatisfactory. We aimed to investigate the prognostic value of various biomarkers in gastric cancer.
Methods We analyzed 505 (279 early-staged and 226 advanced-staged) gastric cancer tissues from patients who underwent radical gastric resection from January 2014 to December 2016. Available surgical specimens immunohistochemically stained for p53, epidermal growth factor receptor (EGFR), human EGFR 2 (HER2), E-cadherin, and Ki-67 were reviewed. We evaluated the association between positivity to various biomarkers and disease recurrence, disease-free survival, lymph node metastasis, and microscopic lymphovascular invasion.
Results The median follow-up duration was 32.5 months (range, 7 to 70 months). Advanced gastric cancer cases showed high Ki-67 expression; other cases showed unremarkable expression. Concerning disease recurrence, lymphatic invasion, and disease-free interval, all biomarkers had no prognostic effects. HER2-positive stage I gastric cancer tended to occur in old patients and in the upper one-third of the stomach (p=0.01). HER2 positivity had statistically significant correlations with disease recurrence (p=0.01) and microscopic lymphovascular invasion (p=0.03) in stage I cases.
Conclusions Various biomarkers had limited prognostic value for gastric cancer. Only HER2 could be a poor prognostic biomarker for stage I gastric cancer. HER2-positive early-stage gastric cancer would need additional therapy despite curative resection.
Keywords Gastric cancer; Prognosis; HER2

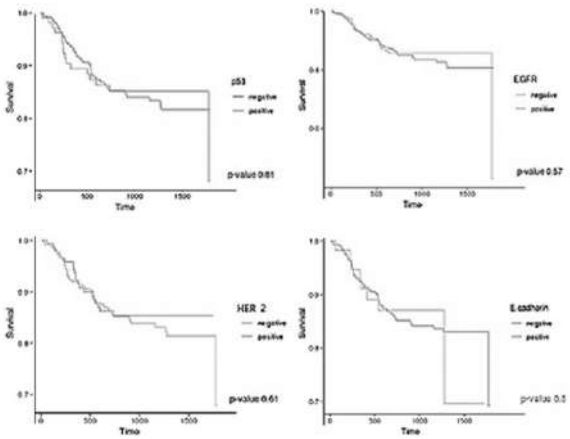

Fig. 1. Prognostic effect of biomarkers.

E-poster Exhibition

Upper GI EE-UGI-055

Helicobacter pylori Prevalence in Mongolia by Using ^{14}C Urea Breath Test

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Background/Aims *Helicobacter pylori* are one of the major etiologies for stomach diseases in the Mongolian population. *H. pylori* infection prevalence is ranged 70% to 80% in adults, 60% in gastric cancer patients and around 70% in children. In Mongolia, the diagnosis of *H. pylori* infection is performed by using invasive (endoscopic biopsy for histopathology, culture, and rapid urease test) and noninvasive (stool antigen test, and serological tests) methods. Urea breath test (UBT) are high accuracy diagnostic method for screening and evaluation of treatment results of *H. pylori* infection. The Maastricht V/Florence consensus report recommended the UBT is currently recommended as the best approach for the screening of *H. pylori* infection in patients with dyspeptic symptoms because of its noninvasiveness and high sensitivity.
Methods We enrolled in this cross-sectional study 168 patients with dyspeptic symptoms at the Gastroenterology Department of Soyorkhol Med Hospital in Mongolia between June 2018 to August 2019. The patient had drunk one urea C14 capsule with 30 to 50 mL water. After 15 minutes the patient blowing into the breath collecting cart until the cart's orange dot getting yellow. Then breath collecting cart inserted to the device and estimated the number of detecting Helicobacter. We use Microsoft Excel, SPSS (ver. 20.0) program for Statistical analysis.
Results Total number of collected cases were 168, among of them 72 (42.85%) were male and 96 (57.14%) women, mean age was 36.42 years. ^{14}C-UBT was positive in 151 patients (89.88%) and negative in 17 patients (10.11%). Active *H. pylori* infection were very high 55 patients (32.73%) among ≤29 aged people, 43 patients (25.59%) in 30 to 39 years, 21 patients (12.5%) in 40 to 49 years, 18 patients (10.71%) for 50 to 59 years and 14 patients (8.3%) for 60 years older people. ^{14}C-UBT average results were 232.54, the highest result were 1,169 and the lower result was 5. During the evaluation of ^{14}C-UBT results we could not find false negative results.
Conclusions The prevalence of active infection of *H. pylori* were high, especially among 20 to 39 years old adults compared to other participants.
Keywords *Helicobacter pylori*; ^{14}C urea breathe test

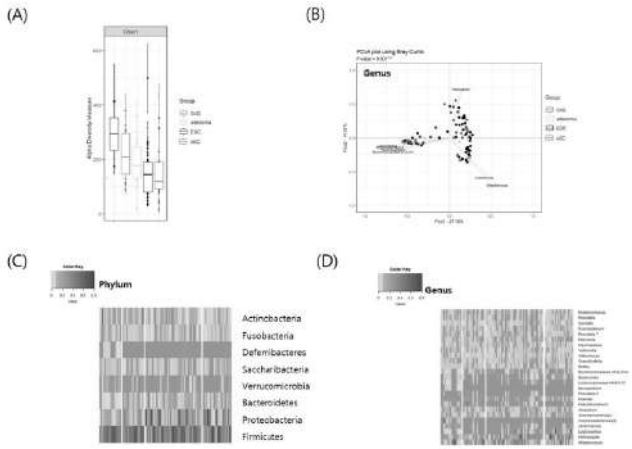

Fig. 1. Next generation sequencing (NGS) analysis of gastric juice.

Upper GI EE-UGI-056

Differences of Gastric Microbial Composition throughout the Process of Gastric Carcinogenesis

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Background/Aims Recently, next generation sequencing method enabled more precise and comprehensive identification of the gastric microbiota, which is regarded important in gastric carcinogenesis. There are reports that compositions of gastric microbiota differ between patients with and without gastric cancer. The aim of this study was to clarify the change of gastric microbial component throughout the multistep gastric carcinogenesis process.
Methods Gastric juice from 95 patients (atrophic gastritis, 16; adenoma, 16; early gastric cancer [EGC], 42; advanced gastric cancer [AGC], 21) were sampled at Chung-Ang University Hospital. Bacteria in gastric juice were isolated using centrifugation at 10,000 x*g* for 10 minutes at 4°C. Bacterial genomic DNA was amplified with 16S_V3_F and 16S_V4_R primers. The libraries were prepared, and representative sequences of the OTUs were finally classified using SILVA 128.
Results We found that the alpha diversity of gastric microbiota continued to decrease as the gastric carcinogenesis progressed (Fig. 1A). And, types of microbiome are segregated two groups only EGC group (Fig. 1B). Regarding microbial composition in the phylum level, *Deferribacteres* and *Verrucomicrobia* were reduced, while *Bacteroidetes* and *Proteobacteria* were increased in the adenoma, EGC, and AGC groups compared to atrophic gastritis group (Fig. 1C). At the genus level, different microbial composition was noted among the various disease groups (Fig. 1D).
Conclusions Microbial diversity in gastric juice decreased throughout the multistep gastric carcinogenesis process. Microbial composition was significantly different between the patients with or without gastric neoplasm in both the phylum and genus level. Functional studies are further needed to elucidate the exact causal relationship between gastric microbial change and gastric carcinogenesis.
Keywords Microbiome; Next generation sequencing; Stomach disease; Gastric juice; Pathogen

Upper GI EE-UGI-057

Abdominal Obesity Increases Risk for Esophageal Cancer: A Nationwide Population-Based Cohort Study of South Korea

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Background/Aims The relationship between overall obesity, as measured by body mass index (BMI), and risk of esophageal squamous cell carcinoma (ESCC) has been reported, and it has a negative correlation. However, the relationship with abdominal obesity, as measured by waist circumference, may be different. We investigated the association between abdominal obesity and ESCC.
Methods Retrospective cohort study with 22,809,722 individuals who had undergone regular health check-ups provided by the National Health Insurance Corporation between 2009 and 2012 (median follow-up period was 6.4 years) in South Korea. Abdominal obesity was defined as a waist circumference over 90 cm for men and 85 cm for women. We estimated hazard ratios (HRs) and 95% confidence intervals (CIs) using chi-square test and Cox proportional hazard model adjusted for confounding factors. Primary outcome was newly developed esophageal cancer.
Results After adjusting for BMI, abdominal obesity increased the risk of ESCC (HR, 1.29; 95% CI, 1.23 to 1.36). Waist circumference is associated with increased risk of ESCC in a dose-dependent manner (p for trend <0.0001). We analyzed individuals divided into five categories of BMI. Among individuals with overweight (BMI, 23 to 24.9 kg/m^2) and obese I (BMI, 25 to 29.9 kg/m^2), abdominal obesity was a risk factor associated with developing ESCC (HR, 1.22; 95% CI, 1.11 to 1.34 and HR, 1.28; 95% CI, 1.18 to 1.39, respectively).
Conclusions Abdominal obesity, not BMI itself, is associated with an increased risk for ESCC. Therefore, reducing abdominal obesity may affect decreasing the development of ESCC.
Keywords Esophageal cancer; Esophageal squamous cell carcinoma; Abdominal obesity; Waist circumference; Body mass index

Upper GI EE-UGI-058

The Influence of Direct Oral Anticoagulants on Delayed Bleeding in Patients with Early Gastric Neoplasms Who Underwent Endoscopic Submucosal Dissection

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Background/Aims Direct oral anticoagulants (DOAC) are widely prescribed for prevention of stroke in elderly patients with atrial fibrillation and approved indication for DOAC has been expanded. We aimed to evaluate the risk of delayed bleeding in patients who had taken DOAC and underwent endoscopic submucosal dissection (ESD) for gastric neoplasms.
Methods We included consecutive patients who underwent ESD between January 2015 and July 2019 in Seoul National University Hospital. Patients were divided into four groups (no med, no medication; DOAC; WFR, warfarin; anti-PLT, anti-platelet agent) according to the medications they had been taken before the procedure. We defined delayed bleeding as obvious post-procedural GI bleeding sign including hematemesis or melena combined with hemoglobin drop $\geq$2 g/dL.
Results Among 1,634 patients enrolled in this study, 23 patients (1.4%) had taken DOAC and they usually stopped the medication for 2 days before the ESD and resumed within 1 or 2 days. We compared rates of delayed bleeding between groups. Delayed bleeding rates of the groups of no med, DOAC, WFR, and anti-PLT were 2.1% (32/1,499) 8.7% (2/23), 14.3% (2/14), 11.2% (11/98), respectively (p<0.001). For DOAC users, the median time of bleeding was 4.5 days (range, 1.0 to 8.0 days) after undergoing ESD. Taking DOAC was associated with post-ESD bleeding with marginal significance (adjusted odds ratio, 3.89; 95% confidence interval, 0.80 to 18.96, p=0.093) but the bleeding rate was not significantly different from that of anti-platelet users (p=1.000).
Conclusions DOAC use seems to increase the risk of delayed bleeding after ESD with 2 days of cessation despite statistical insignificance. However, bleeding rate of DOAC users was not significantly different compared with the patients with continuous anti-platelet therapy. Additional a week of caution for bleeding is needed after resuming DOAC.
Keywords Direct oral anticoagulants; Endoscopic submucosal dissection; Delayed bleeding; Gastric neoplasm

Upper GI EE-UGI-059

Accuracy of Diagnosis of Chronic Gastritis and *Helicobacter pylori* Infection through Microvascular Pattern

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Background/Aims Atrophic gastritis is a precursor lesion of gastric cancer and *Helicobacter pylori* (HP) infection is well-known risk factors of gastric cancer. An HP infection of gastric mucosa can derange normal structures of gastric mucosa which consists of collecting venules, capillaries and surrounding gastric glands. The aim of this study was to validate the usefulness of natural endoscopic images for predicting atrophic gastritis and HP infection status to avoid an unnecessary biopsy.
Methods This is a prospective feasibility study at a single academic center. Forty-five asymptomatic patients, between 20 and 80 years underwent gastroscopy. The endoscopic findings were classified into three types according to the regular arrangement of collecting venules (RAC) and subepithelial capillary network (SECN) patterns: type 1, intact RAC with even SECN; type 2, loss of RAC with uneven SECN; type 3, loss of RAC with decrease of SECN. These findings were analyzed to determine how well these endoscopic classifications were correlated with histologic findings and rapid urease test to determine the severity of atrophic gastritis and the HP infection.
Results The sensitivity and the specificity of type 1 corresponding to the diagnosis of normal finding were 66.7% and 97.2%, respectively. The sensitivity and the specificity of type 2 corresponding to the diagnosis of mild atrophic gastritis were 82.4% and 82.1%. The sensitivity and specificity of type 3 corresponding to the diagnosis of severe atrophic gastritis were 89.5% and 92.3%. The sensitivity and the specificity of the type 2 pattern for predicting an HP-infected gastric mucosa were 95.8% and 96.7%.
Conclusions We suggests that atrophic gastritis and an HP infection can be highly predicted with high accuracy based on natural endoscopic images of mucosal vascular and surface patterns.
Keywords Microvascular pattern; *Helicobacter pylori* infection; Atrophic gastritis

Upper GI EE-UGI-060

Endoscopic Ultrasound Feature of Gastric Submucosal Tumor Diagnosed as Ectopic Pancreas after Endoscopic Resection

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Background/Aims Gastric ectopic pancreas is a benign tumor. But there are some limitations to distinguish ectopic pancreas from malignant tumor without histologic confirmation. We analyzed endoscopic ultrasound (EUS) features of Submucosal tumor diagnosed as ectopic pancreas after endoscopic resection.
Methods Thirty-one patients who were diagnosed gastric ectopic pancreas by histopathology were included in this study (from January 2004 to July 2018). All of them underwent EUS and endoscopic resection: endoscopic mucosal resection or endoscopic submucosal dissection.
Results Seventeen patients (54.8%) were female, with a median age of 41.1 years (range, 14 to 74 years). Most commonly, the lesions were localized in antrum (n=26, 83.9%). Before histologic confirmation, In EUS finding, most commonly involved layer were muscularis mucosae (51.5%) and submucosal layer (51.5%). Mean size was 10.6 mm (range, 7 to 15 mm). Mixed echogenicity (61.3%), heterogenous pattern (77.4%), and indistinct border (54.8%) was commonly observed. Calcification (12.9%), anechoic duct-like structure (32.3%), and thickening of muscularis propria (more than twice than normal) (41.9%) were observed in some patients. Endoscopic mucosal resection (41.9%) and endoscopic submucosal dissection (58.1%) were performed. *En-bloc* rate was 69.2% and 88.9% respectively.
Conclusions EUS can help identify the features of the ectopic pancreas. For complete ablation, endoscopic submucosal dissection may be better than endoscopic mucosal resection.
Keywords Accessory pancreas; Endoscopic ultrasound; Endoscopic mucosal resection; Endoscopic submucosal dissection

Upper GI EE-UGI-061

Case Report: Bleeding Duodenal Varix from Portal Hypertension Secondary to Hepatobiliary Tuberculosis

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Background/Aims Bleeding from ectopic varices contribute to as much as 5% of all variceal hemorrhages. Up to 17% of which may be found in the duodenum. Among patients with portal hypertension, about 0.4% develop duodenal varices. If not promptly recognized, these varices could be fatal due to massive bleeding. We present a case of a 32-year-old male patient, known case of *Pulmonary tuberculosis*, incompletely treated 3 years prior to admission which came in with jaundice and massive upper gastrointestinal bleeding.
Methods Initial upper endoscopy showed large tortuous esophageal varices. Rubber band ligation was done however hematemesis, hematochezia and melena with hypotension recurred. Repeat upper endoscopy showed a submucosal mass at the first segment of the duodenum with a small reddish spot. Endoscopic ultrasound revealed tortuous vessels contiguous with the first segment of duodenum which appears to drain at the portal vein. Prior to completion of the endoscopic ultrasound, fresh blood was noted coming out of the duodenum. Histoacryl injection was done.
Results Complete hemostasis was achieved. The rest of his workup supported findings consistent with portal hypertension secondary to hepatobiliary tuberculosis. He was then subsequently treated with Anti-Koch's regimen. No recurrence of bleeding noted on follow-up.
Conclusions Ectopic variceal hemorrhage may be managed medically, endoscopically, surgically or via interventional radiology. Histoacryl injection appears to be a viable option for emergency management of bleeding duodenal varices as seen in our patient.
Keywords Duodenal varix; Hepatobiliary tuberculosis; Histoacryl injection

Upper GI EE-UGI-062

A Rare Case of Epstein-Barr Virus Positive Gastric Medullary Carcinoma (Lymphoepithelioma-Like Carcinoma)

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Background/Aims Gastric medullary carcinoma (GMC) is a very rare type of gastric neoplasm typically presenting in elderly males. Here we present a case of a 72-year-old male with an Epstein-Barr virus positive GMC.
Methods A 72-year-old man presented to the emergency department with hematemesis. Initial esophagogastroduodenoscopy (EGD) revealed a 3 cm-sized subepithelial tumor with bleeding ulcer at gastric high body (HB). After coagulation therapy, a biopsy was performed on the lesion and chronic gastritis was diagnosed. Three months later, follow up endoscopy revealed that the gastric ulcer had healed. Gastroscopy contrast-enhanced computed tomography (gastroscopy-ECT) showed subepithelial mass at HB and thought to gastrointestinal stromal tumors. A re-biopsy showed a chronic gastritis. The patient was presented 1 year later with melena. EGD revealed an ulcerated subepithelial mass at HB. Endoscopic ultrasound showed hypoechoic mass in the submucosa and gastroscopy-ECT showed no interval change. Twenty months later, he got EGD for healthcare checkup. Endoscopic findings showed subepithelial lesion with early gastric cancer type III and biopsy result confirmed adenocarcinoma, poorly-differentiated. Gastroscopy-ECT revealed that slightly increased size of subepithelial mass.
Results The patient underwent subtotal gastrectomy. The final histopathology revealed carcinoma with lymphoid stroma (medullary carcinoma or lymphoepithelioma-like carcinoma) and focal extension to subserosa. In situ hybridization for Epstein-Barr virus-encoded RNA-1 (EBER-1) showed positive result. The tumor was best categorized as a lymphoepithelioma-like carcinoma (LELC). The patient remains alive with no evidence of recurrence after an 18-month follow-up period.
Conclusions Although the World Health Organization (WHO) uses GMC and LELC as synonyms for gastric carcinoma with lymphoid stroma, GMC generally refers to microsatellite-unstable solid-type carcinomas, and LELC implies an EBV-driven solid-type carcinoma. All three tumor types feature nests and clusters of poorly or undifferentiated cells showing a syncytial growth pattern surrounded by an intense lymphoplasmacytic cell infiltration. We report EBV positive lymphoepithelioma-like carcinoma through repeated endoscopy and biopsy.
Keywords Gastric medullary carcinoma; Lymphoepithelioma-like carcinoma; Epstein-Barr virus

Fig. 1. EBV-positive gastric medullary carcinoma.

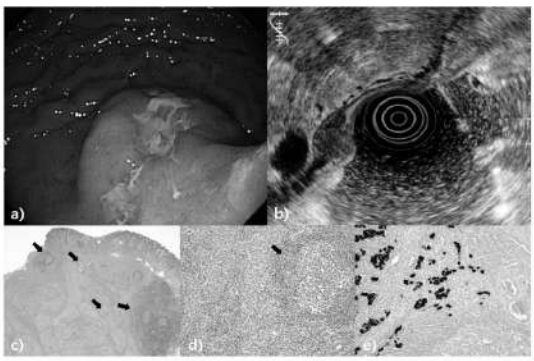

Figure 1: (a) EGD shows the 3 × 3 cm subepithelial gastric mass with central ulceration; (b) EUS finding is that hypoechoic mass is originated in the submucosal layer and accompanied by mucosal defects and invasion of proper muscle layer. (c), (d) H&E stain of Carcinoma with lymphoid stroma. (c) The specimen shows irregular sheets of tumor cells at left side and center with lymphoid stroma(solid arrows). (d) High power photograph shows irregular sheets of tumor cells at left side and lymphoid follicle with germinal center(arrow). (e) The EBER in situ hybridization. This study shows that the tumor cell neuclei are diffusely positive for EBER ISH.

EBV, Epstein-Barr virus; EGD, esophagogastroduodenoscopy; EUS, endoscopic ultrasound; EBER, EBV encoded RNA; ISH, in situ hybridization.

Upper GI EE-UGI-063

Prevalence of Gastric Cancer at Gastrointestinal Endoscopy Unit of a Dhaka Hospital in Bangladesh

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Background/Aims The prevalence of *Helicobacter pylori* infection is high, but the incidence of gastric cancer is known to be low among Bangladeshi natives which has been supported by decreased incidence of cancer precursor lesions in our setup. Epidemiological data of gastric cancer is scarce in Bangladesh. The Present study was aimed to know the proportion of gastric cancer among symptomatic subjects who underwent upper gastrointestinal (GI) endoscopy at a Dhaka hospital in Bangladesh.
Methods This is a retrospective observational study conducted by using data collected from endoscopy registry of Labaid Hospital–a tertiary Care Hospital at Dhaka. Data from 23,848 subjects were available for analysis during January 2016 to June 2018. In the data registry patient's age, gender and other than abdominal pain/discomfort no other clinical details were available.
Results Of the total 23,848 subjects, 17,886 (75%) and 5,962 (25%) were male and female respectively. The period prevalence (January 2016 to June 2018) rates of gastric cancer were 0.85% (202/23,848). Most of the patients (37%) were found in age group more than 60 years with mean age 53.7±10.7 years. The point prevalence for 2016, 2017, and 2018 were respectively 0.31%, 0.38% and 0.15%.
Conclusions The present observation of near 1% prevalence rates of gastric cancer at this GI endoscopy facility is suggestive of its higher occurrence rates in our setup. However, further population-based study would be able to validate these data. Only use of endoscopic diagnosis without histopathological confirmation was the important limitation of this study.

Upper GI EE-UGI-064

The Effect of Rebamipide Addition to Triple Therapy during *Helicobacter pylori* Eradication

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Background/Aims Previous studies reported that rebamipide improve the effectiveness of *Helicobacter pylori* eradication therapy. However, effect of rebamipide on possible reduction of side effects remained controversial. This study was performed to evaluate whether the addition of rebamipide to proton pump inhibitor (PPI)-based triple therapy decreases the eradication rates and side effects.
Methods We reviewed 61 patients who were infected with *H. pylori* and treated with triple therapy plus rebamipide. The triple therapy consisted of lansoprazole 30 mg b.i.d. (twice a day), clarithromycin 500 mg b.i.d., and amoxicillin 1 g b.i.d. for 7 days. The patients received rebamipide or not for 7 days starting from the first day of triple therapy. Eradication rates were obtained by urea breath test performed 4 weeks after completion of triple therapy. Adverse events and complications were evaluated by symptom questionnaires after 7, 14, 21 and 28 days of the treatment.
Results Thirty-five patients were treated with triple therapy plus rebamipide (group A) and another 26 patients without rebamipide (group B). *H. pylori* eradication rates was 60% (21/35) in group A and 53.8% (14/26) in group B. Two major side effects are reflux symptom and epigastric discomfort. There was no noticeable difference in side effect between two groups. Most adverse events were mild to moderate in intensity.
Conclusions The addition of rebamipide to triple therapy might be effective on the boosting eradication rates than without rebamipide. The side effects were mostly reduced after 4 weeks of eradication treatment.
Keywords Rebamipide; Triple therapy; *Helicobacter pylori*

Upper GI EE-UGI-065

Long-term Outcomes of Patients with Gastric Adenoma including Low-grade and High-grade Dysplasia in Korea

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Background/Aims New endoscopic resection techniques are constantly being developed for gastric adenoma, which can be classified as low or high grade according to the Vienna classification. However, long-term data on gastric adenoma (e.g., removal or follow-up after resection via endoscopy) remain lacking. We investigated long-term outcome of gastric adenoma after endoscopic resection and risk factors for recurrence.
Methods We retrospectively analyzed 133 cases with gastric adenoma that underwent endoscopic resection from January 2010 to November 2018 at Haeundae Paik Hospital, Inje University School of Medicine, Busan, Korea. One hundred six (79.7%) and 27 patients (20.3%) received endoscopic resection once and more than twice, respectively.
Results Compared with the initial endoscopic biopsy pathological results, the upgraded and downgraded histological discrepancy rates were 10.5% (n=14) and 3.0% (n=4) after resection, respectively. The mean time to recurrence was 2.23 years. The most common endoscopic gross finding was flat lesions (58.6%). The lesions were found frequently in the antrum (52.6%; long axis) and lesser curvature (39.8%; short axis). Eleven (8.3%) and 16 patients (12.0%) had recurred synchronous and metachronous lesions, respectively. In the multivariate cox analysis of the recurrence group, intestinal metaplasia (hazard ratio, 2.761; 95% confidence interval, 1.117 to 6.820; p=0.028) and lesion size (hazard ratio, 1.607; 95% confidence interval, 1.082 to 2.385; p=0.019) were independent factors for receiving endoscopic resection more than twice.
Conclusions If patients have severe intestinal metaplasia or large size of lesion at endoscopic resection for gastric adenoma, periodic observation is necessary.
Keywords Gastric neoplasm; Risk factors; Recurrence; Intestinal metaplasia; Lesion size

Upper GI EE-UGI-066

Computed Tomography versus Endoscopic Ultrasound for Differentiating Small (25 cm) Gastrointestinal Stromal Tumors from Leiomyomas

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Background/Aims Abdominal computed tomography (CT) or endoscopic ultrasound is recommended for the evaluation of gastric subepithelial tumors. However, few studies have compared the diagnostic performance of these two methods. We compared the diagnostic performance of CT versus endoscopic ultrasound for gastric subepithelial tumors smaller than 5 cm. We also identified significant CT findings associated with the diagnosis of gastrointestinal stromal tumors.
Methods Seventy-one patients with pathologically proven gastric subepithelial tumors were enrolled. We examined the diagnostic performance of CT compared with endoscopic ultrasound. We analyzed CT findings, including the location, long diameter (LD), short diameter (SD), LD-SD ratio, contour, margin, growth pattern, degree and pattern of enhancement, attenuation value, intralesional necrosis, calcification, hemorrhage, surface dimpling, and perilesional lymph node.
Results Endoscopic ultrasound had a sensitivity of 77.6%, specificity of 61.5%, positive predictive value (PPV) of 90.0%, negative predictive value (NPV) of 38.1%, and accuracy of 74.6%. CT had a sensitivity of 84.5%, specificity of 53.8%, PPV of 89.1%, NPV of 43.8%, and accuracy of 78.9%. Multivariate analysis revealed that the presence of intralesional necrosis (odds ratio [OR], 10.88; p=0.037) and an LD-SD ratio less than 1.5 (OR, 32.37; p=0.002) were independent CT findings for the diagnosis of gastrointestinal stromal tumors.
Conclusions CT is as effective as endoscopic ultrasound for the diagnosis of gastric subepithelial tumors smaller than 5 cm. Tumors with intralesional necrosis and an LD-SD ratio less than 1.5 may require further pathologic diagnosis.
Keywords Endosonography; Gastric neoplasm; Radiographic computed tomography

Upper GI EE-UGI-067

Efficacy and Safety of Endoscopic Incisional Therapy for Esophageal Anastomotic Stricture: Comparison with Balloon Dilation

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Background/Aims Benign esophageal stricture has been treated with endoscopic methods; and balloon dilation (BD) is common modality for treating stricture. However, recurrent refractory esophageal stricture after balloon dilatation have been reported and it impairs quality of life of patients. The aim of this study was to evaluate efficacy and safety of endoscopic incisional therapy (EIT) compared to BD for anastomotic stricture after total gastrectomy.
Methods Subjects who underwent EIT or BD as a first treatment for esophagojejunostomy anastomotic stricture after total gastrectomy between January 2010 and December 2017 were eligible. The medical records were retrospectively reviewed and clinical characteristics were investigated. Stricture was defined as an inability to pass a conventional endoscope. The stricture area was incised under direct vision with the nano-insulated-tip knife in a radial fashion parallel to the longitudinal axis of the esophagus.
Results Twenty-one patients presented benign anastomotic stricture after total gastrectomy. BD group included 12 patients and EIT group included nine patients who underwent EIT with or without BD. Among the nine patients in EIT group, three patients received additional BD immediately after EIT. Re-stricture rate showed significant difference between BD group and EIT group (41.7% vs 0%, p=0.045). Between two groups, there were no significant differences in procedure time, interval from surgery to first stricture, hospitalization period, and complication rates. One patient developed microperforation during BD and clipping was done to the site without undergoing surgical intervention.
Conclusions EIT is a feasible, safe and effective treatment modality compared to BD for esophagojejunostomy anastomotic stricture after total gastrectomy showing significant lower re-stricture rate.
Keywords Esophagus; Anastomosis; Stricture; Endoscopy

Upper GI EE-UGI-068

Possible Anti-Diabetic Potentials of Coffea arabica L. and Their Active Compounds on Inhibition of Alpha-Amylase and Alpha-Glucosidase Activities

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Background/Aims One of the therapeutic approaches the post-prandial hyperglycemia by suppressing the absorption of glucose through the inhibition of α-amylase and α-glucosidase activities. We evaluated the anti-diabetic potential of coffee fruits (*Coffea arabica* L.) extract in different colors (green, yellow, and red) and their active compounds on α-amylase and α-glucosidase activity.
Methods The coffee fruits extract was prepared with boiling distilled water and lyophilized to obtain dry powders. *In vitro* inhibitory properties of extracts and their active compounds on α-amylase and α-glucosidase activities were performed using standard procedures.
Results Our data showed that coffee fruits extracts are potent inhibitors of α-amylase, and suggest that chlorogenic acid, caffeine and caffeic acids in these extracts strongly inhibit α-amylase activity as the standard acarbose. Also, these extracts and their active compounds have a potential α-glucosidase inhibition.
Conclusions These results suggest that the anti-diabetic potential of coffee fruits extracts may be due to its ability to inhibit both α-amylase and α-glucosidase and the presence of multiple components of the extract such as chlorogenic acid, caffeine and caffeic acids. Further studies are needed to reveal glucose uptake studies.
Keywords *Coffea arabica* L.; Alpha-amylase; Alpha-glucosidase; Caffeine; Chlorogenic acid

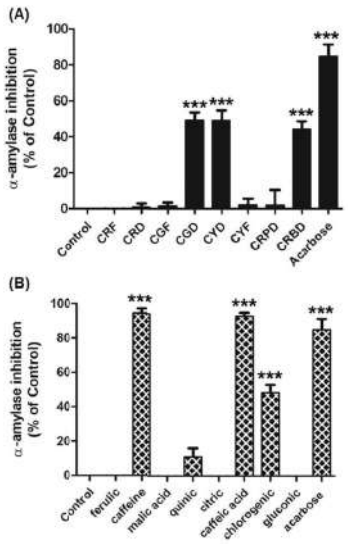

Fig. 1. Inhibitory activity against amylase.

Upper GI EE-UGI-069

Endoscopic Appearance Can Be a Predictive Factor in Newly Diagnosed Gastric MALT Lymphoma

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Background/Aims Gastric mucosa associated lymphoid tissue (MALT) lymphoma shows various endoscopic appearances, such as erosion, hypertrophic fold, ulceration and mass formation. There were reports that MALT with high grade component has endoscopic appearance similar to gastric adenocarcinoma and depth of invasion in endoscopic ultrasound correlate with prognosis. We conducted this study to identify the association of endoscopic appearance of gastric MALT lymphoma in the stage, prognosis and pathologic findings.
Methods All newly diagnosed MALT lymphoma patients in Chonbuk National University Hospital from 2008 to 2018 were assessed for inclusion. The endoscopic appearance of MALT lymphoma was defined as; 1: superficial, 2: hypertrophic folds, 3: ulceroinfiltrative and 4: mass forming.
Results Total of 47 were assessed for inclusion and 11 patients were excluded due to follow-up loss. *Helicobacter pylori* was present in 28 patients (77.8%). Those with stage II or higher were three (8.3%) and 12 (33.4%) had 1 or higher MALT-IPI. Complete remission after final treatment was 34 (94.4%). Four had different type of lymphoma in follow-up biopsy. Sixteen (44.4%) had superficial, two (5.6%) hypertrophic fold, 13 (36.1%) ulceroinfiltrative and five (13.9%) mass forming appearance. The endoscopic finding significantly correlated with stage, IPI, chemotherapy and CR rate (Fig. 1). Interestingly, those with higher stage higher MALT-IPI, performed chemotherapy and not achieved CR were almost entirely in group 3 and 4. Those with different cell type in follow-up biopsies were all in group 3 and 4, but with no statistical significance (p=0.073).
Conclusions The endoscopic appearance of MALT lymphoma had significant association with stage, MALT-IPI, chemotherapy and CR. Ulceroinfiltrative or mass forming morphologies, which can be assumed to have deeper invasion, had worse characteristics and may have other pathologic diagnosis. Due to small number of subjects, further study is needed to confirm our result.
Keywords MALT lymphoma; Stomach; Endoscopy; Prognosis

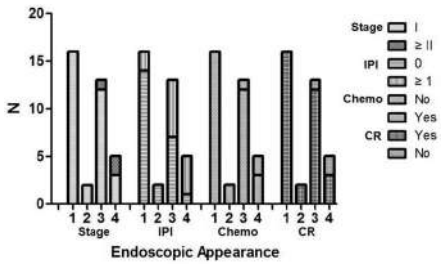

Fig. 1. Factors with significance.

Upper GI EE-UGI-070

IgG4-Related Disease in Stomach: A Case Report

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Background/Aims IgG4-related disease (IgG4-RD) is an immune-mediated fibroinflammatory disease and can involve one or multiple organs. IgG4-RD in stomach is rare and there are not any confirmative diagnostic methods before surgery. Here, we report IgG4-RD in stomach case which was initially diagnosed with gastric subepithelial tumor (SET).
Methods A 45-year-old man, diagnosed with gastric SET which was incidentally found by endoscopy, visited our hospital for further evaluation. He had not any medical history and had not any specific symptom and physical examination was normal. The results of endoscopy showed 3×3 cm, fixed, round-shaped, hard submucosal lesion at great curvature of upper gastric body. The abdomen computed tomography showed well-defined heterogeneously enhancing wall mass at great curvature of upper gastric body, which seemed to be gastric submucosal tumor. After all, He underwent laparoscopic wedge resection of stomach with lymph node dissection.
Results The mass size was 3×2.8 cm. Histopathological examination showed tan-whitish colored firm mass, whit-gray color on cut section, which was involved both submucosa and subserosa. Microscopically, after hematoxylin and eosin staining, lymphoid follicles, dense lymphoplasmacytic infiltrate with plasma cells were identified. Both IgG and IgG4 were positive on immunohistochemistry stain (Fig. 1) and the ratio of IgG4 and IgG was 0.15. Other types of gastric SET were ruled out through immunohistochemistry stain. Finally, we could have diagnosed IgG4-RD.
Conclusions High serum IgG4 is one of the features of IgG4-RD but the specificity and sensitivity are not reliable for diagnosis the disease. High serum IgG4 can be detected in certain diseases. So Histopathological diagnosis is mandatory for IgG4-RD. The treatment of choice in IgG4-RD is glucocorticoids. However, most of IgG4-RD in stomach was removed by surgical methods prior to apply such medication. That is why we need to seek other diagnostic methods without surgery that can cause some surgical complications at this moment.
Keywords IgG4-related disease; Gastric subepithelial tumor; IgG4-RD in stomach

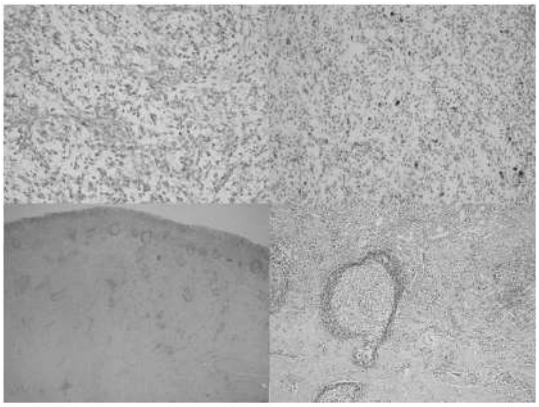

Fig. 1. Histological findings.

Upper GI EE-UGI-071

Dilation of the Plummer-Vinson Ring: Efficiency and Security

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Background/Aims The Plummer-Vinson syndrome (PVS) or Kelly Paterson is a rare entity defined by the association of upper dysphagia, iron deficiency anemia and a fibrous ring of the cervical esophagus. Endoscopic dilatation of the esophageal diaphragm is often necessary. The main is to analyze the results of endoscopic treatment and then to study the epidemiological, clinical and endoscopic characteristics of PVS.
Methods Eighty-one cases of PVS collected in our unit between September 2005 and August 2019. All patients underwent martial treatment and endoscopic dilation of the esophageal ring with Gillard Savary Bougies or hydrostatic balloon under or without fluoroscopy. Other session (s) of dilatation was performed in case of recurrence of dysphagia and/or esophageal stenosis.
Results The 18,364 upper gastrointestinal endoscopies were performed, including 198 in the context of PVS, over a period of 14 years (1%). Eighty-one patients with PVS were included, including 67 women (82.7%) and 14 men (18.3%). The average age was 39 years. All patients presented dysphagia and anemic syndrome. The anemia found in all patients was iron deficient, the mean hemoglobin level was 9.5 g/dL and ferritin rate 10 µg/L. High gastrointestinal endoscopy was performed in all patients; 76 cases (93.8%) had a single ring, four patients (4.9%) had two rings, one patient (1.3%) had three rings. All our patients underwent endoscopic dilation with an average of 1.5 dilations with Savary Gillard's bougies in 76 cases (93,8%) and balloons of dilation in five cases (6.2%). No perforation was noted. The clinical, biological and endoscopic evolution was favorable; no case of malignant degeneration was noted with a mean follow-up of 31.8 months.
Conclusions Management of PVS is based on endoscopic dilatation and martial supplementation. Our experience confirms that endoscopic dilation is effective, well tolerated and safe.
Keywords Plummer-Vinson syndrome; Endoscopique dilation

Upper GI EE-UGI-072

Heterotopic Gastric Mucosa of the Proximal Esophagus: An Unknown Entity?

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Background/Aims Heterotopic gastric mucosa (HGM) is an islet of gastric mucosa within the esophageal mucosa. These lesions can sit throughout the digestive tract and rarely in the upper third of the esophagus. The pathophysiology of HGM remains poorly understood. The aim is to estimate the prevalence of HGM, clinical signs, endoscopic, microscopic aspects and different epidemiological factors associated.
Methods All patients from a single endoscopy center with a HMG of the upper third of the esophagus were included over a 5-month evaluation period. All lesions seen in endoscopy were confirmed by histological analysis.
Results The 736 patients underwent gastroscopy for 5 months. HGM of the upper third of the esophagus was found in 10 patients. There were eight men and two women with an average age of 55 years. Two patients were smokers. Upper gastrointestinal endoscopy was required for clinical manifestations of gastroesophageal reflux in eight patients. The other two indications were a report of iron deficiency anemia and a search for signs of portal hypertension. The clinical manifestations were dominated by dyspepsia (66%), epigastralgia (50%), heartburn (33%) and regurgitation (16%). The endoscopic lesions associated with HGM were: gastritis (7/10), hiatal hernia (1/10). The lesions of HGM appeared in the form of rounded, suspended, "salmon-red" is lets, well defined, measuring on average 1.75 cm, sitting on average at 17.5 cm of the dental arches. The histological study confirmed the appearance of typically fundic glandular cells, with presence of intestinal metaplasia in 30% of HGM cases (Fig. 1). One patient had *Helicobacter pylori* infection. No dysplasia was visualized.
Conclusions HGM of the proximal esophagus is a benign abnormality most often accidently discovered in endoscopy. In our series the estimated prevalence is 1.3% with a clear male predominance. No dysplasia was found. its management is still debated and could be similar to Barrett's esophagus for monitoring and treatment.
Keywords Upper esophagus; Heterotopic gastric mucosa; Endoscopy

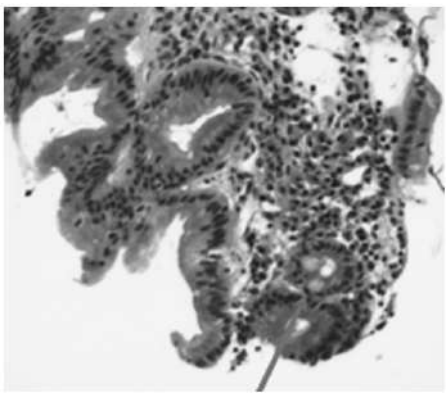

Fig. 1. Intestinal metaplasia in heterotopic gastric mucosa.

Upper GI EE-UGI-073

Fluoroscopic Gastroduodenal Stent Placement in 55 Patients with Endoscopic Stent Placement Failure

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Background/Aims To evaluate the technical feasibility and clinical effectiveness of fluoroscopic self-expandable metal stent (SEMS) placement in malignant gastroduodenal obstructions after failed endoscopic SEMS placement.
Methods Between September 2010 and July 2017, 874 patients underwent endoscopic SEMS placement for dysphagia caused by malignant gastroduodenal obstructions. Endoscopic SEMS placement failed in 55 of 874 patients (6.3%). These patients were referred for fluoroscopic SEMS placement. In case of failed fluoroscopic SEMS placement, combined endoscopic and fluoroscopic SEMS placement was attempted at the same setting.
Results Fluoroscopic SEMS placement was technically successful in 40 of 55 patients (72.7%). Combined endoscopic and fluoroscopic SEMS placement was technically successful in six of 15 patients with fluoroscopic SEMS placement failure. Failures in the nine patients were due to complete obstruction (n=5) and acute angulation at the stricture site (n=4). The overall technical success rate was 83.6% (46/55). Clinical success was achieved in 95.6% of patients (44/46). Complications occurred in seven of 46 patients (15.2%), including tumor overgrowth (n=3), SEMS migration (n=3), and bleeding (n=1). The median SEMS patency and patient survival periods were 515 (95% confidence interval [CI], 266.6 to 761.5) and 83 (95% CI, 60.6 to 105.4) days, respectively.
Conclusions Fluoroscopic SEMS placement is technically feasible and clinically effective in in cases of endoscopic SEMS placement failure. A combined endoscopic and fluoroscopic approach increases the technical success rate after failure of the endoscopic or fluoroscopic approach.
Keywords Self-expandable metallic stents; Gastroduodenal; Endoscopy

Upper GI EE-UGI-074

Clinical Effectiveness and Safety of Self-Expanding Metal Stent Placement Following Palliative Chemotherapy in Patients with Advanced Esophageal Cancer

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Background/Aims To investigate the effect of prior chemotherapy on self-expanding metal stent (SEMS)-related complications in patients with locally advanced primary esophageal cancer.
Methods Data from patients with locally advanced primary esophageal cancer who received SEMS placement with or without prior chemotherapy were retrospectively reviewed. Patients were grouped according to prior palliative therapy: group A had received SEMS only, and group B had received palliative chemotherapy prior to SEMS placement. Patient age, stricture length, location, and dysphagia score prior to SEMS placement were evaluated. Outcomes after SEMS placement, including technical and clinical success rates, the occurrence of complications and survival, were compared.
Results The study included 105 patients (group A, n=41; group B, n=64). There were no significant differences between the two groups prior to SEMS placement. SEMS placement was technically successful in all patients, with no procedure-related complications reported. Clinical success was achieved in 95.1% of patients in group A and 96.8% of patients in group B. The duration of stent patency was significantly shorter in group B (162 days: 95% confidence interval [CI], 126.6 to 198.4) versus group A (339 days: 95% CI, 258.8 to 419.3) (p=0.001). No significant differences were seen between the two groups regarding dysphagia score improvement (p=0.66), complications (p=0.094), or survival (p=0.592).
Conclusions Prior chemotherapy did not increase the risk of complications following SEMS placement in patients with locally advanced esophageal cancer.
Keywords Self-expandable metallic stents; Esophageal neoplasm; Chemotherapy

Upper GI EE-UGI-075

Low Grade Gastric Mucosa-Associated Lymphoid Tissue Lymphoma: Clinicopathological Factors Associated with *Helicobacter pylori* Eradication and Tumor Regression

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Background/Aims Eradication of *Helicobacter pylori* is widely accepted as the initial therapy for low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma. The aim of this study was to assess the remission and relapse rates of low-grade gastric MALT lymphoma after *H. pylori* eradication and to identify the clinical factors affecting remission.
Methods We retrospectively analyzed 151 patients diagnosed with gastric MALT lymphoma from May 2003 to December 2018.
Results Of the 151 patients, 112 (74.2%) had an *H. pylori* infection. Total regression rates with eradication was 90.2% (101/112) in *H. pylori*-positive patients and 55% (11/20) in *H. pylori*-negative patients. Age, sex, tumor location, endoscopic findings, and the severity of mononuclear lymphocytes were not related to achieving successful initial *H. pylori* eradication and remission. However, patients with a smaller *H. pylori* burden (p=0.030) and less neutrophil infiltration (p=0.003) were more likely to achieve a successful initial *H. pylori* eradication. *H. pylori* (p<0.001) and the burden (p=0.020) were significantly related to remission of MALT lymphoma.
Conclusions The results show that *H. pylori* burden and neutrophil infiltration were inversely related to the success of the initial *H. pylori* eradication procedure and that the *H. pylori* burden was inversely related to the remission of MALT lymphoma.
Keywords Mucosa-associated lymphoid tissue; Lymphoma; *Helicobacter pylori*; Eradication; Remission

Upper GI EE-UGI-076

Comparing the Accuracy of Endoscopic Ultrasound and Computed Tomography in Staging of Esophageal Cancer

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Background/Aims Endoscopic ultrasound (EUS) is a suitable device for staging of esophageal cancers. However, chest computed tomography (CT) has traditionally been the standard diagnostic modality for malignancies. This study aimed was to compare the accuracies of EUS and chest CT in T and N staging of esophageal cancers.
Methods We retrospectively analyzed 149 patients who had undergone EUS examination and 275 patients who had undergone chest CT before cancer surgery. The inclusion criteria were: patients diagnosed with esophageal cancer on biopsy, patients who had undergone EUS examination or chest CT before cancer surgery, and patients who underwent cancer surgery at the Seoul National University Bundang Hospital from May 2003 to December 2018. We determined the accuracy of T and N staging on EUS examination and chest CT with the biopsy specimens.
Results The overall accuracies of EUS examination and chest CT were 73.8% (110/149) and 38.9% (107/275), respectively, for T staging (p<0.001) and 64.4% (96/149) and 34.8% (170/275), respectively, for N staging, which was not statistically different (p=0.596). For the substaging, the accuracy of EUS examination was higher than that of chest CT (p<0.001) for the T1 stage, but the accuracy of chest CT was higher than that of EUS for the N2 stage (p=0.037). In the T1-stage group, understaging was higher on chest CT (T0) than on EUS examination (p<0.001).
Conclusions EUS examination is superior to chest CT for diagnosing T1 esophageal cancers, whereas chest CT is superior to EUS examination for diagnosing N2 esophageal cancers. Further, the risk of understaging is higher with chest CT than with EUS examination for T1 esophageal cancers.
Keywords Esophageal cancer; Endoscopic ultrasound; Chest computed tomography; Stage

Upper GI EE-UGI-077

Computed Tomography-Guided Percutaneous Endoscopic Gastrostomy Tube Placement in a Post Partial Gastrectomy Patient: A Pioneering Experience

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Background/Aims Percutaneous endoscopic gastrostomy (PEG) is an effective access providing long-term enteral feeding. One indication for PEG placement include inadequate enteral intake due to dysphagia caused by a neoplasia or a neurologic disorder. PEG tube, in some cases is not feasible due to obesity, ascites, peritoneal carcinomatosis, inadequate transillumination or previous abdominal surgery. Computed tomography (CT)-guided PEG is an alternative method in cases where endoscopic placement is not successful. The aim of this report is to demonstrate the feasibility of PEG placement in post-gastrectomy patients.
Methods An 84-year-old female, post-partial gastrectomy with Billroth II anastomosis, having multiple hospitalizations due to recurrent aspiration pneumonia. Baseline CT scan showed a 2.6 cm distance from anterior wall of the stomach to the anterior abdominal wall, without intervening bowel loops in between (Fig. 1A).
Results Initial endoscopic evaluation showed an unremarkable esophagus and remaining proximal stomach with gastrojejunostomy anastomoses. Guided by CT and endoscopic transillumination, the left pleura, diaphragm in the superior aspect of the stomach and the anastomotic site between the stomach and jejunum were identified prior to puncture. PEG tube was placed via pull-through technique under intravenous sedation (Fig. 1B). Initiation of enteral feeding was tolerated without untoward event 24-hour after the procedure. Full, intermittent feeding achieved after 4 days.
Conclusions With our firsthand experience, PEG placement guided by radiologic imaging is advantageous over endoscopy alone in patients who previously had extensive gastric surgery. CT guidance provides better anatomic orientation to avoid accidental puncture of neighboring organs and reduces the risk of tube misplacement. CT-guided PEG tube placement may be a good option as alternative to surgical tube placement.
Keywords Case report; Peg tube placement; Computed tomography-guided; Percutaneous endoscopic gastrostomy

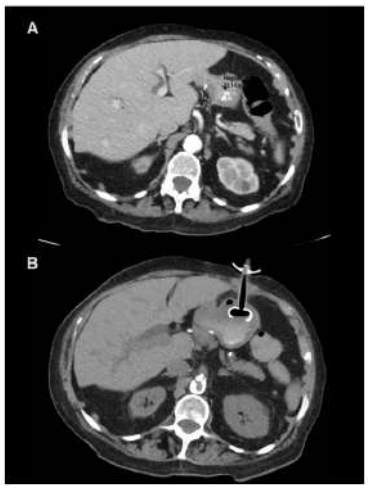

Fig. 1. Abdominal Computed tomography scan image.

Upper GI EE-UGI-078

Association between Time Interval from Diagnosis to Endoscopic Submucosal Dissection and Complete Resection in Patients with Gastric Neoplasm

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Background/Aims There are no standard guidelines regarding the time interval from the diagnosis of gastric neoplasms to endoscopic submucosal dissection (ESD). This study was aimed to evaluate the association between the time interval from the diagnosis to ESD and success of complete resection for high-grade dysplasia (HGD) and early gastric cancers (EGCs).

Methods A total of 1,728 patients who underwent ESD for HGD or EGC from January 2005 to March 2019 were enrolled. The time intervals from the diagnosis to ESD were analyzed as continuous variables. A multivariable logistic regression analysis was performed to evaluate the influence of the time interval on success of complete resection.

Results Of the 1,728 enrolled patients, 568 (32.9%) and 1,160 (67.1%) patients were diagnosed with HGD and EGC, respectively. The complete resection rate is 91.1% (1,572 patients) and the mean time interval for all patients was 36.30 (±19.17) days. There was significant difference in the mean waiting time between two groups divided by referral center (our center vs other center: 29.4±14.5 vs 40.4±20.4, p<0.001). However, the success rate of complete resection was not different between two groups (p>0.05). The time interval does not significantly influence the incidence of complete resection (adjusted odds ratio, 0.995; 95% confidence interval, 0.985 to 1.004; p=0.326).

Conclusions A longer time interval from the diagnosis to ESD was not associated with incomplete resection. These results could help establish endoscopic treatment guidelines for gastric neoplasms and aid both patients and endoscopists.

Keywords Early gastric cancer; Gastric adenoma; Endoscopic submucosal dissection; Time interval

Upper GI EE-UGI-079

Gastric MALToma Studied with FDG-PET: A Comparison with Endoscopic Findings

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Background/Aims This study evaluated the diagnostic efficacy of fluorine-18 fluorodeoxyglucose positron emission tomography/computed tomography (F-18 FDG PET/CT) for patients with gastric mucosa-associated lymphoid tissue (MALT) lymphoma and examined the association between FDG avidity and the clinical factors affecting lesions.

Methods From January 2000 to December 2018, consecutive patients with stage-I gastric MALT lymphoma were enrolled in single center retrospectively. A total of 131 patients were diagnosed with gastric MALT lymphoma and had received eradication therapy. The median age of the patients was 58 years (range, 20 to 81 years). There were fewer male than female (male:female, 48:83) and male to female ratio was 1:1.7. Among the patients diagnosed with gastric MALT lymphoma, 19 who underwent a PET/CT for gastric MALT lymphoma were semi-quantitatively and qualitatively tested for FDG avidity of lesions in the stomach. Retrospectively collected data was analyzed to investigate the endoscopic findings between the patients with positive F-18 FDG PET/CT scans and those with negative scans.

Results Eleven of the 19 patients showed FDG avidity. When comparing the size of lesions in the stomach, the patients with FDG avidity had significantly larger lesions than those without (30.1 mm vs 15.0 mm, p=0.03). The FDG-avid group has a significantly higher rate of positive CT scans than the non-avid group (75% vs 13%, p=0.03). According to the endoscopic finding of the lesions, FDG avidity was pronounced with 83% of the protruding tumors, and 100% of the erosive-ulcerative types, which are a type of depressed tumors.

Conclusions When gastric MALT lymphoma is large and the macroscopic appearance of a lesion is that of a protruding tumor or erosive-ulcerative type of depressed tumor, there is a high probability that such patients may have a positive F-18 FDG PET/CT scan.

Keywords Stomach; MALToma; Endoscopy

Upper GI EE-UGI-080

Comparison of the Eradication Rate of Second-Line Treatment According to the Type of First-Line Therapies in *Helicobacter pylori*

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Background/Aims Various therapies have been tried to overcome the antibiotics resistance of *Helicobacter pylori*. However, little is known about the results of second-line treatment of these first-line therapies. We compared the eradication rates of second-line treatment according to first-line therapy.

Methods We analyzed 1,141 patients who have been treated for *H. pylori* infection from January 2014 to December 2018 in our hospital retrospectively. Treatment regimen was defined as follows; triple therapy-proton pump inhibitor (PPI), amoxicillin and clarithromycin for 14 days; concomitant therapy-PPI, amoxicillin, clarithromycin and metronidazole for 10 days; sequential therapy-PPI, amoxicillin for 5 days, followed by PPI, clarithromycin, metronidazole for 5 days; hybrid therapy-PPI, amoxicillin for 5 days, followed by PPI, amoxicillin, clarithromycin, metronidazole for 5 days; and PBMT therapy-PPI, bismuth, metronidazole, tetracycline for 14 days. All the patients took PBMT therapy for second-line treatment.

Results The eradication rate of first-line treatment was 88.4% (1,009/1,141). The eradication rate was 84.0% (379/4,515) for triple therapy, 92.7% (537/498) for concomitant therapy, 87.3% (103/118) for sequential therapy, 82.9% (29/35) for hybrid therapy respectively. Concomitant therapy had a significantly high eradication rate than the other therapies (92.7%, p<0.001). 132 patients underwent second-line treatment of *H. pylori* with PBMT regimen. The eradication rate of second-line treatment were 84.8% (112/132). The eradication rate according to the type of first-line treatment is as follows. The 83.3% (60/72) for triple therapy, 84.6% (33/39) for concomitant therapy, 73.3% (11/15) for sequential therapy and 83.3% (5/6) for hybrid therapy (p=0.795) (Fig. 1). There was no significant difference in eradication rate according to first-line therapy.

Conclusions There was no significant difference in eradication rate of second-line PBMT therapy according to first-line therapy.

Keywords *Helicobacter pylori*; Eradication rate; Second-line treatment

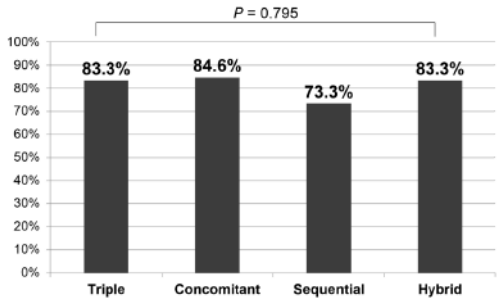

Fig. 1. Eradication rate of second-line therapy.

Upper GI EE-UGI-081

An Unusual Cause of Dysphagia: Sodium Polystyrene Sulfonate-Induced Esophageal Necrosis

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Background/Aims Sodium polystyrene sulfonate (SPS; Kayexalate) is a cation exchange resin usually used in the management of hyperkalemia especially in patients with chronic renal disease. It has been linked with several gastrointestinal adverse effects. However, most reports and studies have mentioned only the colonic effects of this medication. In this case report, we present a case of an SPS-induced esophageal mass presenting as dysphagia and gastrointestinal bleeding.
Methods This is a case of a 35-year-old Filipina who presented with a two-day history of dysphagia and vomiting of blood-tinged saliva. She is a known case of chronic kidney disease secondary to chronic glomerulonephritis on hemodialysis with history of kayexalate intake around one year prior. Physical examination findings were normal.
Results Upper gastrointestinal endoscopy revealed an irregular friable, bleeding mass involving less than half of the circumference of the esophageal lumen at the 27 to 30 cm level from the incisors. Biopsy was done which showed benign esophageal mucosa with moderate active inflammation and reactive epithelial changes admixed with detached fragments of fibrinopurulent exudate and many kayexalate crystals. No malignant cells were found. A repeat gastroscopy was done after three months which showed complete resolution of the previously seen esophageal mass. There are currently no treatment guidelines for patients with SPS-induced gastrointestinal mucosal injury. In most reports, withdrawal of the offending drug would eventually lead to resolution of symptoms.
Conclusions There are still few cases reported of upper gastrointestinal manifestations of SPS-induced mucosal injury. This is a rare case of a young hemodialysis patient who presented with an esophageal mass. Aside from malignancy, it is always imperative to take into account the patient's history in determining other differential diagnoses that could easily be missed.
Keywords Kayexalate; Upper gastrointestinal bleeding

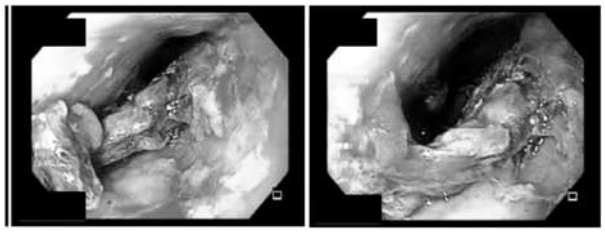

Fig. 1. Esophageal necrosis.

Upper GI EE-UGI-082

Analysis of the Incidence and Clinicopathological Characteristics of Metachronous Gastric Cancer after Surgery

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Background/Aims Early gastric cancer (GC) patients have a good prognosis after radical resection. However, there is risk of metachronous gastric neoplasm (MGN) if the patients have a gastric remnant after the surgery. The aim of this study was to clarify the risk factors for MGN after partial gastrectomy for GC.
Methods Data of 680 patients who received surgical treatment after diagnosis of GC at Seoul National University Bundang Hospital from 2003 to 2017 were retrospectively analyzed using Electronic Medical Recording and Clinical Data Warehouse. A univariate Cox proportional hazards model was used to identify possible covariates as significant risk factors for MGN. Then, the variables with $p<0.05$ were subjected to multivariate Cox proportional hazards model to identify independent contribution. In addition, the variables which were considered to be possible risk factors for MGN based on the previous studies were also analyzed in multivariate model.
Results Total 680 patients were diagnosed with GC and received surgical treatment, and 574 patients were received subtotal, partial, or distal gastrectomy. Among these cases, 11 patients (1.6%) were diagnosed as having MGN in the gastric remnant. They underwent curative resection by endoscopic resection (six patients), remnant gastrectomy (four patients) or chemotherapy (one patient). Table 1 shows the clinicopathological characteristics of patients with and without MGN. Multivariate analysis showed that male sex only was independent risk factor.
Conclusions Our data suggested that more intensive endoscopic follow-up is needed for the remnant stomach in patients with these risk factors to detect MGN at its early stage. Further study including a higher number of MGN patients may be needed for accurate analysis.
Keywords Gastric cancer; Metachronous gastric cancer; Risk factors

Table 1. Clinicopathological Characteristics of Patients with and without MGN

Variable	Patients with MGN (%) (n=11)	Patients without MGN (%) (n=513)	P value
Sex			
Female	0 (0%)	198 (39%)	***0.01**
Male	11 (100%)	315 (61%)	
Mean age, yr	62.27±9.48	58.21±12.20	0.26
Family history of gastric cancer			
No	6 (55%)	107 (21%)	0.06
Yes	5 (45%)	406 (79%)	
Smoking status			
No	2 (18%)	205 (40%)	0.21

Upper GI EE-UGI-083

Clinical Outcomes of Endoscopic Mucosal Resection for Type 1 Gastric Neuroendocrine Tumor

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Background/Aims The aim of this study was to assess the efficacy and safety of endoscopic resection, a less invasive treatment modality, for type 1 gastric neuroendocrine tumor (NET).
Methods From January 2004 to December 2017 were included in this study. All patients had undergone endoscopic mucosal resection for the lesions and histologically confirmed to NET.
Results The median age was 57.2 years (range, 44 to 70 years) with 12 females (63.2%). NETs were detected in 13 patients as single and multifocal in six patients (range, 3 to 9). Endoscopic resection was performed to 44 NETs in 19 patients. Mean diameter of 44 NETs was 7.4±2.9 mm. The most common tumor location of gastric NETs was body (90.9%), followed by fundus (6.8%) and antrum (2.2%). Histologic grade of NETs were grade 1 (95.5%) and grade 2 (4.5%). EUS was performed in 12 patients (63.2%). EUS showed hypoechoic (50%) and homogeneous (91.7%) was most common finding. Second layer (66.7%) was most common involved layer, followed by third layer (25%) and first layer (8.3%). Cap-assisted EMRs were performed for 10 (22.7%), EMRs for 27 (61.4%) and EMRs after ligation for seven NETs (15.9%). *En-bloc* resection was performed in 43 NETs (97.7%). R0 resection was performed in 35 NETs (79.5%). Regular follow-up duodenoscopy after 1 year from endoscopic resection was performed in 14 patients (68.4%). Median follow-up duration was 36.2 months (range, 23 to 118.2 months). Recurrence was observed in three patients (10%). One patient recurred from solitary tumor (10%) and two patients recurred from multicentric tumor (50%).
Conclusions Endoscopic mucosal resection is considered a safe and effective treatment option for type 1 gastric NET. Multicentric tumor could be a risk factor of recurrence of gastric NET.
Keywords Carcinoid; Endoscopic resection; Stomach

Upper GI EE-UGI-084

Elevated Lesions of the Corpus in the Absence of *Helicobacter pylori* Infection

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Background/Aims Elevated lesions are often found even in the absence of *Helicobacter pylori* infection. This study aimed to elucidate elevated lesions of the corpus in Giemsa-negative subjects.
Methods From January 2010 to January 2015, among the subjects who underwent gastroscopy and serum assays for gastric cancer screening, Giemsa-negative subjects were analyzed consecutively. The subjects were included when gastric biopsy was performed in the corpus. Past *H. pylori* infection was defined as eradication history or endoscopic findings suggesting past infection (advanced atrophy, metaplasia, or xanthoma).
Results Among 160 subjects with elevated lesions in the corpus, 62 showed fundic gland polyps, 26 showed foveolar hyperplasia, and 25 showed intestinal metaplasia (IM). Seventeen subjects showed coexisting pathology findings including eight with foveolar hyperplasia and IM. Fundic gland polyp was common in subjects of young age (p<0.001), without past infection (p<0.001), of female gender (p=0.001), without hypertension (p=0.004), and with low body mass index (BMI; p=0.006). Foveolar hyperplasia was common in old age (p=0.008) and with aspirin intake (p=0.027). IM was common in subjects with past infection (p<0.001), of male gender (p<0.001), of old age (p=0.001), with high BMI (p=0.006), and who smoked cigarette (p=0.016). On multivariate analysis, young age (odds ratio [OR], 0.932; 95% confidence interval [CI], 0.893 to 0.972; p=0.001) was associated with fundic gland polyp, whereas old age (OR, 1.049; 95% CI, 1.004 to 1.096; p=0.033) was associated with foveolar hyperplasia.
Conclusions Elevated lesions of the corpus differed according to age in Giemsa-negative subjects. In young subjects, most were fundic gland polyps. In old subjects, IM was often found with foveolar hyperplasia.
Keywords Fundic gland polyp; Foveolar hyperplasia; Intestinal metaplasia; Giemsa negative

Upper GI EE-UGI-085

Severe Esophageal Involvement in Bullous Pemphigoid

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Background/Aims A 72-year old gentlemen was referred from dermatology due to new onset odynophagia for the past 1 month. His medical history was significant for newly diagnosed bullous pemphigoid 3 months ago. Histopathological diagnosis was confirmed via skin biopsy which showed DIF 2-3+ linear staining IgG and C3 at the dermo epidermal junction. The patient underwent an esophagogastroduodenoscopy which showed severe oesophageal ulceration starting from 20 cm to 35 cm at the gastroesophageal junction. The oesophageal ulcers were more severe distally with contact bleeding. Given the final diagnosis of oesophageal involvement of bullous pemphigoid, he was started on a tapering dose of 30 mg prednisolone, which resulted in significant improvement of his odynophagia.
Conclusions Bullous pemphigoid and mucous membrane pemphigoid, are a spectrum of uncommon autoimmune dermatologic conditions. Pemphigoid disorders involves circulating antibodies that are directed against the basement membrane of squamous epithelium, with subsequent activation of complement and the inflammatory infiltrate. This case encourages gastroenterologists to be aware of the gastrointestinal complications of dermatological diseases and to be cautious while performing endoscopy in patients with bullous pemphigoid.
Keywords Upper gastrointestinal tract

Upper GI EE-UGI-086

A Case of Elastofibroma of the Stomach

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Background/Aims Elastofibroma is a rare pseudo-tumoral lesion of the soft tissues usually located in the subscapular cutaneous region. Other locations including gastrointestinal tract are very unusual. It has been reported that several cases (<40 cases) occurred in the stomach, the colon, the rectum, and the tracheobronchial tree. We report a rare case of surgically removed elastofibroma of the stomach.
Results A 48-year-old woman visited for the evaluation of the gastric submucosal tumor which was incidentally found at a duodenoscopy. She had no history of systemic illness, or family history of cancer. Physical examination and routine laboratory test were unremarkable. Endoscopy showed protruding lesion with smooth surface measuring approximately 1.3×1.2 cm in the lesser curvature of the gastric lower body. Endoscopic ultrasound revealed a hypoechoic and heterogeneous lesion in the submucosa layer. After then, upper gastroscopy was followed every year. Five years later, the size was increased to 2.3×2.1 cm. Computed tomography gastrography 3D (enhance) demonstrated an about 2 cm sized hypodense lesion in the LC side of gastric lower body. Laparoscopic wedge resection was performed. Histologically, elastic stain (Verhoeff) outlined these fibers, demonstrating an irregularly serrated border with some rare branched forms. The fibers were negative for CD117, CD34, Desmin, S-100 protein, Ki-67, smooth muscle actin. Based on pathologic findings, it was confirmed as elastofibroma. In summary, our case is a rare example of stomach elastofibroma fortuitously discovered and diagnosed by histology.
Keywords Elastofibroma; Pseudo-tumor; Stomach; Elastic stain

Upper GI EE-UGI-087

The Effect of Levofloxacin-Based Third-Line *Helicobacter pylori* Eradication Therapy in Seoul

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Background/Aims The seroprevalence of *Helicobacter pylori* in Korea was found to be decreased. But the eradication rates of first- and second-line therapy have been decreasing progressively. Therefore, there is an increasing need for third-line therapy of *H. pylori*. We performed this study to evaluate the efficacy of levofloxacin-based regimens in patients with first- and second-line *H. pylori* eradication failures.
Methods We retrospectively reviewed 16 patients who were treated with third-line therapy in Seoul Paik Hospital between October 2017 and April 2019. Patients, in whom a first-line therapy with proton pump inhibitor (PPI)-clarithromycin-amoxicillin and a second-line therapy with PPI-bismuth-tetracycline-metronidazole had failed, received treatment with lansoprazole (30 mg twice daily), amoxicillin (1 g twice daily) and levofloxacin (500 mg twice daily) for 10 days. Eradication rate was confirmed with urea breath test 4 weeks after the cessation of therapy.
Results A total of 16 subjects (male:female=6:10: age, 48 to 75 years old; median age, 66.5 years old) were enrolled in the study. All patients took all the medications correctly. *H. pylori* eradication rate was 43.8% (7/16) in the levofloxacin-based regimen.
Conclusions *H. pylori* eradication rate of levofloxacin-based regimen could not achieve enough eradication rate in this study. Also, a recent other study showed 57.1% rate of eradication in Korea. Since the eradication rate of levofloxacin-based third-line therapy is low, nationwide multicenter studies on eradication therapy including new drugs such as potassium-competitive acid blocker will be needed.
Keywords Levofloxacin; *Helicobacter pylori*; Third-line eradication

Upper GI EE-UGI-088

A Case Series of Definitive Chemoradiation Therapy for Superficial Esophageal Cancer

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Background/Aims The treatment of choice for superficial esophageal cancer has been esophagectomy for many years despite high treatment-related morbidity and mortality. Definitive chemoradiation therapy (DCRT) for superficial esophageal cancer may be an appropriate option for patients who are older age with multiple comorbidities or decline surgery. We describe our experience with nine patients with superficial esophageal cancer who underwent DCRT.
Methods We reviewed patients diagnosed with esophageal cancer from January 2014 to December 2018 in Kosin University Gospel Hospital. DCRT consisted of six or more courses of chemotherapy that was 5-fluorouracil (5-FU; 1,000 mg/m^2, intravenously on day 1–4) and/or cisplatin (75 mg/m^2, intravenously on day 1) with radiotherapy (median dose 50.4Gy) and 68.4 Gy doses of radiation were used in RT alone.
Results A total of 77 patients of esophageal cancer underwent DCRT or RT instead of surgery and only nine of 77 patients were superficial esophageal cancer. Among them, seven patients underwent DCRT and two patients underwent RT alone. Among seven patients who underwent DCRT, four patients were treated successfully without recurrence, one patient is being treated without recurrence recently and two patients were recurred during treatment. Two patients who received RT alone were follow up loss during treatment. Most of the patients had high risk of surgery because of the multiple comorbidities, old age, long segment of the cancer.
Conclusions Our case reports focus on the clinical outcome of superficial esophageal cancer patients underwent DCRT instead surgery. DCRT which can preserve the esophagus, has been proposed as an alternative therapy to esophagectomy for superficial esophageal cancer, particularly in elderly patients and/or those with concurrent illness, inoperable condition, patients who decline surgery. It would be desirable to further study about appropriate treatment method and duration of DCRT for superficial esophageal cancer and treatment response compared with surgical treatment.
Keywords Superficial esophageal cancer; Definitive chemoradiation therapy

Upper GI EE-UGI-089

Is Gastrin Level Associated with Synchronous Colon Adenoma in Patients with Gastric Adenoma/Cancer?

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Background/Aims Several studies showed an association between colorectal and gastric adenoma or cancer. Although the mechanism underlying the development of synchronous neoplasms of the stomach and colorectum remains controversial, there are several explanations such as the existence of common genetic abnormalities in gastric and colorectal cancer, and microsatellite instability. In addition, there is evidence that gastrin system may play a role in the promotion of colon carcinogenesis in humans. We aimed to investigate gastrin level according to the synchronous colon adenoma in gastric adenoma or cancer patients.
Methods From January 2018 through May 2019, we compared the serum pepsinogen I, II, and gastrin level according to the presence of colorectal adenoma in 76 patients who underwent endoscopic resection for gastric adenoma or cancer.
Results In patients with gastric adenoma/cancer and colorectal adenoma, pepsinogen I was 66.3±58.9, pepsinogen II was 25.8±17.5, and pepsinogen I/II ratio was 2.8±2.6, and in patients with gastric adenoma/cancer only, pepsinogen I was 86.2±195.8, pepsinogen II was 22.3±14.1, and pepsinogen I/II ratio was 3.4±3.9. There was no difference in pepsinogen I, II and I/II ratio between two groups. Gastrin levels were 97.3±82.6 in patients with gastric adenoma/cancer and colorectal adenoma, and 88.9±78.2 in patients with gastric adenoma alone. There was no difference in gastrin levels between the two groups.
Conclusions In patients with gastric adenoma or cancer, there was no difference in pepsinogen I, II or gastrin level according to synchronous colon adenoma.
Keywords Gastric adenoma; Colon adenoma; Gastrin

Upper GI EE-UGI-090

Esophageal Varix in a Male Patient with Tamoxifen Use

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Background/Aims Tamoxifen is a selective oestrogen-receptor modulator. Although the mechanism is unknown, it is known to increase the risk of thromboembolic events such as deep venous thrombosis and pulmonary embolism. However, esophageal varices in patients using Tamoxifen have not been reported in Korea.
Methods A 61-year-old male patient with a history of diabetes and hyperlipidemia who has taken radiation and tamoxifen after right mastectomy for breast cancer in 2015. The patient complained of melena symptoms from 10 days ago and confirmed Esophageal varix by endoscopy.
Results The patient had no alcohol history and no other findings associated with chronic liver disease were found. Laboratory work revealed white blood cell of 4,300/μL, hemoglobin of 6.2 g/dL, platelet of 100,000/μL and hematocrit of 19.5%. In addition to the pancytopenia findings, a decrease in protein C and protein S was observed, and no abnormalities were observed in other blood tests. In the abdominal computed tomography, portal vein thrombosis were not identified, but splenomegaly and esophageal varix were observed.
Conclusions Esophageal varices are the most important cause of upper gastrointestinal bleeding, which is often caused by portal hypertension (PTH). PTH is most often diagnosed with Liver cirrhosis. If PTH is not accompanied by Liver cirrhosis, non-cirrhotic portal hypertension may be caused by infection, abdominal injury, tumor, coagulopathy, and associated portal vein thrombosis. In this case, we report esophageal varices in patients using tamoxifen without risk factors of liver disease.
Keywords Esophageal varix; Tamoxifen

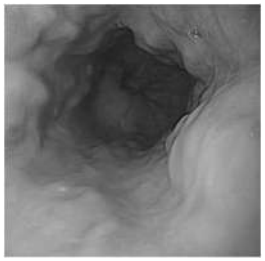

Fig. 1. Endoscopic finding.

Upper GI EE-UGI-091

Five-Year Progress of Gastric MALT Lymphoma Presenting as Gastric Outlet Obstruction

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Background/Aims Gastric mucosa-associated lymphoid tissue (MALT) lymphoma is the most common and best-studied extranodal marginal zone B cell lymphoma of MALT type. It is associated with *Helicobacter pylori*-induced chronic gastritis and features an indolent clinical course compared to the other malignant tumor. Complications such as obstruction, perforation, or bleeding are rarely observed.
Methods We report a case of gastric MALT lymphoma presenting as gastric outlet obstruction (GOO).
Results A 74-year-old woman visited the gastroenterology clinic for recurrent vomiting. Four years and 5 months ago she had visited for anemia. At that time, upper endoscopy revealed gastric ulcers. Histology showed chronic inflammation with *H. pylori* infection. Before the histology reported, she was prescribed with acid suppressant and became lost to follow-up. Two years and 8 months ago she revisited for aggravated gastric ulcers with *H. pylori* infection. She was prescribed for *H. pylori* eradication and lost again. Final histology was MALT lymphoma. At this time, gastric ulcers showed nodular base. Antrum were narrowed. Food materials stuffing the body suggested GOO. Computed tomography scan and positron emission tomography scan showed full layered encircling mass with high FDG (fluorodeoxyglucose) uptake in antrum and enlarged mesenteric lymph nodes. Laparoscopic distal gastrectomy with lymph node dissection was performed and Ann Arbor stage II MALT lymphoma with t (11;18) was diagnosed. *H. pylori* was negative. The patient has been followed up without recurrence or progression for more than a year.
Conclusions Due to the indolent clinical course, "Watch and Wait" strategy is often employed in gastric MALT lymphoma. However, we experienced a case of gastric MALT lymphoma progressing to GOO over about 5 years.
Keywords MALT lymphoma; Stomach; Gastric outlet obstruction

Fig 1. Upper endoscopy and computed tomography findings.

Upper GI EE-UGI-092

Successful Hemostasis of a Rare Case of Upper Gastrointestinal Bleeding from a Duodenal Varix in a Patient with a Myeloproliferative Neoplasm

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Background/Aims Portal hypertension is defined as an increase in hepatic sinusoidal pressure ≥6 mm Hg. Persistent portal hypertension results to formation of varices, uncommonly in the duodenum accounting for <5% of all variceal bleeding. Primary myelofibrosis (PMF) is a myeloproliferative disorder with extramedullary hematopoiesis in locations like the spleen, liver and lymph nodes. Up to 18% of patients with PMF develop portal hypertension with splanchnic venous thrombosis being the most common etiology. Patients develop gastrointestinal varices with high incidence of bleeding and herald poor prognosis. Herein we describe a patient with PMF presenting with multiple episodes of gastrointestinal bleeding.
Methods A 38-year-old male, known case of PMF with portal, superior mesenteric and splenic vein thrombosis presenting with black tarry stools.
Results Upper gastrointestinal endoscopy was done, the esophagus was lined with a column of varices with no sign of bleeding. The stomach lumen was empty with intact walls and patches of erythema. Upon advancement at the duodenal bulb, there was a 1 cm actively bleeding vessel over a violaceous mucosa (Fig. 1). Multiple hemoclips were deployed which partially controlled the bleeding. N-butyl-2-cyanoacrylate with lipiodol mixture was injected between hemoclips resulting to complete hemostasis.
Conclusions Since the incidence of duodenal variceal bleeding is low, no definitive therapy has yet been established. Endoscopy is a reasonable option as it provides diagnosis and a less invasive approach by ligation or sclerotherapy. Sclerotherapy is preferred in cases of active bleeding since injection can be performed immediately without the need to withdraw the scope.
Keywords Case report; Duodenal varices; Massive gastrointestinal bleeding; Portal vein thrombosis; N-butyl-2-cyanoacrylate Injection

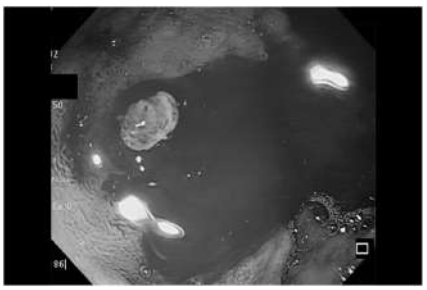

Fig. 1. Duodenal varix.

Upper GI EE-UGI-093

Heterotopic Pancreas: Added Value of Endoscopic Ultrasound with Computed Tomography for Diagnosis

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Background/Aims To avoid unnecessary surgeries, noninvasive distinction of heterotopic pancreas (HP) from other subepithelial tumors (SETs) with high accuracy is crucial. We aimed to investigate the added value of endoscopic ultrasound (EUS) with computed tomography (CT) in distinguishing HP from other pathologies, when gastroduodenal SETs are suspected on upper endoscopic examination.
Methods We retrospectively included 54 consecutive patients with gastroduodenal SETs who had undergone both abdominal CT and EUS within a 3-month interval. All EUS, endoscopy, and CT images were reviewed and evaluated in a blinded manner by an endoscopist and a radiologist, respectively. Univariate and multivariate analyses were performed to identify EUS/CT findings related to HP. Diagnostic performance of CT only and CT combined with EUS was compared for distinguishing HP from other SETs.
Results We included patients with HP (n=17; pathologically confirmed, n=6), gastrointestinal stromal tumor (n=24), and other pathologies (n=13). Multivariate logistic regression analyses revealed that irregular margin, origin from submucosal layer, internal microcystic-tubular structure, and oval shape were independent factors in diagnosing HP by EUS, whereas a micro-lobulating contour was the only significant independent factor in CT. In assessments of diagnostic performance, CT combined with EUS showed significantly superior diagnostic performance in comparison with CT only (area under the curve: 0.961 vs 0.833, p=0.028) in the consensus interpretation of an endoscopist and a radiologist (Fig. 1).
Conclusions CT combined with EUS with a comprehensive and complementary interpretation showed significant added value compared to CT only in diagnosing gastroduodenal HP.
Keywords Endosonography; Computed tomography; Pancreas; Neoplasm

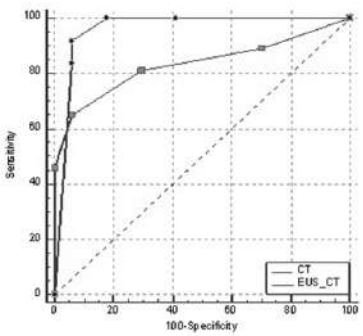

Fig. 1. Receiver operating characteristic of diagnostic performance. CT, computed tomography; EUS, endoscopic ultrasound.

Upper GI EE-UGI-094

Endoscopic Ultrasonography Findings for Brunner Gland Hamartoma/Adenoma in the Duodenum

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Background/Aims Brunner gland hamartoma/adenoma (BGHA) is a rare tumor in the duodenum which is benign in nature and can be monitored without any treatment if complications do not occur. A proper diagnostic modality for BGHA is lacking; however, endoscopic ultrasonography (EUS) can identify the tumor noninvasively. In the present study, EUS findings for BGHA were investigated.
Methods Patients diagnosed with BGHA were retrospectively identified from medical records of two university hospitals. The medical records and pathological findings were analyzed to determine common features.
Results The mean age of 10 patients with BGHA was 52.7±10.7 years. The tumor size ranged from 10 to 36 mm and the median diameter was 26.3 mm. Typical findings of EUS were as follows: located mainly in the submucosal layer, variable echogenicity, cystic or solid lesions, and well-circumscribed. These EUS findings were classified into three categories: type 1, heterogenous echogenicity with large cysts (four cases); type 2, heterogenous echogenicity without cystic lesions (four cases); type 3, mixed echogenicity with very small cysts (two cases).
Conclusions The EUS features and classification can provide useful information for noninvasive diagnosis of BGHA, although future studies with larger cohorts are needed to confirm the findings.
Keywords Duodenum; Brunner gland; Hyperplastic polyp

Upper GI EE-UGI-095

Gastric Cancer in the Young: A Case Report

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Background/Aims Gastric cancer is the 3rd leading cause of cancer mortality worldwide accounting for approximately 783,000 demises in 2018. The median age of diagnosis is at 70 years old. Early onset gastric cancer is defined as gastric cancer before the age of 45 years and encompasses about 10% of gastric cancers, although this may range between 2.7% and 15% depending on the population studied.
Methods A 24-year-old male presented with epigastric pain, early satiety and bloating. He later on developed dysphagia to solid food, vomiting and unintentional weight loss of 6 kg in 1 month. Physical examination of the abdomen was unremarkable with no palpable mass or lymphadenopathy. Initial laboratories were equally unremarkable.
Results Esophagogastroduodenoscopy was done which showed gastric cardia mass with extension to the esophagus. Specimen was sent for biopsy and revealed adenocarcinoma. Metastatic work up was negative for distant metastasis. Patient underwent radical total gastrectomy with frozen section, D2 lymphadenectomy with splenectomy, loop esophagojejunostomy with pouch formation, wide excision of liver nodule (segment IVB); with a feeding jejunostomy. Histopathologic examination revealed a moderately differentiated gastric adenocarcinoma, tubular (World Health Organization classification)/intestinal type (Lauren classification); extending to the gastroesophageal muscularis propria with lymph node metastasis. The tumor infiltrates into the serosa (visceral peritoneum) (T4a), with three out of 10 lymph nodes positive for metastasis (N2). These findings are consistent with stage IIIA tumor according to the American Joint Committee on Cancer 8th edition. Patient was discharged stable and was given Trastuzumab (ToGA trial).
Conclusions Gastric cancer albeit more common in the elderly, can also present in the young. There should be a high index of suspicion in young patients presenting with dyspepsia with warning signs.
Keywords Gastric cancer; Cancer in the young

Upper GI EE-UGI-096

Fluoroscopic Self-Expandable Metallic Stent Placement for Treating Postoperative Nonanastomotic Strictures in the Proximal Small Bowel: A 15-Year Single Institution Experience

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Background/Aims To evaluate the efficacy and safety of fluoroscopic self-expandable metallic stent (SEMS) placement for treating postoperative nonanastomotic strictures in the proximal small bowel.
Methods Data from eight consecutive patients (mean age, 63.8±6.9 years; seven males and one female) who underwent 17 fluoroscopic SEMS placement procedures in total for treating postoperative nonanastomotic strictures in the proximal jejunum were retrospectively reviewed. The most recent surgery for all the patients was total gastrectomy with esophagojejunostomy. Strictures were located in the proximal jejunum in all patients. The mean length of the strictures was 5.8±2.0 cm. Five patients with comorbidities were poor surgical candidates. Four patients underwent fluoroscopic balloon dilation, three of whom showed no resolution of obstructive symptoms and one demonstrated recurrence of symptoms.
Results Technical and clinical success was achieved in 100% SEMS procedures (17/17). Complete resolution of obstructive symptoms and improvement in oral intake status occurred within 3 days after all procedures, rendering a clinical success rate of 100% (17/17). No complication occurred during or after the procedures. The median follow-up duration was 167 days (interquartile range [IQR], 48 to 576 days). Stent malfunction occurred after 58.8% of the procedures (10/17), including six occurrences of stent migration and four of benign tissue hyperplasia. Surgical removal of the migrated stents was performed in two patients. Recurrence of symptoms occurred after 64.7% of the procedures (11/17). The median stent dwell and recurrence-free times were 32 days (IQR, 20 to 193 days) and 68 days (IQR, 38 to 513 days), respectively.
Conclusions Fluoroscopic SEMS placement may be effective and safe for treating postoperative nonanastomotic strictures, but stent malfunction and recurrence are major drawbacks.
Keywords Postoperative nonanastomotic strictures; Small bowel; Self-expandable metallic stent

Upper GI EE-UGI-097

Fully Covered Self-Expanding Esophageal Metal Stents in Patients with Inoperable Malignant Disease Who Survived for More Than 6 Months after Stent Placement

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Background/Aims To investigate the clinical outcomes of fully covered self-expanding metal stent (FCSEMS) placement in patients with malignant esophageal obstruction who survived longer than 6 months.
Methods From January 2002 to January 2018, 88 FCSEMS were placed in 64 patients (mean age, 62.9±11.6 years; 58 males) with inoperable malignant esophageal obstruction with or without esophago-respiratory fistula. Only patients who survived more than 6 months with FCSEMS in place were included. Data regarding technical and clinical success, complications, reinterventions, stent patency, and patient survival were obtained from a prospectively maintained hospital database.
Results The technical and clinical success rates were 100% (64/64). During follow-up, the median dysphagia score significantly improved (3.09±0.68 to 1.05±0.60, p<0.001). The complication rate was 48.8%. Multivariate analysis revealed that only longer stenting duration was associated with complications (hazard ratio, 1.220; 95% confidence interval [CI], 1.074 to 2.760; p=0.039). The median follow-up duration was 257 days (range, 181 to 969 days). The median stent patency duration was 289 days (95% CI, 209.9 to 368.1 days). The median survival was 254 days (95% CI, 219.7 to 288.3 days).
Conclusions Our data suggest that esophageal FCSEMS placement is an effective option for patients with malignant dysphagia when survival longer than 6 months is expected. The rate of complications increases with time, and SEMS development in needed to keep up with the advancement in oncological treatment.
Keywords Self-expandable metallic stents; Esophageal neoplasms; Survival

Upper GI EE-UGI-098

Brunner Gland Adenoma as a Rare Cause of Upper Gastrointestinal Bleeding: Case Report and Review of Literature

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Background/Aims Brunner gland adenoma is a rare benign tumor arising from Brunner glands in the duodenum. Mostly, lesions are accidentally discovered during esophagogastroduodenoscopy. However, in some cases, it may present clinically with vague abdominal symptoms or bleeding.
Methods Our case is a 54-year-old male patient complaining of progressive fatigue and intermittent melena for 3 months. Clinical examination was unremarkable. Routine blood tests showed microcytic hypochromic anemia. Esophagogastroduodenoscopy showed normal esophageal and gastric mucosa with a pedunculated polyp seen at the anterior wall of the duodenal bulb. Endoscopic ultrasound (EUS) showed a duodenal hyperechoic mass arising from the submucosal layer in the anterior wall of the bulb with central cystic degeneration. Both endoscopic and EUS guided biopsies were non-diagnostic.
Results Endoscopic mucosal resection was performed after obtaining the patient's consent. Histopathological examination showed hyperplastic mucosal lobules with Brunner glands and smooth muscle cells; no malignant cells or *H. pylori* infection were evident.
Conclusions Brunner gland adenoma is a rare lesion of the duodenum and should be considered in the differential diagnosis of upper gastrointestinal bleeding. EUS is helpful in the diagnosis and detection of the layer of origin. However, the final diagnosis is usually made after removal of the lesion.
Keywords Gastroscopy; Brunner gland adenoma; Anemia

Upper GI EE-UGI-099

Nutritional Benefits of Percutaneous Endoscopic Gastrostomy

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Background/Aims For patients who need enteral feeding for more than 2 to 3 weeks, percutaneous endoscopic gastrostomy (PEG) is the most commonly used technique.
Methods In this retrospective study, 151 patients underwent first PEG at Chungnam National University Hospital between January 2013 and December 2018 and were followed up for more than 3 weeks. All enrolled patients underwent the pull technique, and all techniques were performed by a gastroenterologist.
Results There were 116 male patients in the enrolled study group. The mean age of the patients was 64.92 years with 74 patients aged older than 65 years. In total, 112 patients (74.2%) underwent PEG insertion due to neurologic disease, 34 (22.5%) due to malignancy, and five (3.3%) due to other problems. In the neurologic disease group, 34 patients (22.5%) had brain hemorrhage, 28 (18.5%) had stroke, 21 (13.9%) had amyotrophic lateral sclerosis, nine (6.0%) had Parkinson disease, and seven (4.6%) had other neurologic diseases. In Table, a summary of pre-PEG and laboratory results between 3 weeks to 6 months after PEG insertion is shown. The average hemoglobin level increased from 11.52 to 11.96 g/dL (p=0.005), total protein level from 6.31 to 6.72 g/dL (p=0.000), albumin level from 3.16 to 3.5 g/dL (p=0.000), total cholesterol level from 144.53 to 151.67 mg/dL (p=0.009), and body mass index (BMI) from 18.95 to 19.3 kg/m^2 (p=0.23); these increases were all statistically significant.
Conclusions Hemoglobin, total protein, albumin, and total cholesterol levels and BMI increased statistically significantly. These data can reflect the usefulness of PEG insertion in patients with poor nutritional condition and unavailable oral feeding.
Keywords Stomach; Endoscopy; Gastrostomy; Nutrition

Table 1. Laboratory Results

Laboratory values	Total	Pre PEG	Post PEG	p
Hemoglobin, g/dL	144	11.52 ± 1.78	11.96 ± 1.74	0.005
Lymphocyte, x 10^3/uL	144	1.45 ± 0.72	1.57 ± 0.85	0.111
Total protein, g/dL	145	6.31 ± 0.74	6.72 ± 0.65	0.000
Albumin, g/dL	145	3.16 ± 0.52	3.50 ± 0.5	0.000
Total cholesterol, mg/dL	122	144.53 ± 39.8	151.67 ± 45.25	0.009
BUN, mg/dL	145	16.95 ± 11.12	18.46 ± 9.3	0.102
Creatinine, mg/dL	145	0.68 ± 0.67	0.70 ± 0.61	0.508
BMI, Kg/m^2	53	18.95 ± 2.98	19.3 ± 3.04	0.023

PEG, percutaneous endoscopic gastrostomy; BUN, blood urea nitrogen; BMI, body mass index.

Upper GI EE-UGI-100

Phototoxicity of Methylene Blue on Gastric Mucosa by Endoscopic Light Irradiation *In Vitro* and *In Vivo* Model

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Background/Aims While methylene blue (MB) have been widely used in medical field, such as chromoendoscopy and photodynamic therapy, few studies on toxicity of MB with endoscopic light irradiation has been done. Therefore, the study about the toxicity of MB is necessary for safe endoscopical use.
Methods We conducted the experiments of *in vitro* study in human gastric cell line (AGS). Cellular cytotoxicity using ASC cell was evaluated with TUNEL assay under presence of MB and endoscopic light. We also implemented, *in vivo*, treatment of MB with endoscopic light on gastric mucosa of beagle dogs and its toxicity was also evaluated by TUNEL positive score.
Results From *in vitro* data, cell viability by MB and light irradiation was lower than that under MB with without light. The higher MB concentration was, the more TUNEL score was. From *in vivo* beagle dog's gastric mucosa, the TUNEL positive score was highest immediately in 0.1 % and 0.5 % of MB with endoscopic light than in control ($p<0.05$). The TUNEL positive cells in MB+ light were continuously higher in 3 days after irradiation ($p<0.05$). After then, it decreased gradually to control level at 10 days ($p>0.05$).
Conclusions Although MB have been known as non-toxic chemicals widely to human organism, MB might be cytotoxic until several days after light irradiation.
Keywords Methylene blue; Light; Cytotoxicity; Gastric mucosa; Endoscopic light

Upper GI EE-UGI-101

Comparison of High and Low Molecular Weight Chitosan as *In Vitro* Boosting Agent for Photodynamic Therapy against *Helicobacter pylori* using Methylene Blue and Endoscopic Light

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Background/Aims We reported in a previous study that photodynamic therapy (PDT) of *Helicobacter pylori* could potentiate bactericidal effect by adding chitosan. As a next step, we compared the bactericidal effects of low molecular weight (LMW) combined with PDT to high molecular weight (HMW) chitosan.
Methods To perform PDT to kill *H. pylori*, we used endoscopic light as light source, methylene blue (MB) as a photosensitizer and chitosan (310–375 and 50–190 kDa). We evaluated bacterial removal rate and its membrane damage by ethidium bromide monoazide polymerase chain reaction (PCR) method (EMA q-PCR). 8-oxo-2'-dexoyguanosine by ELISA was measured for oxidative stress.
Results At a chitosan concentration of $\leq$0.05%, the killing effect did not differ between the two molecular weights, and 100% bacterial removal rate was observed at a light energy $\geq$6.23 mJ/cm^2 powers under 0.02% MB. After 15 minutes irradiation, LMW chitosan with high concentration of MB (0.004%) showed highest killing effects, which were consistent with the results of EMA q-PCR but not with the level of 8-OHdG. Bactericidal effects of LMW chitosan plus PDT using 0.002% and 0.004% MB for 15 minutes irradiation were significantly higher than those using HMW chitosan plus PDT.
Conclusions We found that PDT using MB with LMW chitosan to kill *H. pylori* exerted greater bactericidal effects through bacterial membrane damage than PDT with HMW chitosan. These results suggest that it would be better to choose LMW chitosan to enhance the effect of PDT for clinical application, even at a very low concentration of PS.
Keywords *Helicobacter pylori*; Photodynamic therapy; Chitosan; Bactericidal effects; Photosensitizer

Upper GI EE-UGI-102

Comparison of Empirical and Genotypic Resistance-Guided Tailored Therapy for *Helicobacter pylori* Infection: A Randomized Controlled Trial

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Background/Aims We investigated to compare the effect of empirical therapy versus genotypic resistance-guided tailored therapy (tailored therapy) for eradication of *Helicobacter pylori* infection.
Methods In this prospective, single center, open-label randomized controlled trial, we enrolled 72 patients with *H. pylori* infection from January 2019 through June 2019 in South Korea. The patients were randomly assigned to both groups received empirical therapy (n=36) or tailored therapy (n=36). Empirical therapy was defined as triple therapy with esomeprazole, amoxicillin, and clarithromycin for 10 days irrespective of clarithromycin resistance. Tailored therapy was triple therapy or quadruple therapy with esomeprazole, metronidazole, tetracycline, and bismuth for 10 days based on genotype markers of resistance determined by gastric biopsy specimens. Resistance-associated mutations in 23S ribosomal RNA were confirmed by multiplex polymerase chain reaction (PCR). Eradication status was assessed by ^{13}C-urea breath test and the primary outcome was eradication rate.
Results *H. pylori* was eradicated in 27 of 36 patients (75.0%) given empirical therapy and 32 of 36 patients (88.9%) treated with tailored therapy (p=0.136) in intention-to-treat analysis. In per-protocol analysis, *H. pylori* was eradicated in 32 of 33 (97.0%) patients receiving tailored therapy and 27 of 33 (81.8%) patients with empirical therapy (p=0.046). While clarithromycin resistant *H. pylori* was eradicated in three of nine (33.3%) with empirical therapy, it was treated in 11 out of 12 (91.7%) with tailored therapy (p=0.009). There was no difference in compliance between two groups. Rate of adverse events of tailored group was higher than that of empirical therapy (p=0.036) since quadruple therapy group had more side effects than triple therapy group (p=0.001).
Conclusions Genotype resistance–guided tailored therapy based on PCR is a good alternative to increase the eradication rate.
Keywords 23S ribosomal RNA; *Helicobacter pylori*; Genotype resistance guided tailored therapy; Eradication rate

Upper GI EE-UGI-103

Clinical Implication of Multidisciplinary Team Approach for the Treatment of Gastric Cancer

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Background/Aims The aim of the study is to identify the clinical impact of multidisciplinary team (MDT) approach for the treatment of gastric cancer.
Methods A total of 2,655 patients who underwent curative gastrectomy and diagnosed pathologic stage II or III between 1989 to 2018 in Seoul St. Mary's Hospital were retrospectively reviewed and divided into two groups: 1,566 for control group and 1,089 for MDT group.
Results The patients in the MDT group were older, had higher body mass index. The tumor was located more upper side and the pathological stage was lower in the MDT group. Minimally invasive surgery was more frequently performed and the operation time was shorter in the MDT group. Overall and disease-free survival was significantly improved after the MDT approach especially in the younger patients and in the higher pathological stage. The MDT approach was independent protective prognostic factor for overall and disease-free survival. In addition, survival after recurrence was also significantly improved after the MDT approach.
Conclusions The MDT approach might improve overall and disease-free survival for the treatment of gastric cancer.
Keywords Stomach neoplasms; Stomach neoplasms; Gastrectomy; Survival; Multidisciplinary

Upper GI EE-UGI-104

Optimal Time for Initiation of *Helicobacter pylori* Eradication in Patients with Peptic Ulcer

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Background/Aims *Helicobacter pylori* eradication and additional treatment of ulcer healing are necessary for *H. pylori*-positive patients with an active peptic ulcer. However, there is no uniform guideline for whether *H. pylori* eradication should be initially or later in the treatment process. Therefore, this study was conducted to evaluate whether differences in the timing of eradication therapy in peptic ulcer impacts success rates in eradicating *H. pylori*.
Methods Subjects were randomly assigned early eradication group (eradication treatment within 2 weeks) or late eradication group (eradication treatment after 8 weeks). Successful eradication was defined as negative ^{13}C-urea breath test at least 4 weeks after completion of treatment. The primary endpoint was eradication rates of treatments by intention-to-treat (ITT) and per-protocol (PP) analysis.
Results A total of 133 patients were enrolled in the ITT and 114 in the PP analysis. The cumulative PP and ITT eradication rates were 79.7% (106/133) and 81.6% (93/114), respectively. The eradication rates were significantly higher in early eradication group than those in late eradication group in PP analysis (87.7% vs 72.1%, p=0.025). ITT analysis revealed that early eradication group achieved a higher eradication rate than late eradication group (88.9% vs 75%), but the difference was not statistically significant (p=0.089). No significant differences in compliance or adverse events were found (p=0.395 and p=0.974).
Conclusions The findings suggest that early eradication therapy within 2 weeks is more effective than late eradication therapy in patients with peptic ulcer.
Keywords Peptic ulcer; *Helicobacter pylori*; Early eradication

Upper GI EE-UGI-105

Optimal Interval of Endoscopic Screening for Gastric Cancer and Characteristics of Missed Cancer

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Background/Aims There is still controversy over the optimal endoscopic interval for gastric cancer screening. In the previous study, we confirmed that there was no significant difference between 2- and 3-year interval, but the number of samples was small. Thus, we analyzed further through prospectively maintained database to define appropriate endoscopic interval and characteristics of missed cancer.
Methods We analyzed the questionnaire including interval between penultimate endoscopy and diagnosis of gastric cancer, the endoscopic findings, stage and treatment at the time of diagnosis. The patients were divided into two groups according to cancer type (early gastric cancer [EGC] vs advanced gastric cancer [AGC]) and endoscopic examinations (2 and 3 years).
Results From February 2014 to July 2018, 1,987 patients with gastric cancer were enrolled prospectively and, 176 (8.9%) patients with endoscopic interval less than 1 year were classified as missed gastric cancer group. There were significant differences in endoscopic interval (p<0.001), age (p=0.046), family history of gastric cancer (p=0.046), tumor location (p<0.001), histology (p<0.001), stage (p<0.001) and treatment modality (p<0.001) between EGC and AGC group. Endoscopic intervals of less than 2 or 3 years were associated with higher proportions of EGC (adjusted odd ratio [OR], 4.243; 95% confidence interval [CI], 3.384 to 5.321; adjusted OR, 4.277; 95% CI, 3.385 to 5.403; respectively, p<0.001). The incidence of missed gastric cancer was tend to be higher in men than women (p=0.034) and in young than old age (p=0.038 among age groups <40, 40 to 74, ≥75).
Conclusions Endoscopic gastric cancer screening at 2- and 3-year intervals did not differ in terms of increasing the detection rate of EGC and enabling endoscopic resection. It is necessary to establish optimal endoscopic interval through large-scale randomized controlled trials.
KeyWords Gastric cancer; Optimal interval; Endoscopic screening; Missed cancer

Lower GI EE-LGI-001

Comparison of Long-term Outcomes between Infliximab and Adalimumab in Biologic-Naive Patients with Ulcerative Colitis

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Background/Aims Both infliximab and adalimumab have been a standard treatment of moderate to severe ulcerative colitis (UC). However, there have been no head-to-head trials comparing treatment efficacy and outcomes between the two agents. The aim of this study was to compare efficacy and long-term outcomes between infliximab and adalimumab in patients with biologic-naïve UC.
Methods In a single tertiary referral center in Korea, we retrospectively analyzed 113 biologic-naïve UC patients who received tumor necrosis factor (TNF)-α inhibitors from September 2012 to December 2017. Infliximab group (n=83) and adalimumab group (n=30) were compared in terms of rates of remission and response at weeks 8 and 52. Kaplan-Meier curves were used to compare long term outcomes.
Results Baseline clinical characteristics were similar between the two groups. There were no significant difference in the rates of clinical remission and response at weeks 8 and 52 between the two groups. Moreover, long-term rates of poor outcome, all-cause hospitalization, UC-related hospitalization, corticosteroid prescription, discontinuation of TNF-α inhibitor, and switching to secondary TNF-α inhibitor showed no significant difference. In multivariate analysis, type of TNF-α inhibitor was not a significant factor for any of the outcomes. During the follow-up period, there has been no adverse event to discontinue treatment and the rates of adverse event between the two groups showed no statistically significant difference.
Conclusions Infliximab and adalimumab were similar in terms of treatment efficacy and long-term outcomes in patients with biologic-naïve moderate-to-severe UC.
Keywords Comparative study; Infliximab; Adalimumab; Tumor necrosis factor-alpha; Colitis, ulcerative

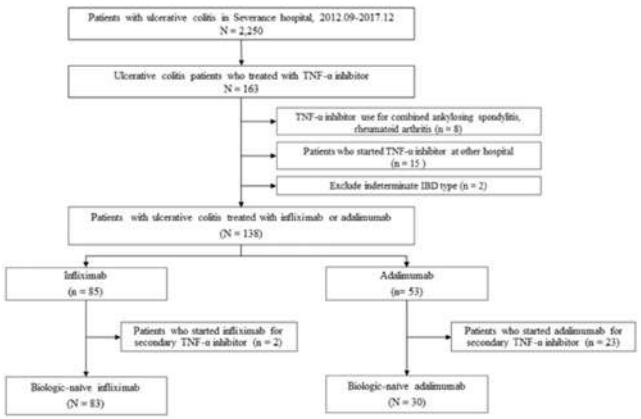

Fig. 1. Flow of patients.
TNF, tumor necrosis factor.

Lower GI EE-LGI-002

Efficacy and Safety of Gelidium Elegans Intake on Bowel Symptoms in Obese Adults: A 12-Week Randomized Double-Blind Placebo-Controlled Trial

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Background/Aims Gelidium elegans (GE) is known to have anti-obesity effects and beneficial effects on functional bowel symptoms in preclinical studies. The aim of this study was to determine the efficacy and safety of GE intake on bowel symptoms in obese human adults.
Methods This 12-week single-center randomized double-blind placebo-controlled study was performed from September 2016 to May 2017. Consecutive obese subjects were randomly assigned (1:1) to either GE (1 g) or placebo (1 g) once daily group for 12 weeks. Patients' bowel symptoms were evaluated using the Bristol Stool Form Scale, Constipation Scoring System (CSS) and Patient Assessment of Constipation-Symptoms (PAC-SYM) questionnaire.
Results The stool symptom score of PAC-SYM significantly improved in the GE group compared with the placebo group after the 12-week treatment (p=0.041). Abdominal discomfort score of CSS significantly decreased at 12 weeks compared to that at baseline in the GE group (p=0.003), but not in the placebo group (p=0.398). In addition, abdominal discomfort score of CSS slightly decreased in the GE group compared with the placebo group after the 12-week treatment (p=0.060). However, stool consistency, total CSS score and PAC-SYM score did not change significantly in both GE group and the placebo group over the 12-week treatment period.
Conclusions GE treatment for 12 weeks improved the stool symptom score on the PAC-SYM and abdominal discomfort score on the CSS in obese adults. However, further research is needed in large-scale human studies.
Keywords Dietary fiber; Defecation; Gelidium elegans; Obesity; Seaweed

Lower GI EE-LGI-003

Transient Antibody to Infliximab in Pediatric Inflammatory Bowel Disease

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Background/Aims The immune-mediated response of infliximab (IFX) in inflammatory bowel disease can lead to the development of antibody to infliximab (ATI). The presence of ATI has been linked to lower IFX trough levels (IFX TL) and loss of response (LOR) to treatment. However, previous reports have shown that by dose intensification, transient ATIs may disappear and patients under LOR may regain response to IFX. We aimed to introduce our experience with transient ATIs.
Methods We performed a retrospective analysis of 132 pediatric inflammatory bowel disease patients treated with IFX between December 2008 and March 2015. Patients were selected based on retrospective screening for ATIs detected on at least one time point during follow up. Using the same samples, we measured IFX TLs by ELISA, and clinical responses to therapy and laboratory results were investigated.
Results Ten out of 132 patients (7.5%) had developed ATIs 17.14 weeks after starting IFX. In four out of 10 patients (40%), ATIs disappeared 3 weeks after individualized dose intensification treatment according to the discretion of the physician, whereas in six out of 10 patients (60%), ATIs persisted. The duration from the detection of LOR to dose intensification was shorter in subjects whose ATIs disappeared compared to those whose ATIs persisted (4.4 weeks vs 34.7 weeks). In patients with transient ATIs, IFX TL increased from 0 μg/mL when ATIs were first detected to 2.72 μg/mL when ATIs disappeared. The proportion of patients discontinuing IFX was significantly higher in subjects with persisted ATIs.
Conclusions ATIs may be transient, and may disappear after dose intensification. Therefore, evaluation of IFX TL and ATIs is required when LOR is suspected. While LOR may be capable of overcoming by early dose intensification in patients with low titer ATIs, the presence of high ATIs may require switching to other biologics.
Keywords Inflammatory bowel disease; Antibody to infliximab

Lower GI EE-LGI-004

Fecal Calprotectin as a Prognostic Factor of Gastrointestinal Involvement in Pediatric Henoch-Schonlein Purpura Patients

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Background/Aims Henoch-Schonlein purpura (HSP) is a systemic vasculitis involving small vessels, which is characterized by a peculiar skin rash, arthritis, gastrointestinal (GI) symptoms and renal symptoms. Fecal calprotectin (FC) elevation indicates intestinal inflammation, and is can be used as an indicator for other intestinal diseases. In this study, FC levels in patients diagnosed with HSP were examined, and the correlation between FC levels and the prognosis of GI involvement in HSP patients was evaluated.
Methods The medical records of 69 pediatric patients who were diagnosed with HSP and hospitalized between February 2015 and June 2019, were included in this retrospective study.
Results Of the 69 patients, 37 (53.6%) were males, and their mean age was 6.85±2.93 years. The mean hospitalization period of the patients was 5.41±5.27 days. Of all patients, 40 (58.0%) had GI involvement (group1), and 29 (42.0%) had no GI symptoms and no specific findings on tests. A significant difference was detected in hospitalization periods (p=0.000), HSP activity scores (p=0.000), and FDP, D-dimer levels and stool occult blood between the two groups. A marked difference was observed in FC levels between groups (379.99±399.8 vs 77.4±97.6, p=0.000), and the proportion of patients with FC levels over 50 also showed a difference (77.8% vs 20.8%, p=0.000). In receiver operating characteristic curve, area under curve was 0.844 and cutoff value was 69.10 mg/Kg (sensitivity 87.5%, specificity 72.4%). FC level was correlation with HSP clinical score, severity of GI symptom, and area of GI involvements.
Conclusions FC can be used as an indicator of GI involvement in HSP patients, and may be used as a prognostic factor of duration of GI symptoms or response of treatment.
Keywords Henoch-Schonlein purpura; Calprotectin; Children

Lower GI EE-LGI-005

Clinical Features and Outcomes of Severe Stercoral Colitis: A Single-Center Experience

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Background/Aims Stercoral colitis with high morbidity and mortality results from a rare inflammatory change of colonic wall by fecal impaction. The incidence and severity of stercoral colitis has become higher due to increase of the number of patient with comorbidities and immobility, and change into low fiber diet. The aim of this study is to investigate clinical features and outcomes of severe stercoral colitis after medical or surgical treatment.
Methods From January 2010 to December 2018, a total of 24 patients hospitalized due to severe stercoral colitis were selected. Severe stercoral colitis was defined as specific radiologic findings or endoscopic diagnosis accompanied by unstable vital signs or multiorgan failure. Baseline characteristics of the subjects and clinical features of stercoral colitis were evaluated retrospectively. The enrolled patients were divided into the medical treatment group (n=17) and the surgical treatment group (n=7). Overall survival (OS) by therapeutic method was analyzed by Kaplan-Meier method.
Results Median age of the enrolled subjects was 81.8 years and female was predominant (75.0%). The most common involved bowel was a rectosigmoid colon (70.8%). Perforation was observed in five patients (20.8%). There was no significant difference in baseline characteristics between the two groups except perforation rate. Eight patients and thee patients were expired in the both groups, respectively (47.1% vs 42.9%). Median OS was 51.0±14.3 days (95% confidence interval [CI], 22.9 to 79.1) in the medical treatment group and 43.0±16.3 days (95% CI, 11.0 to 75.0) in the surgical treatment group. No significant difference of OS was statistically observed between the both groups (p=0.318).
Conclusions This study shows that the mortality rate of severe stercoral colitis is very high and it may not be associated with medical or surgical therapeutic method.
Keywords Stercoral colitis; Fecal impaction; Overall survival; Perforation

Lower GI EE-LGI-006

Incidence and Infantile Risk Factors of Pediatric Onset Inflammatory Bowel Diseases in Korea: A Nationwide Population-Based Study

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Background/Aims The etiology of inflammatory bowel diseases (IBD) is multifactorial. The mucosal inflammation is resulted from an immune dysregulation which caused by various environmental factors, intestinal microbiota and genetic susceptibility. We aimed to investigate feeding pattern and oral hygiene care as early environmental exposures that affect the development of pediatric onset IBD.
Methods We enrolled the individuals (n=1,986,758) who had participated in the National Health Screening for Infants and Children (NHSIC) program at the age of 9 to 12 months in 2007 to 2015. The study population was followed up to 2018 and identified 70 IBD patients (Crohn's disease 46 and ulcerative colitis 24) from the rare intractable diseases registry in the National Health Insurance database. We analyzed birth weight, continuing of breastfeeding, time to complementary feeding, early introduced food category, oral hygiene care status from NHSIC database.
Results During study period, the average incidence rate of pediatric onset IBD was 0.45 per 100,000 person-years. The age-related incidence rates of 1 to 3 years of age, 3 to 6 years of age, 6 to 9 years of age and 9 to 12 years of age groups were; 0.19, 0.22, 0.71 and 2.81 per 100,000 person-years, respectively. IBD patients was poor oral hygiene care status including dental decay and tooth brushing habit comparing to general population (p<0.001, p=0.002, respectively). Formulated milk feeding (hazard ratio, 1.61; 95% confidence interval, 0.94 to 2.76; p=0.08) and early introduction of complementary food before 6 months of age (hazard ratio, 1.92; 95% confidence interval, 1.07 to 3.46; p=0.03) were risk factors of develop pediatric onset IBD.
Conclusions Infantile feeding pattern including continuing breastfeeding, early introduction of complementary feeding before 6 months of age and oral hygiene care status during infant period are contributable environmental factors for pediatric onset IBD.
Keywords Inflammatory bowel diseases; Pediatrics; Environmental risk factors; Complementary feeding; Breastfeeding

Lower GI EE-LGI-007

The Bleeding Risk of Colonoscopic Polypectomy in Liver Cirrhosis Patient

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Background/Aims It is well known that liver cirrhosis patients have more bleeding tendency than general population Bleeding risk of colonoscopic polypectomy for liver cirrhosis patients is unclear. So, we aimed to evaluate the risk factors of post-polypectomy bleeding in liver cirrhosis patients.
Methods We examine the medical record of all patients with liver cirrhosis who underwent colonoscopy at Bucheon St Mary's Hospital between August 2011 to September 2019. We included 74 patients who underwent colonoscopic polypectomy and they were classified into two groups, bleeding group (n=34) and non-bleeding group (n=40). We analyzed the risk factors associated with post-polypectomy bleeding.
Results Among 74 patients, Child-Pugh class A was 63.5% (n=47), class B was 24.3% (n=18), and class C was 12.2% (n=9). Methods of polypectomy were endoscopic mucosal resection (n=48) or biopsy (n=26). Two groups showed statistically significant differences in Child-Pugh score (p=0.003), polyp size (p<0.001) and remove method (p=0.016). The post-polypectomy bleeding significantly increased with higher Child-Pugh score (odds ratio [OR], 2.731; p=0.022) and larger polyp size (OR, 1.271; p=0.048) in multivariate analysis.
Conclusions The risk of post-polypectomy bleeding increases in patients with liver cirrhosis. Child-Pugh class and polyp size are important risk factors. Therefore, while performing colonoscopic polypectomy, endoscopists should pay attention to liver cirrhosis patients with higher bleeding risk factors.
Keywords Liver cirrhosis; Colonoscopic polypectomy; Post polypectomy bleeding; Child-Pugh class

Lower GI EE-LGI-008

Heterotrophic Expression of Olfactory Receptors, OR2W3 is Associated with the Progression of Advanced Colorectal Cancer

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Background/Aims Ectopic expression of olfactory receptors have been detected in various tissue including testis, prostate, kidney and gastrointestinal tracts. We identified meaningful olfactory receptors genes in advanced colon cancer patients using NGS sequencing. From this sequencing results, we aimed to determine the function and roles of ORs in the pathogenesis of advanced colon cancer.
Methods Colon tissues (seven advanced colon cancer patients and seven for control) were obtained from endoscopic biopsy for RNA sequencing and qPCR. OR2W3 expression was investigated in primary tumors of 90 advanced colorectal cancer patients. The expression pattern and function of OR2W3 were analyzed with clinicopathological and molecular characteristics.
Results We identified the heterotopic OR genes and validated again by qPCR. We found that the genetic expression of OR2W3 was significantly down-regulated in colon cancer patients. OR2W3 infiltration was significantly correlated with lower tumor invasion and staging (p=0.04, p=0.028). To characterize OR2W3 positive cells, immunohistochemical analysis for lamina propria mononuclear cells were analyzed in colorectal cancer patients. Immunohistochemical analysis revealed an increase in the proportion of Syndecan-1 positive cells expressing of OR2W3 with about 60% of all OR2W3 positive lamina propria mono nuclear cells (p<0.05). The OR2W3/Syndecan-1 positive cells were mainly co-localized IgA and not IgG.
Conclusions Taken together, our data suggest that OR2W3 in advanced colon cancer can affect tumor progression and prognosis. OR2W3 can be a marker of plasma cells which secrete IgA. This result prompt to investigate the function of OR2W3 in both immune cells and epithelial cells in the pathogenesis of colon cancer.
Keywords Colorectal cancer

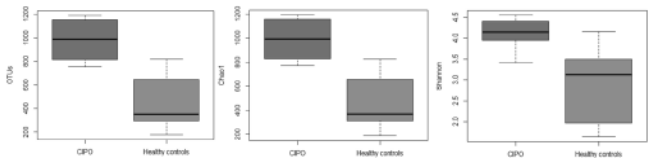

Fig. 1. Bacterial richness and diversity.

Lower GI EE-LGI-009

Fecal Microbiota Analysis of Chronic Intestinal Pseudo-Obstruction Patients

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Background/Aims Chronic intestinal pseudo-obstruction (CIPO) is an intestinal motility disorder in which impaired intestinal motor activity causes recurrent symptoms of intestinal obstruction in the absence of mechanical obstruction. Gut microbiome disturbances can contribute to gut dysfunction, but it is not clear if changes in the microbiota occur prior to or as a result of colon motility disorders. Moreover, there were no studies of intestinal microbiota in CIPO patients. Here, we aimed to investigate the difference of gut microbiomes between CIPO patients and healthy controls.
Methods A total of seven CIPO patients (male:female=3:4) who visited tertiary care center from January 2017 to February 2019 were prospectively enrolled. Seven stool samples of CIPO patients were compared with stool samples of 13 healthy controls. Fecal samples were collected and analyzed using 16S rRNA gene pyrosequencing.
Results Mean age of CIPO patients at enrollment was 45.4 years and mean symptom duration was 13.6 years. In the abdomen computed tomography (CT) scan, small bowel dilatation was demonstrated in four patients (57.1%). The maximally dilated lesion was a transverse colon (57.1%) and the average diameter was 68.1 mm by CT scan. Bacterial richness and diversity were significantly increased in the CIPO patients compared with healthy controls (Fig. 1). The fecal microbiota composition of the CIPO patients and healthy controls was similar at the phylum level; Firmicutes, Bacteroidetes, Actinobacteria, Proteobacteria. However, a significantly higher abundance of Acetitomaculum, Ruminococcus, Eubacterium_g17, and Clostridiales_uc_g was detected in CIPO patients compared with controls at the genus level.
Conclusions CIPO is associated with a rich and diverse fecal microbiome with a higher abundance of Acetitomaculum, Ruminococcus, Eubacterium_g17, and Clostridiales_uc_g. This finding could be helpful in the further understanding of pathophysiology in CIPO in the intestinal modulation by microbiome.
Keywords Intestinal pseudo-obstruction; Gastrointestinal microbiome

Lower GI EE-LGI-010

Biologic Use Patterns and Predictors for Non-Persistence and Switching of Biologics in Patients with Inflammatory Bowel Disease: A Nationwide Population-Based Study

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Background/Aims Data on real-life patterns of biologic use for inflammatory bowel disease (IBD) are scarce. We examined the patterns of biologic use and the factors associated with non-persistence and switching of biologics in Korean IBD patients.
Methods Using National Health Insurance claims, we collected data on patients who were diagnosed with IBD and exposed to biologics between 2010 and 2016.
Results Among 1,838 patients with Crohn's disease (CD), 1,237 and 601 started with infliximab and adalimumab, respectively. Among 1,125 patients with ulcerative colitis (UC), 774, 294, and 57 initiated infliximab, adalimumab, and golimumab, respectively. Rates of non-persistence and switching were higher in UC than in CD. One- and 3-year non-persistence rates were 14.2% and 26.5% in CD and 35.4% and 53.4% in UC, respectively. One- and 3-year switching rates were3.7% and 10.1% in CD and 15.6% and 22.0% in UC, respectively. In both CD and UC, infliximab and adalimumab initiators showed similar persistence rates, whereas adalimumab initiators had a higher risk of switching than infliximab initiators. In UC, golimumab initiators had a higher risk of non-persistence and switching than infliximab initiators. Steroid use at biologic initiation was associated with an increased risk of non-persistence and switching in both CD and UC. UC patients who started biologic treatment at tertiary hospitals were more likely to continue treatment than those who started at general hospitals/community hospitals/clinics.
Conclusions In real-world clinical practice settings, discontinuation of biologics occurred frequently in IBD patients, and switching of biologics was common in UC patients.

Lower GI EE-LGI-011

Comparison of Endoscopic Disease Activity Score in Patients with Ulcerative Colitis

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Background/Aims The assessment of ulcerative colitis (UC) activity is based on a combination of symptoms, laboratory markers, and endoscopic findings. Mayo endoscopic score (Mayo ES) and the Ulcerative Colitis Endoscopic Index of Severity (UCEIS) are used to evaluate UC severity. This study compared Mayo ES and UCEIS for evaluating UC severity in patients undergoing repeat colonoscopy after initial treatment.
Methods Thirty-five UC patients who received colonoscopy before and after induction therapy were included. We retrospectively analyzed the medical records of the patients with UC first diagnosed at our hospital. We compared changes in Mayo ES and UCEIS before and after therapy with findings of the site with the most severe inflammation.
Results Mean age of the patients was 46.8 years old and 37.2% of the patients were female gender. Extensive colitis was noted in 12 patients (34.3%), left side colitis in seven patients (20%), and proctitis in 16 patients (45.7%). All used oral mesalazine (100%) and 17 cases (48.5%) used oral steroid. Mayo score improved from 7.43±2.12 to 4.17±0.53 (p=0.089). Before treatment, C-reactive protein showed moderate correlation with Mayo score (r=0.496, p=0.006), Mayo ES (r=0.377, p=0.044) and UCEIS (r=0.46, p=0.011). Mayo ES showed strong correlation with UCEIS (r=0.816, p<0.001). Mayo ES improved from 1.83±0.75 to 1.34±0.80 (p=0.003), and UCEIS improved from 4.63±2.02 to 3.26±1.99 (p=0.004).
Conclusions Both Mayo ES and UCEIS had excellent and similar results for evaluating initial treatment response in patient with ulcerative colitis. These finding can support the usefulness of both endoscopic disease activity score in UC after initial therapy.
Keywords Ulcerative colitis; Mayo; UCEIS

Lower GI EE-LGI-012

Evaluation of Nutritional Status using Anthropometric Measurements in Patients with Crohn's Disease and Ulcerative Colitis

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Background/Aims Malnutrition is a common feature of inflammatory bowel disease (IBD), and it may arise from factors including inadequate dietary intake, malabsorption, and disease activity. Anthropometric evaluation is an important part of the nutritional assessment. The aims of this study were to evaluate the nutritional status of IBD patients and to investigate the correlation between nutrient factors and disease activity in patients with IBD.
Methods We retrospectively analyzed the medical records of 31 patients with Crohn's disease (CD), and 16 patients with ulcerative colitis (UC) from November 2018 to September 2019 in Seoul Paik Hospital. The nutritional status was assessed by extensive anthropometric measurements and biochemical markers of nutrition. Disease activity of CD was assessed by Harvey-Bradshaw index (HBI; ≥5 defined as active disease) and disease activity of UC was classified by the partial Mayo score (PMS; ≥2 defined as active disease).
Results Patient's average age was 47.2 years old, and included 32 males and 15 females. They were classified into two groups according to disease activity. The hemoglobin was showed negative correlation with HBI (p<0.036). The serum C-reactive protein (CRP) and the erythrocyte sedimentation rate (ESR) were showed correlation with disease activity (p<0.005 in CRP and p<0.0007 in ESR). There was statistically significant correlation between body mass index (BMI), classified into three groups (underweight, normal, and overweight), and active disease (p<0.031).
Conclusions In this study, statistical significance of the correlation between all of nutrient factors based on anthropometric measurements and disease activity in patients with IBD is insufficient except BMI groups. Due to the number of patients being small, further studies with larger group of IBD patients will be necessary to more accurately assess the correlation between nutrient factors and disease activity.
Keywords Inflammatory bowel disease; Nutritional status; Anthropometric measurements; Body composition; Disease activity

Lower GI EE-LGI-013

Genotype-Based Treatment with Thiopurine Reduces Incidence of Myelosuppression in Patients with Inflammatory Bowel Diseases

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Background/Aims Thiopurine-related myelosuppression interferes with thiopurine therapy for patients with inflammatory bowel disease (IBD). We investigated whether pretreatment analyses genetic variants associated with thiopurine-induced leukopenia could be used to effectively identify patients who required dose adjustments.
Methods We performed a multicenter, prospective study of patients with IBD at five tertiary medical centers in Korea, from January 2016 through September 2018. Seventy-two patients were randomly assigned to a group that underwent genotype analysis for the NUDT15 variant (rs116855232) and FTO variant (rs79206939) and three common TPMT variants (rs1800460, rs1800462, and rs1142345) associated with myelosuppression and 92 patients were assigned to a group that did not undergo genotype analysis (non-genotyping group). Patients heterozygous for any variant received 50 mg azathioprine equivalents, whereas those who were homozygous for any variant received alternative drugs. Patients who did not carry any of the genetic variants and patients in the non-genotyping group received 50 mg azathioprine equivalents followed by dose escalation up to 2–2.5 mg/kg.
Results Twelve patients (16.7%) in the genotype analysis group and 33 patients (35.9%) in the non-genotyping group developed myelosuppression (p=0.005) (Fig.1). A multivariate analysis revealed that body mass indices above 21 kg/m^2 (hazard ratio [HR], 0.43; 95% confidence interval [CI], 0.22 to 0.81; p=0.009), pretreatment genotype analysis (HR, 0.37; 95% CI, 0.18 to 0.77; p=0.008), and the maximum dose of thiopurines (HR, 0.34; 95% CI, 0.19 to 0.59; p<0.001) independently decreased risk of myelosuppression. Pretreatment genotype analysis reduced numbers of outpatient clinic visit and numbers of patients with drug discontinuation or dose reductions.
Conclusions In a randomized controlled study of patients undergoing thiopurine therapy for IBD, selection of therapy based on genetic variants associated with thiopurine-induced leukopenia significantly reduced the proportion of patients with myelosuppression during treatment.
Keywords Immune modulator; Adverse drug reaction; Genetic risk factor; Metabolism

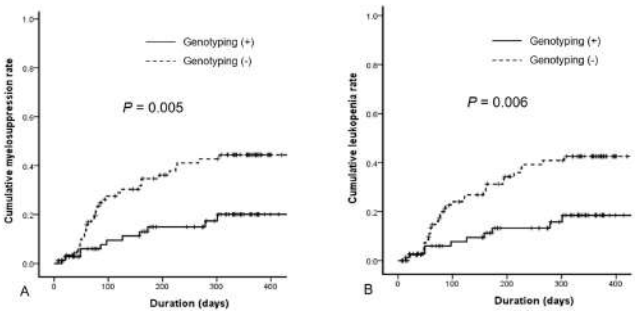

Fig. 1. Cumulative risks of myelosuppression.

Lower GI EE-LGI-015

Clinical Characteristics and Prognosis of Elderly Patients with Colorectal Cancer Undergoing Surgical Resection

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Background/Aims With the aging population, about 20% of patients diagnosed with colorectal cancer (CRC) are ≥80 years old. Elderly CRC patients tend to avoid standard treatment, especially curative surgical resection, due to concerns of surgical complications or underlying diseases. The aim of this study is to compare clinical characteristics and prognosis between patients who underwent surgical resection and who received supportive care, and to determine the usefulness of surgical treatment in elderly patients.
Methods A total of 114 patients aged ≥80 years who were diagnosed with CRC between March 2007 and November 2017 were analyzed retrospectively. Of these patients, 73 patients underwent surgical resection for malignancy and 41 patients received supportive care. Clinicopathological factors and overall survival (OS) rates were compared.
Results Surgical resection group had better Eastern Cooperative Oncology Group (ECOG) performance status and American Society of Anesthesiologists (ASA) physical status, and lower stage than supportive care group. The 3-year OS rate of surgical group was significantly higher than that of supportive group (60.7% vs 9.1%, p<0.001). In extreme-elderly patients (age ≥85 years), surgical group showed better 3-year OS rate than supportive group (73.9% vs 6.3%, p<0.001) although ECOG performance status and ASA physical status were not different. The postoperative mortality rate of elderly group and extreme-elderly group was 4.1% and 8.7%, respectively. In the analysis of risk factors related to survival, surgical resection was a good prognostic factor in both elderly group (hazard ratio [HR], 0.223; p=0.015) and extreme-elderly group (HR, 0.083; p=0.009).
Conclusions Surgical treatment in elderly CRC patients showed survival benefit, even in the extreme-elderly patients. Surgical resection for CRC in elderly patients can be performed to improve survival.
Keywords Colorectal cancer; Elderly; Surgery; Prognosis

Lower GI EE-LGI-016

Impact of Timing of Immunomodulator Use on First Intestinal Resection in Crohn's Disease with Poor Prognostic Factors: A Nationwide Population-Based Cohort Study 2004 to 2015

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Background/Aims The optimal timing of immunomodulator (IM) administration is controversial issue in treatment of Crohn's disease (CD) with poor prognostic factors. We performed a nationwide population-based study to investigate the impact of timing for IM use on first intestinal resection in CD with poor prognostic factors.
Methods Using the National Health Insurance claims data, we collected data on newly diagnosed CD patients between 2004 and 2015. Among them, patient who have at least two risk factors for progression (diagnosis at age <40 years, systemic corticosteroid treatment <3 months after diagnosis, and perianal fistula at diagnosis) were enrolled to the analysis. Patients with prescription days less than 70% (255 days) per year were excluded. We quantified the impact of timing of IMs on the risk of first bowel resective surgery using a Cox regression model. Following variables including age, gender, single poor prognostic factors, and hospital volume were controlled.
Results We identified 3,421 eligible patients with CD. During 5,912,815 person-day follow-up, intestinal resection was performed in 357 patients (10.4%). Compared with patients received IM within 3 months after diagnosis, the risk of surgery was significantly increased in patients who started IM after 9 months from diagnosis, besides the risk showed gradually increasing trend as the starting time was delayed among patients received IM after 9 months (hazard ratio [HR], 1.65; 95% confidence interval [CI], 1.07 to 2.54 in 9–12 months group; HR, 1.62; 95% CI, 1.17 to 2.24 in 1–2 years group; HR, 2.02; 95% CI, 1.51 to 2.69 in >2 years groups).
Conclusions Compared with patients received IM within 3 months from diagnosis, the risk of surgery was significantly increased in patients started IM after 9 months, and the risk was gradually increasing trend as the starting time was delayed. Our results suggest that initiation of IM within 9 months after diagnosis may be appropriate in CD patients with poor prognostic factors.
Keywords Crohn disease; Immunomodulator; Timing; Poor prognostic factor; Bowel surgery

Lower GI EE-LGI-017

Fecal Microbiome Analysis in Patients with Dilated Colon with Stricture Manifested as Chronic Refractory Constipation

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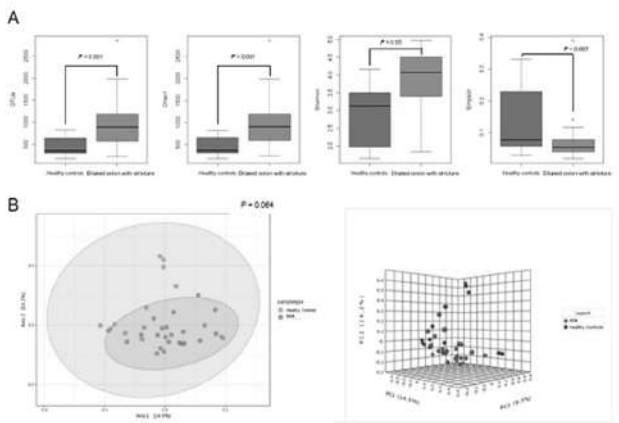
Background/Aims Dilated colon with stricture (DCS) is a rare disease characterized by chronic refractory constipation, mimicking mechanical intestinal obstruction. The cause of the stricture is not clear. However, ischemic disease or ganglionitis of unknown origin might have preceded. We conducted the first study to compare the gut microbiome of DCS patients with healthy controls.
Methods A total of 24 DCS patients (male:female=15:9) who visited tertiary care center from January 2017 to February 2019 were prospectively enrolled. Twenty-four stool samples of DCS patients were compared with stool samples of 13 healthy controls. Samples were analyzed using 16S rRNA gene pyrosequencing.
Results Mean age of DCS patients at enrollment was 58.0 years and mean symptom duration was 3.1 years. The maximally dilated lesion was a transverse colon and the average diameter was 78.8 mm by computed tomography scan. Bacterial richness and diversity were significantly increased in the DCS group compared with healthy controls (Fig. 1). DCS patients showed similar microbiome relative abundance compared to healthy controls at phylum level. However, *Verrucomicrobia* was significantly prevalent in the DCS group (p<0.05). A significantly higher abundance of *Frisingicoccus*, *Ruthenibacterium* and *Agathobaculum* and significantly lower abundance of *Butyricicoccus*, *Prevotella*, and *Agathobacter* were detected in DCS patients compared with healthy controls at genus level (p<0.05).
Conclusions DCS is associated with a rich and diverse fecal microbiome including higher abundance of *Frisingicoccus*, *Ruthenibacterium* and *Agathobaculum* and lower abundance of *Butyricicoccus*, *Prevotella* and *Agathobacter*. These findings could be related with chronic refractory constipation or might be due to stricture.
Keywords Colon; Stricture; Fecal; Microbiome; Constipation

Figure 1 shows alpha and beta diversity between groups. Bacterial richness and diversity were significantly increased in the DCS group compared with healthy controls.



Lower GI EE-LGI-018

Jumbo Biopsy Forceps Versus Cold Snares for Removing Diminutive Colorectal Polyps: A Prospective Randomized Controlled Trial

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Background/Aims Cold snare polypectomy (CSP) and jumbo forceps polypectomy (JFP) have been shown to be effective for removing diminutive colorectal polyps (DCPs) (5 mm). However, no study has compared complete resection rates between CSP and JFP for DCPs. The aim of this study was to compare the efficacy and safety of JFP with CSP for the removal of DCPs.
Methods This was a prospective randomized controlled trial from two tertiary-care referral centers. A total of 1003patients were screened, and 169 patients with 196 DCPs were enrolled. The main outcome was complete polyp resection rate.
Results Of 196 diminutive polyps, 177 (90.3%) were adenomatous polyps. The overall complete resection rate was 92.1% (163/177). The complete resection rate was not significantly different between JFP and CSP groups (92.0% vs 92.2%, P Z .947). JFP achieved complete resection rates comparable with CSP for polyps >3 mm (90.3% vs 89.8%, P Z .928). Polypectomy procedure time, tissue retrieval rate, and rate of postpolypectomy adverse events were not significantly different between the two groups.
Conclusions Both JFP and CSP achieved complete resection rates of >90% for DCPs. Thus, JFP may be considered for polypectomy of DCPs. (International clinical trial registry number: KCT0002805)
Keywords Jumbo biopsy; Cold snare

Graphic abstract

Lower GI EE-LGI-019

Causes and Risk Factors of Death in Patients with Intestinal Behcet Disease

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Background/Aims There is a lack of studies addressing mortality and causes of death in cohorts of Asian patients with intestinal Behcet disease (BD). This study aimed to assess causes of death in patients with intestinal BD and compare the related factors with mortality in a single center with a retrospective manner.
Methods Total 543 patients who diagnosed intestinal BD in Severance Hospital, Yonsei University College of Medicine, Seoul, Korea, between January 1989 and December 2015 were enrolled to this study. Patient's baseline demographic and clinico-laboratory data were collected based on electronic and paper medical records. The baseline characteristics and treatment related outcomes were compared between dead intestinal BD patients and control group (n=115, age, sex and diagnosis periods were matched). All factors with p-value of <0.05 in the univariate analysis were included in a Cox proportional hazards multivariate model.
Results Total 57 patients (10.5%) with intestinal BD died during study periods. The median duration of follow-up period was 32.1 months (range, 1 to 280 months). Main causes of death included systemic infection (n=18, 31.6%), malignancy (n=16, 28.1%) and cardiovascular disease (n=14, 24.6%). In multivariate analyses, combined hematologic disease (hazard ratio [HR], 5.016; 95% confidence interval [CI], 2.459 to 10.230), Charlson comorbidity index (HR, 1.485; 95% CI, 1.257 to 1.754), loss of weight (HR, 5.422; 95% CI, 2.368 to 12.416), extraintestinal manifestations at major vessels (HR, 2.211; 95% CI, 1.077 to 4.540) and disease distribution at upper gastrointestinal tract (HR, 3.949; 95% CI, 1.752 to 8.900) were associated with the risk of mortality.
Conclusions Main causes of death were systemic infection, malignancy and cardiovascular disease. Combined hematologic disease, Charlson comorbidity index, loss of weight, extra-intestinal manifestations at major vessels and disease distribution at upper gastrointestinal tract were associated with increase of mortality in intestinal BD.
Keywords Causes of death; Intestinal Behcet disease; Mortality rate; Risk factor

Lower GI EE-LGI-020

Effects of Periodontitis and Cigarette Smoking on Ulcerative Colitis: A Nationwide Population-Based Cohort Study

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Background/Aims Periodontitis is caused by the interaction between microbiota in the root canal and host immune system. However, the effect of periodontitis on inflammatory bowel disease (IBD) is unclear. The aim of this study was to assess whether the incidence and risk of IBD increased in patients with periodontitis compared with general population.
Methods We performed a nationwide, population-based study using claim data from the National Healthcare Insurance Service-National Health Screening Program in Korea. Included were people aged 20 or older who participated in the national health screening program at least once in the index year 2009 (n=9,950,548). Periodontitis was defined as diagnosed within 2 years before the index year according to ICD-10 code. We compared patients with periodontitis to individuals without periodontitis. The end point was newly diagnosed IBD that met both of ICD-10 codes and V code for rare intractable diseases until December 31th, 2017. We exclude IBD patients who were diagnosed within 1 year from the index year (lag period).
Results The mean follow up duration was 7.26±0.76 years. Patients with periodontitis had higher risk of ulcerative colitis (UC) than populations without periodontitis matched by age, sex, smoking, drinking, physical activity and body mass index (hazard ratio [HR], 1.090; 95% confidence interval [CI], 1.022 to 1.162; p<0.0001). According to a subgroup analysis of the periodontitis group, the risk of UC was significantly higher in patients who were over 50 years old, heavy drinkers and current smokers (HR, 1.987; 95% CI, 1.123 to 3.515; p for interaction analysis=0.0331). However, the risk of CD in patients with periodontitis did not increase compared to the general population.
Conclusions Patients with periodontitis are at an increased risk of UC compared with individuals without periodontitis. Patient with periodontitis who were current smoker had a higher risk of UC than smokers without periodontitis.
Keywords Periodontitis; Smoking; Ulcerative colitis

Lower GI EE-LGI-021

LPS-induced Lipocalin 2 Is Modulated via TLR4/NF-kB Activation in Murine Macrophage

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Background/Aims Lipocalin 2 (LCN2) is highly expressed in several infectious and inflammatory disorder. However, the expression level and underlying mechanism of LCN2 in inflammatory bowel disease (IBD) is still poorly understood. In the current study, the expression and potential mechanism of LCN2 was investigated in murine IBD models and LPS-activated macrophage.
Methods Experimental colitis murine models were induced by dextran sodium sulfate in drinking water. The level of LCN2 *in vivo* models were evaluated using LCN2 ELISA kit, revers-transcriptase polymerase chain reaction, Western blotting and immunohistochemistry. Murine macrophage RAW264.7 cells were activated by LPS in various time and concentration. Alteration of signaling pathway were examined by Western blotting. Luciferase reporter assay was used to validate the promoter activity of LCN2.
Results *In vivo* study, the expression of LCN2 was strongly higher in colon of colitis-induced mice than in colon of normal mice. The levels of LCN2 mRNA and protein in RAW264.7 cells were markedly upregulated by LPS in time and concentration dependent manner. Secreted LCN2 of RAW264.7 cells was also increased by LPS stimulation. Importantly, LPS-induced LCN2 in RAW 264.7 cells was diminished by TLR4 and NF-kB inhibition using specific inhibitors. Reporter assay results determined that LPS induces the LCN2 gene promoter activity under control of NF-kB activation.
Conclusions These results suggest that LCN2 has potential as a biomarker of IBD and it plays a role as a pro-inflammatory regulator in macrophage activation modulated by TLR4/NF-kB activation.
Keywords Lipocalin 2; Colitis; Toll-like receptor; Macrophage

Lower GI EE-LGI-022

Endoscopic Retrograde Appendicography: An Effective Diagnostic Method for Acute Appendicitis

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Background/Aims Appendicography had been used in the diagnosis of chronic appendicitis. To our knowledge, the role of endoscopic retrograde appendicography for the diagnosis of acute appendicitis remains unknown. The aim of this study was to evaluate the role of endoscopic retrograde appendicography for the diagnosis of acute appendicitis.
Methods Patients with suspected acute appendicitis between December 2013 and November 2015 at Second Affiliated Hospital of Harbin Medical University underwent endoscopic retrograde appendicography. The findings and complication were analyzed retrospectively.
Results Thirty-three patients (20 men and 13 women, average age 44±18 years) with suspected acute appendicitis were studied. The diagnosis was established in 92% (n=23) by endoscopic retrograde appendicography; two patients (8%) had failure cannulation of appendiceal orifice and in eight patients, acute appendicitis was ruled out by normal endoscopic retrograde appendicography thus avoiding a negative appendectomy. In 23 patients with acute appendicitis, colonoscopic findings showed mucosal hyperemia and edema of appendiceal orifice (83%) (Fig. 1A and B), pus outpouring from the appendiceal orifice (74%) (Fig. 1C), and swollen surrounding cecal mucosa (61%). Appendicograpic findings included diffuse lumenal dilation (diameter, 0.8±0.4 mm), filling defects (22%) (Fig. 1D), and partial stenosis (43%) (Fig. 1E), stiffness or inflexibility (87%). There were no complications during or after follow-up for a median of 13 months (interquartile range, 9 to 24 months). Fig. 1F shows normal appendix.
Conclusions Endoscopic retrograde appendicography appears to be a reliable and safe method to confirm or exclude the diagnosis of acute appendicitis. Further prospective confirmatory studies are needed.
Keywords Acute appendicitis; Endoscopic retrograde appendicography

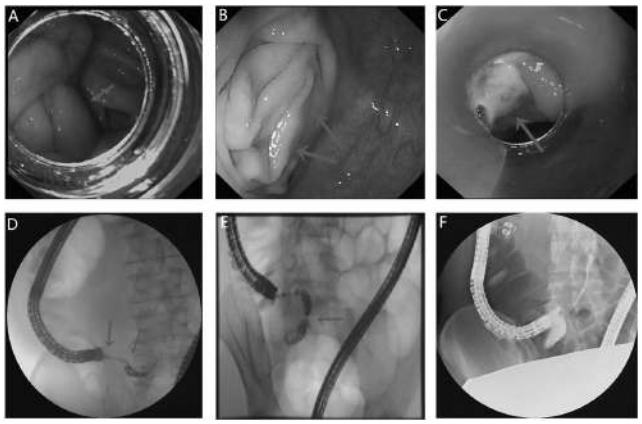

Fig. 1. ERA findings.

Lower GI EE-LGI-023

Role of Serum Procalcitonin in Predicting Severity of *Clostridium difficile* Infection

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Background/Aims Procalcitonin (PCT) is a precursor of the calcitonin hormone which is known to be associated with the severity of infection. However, the role of PCT in predicting the severity of *Clostridium difficile* infection (CDI) is not well studied. This study aimed to investigate the diagnostic value of PCT in predicting the severity of CDI.
Methods Medical records of patients who diagnosed with CDI at Keimyung University Dongsan Medical Center between March 2014 and January 2019, were reviewed retrospectively. Only patients with values of PCT and C-reactive protein (CRP) results within 72 hours of CDI diagnosis were included. Patients were classified into 3 groups according to CDI severity based on Infectious Diseases Society of America guideline. Area under receiver operating characteristic curves (AUROCs) were used to evaluate diagnostic accuracy.
Results Eighty-seven patients (mean age, 68.25 years; males 56.8%, nosocomial infection 73.9%) were analyzed. Forty-six patients (52.8%) were classified into non-severe group, 35 (40.2%) into severe group, and the rest (6, 6.8%) into fulminant group. Mean levels of PCT and CRP of non-severe group, severe group and fulminant group were 1.7, 6.9, and 8.2 ng/mL, respectively. PCT levels correlated with CRP levels ($r=0.50$, $p<0.01$). We used PCT 0.27 ng/mL as optimal cutoff value to diagnose severe CDI ($p<0.0001$; odds ratio, 15.08; AUROC, 0.77). When combined with PCT and CRP, the discriminating power for CDI severity was better (AUROC, 0.81) than that of PCT or CRP separately (AUROC, 0.77 or 0.65). In addition, the combination of CRP, PCT, PLT, and chronic kidney disease showed a higher discrimination ability to measure the severity of CDI (AUROC, 0.89).
Conclusions PCT may be simple and useful prognostic marker for disease severity in patients with CDI. Further studies may be necessary to confirm our results.
Keywords Biomarker; *Clostridium difficile* infection; Severity

Lower GI EE-LGI-024

Proteomics-Based Functional Studies Reveal that Galectin-3 Plays a Protective Role in the Pathogenesis of Intestinal Behçet Disease

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Background/Aims The pathogenesis of intestinal Behçet disease (BD) remains poorly understood. Therefore, we aimed to discover and validate biomarkers using proteomics analysis and subsequent functional studies.
Methods After two-dimensional electrophoresis, candidate proteins were identified using matrix-assisted laser desorption/ionization tandem time-of-flight mass spectrometry (MALDI-TOF/TOF MS). We validated these results by evaluating the protein levels and their functions *in vitro* using HT-29 colorectal cancer cells, colon tissues from patients and mice, and murine bone marrow derived macrophages (BMDMs).
Results Of the 30 proteins differentially expressed in intestinal BD tissues, we identified seven using MALDI-TOF/TOF MS. Focusing on galectin-3, we found that transforming growth factor-β and interleukin-10 (IL-10) expression was significantly lower in shLGALS3-transfected cells. Expression of GRP78 and XBP1s and apoptosis rates were all higher in shLGALS3-transfected cells upon the induction of endoplasmic reticulum stress. In response to lipopolysaccharide stimulation, microtubule-associated protein 1 light chain 3B accumulated and lysosomes decreased in these cells. Finally, Salmonella typhimurium infection induced caspase-1 activation and increased IL-1β production, which facilitated activation of the NLRC4 inflammasome, in Lgals3-/- murine BMDMs compared to wild type BMDMs.
Conclusions Our data suggest that galectin-3 may play a protective role in the pathogenesis of intestinal BD via modulation of ER stress, autophagy, and inflammasome activation.
Keywords Intestinal Behçet disease; Proteomics; Galectin-3

Lower GI EE-LGI-025

Comparisons of Colonoscopy Quality Indicators for the Prediction of Adenoma Miss Rate

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Background/Aims Adenoma detection rate (ADR) is most widely used as an indicator of quality for colonoscopy. However, high ADR alone do not guarantee the complete removal of adenomas due to limitation of definition of ADR. Therefore, other optimal indicator is needed to better reflect the quality of colonoscopist. In our study, we analyzed the association of several quality indicators such as the total adenomas per colonoscopy (APC), adenoma per positive participants (APP) and ADR-plus with adenoma missed rate (AMR).
Methods Patients who underwent more than two total colonoscopies for screening, surveillance within 3 years in our hospital between January 2011 and February 2016 were included. AMR and AMR more than 5 mm miss rate (AMR>5 mm) were calculated from nine endoscopists who performed total colonoscopy more than 40 times as a first colonoscopist. ADR, APC, APP, and ADR plus were calculated from patients with age over 40 years.
Results A total of 612 patients aged ≥40 years were analyzed retrospectively. Mean age was 59.2 years and male was 390 (63.7%). And mean time interval between colonscopic exams was 18.1 months. There were no significant differences in age, sex, bowel preparation quality and mean time interval between colonoscopic exams among nine endoscopists. AMR was 0.32, 0.35, 0.43, 0.24, 0.43, 0.33, 0.29, 0.24 and 0.35. AMR>5 mm was 0.27, 0.19, 0.22, 0.17, 0.29, 0.33, 0.18, 0.20 and 0.35, respectively. AMR was not significantly correlated with all quality indicators. Whereas APC had a significant inverse correlation with AMR>5mm (r=−0.556, p=0.037), the other indicators were not significantly correlated with AMR>5 mm (r for ADR=−0.278, p=0.297; r for ADR plus=−0.500, p=0.061; r for APP=−0.500, p=0.061).
Conclusions APC had the significant negative association with AMR >5 mm. APC might be a better quality indicator for meticulous colonoscopist.
Keywords Colonoscopy; Quality indicator; Adenoma miss rate

Lower GI EE-LGI-026

Can Seasonal Upsurge of Workload of Endoscopists Affect the Quality of Colonoscopy?

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Background/Aims Korean endoscopists tend to suffer from overload during November to December during which the number of endoscopic procedures dramatically increase. We retrospectively investigated whether adenoma detection rate (ADR) and polyp detection rate (PDR) were affected by seasonal overload.
Methods We assumed that the number of colonoscopies and upper endoscopies can represent workload of endoscopists. We retrospectively collected the data from January in 2015 to December in 2018 at Anseong St. Mary Hospital. We made two groups with every month, group A of January to October and group B of November to December. We compared the monthly average of the number of colonoscopies and upper endoscopies of both groups. Primary outcome was ADR and secondary outcome was PDR. We calculated monthly average of ADR and PDR of both groups and compared them.
Results From 2015 to 2018, 3,281 colonoscopies and 24,418 upper endoscopies were done at Anseong St. Mary Hospital. The monthly averages of the number of colonoscopies of two groups were significantly different (62.8 vs 95.7, p=0.03). The monthly average of the number of upper endoscopies were significantly different between group A and group B (264 vs 723, p=0.01). But the monthly average of ADR of group A did not show significant difference with group B (ADR, 21.8 vs 22.1, p=0.33). There was no significant difference in the monthly average of PDR between two groups (43.8 vs 46.6, p=0.25).
Conclusions Seasonal Upsurge of workload of endoscopists did not lower the quality of colonoscopy.
Keywords Colonoscopy; Adenoma detection rate; Polyp detection rate

Lower GI EE-LGI-027

A Nationwide Analysis of Readmission Rate after Colorectal Cancer Surgery in the US

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Background/Aims Data on readmission rates after colorectal cancer (CRC) surgery are scarce. We aimed to analyze the readmission rate following CRC surgery in a U.S. nationwide database.
Methods We queried the Nationwide Readmissions Database from 2010 to 2015 to estimate the national all-cause 30-day readmission rate after CRC surgery in adults, and to determine the reasons for readmission. Patients with only subepithelial tumors, appendiceal cancer and anal cancer were excluded. Multivariable-adjusted logistic regression models were used to analyze potential factors associated with readmission. All results were weighted for national estimates.
Results The estimated number of index cases during the study period was 616,348. Among these patients, 90,555 (14.7%; 95% confidence interval [CI], 14.5% to 14.9%) were readmitted within 30 days of discharge. The most frequent diagnoses for readmission were gastrointestinal (54.8%), infectious (10.6%), and cardio/cerebrovascular (6.3%). Rectal resection, longer length of stay, non-invasive cancer, surgery at a metropolitan teaching hospital, non-routine discharge, elective admission, and higher Elixhauser comorbidity score were associated with subsequent readmission. The readmission rate showed a decreasing trend from 15.5% (95% CI, 15.0% to 16.0%) in 2010 to 13.5% (95% CI, 13.1% to 13.8%) in 2015 (p-trend <0.001) (Fig. 1). There was no obvious change in this trend during the study time.
Conclusions In the United States, approximately 1 in 7 persons undergoing CRC surgery is readmitted to the hospital within 30 days. The readmission rate decreased from 2010 through 2015. It remains to be determined whether any of the predictors of readmission can point to modifiable factors that can further decrease readmission rates.
Keywords Colorectal neoplasms; Cancer; Surgery; Readmission; Population-based

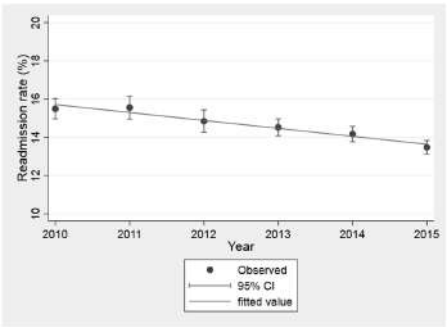

Fig. 1.

Lower GI EE-LGI-028

Positioning of Self-Expandable Metal Stent Insertion in Colonic Obstruction by Extracolonic Malignancy

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Background/Aims Self-expandable metal stent (SEMS) insertion has been known to be effective and safe for decompression of obstructive primary colorectal cancer (CRC). However, the clinical outcomes of stent insertion for colorectal obstruction by extracolonic malignancies are controversial. The aim of this study is to compare the outcomes of SEMS insertion between primary CRC and extracolonic malignancy (ECM) groups.
Methods A total of 510 patients with malignant colon obstruction caused by stage 4 CRC or ECM in whom SEMS was inserted from August 2005 to March 2013 were retrospectively analyzed in a tertiary referral university hospital.
Results Among 510 patients, 343 patients had CRC and 167 patients had ECM. ECM were bladder, gynecologic, pancreatic, and gastric cancer. In patients with CRC and ECM, technical success rate was 97.1% and 92.8% (p=0.035). Clinical success rate was 92.5% and 78.1% (p<0.001). Complication rate was higher in ECM group than CRC group (38.1% vs 26.7%, p=0.015). Carcinomatosis (hazard ratio [HR], 3.321; p=0.030) and obstruction on right colon (HR, 2.626; p=0.035) were risk factors for technical failure. ECM was the factor predictive of the reobstruction or migration of SEMS (HR, 1.664; p=0.007).
Conclusions Colonic obstruction by ECM was not a risk factor of technical or clinical success. It was a risk factor of reobstruction or migration of SEMS. Therefore, SEMS insertion was optionally considered in the patient with short expected life expectancy or high-risk patients for surgery.
Keywords Self-expandable metal stent; Colorectal obstruction; Colorectal cancer; Extracolonic malignancy; Complications

Lower GI EE-LGI-029

Methylation Profile of Tumor Suppressor Genes in Crohn's Disease Patient Samples

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Withdrawn

Background/Aims The cause of inflammatory bowel disease (IBD) is still unknown, but there is growing evidence that environmental factors such as epigenetic changes can contribute to the disease etiology.
Methods In this study, we analyzed the methylation pattern of 16 well-known tumor suppressor gene panel (p16, SFRP1, SOX17, SFRP2, SFRP5, p14, p15, GATA5, E-cadherin, Timp3, BNC1, TFPI2, GATA4, SFRP4, GATA4) in Crohn's disease (CD). Previously, promoter hypermethylation of [illegible] identified in colon cancer hypermethylome. We therefore [illegible] pattern of these genes in CD patients (n=15) using methylation-specific polymerase chain reaction (MSP) and bisulfite sequencing analysis.
Results Interestingly, SFRP1, SOX17, SFRP2, SFRP5, and BNC1 showed 100% methylated in all CD samples we tested. TFPI2, GATA4, SFRP4, GATA4 showed over 30% samples were hypermethylated. But other genes (p16, MGMT, p14, p15, E-Cad, and Timp3) showed no methylation in CD samples. We confirmed these methylation pattern in the sequences by bisulfite sequencing analysis.
Conclusions Overall this study suggest that known tumor suppressor gene may be useful for the diagnosis and therapeutic treatment of CD and also for the unknown biological role of these genes in CD pathogenesis.
Keywords DNA methylation; Crohn disease

Lower GI EE-LGI-030

Comparison of the *In Vitro* Photodynamic Bactericidal Effects of Four Tetracyclines against *Clostridium difficile* KCTC5009 in Planktonic Cultures

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Background/Aims Tetracyclines (TCs) are used as broad-spectrum antibiotics with low risk causing *Clostridium difficile* infection and as a photosensitizer in photodynamic therapy (PDT).
Methods We compared the *in vitro* killing effects of *C. difficile* of four TCs (TC, doxycycline, minocycline, and tigecycline) with PDT using ultraviolet A. To increase the photodynamic antibacterial activity of TCs, chitosan was applied as a boosting agent. Bactericidal effects after PDT, were measured by counting viable cells and assessing DNA damage and membrane integrity. Because TCs showed antibacterial activity at high concentration, low concentration of TCs (0.05 and 0.1 mg/mL) were used.
Results Chitosan treatment combined with PDT increased the bactericidal effect by >100-fold compared with PDT alone in each of the four TCs. DNA damage measured by ethidium bromide monoazide and real-time quantitative polymerase chain reaction was also greater for PDT+chitosan treatment than for PDT alone or control condition; the Ct values for the control, PDT, and PDT+chitosan; 14.67±0.22, 20.46±0.12, and 25.54±0.17, respectively. During PDT, each of four TCs caused severe cell membranes damage compared with control condition. The effect did not differ much between the four TCs.
Conclusions These data suggest that PDT combined with original TCs plus chitosan may be an effective method for killing *C. difficile*.
Keywords *Clostridium difficile* infection; Photodynamic therapy; Ultraviolet A; Tetracycline; Chitosan

Lower GI EE-LGI-031

Umbilical Cord/Placenta-Derived Mesenchymal Stem Cells Inhibit Fibrogenic Activation in Human Intestinal Myofibroblasts via Inhibition of Myocardin-Related Transcription Factor A

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Background/Aims The lack of anti-fibrotic agents targeting intestinal fibrosis is a large unmet need in inflammatory bowel diseases, including Crohn's disease and ulcerative colitis. Previous studies have found that perinatal tissue (umbilical cord [UC], placenta [PL]) derived mesenchymal stem cells (MSCs) reduce fibrosis in several organs. However, their effects on human intestinal fibrosis are poorly understood. This study investigated the anti-fibrogenic properties and mechanisms of MSCs derived from UC and PL (UC/PL-MSCs) on human primary intestinal myofibroblasts (HIMFs).
Methods The HIMFs were treated with transforming growth factor-β1 (TGF-β1) and co-cultured with UC/PL-MSCs. We used a small molecular inhibitor CCG-100602 to examine whether serum response factor (SRF) and its transcriptional cofactor myocardin-related transcription factor A (MRTF-A) are involved in TGF-β1-induced fibrogenic activation in HIMFs. The anti-fibrogenic mechanism of UC/PL-MSCs on HIMFs was analyzed by detecting the expression of RhoA, MRTF-A, and SRF in HIMFs.
Results UC/PL-MSCs reduced TGF-β1-induced procollagen1A1, fibronectin, and α-smooth muscle actin expression in HIMFs. This anti-fibrogenic effect was more apparent in the UC-MSCs. TGF-β1 stimulation increased the expressions of RhoA, MRTF-A, and SRF in the HIMFs. TGF-β1 induced the synthesis of procollagen1A1, fibronectin, and α-smooth muscle actin through a MRTF-A/SRF dependent mechanism. Co-culture with the UC/PL-MSCs down regulated fibrogenesis by inhibition of RhoA, MRTF-A, and SRF expression.
Conclusions UC/PL-MSCs suppress TGF-β1-induced fibrogenic activation in HIMFs by blocking the Rho/MRTF/SRF pathway and could be considered as a novel candidate for stem cell-based therapy of intestinal fibrosis.
Keywords Intestinal fibrosis; Myofibroblasts; Mesenchymal stem cells; Umbilical cord; Placenta

Lower GI EE-LGI-032

Effects of Short-Chain Fatty Acids Supplementation on Gut Inflammation in the Dextran Sulfate Sodium-Induced Murine Colitis Model

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Background/Aims Short-chain fatty acids (SCFAs) play an important role in maintaining gut homeostasis. However, conflicting results exist whether administration of SCFAs ameliorates gut inflammation in patients with inflammatory bowel disease. We aimed to evaluate the effects of butyrate or mixture of SCFAs on gut inflammation in the dextran sulfate sodium (DSS)-induced murine colitis model.
Methods To induce colitis in mice, 2% DSS was administered for 7 days (from D+14 to D+21). Simultaneously with DSS administration, mice received sodium butyrate (150 mM) or mixture of SCFAs (67.5 mM acetate, 40 mM butyrate, 25.9 mM propionate) in the drinking water throughout the experiment (from D+0 to D+23). On the 23rd day, mice were euthanized and colonic inflammation of each mouse group was evaluated.
Results There were no significant differences in weight change, colonic length, and histological inflammation score between the DSS group, butyrate group, and SCFA group. The expression of proinflammatory cytokines such as TNF-α was increased in DSS-treated mice as well as butyrate and SCFA-treated mice. However, fluorescence activated cell sorter analysis revealed that the expression of CD4+FoxP3+ regulatory T cells was decreased in the DSS group than in the control group, but increased in the butyrate and SCFA groups than in the DSS group.
Conclusions Oral administration of butyrate or mixture of SCFAs resulted in changes in the gut microbial community and regulatory T cell expression, but did not ameliorate gut inflammation in the DSS-induced murine colitis model.

Lower GI EE-LGI-033

Colonoscopic Withdrawal Time as Quality Indicator in Surveillance Colonoscopy after Surgery for Colorectal Cancer

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Background/Aims Colonoscopic withdrawal time (WT) is a quality indicator that can be measured during examination, and has a high correlation with adenoma detection rate (ADR). Although several studies have been conducted on the relation between WT and ADR in the intact colon, little is known about the optimal WT needed to increase ADR in the postoperative colon. We investigated the association between WT and ADR in surveillance colonoscopy after colorectal cancer (CRC) surgery.
Methods We conducted a retrospective cohort study of CRC patients who underwent 1st surveillance colonoscopy after curative colectomy between January 2013 and April 2018. The colonoscopies were performed by eight board-certified colonoscopists. The primary outcome was the ADR for each colonoscopist. We divided the colonoscopists into fast colonoscopists and slow colonoscopists using the 8-minute WT as cutoff, and compared the ADR between the two groups.
Results A total of 2,021 patients underwent first surveillance colonoscopy after CRC surgery, and 680 of them were excluded. Mean WTs by eight colonoscopists during colonoscopy with and without polypectomy were 18.9±13.7 and 8.1±5.6 minutes, respectively. Adenoma was detected in 38.9% of subjects, and ADR varied from 29.3% to 50.6% by individual colonoscopists. In the comparison between fast and slow colonoscopist groups, slow colonoscopists showed significantly higher ADR than fast colonoscopists (49.1% vs 32.2%, p<0.001). The Mean WT during colonoscopy without polypectomy for each colonoscopist and the detection rate of all neoplasia were positively correlated (Rs=0.874, p=0.005).
Conclusions We found that during surveillance colonoscopy after surgery for CRC, a minimum of 8 minutes of WT was necessary. Because patients who underwent colorectal surgery possess high risk for metachronous CRC and adenoma, sufficient WT is mandatory, despite short length colon due to surgery.
Keywords Withdrawal time; Surveillance colonoscopy; Postoperative colon

Lower GI EE-LGI-034

Development and Validation of a Risk Scoring Model for Early Prediction of Severe Ischemic colitis

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Background/Aims Ischemic colitis (IC) is considered to be an intestinal injury as a result of insufficient blood flow and severities of IC can range from mild to life-threatening. The aim of this study was to identify predictive risk factors and propose a scoring model of severe IC.
Methods In a retrospective study, we analyzed medical records of patients with IC admitted to Chungnam National University Hospital from January 2010 to December 2018. The patients were divided into two groups by Favier endoscopic classification: non-severe (stage 1) and severe (stage 2, 3). By using the logistic regression analysis, we obtained a new risk scoring model for early prediction of severe IC.
Results A total of 274 patients with endoscopic evaluated IC were included. One hundred and eighty-one patients (66.1%) were classified as severe IC. In a multivariate analysis, five factors were independently and significantly associated with severe IC: tachycardia (odds ratio [OR], 3.83; 95% confidence interval [CI], 1.65 to 8.87; p=0.002), low-dose aspirin (OR, 4.45; 95% CI, 2.05 to 9.69; p<0.001), non-aspirin antiplatelet agents (OR, 4.67; 95% CI, 1.68 to 12.95; p=0.003), elevated C-reactive protein (OR, 4.80; 95% CI, 2.57 to 8.97; p<0.001) and thrombocytopenia (OR, 7.86; 95% CI, 2.01 to 30.7; p=0.003). AUROC (area under receiver operating characteristic curve) of our new risk scoring model was 0.796 (95% CI, 0.743 to 0.842; p<0.001) (Fig. 1).
Conclusions A new risk scoring model based on presence of tachycardia, administration of low-dose aspirin and non-aspirin antiplatelet agents, elevated C-reactive protein and thrombocytopenia could be used to predict the severity of IC in early stage.
Keywords Ischemic colitis; Predictive model; Risk factors

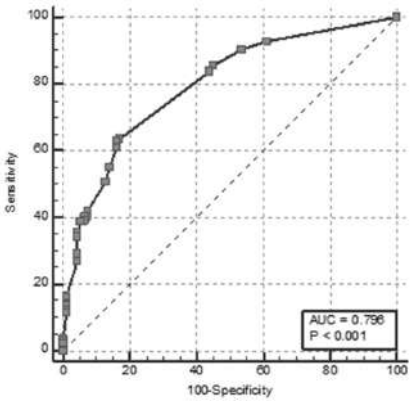

Fig. 1. Receiver operating characteristic curve for predictive model of severe ischemic colitis. The area under the curve (AUC) was 0.796 (95 confidence interval, 0.743 to 0.842).

Lower GI EE-LGI-035

Factors Associated with Stent Patency after Palliative Stenting for Malignant Colorectal Obstruction

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Background/Aims Self-expandable metal stent (SEMS) can be applied to palliate colorectal obstruction secondary to unresectable primary colorectal cancer or extracolonic malignancy. We aimed to identify factors associated with clinical success and stent patency survival after palliative SEMS.

Methods Palliative SEMS data between 2005 and 2019 were retrieved from the institutional colorectal SEMS database and investigated retrospectively. Logistic regression was performed to evaluate factors related to clinical success of palliative stenting. Log-rank test and Cox-proportional hazard analysis were conducted to reveal factors associated with stent patency survival.

Results During the study period, a total of 593 palliative SEMS procedures were performed for malignant colonic obstruction. Technical and clinical success rates were 92.9% and 83.5%, respectively. In the univariate analysis, peritoneal seeding, extracolonic malignancy were associated with clinical failure ($p<0.05$). Multivariate analysis identified that peritoneal seeding (odds ratio, 0.381; 95% confidence interval [CI], 0.22 to 0.63) was a significant risk factor of clinical failure after palliative SEMS. In Cox-proportional hazard analysis, peritoneal seeding (hazard ratio [HR], 2.40; 95% CI, 1.68 to 3.42), stent expansion over 90% on the next day (HR, 1.72; 95% CI 1.15 to 2.58), covered stent (HR, 3.55; 95% CI 2.46 to 5.10) were significantly associated with short stent patency survival.

Conclusions Peritoneal seeding was risk factor for clinical failure of palliative SEMS and associated with short stent patency survival. Stent expansion over 90% on the next day and covered stent were other predictive factors for short stent patency survival in palliative setting.

Keywords Self-expandable metal stent; Colorectal cancer; Malignant colonic obstruction

Lower GI EE-LGI-036

The Incidence and Risk Factors of Venous Thromboembolism in Patients with Inflammatory Bowel Disease: A Nationwide Population-Based Study

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Background/Aims Inflammatory bowel disease (IBD) increases the risk of venous thromboembolism (VTE) events. However, the incidence and risk factors of VTE in Korea IBD patients is unknown. We aimed to reveal the incidence of VTE and analyze the possible risk factors in Korea IBD patients.

Methods A nationwide population-based cohort study was performed using claims data from the National Health Insurance Service in Korea for the years 2004 to 2015. VTE was defined by ICD-10 codes. The hazard ratio (HR) for the risk of VTE on the presence of IBD was calculated after adjusting for covariates such as age, sex, rural area, comorbidities, Charlson comorbidity index (CCI), admission, and therapeutic drugs use for IBD using multivariate Cox proportional hazard regression.

Results A total of 44,997 IBD patients were analyzed of which 13,843 from Crohn's disease (CD) and 31,154 ulcerative colitis (UC). VTE prevalence was 0.8% (360/44,997) overall and 0.6% (77/13,843) in CD patients and 0.9% (283/31,154) in UC patients. According to multivariate analysis, age older than 40 years (adjusted HR [aHR], 4.46; 95% confidence interval [CI], 3.45 to 5.77), rural area (aHR, 1.36; 95% CI, 1.02 to 1.83), hypertension (aHR, 1.54; 95% CI, 1.18 to 2.02), and CCI >3 (aHR, 4.42; 95% CI, 2.94 to 6.64) were the risk factors.

Conclusions The incidence of VTE with IBD was found to be high in Korea. Our study demonstrates old age, rural area, hypertension, or CCI >3 additionally increases the risk for VTE. VTE prophylaxis for this population should be further investigated.

Keywords Inflammatory bowel disease; Venous thromboembolism; Risk factors

Lower GI EE-LGI-037

Clinical Characteristics and Outcome of Iatrogenic Colonic Perforation related to Diagnostic versus Therapeutic Colonoscopy

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Background/Aims Iatrogenic colonic perforation (ICP) is a rare serious complication of colonoscopy, where standard treatment is controversial. This study aimed to characterize diagnostic ICP (DICP) compared to therapeutic ICP (TICP) and determine the possible indication of endoscopic repair.

Methods We studied patients with ICP over 7 years starting in 2011. Their demographics and data regarding perforation, treatment and outcome were investigated by retrospective review of medical records, and the diagnostic and therapeutic groups were compared.

Results Among 29,882 patients who underwent colonoscopy, ICP was identified in 28 (0.09%: diagnostic, 15/24,758, 0.06%; therapeutic, 13/5,124, 0.25%). A total of 56 patients (33 DICP and 23 TICP) including 28 referred cases were analyzed. Mean age was 62.3±11.4 years, and 24 were men. Perforations occurred mostly in the rectosigmoid region and half were detected during or immediately after colonoscopy. Endoscopic treatment was successful in 22 cases and 34 required surgery. Mortality occurred in four (7.1%). Compared to TICP, DICP was more prevalent in females (p=0.045) and rectosigmoid region (p=0.000) and more frequently detected immediately (p=0.000); DICP tended to occur in older patients (p=0.080), be larger (p=0.080) and have better chance of endoscopic repair (p=0.091).Regardless of type of ICP, female predominance (p=0.009), smaller size of perforation (p=0.001), more frequent immediate detection (p=0.000), and shorter hospital stay (p=0.007) were found in the endoscopic repair group compared to surgical group.

Conclusions DICP was more frequent in the rectosigmoid area in older women and could be detected immediately. Immediate detection and small perforation size could be important factors for endoscopic repair. Careful attention and gentle manipulation should be required.

Keywords Colonoscopy; Colonic perforation; Iatrogenic; Endoscopic treatment

Lower GI EE-LGI-038

Bowel Cleansing Impacts Normal Intestinal Microbiome; A Pilot Study

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Withdrawn

Background/Aims Bowel cleansing is an essential step for a successful colonoscopy. The use of laxatives, such as polyethylene glycol (PEG), is generally considered safe for preparing colonoscopy. However, the changes in intestinal microbiome eco-system during the preparation are not well know[illegible] recovery of intestinal bacterial flora according to bowel c[illegible].

Methods Total five patients [illegible]copy were enrolled. Patients were assigned to take 2 L of PE[illegible] method. The impact of bowel cleansing on intestinal microbiome was investigated by 16s-RNA analysis from stool samples. Changes in alpha, beta diversity and proportions of OTUs were studied (at day 0, day 1, after 1, 3 weeks).

Results The relative abundances of phyla did not change significantly after bowel preparation. Some OTUs (e.g., *Bacteroides ovatus*) were significantly changed on day 1 (first feces immediately after bowel prep) compared to baseline day 0 (regular feces). However, according to the Spearman correlation coefficient comparison, the gut microbial composition was not significantly different between day 0 and after 1 week.

Conclusions There was a temporary change in the intestinal microbiomial composition according to bowel cleansing. On the other hand, mucosal microbiomial environment was found to be swiftly normalized within 1 weeks.

Keywords Intestinal microbiome; Bowel cleansing; Polyethylene glycol

Lower GI EE-LGI-039

The Clinical Significance of Simple Endoscopic Scoring of Patients with Rectal Cancer after Concurrent Chemoradiotherapy

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Background/Aims Neoadjuvant concurrent chemoradiotherapy (CCRT) is an effective treatment option for patients with rectal cancer. In this study, we investigated the clinical efficacy of simple endoscopic scoring of patients with rectal cancer after CCRT.
Methods Between July 2008 and October 2015, medical records including endoscopic imaging from 41 patients with rectal cancer who received CCRT were retrospectively reviewed. Two expert gastroenterologists reviewed the endoscopic images and assigned scores from 0 to 3 according to post-CCRT findings. The scoring criteria were as follows: 0=scar without marginal elevation; 1=clean-based ulcer without marginal elevation; 2=clean-based ulcer with marginal elevation; 3=non-clean-based ulcer. We evaluated image scores to predict long-term outcomes using Kaplan-Meier curves and Cox regression models.
Results The median follow-up duration was 55 months (interquartile range, 35 to 76 months). Patients with a low score ($\leq$2) had a 17.2% recurrence rate, whereas patients with a high score (3) had a 50.0% recurrence rate. Patients with a low score had longer disease-free survival (DFS) than those with a high score in log-rank test (p=0.026). In multivariate Cox regression analysis, a high score was a significant predictor of poor DFS in patients with rectal cancer after CCRT treatment (hazard ratio, 4.89; 95% confidence interval, 1.11 to 21.50, p=0.036).
Conclusions This simple endoscopic scoring approach is helpful for predicting prognosis of patients with rectal cancer after treatment with CCRT.
Keywords Rectum; Neoplasm; Neoadjuvant; Chemoradiotherapy; Endoscopy

Lower GI EE-LGI-040

Long-term Efficacy of Endoscopic Balloon Dilatation for Colon Strictures after Surgical Intervention of Colonic Malignancy

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Background/Aims Postoperative strictures composited the most common cause of benign stricture after colorectal malignancy management. There is no long-term follow-up result of endoscopic balloon dilatation for stricture to our knowledge. We retrospectively reviewed our cases and analyzed follow-up result.
Methods The records of 37 patients with postoperative strictures (of less than 5 mm in diameter), with or without chemotherapy, from September 2009 to November 2016 were reviewed retrospectively. All patients underwent the standard endoscope-guided dilation procedure using a CRE wire-guided balloon dilator. Twenty-seven patients had diverting stoma closure after the successful dilation procedure.
Results The mean duration of postoperative follow-up was 38.3 months (range, 3 to 82 months). Twenty-two patients had one session of balloon dilation while other had 2 to 6 sessions, with an average of 1.9 sessions/person. There were five patients with recurrence within 38.3 months (range, 3 to 82 months) of follow-up (post last session of dilation). None of the patients experienced any post balloon dilation complications.
Conclusions Endoscope-guided balloon dilation using a multi-diameter balloon is a simple and safe method for managing anastomotic strictures. Although recurrence was still inevitable in some cases, balloon dilatation is yet effective in relapsed patients. All of the patient exempted from further surgical intervention for stricture.
Keywords Balloon; Dilatation; Colon; Cancer

Lower GI EE-LGI-041

Oral Sulfate Solution and Polyethylene Glycol with Ascorbic Acid in a Split Method for Bowel Preparation in Patients with Ulcerative Colitis: Preliminary Data

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Background/Aims Low-volume preparations are gaining attention for higher acceptability. Oral sulfate solution (OSS) for preparation may cause symptom flares in patients with ulcerative colitis (UC), little is known in this population. We compare the efficacy, safety, tolerability and acceptability of OSS and 2-L polyethylene glycol with ascorbic acid (PEG-Asc) in a split method for bowel preparation in patients with UC.
Methods This was a multicenter, randomized, and single-blind study. Adult outpatients with UC who had stable disease activity (n=110) were randomly allocated to OSS or 2-L PEG-Asc for undergoing colonoscopy. Bowel cleansing was assessed using the Boston Bowel Preparation Scale and rated as successful cleansing if the score was $\geq$6. Patient acceptance (ease of administration and willingness to repeat), compliance (amount of intake), and tolerability (newly developed symptoms such as nausea, bloating, and abdominal pain) were asked with 4-point ordinal scale. Disease activity (partial Mayo/Mayo score) and laboratory data before and after colonoscopy were also checked for safety issue.
Results After exclusions, 53 subjects in the OSS group and 53 subjects in the PEG-Asc group completed the study and were analyzed. There was no significant difference in successful cleansing: 96.2% in the OSS group versus 98.1% in the PEG-Asc group (p=0.5). The acceptance, compliance, and tolerability were not significantly different between two groups (all p>0.05). There was no significant change in serum electrolytes and disease activity in either group.
Conclusions OSS is effective at colonoscopy cleansing and has acceptable tolerability when it is compared with PEG-Asc. Also, OSS does not affect disease activity so that OSS could be used safe for bowel preparation in patients with UC.

Lower GI EE-LGI-042

Hepatitis B Virus Infection Is an Independent Risk Factor for Colorectal Neoplasia, but Hepatitis C Virus Infection Is Not

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Background/Aims Data about the association between hepatitis virus infection and colorectal neoplasia (CRN) are extremely limited. We examined the association between hepatitis B virus (HBV) or hepatitis C virus (HCV) infection and the risk of CRN.
Methods A cross-sectional study was performed on asymptomatic examinees who underwent colonoscopy and serologic testing for hepatitis B surface antigen (HBsAg) and hepatitis C antibody (HCV Ab) between2004 and 2015.
Results Of 155,674 participants who underwent serologic testing for HBsAg, 5,476 (3.5%) were positive for HBsAg. The mean age of the study participants was 41.1$\pm$9.1 years. The prevalence of CRN was higher in the HBsAg(+) than in HBsAg(**–**) participants (16.9% vs 15.6%, p=0.009). Even after adjusting for confounders, HBsAg positivity was associated with an increased risk of CRN (odds ratio [OR], 1.09; 95% confidence interval [CI], 1.01 to 1.19; p=0.033). Of 155,180 participants who underwent serologic testing for HCV Ab, 240 (0.15%) were positive for HCV Ab. The prevalence of CRN was higher in HCV Ab(+) than in HCV Ab(**–**) participants (22.9% vs 15.6%, p=0.002). However, the association disappeared after adjusting for confounders (OR, 1.04; 95% CI, 0.72 to 1.49; p=0.852). Both HBsAg positivity and HCV Ab positivity were not associated with the risk of advanced adenoma and colorectal cancer.
Conclusions HBV infection was independently associated with an increased risk of CRN, but HCV infection was not. Our results indicate the possibility that HBV infection may contribute to colorectal carcinogenesis.
Keywords Colorectal neoplasia; Hepatitis B; Hepatitis C

Lower GI EE-LGI-043

Factors Associated with Bowel Resection in Pediatric Crohn's Disease Patients Treated with Biologics

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Background/Aims We aimed to investigate factors associated with bowel resection among pediatric Crohn's disease (CD) patients treated with biologics.
Methods This study was a retrospective study conducted at two centers in Korea between 2005 and 2019. Included patients were those diagnosed with luminal CD at <19 years old, had been treated with biologics, and had been followed for more than 2 years. Factors associated with bowel resection was analyzed by Cox proportional hazard regression analysis.
Results A total of 110 patients were included in this study. Surgery after starting biologics was observed in nine patients (8.2%) during a median follow-up period of 8.3 years (interquartile range, 5.4 to 9.9 years). Comparison between patients who had undergone bowel resection and those who had not revealed a significantly higher proportion of patients who had a history of bowel resection before starting biologics (33.3% vs 5%, p=0.018), and perianal surgery after starting biologics (55.6% vs 12.9%, p=0.006), respectively. Clinical remission (CR) and biochemical remission (BR) rates at 1-year were significantly lower in patients who had undergone bowel resection after starting biologics compared to those who had not (CR: 66.7% vs 93.1%, p=0.034; BR: 55.6% vs 88.1%, p=0.025; respectively). However, according to multivariable Cox proportional hazard regression analysis, history of bowel resection before starting biologics and perianal surgery after starting biologics were the only factors significantly associated with bowel resection after starting biologics (hazard ratio [H], 14.133; 95% confidence interval [CI], 2.691 to 74.227, p=0.002; HR, 12.767; 95% CI, 2.673 to 60.980, p=0.001; respectively).
Conclusions A history of bowel resection and perianal surgery after biologic treatment were significantly associated with bowel resection after biologic treatment. Efforts to control these factors may further reduce intestinal surgery rates in the treat-to-target era.
Keywords Crohn disease; bowel resection; Biologics; Perianal Surgery

Lower GI EE-LGI-044

Self-Expandable Metal Stent Placement in Orthotopic Patient-Derived Xenograft Colon Cancer Mouse Model

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Background/Aims To develop an endoscopic colon cancer mouse model using patient-derived xenograft (PDX), and to evaluate the safety of self-expandable metal stent (SEMS) placement.
Methods Thirty male nude mice at 8 weeks of age were used in our study. Micro endoscopy was used to inject the human colon cancer cell line, HCT 116 (5×106). Saline was initially injected to elevate the colonic mucosa making a small bleb, to prevent spillage of cancer cells outside the colon wall, followed by injection of the cancer cells (50 μL) inside the bleb. All mice were followed up by endoscopic examination and *in vivo* imaging systems weekly to check for tumor development. When the tumor occupied more than 50% of the colon lumen, a SEMS (4 mm in diameter, 8 mm in length) was inserted inside the colon overlying the tumor under fluoroscopic guidance. The location of the SEMS was then confirmed by endoscopic examination. The mice were followed up weekly using endoscopy and fluoroscopy until sacrifice 2 weeks after SEMS placement.
Results The tumor developed in 25 of the 30 (83.3%) mice 2 weeks after injection. The SEMSs were successfully placed in the 25 mice (technical success, 100%) with no immediate complications. Five mice died from micro-perforation 3 to 6 (mean, 4) days after the SEMS placement. The remaining 20 mice survived with no complications until the time of sacrifice 2 weeks after injection.
Conclusions Micro endoscopy is safe and effective for the development of an orthotopic PDX colon cancer mouse model with precise localization of the tumor site. SEMS placement is relatively easy and safe.
Keywords Colon cancer; Patient-derived xenograft animal model; Micro endoscopy

Lower GI EE-LGI-045

Incidence of Deep Vein Thrombosis in Post Elective Colorectal Cancer Surgery Patients in Hospital Kuala Lumpur

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Background/Aims Overall incidence rate of colorectal cancer is 21.3 cases per 100,000 population/year and deep vein thrombosis (DVT) affects 100 per 100,000 population/year. Abdominal and pelvic malignancy surgery with prolonged immobilization after surgery further increase the risk of DVT. Hence, colorectal cancer patients are at moderate risk for DVT. DVT prophylaxis is proven to reduce the risk for DVT. In modern practice, patients are encouraged to mobilize early and in return, shorter hospital stay. This study was designed to evaluate the incidence of DVT in patients with shorter duration of DVT prophylaxis and hospital stay.
Methods A prospective, cohort, single center, non-randomized study was conducted. All patients listed for elective colorectal cancer surgery in Hospital Kuala Lumpur recruited from June 1, 2018 to May 31, 2019. All patients received mechanical and pharmacological DVT prophylaxis. Ultrasound venous doppler of lower limbs were done before and after surgery.
Results Fifty-seven patients recruited into the study with one patient excluded. One patient (1.8%) was diagnosed with symptomatic unilateral lower limb proximal DVT. No patient was diagnosed with asymptomatic lower limb DVT.
Conclusions Current local practice of DVT prophylaxis was found to be efficient in reducing the risk of DVT in early period for this group of patients. Asian population is generally at lower risk for DVT. Sub-analysis showed short staying patients with short duration of DVT prophylaxis are at low risk of developing DVT. This could be explained by good pain control, early mobilization, early return to pre-operative status and compliance to DVT stockings.
Keywords Deep vein thrombosis; Colorectal; Cancer; Venous; Thrombosis

Table 1. Study Outcome

N = 57		Post Operative DVT	
		Symptomatic	Asymptomatic
Duration of DVT prophylaxis (days) n. (%)			
≤7	42 (73.7%)	-	-
>7	15 (26.3%)	1 (6.67%)	-
Median (days) ± SD	7 ± 3.2		
Range	2-24		
Duration of bed rest (days) n. (%)			
≤ 3 days	35 (61.4%)	-	-
> 3 days	22 (38.6%)	1 (4.5%)	-
Median (days) ± SD	3 ± 4.85		
Range	1-29		
Duration of hospital stay (days) n. (%)			
≤8	39 (68.42%)	-	-
>8	18 (31.58%)	1 (5.56%)	-
Median (days) ± SD	8 ± 5.29		
Range	4-26		
Complications			
Bleeding n. (%)	-		
SSI n. (%)	11 (19.3%)		
Anastomotic leak n. (%)	1 (1.8%)		
Organ failure n. (%)	1 (1.8%)		
HAI n. (%)	1 (1.8%)		
Non-viable flap	1 (1.8%)		

Lower GI EE-LGI-046

Association between Use of Antibiotics and Progression of Colorectal Cancer

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Background/Aims Gut microbiota has been significantly associated with colorectal cancer (CRC) formation, and colonic dysbiosis was previously reported in CRC tissue. Our aim was to evaluate the association between use of antibiotics and progression of CRC.
Methods Between January 2015 and December 2018, patients who had been diagnosed with metastatic CRC and treated with chemotherapy for at least 8 weeks at the Severance Hospital were enrolled for the study, retrospectively. Progression of CRC was diagnosed by computed tomography.
Results There were total 1,249 patients who were diagnosed with metastatic CRC at severance hospital. Among them, 481 patients who were diagnosed with metastatic CRC first time were recruited. Of these, 346 patients (71.9%) used antibiotics. There were no statistically significant differences in age, sex, prevalence of hypertension and diabetes, and primary lesion of CRC (right-sided or left-sided) according to use of antibiotics (all p>0.05). Association between use of antibiotics and progression of CRC was not statistically significant (p=0.924). However, association between use of antibiotics and progression of CRC was statistically significant according to primary lesion of CRC (p=0.007).
Conclusions There was no significant association between use of antibiotics and progression of CRC. Further studies through long-term observation are needed.
Keywords Antibiotics; Colorectal cancer; Gut microbiota

Lower GI EE-LGI-047

Treatment of Refractory or Recurrent *Clostridium difficile* Infection with Fecal Microbiota Transplantation

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Background/Aims *Clostridium difficile* infection (CDI) has recently become a major clinical concern. Failure with conventional treatment and recurrence following initial treatment are gradually increasing. CDI recurrence is of particular concern because the recurrence rate further increases thereafter and the treatment options are limited. Fecal microbiota transplantation (FMT) is a promising treatment option. The aim of this study was to evaluate the effectiveness and adverse event of FMT for recurrent or refractory CDI.
Methods A total of 24 patients that received FMT for recurrent or refractory CDI from July 2017 to June 2019 were retrospectively reviewed. The primary outcome was the success rate of CDI treatment. The secondary outcomes were the recurrence rate of CDI within 8 weeks after FMT treatment and treatment-related adverse events. Outcomes were analyzed by reviewing patient medical records.
Results When 24 patients with recurrent or refractory CDI were treated with FMT, the success rate of treatment was 70.8% (17/24). The recurrence rate of CDI within 8 weeks after FMT treatment was 29.2% (7/24). Treatment-related adverse events were not observed in 91.7% (22/24) of the patients.
Conclusions FMT is a safe and effective treatment option in recurrent or refractory CDI.
Keywords Refractory or recurrent *Clostridium difficile* infection; Fecal microbiota transplantation

Lower GI EE-LGI-048

Predictors of Colorectal Anastomotic Leakage in a 5-Year Review of Cases in a Tertiary Hospital

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Background/Aims Anastomotic leak is still one of the most devastating complications following any colorectal surgery. It increases morbidity, mortality and doubles the length of hospital stay. This study aims to determine the important predictors of anastomotic leakage after surgery.
Methods This is a cross sectional study of all inpatient surgical chart with a diagnosis of anastomotic leak that underwent colorectal surgery within a 5-year period. The association of preoperative and postoperative characteristics in the occurrence of anastomotic leak were identified.
Results Ninety-six patients were included. On logistic regression analysis of preoperative characteristics shown in Table 1, only weight loss and low serum albumin are statistically significant. Among postoperative predictors, the presence of a diverting stoma statistically prevented postoperative leakage.
Conclusions Weight loss and low serum albumin (<3 mg/dL) are significantly associated with anastomotic leakage. Thus, preoperative correction of significant weight loss and hypoalbuminemia is clinically warranted. Intraoperatively, placement of a diverting stoma may also avoid anastomotic leakage.
Keywords Anastomotic leak; Weight loss; Serum albumin; Diverting stoma

Table 1. Preoperative Predictors

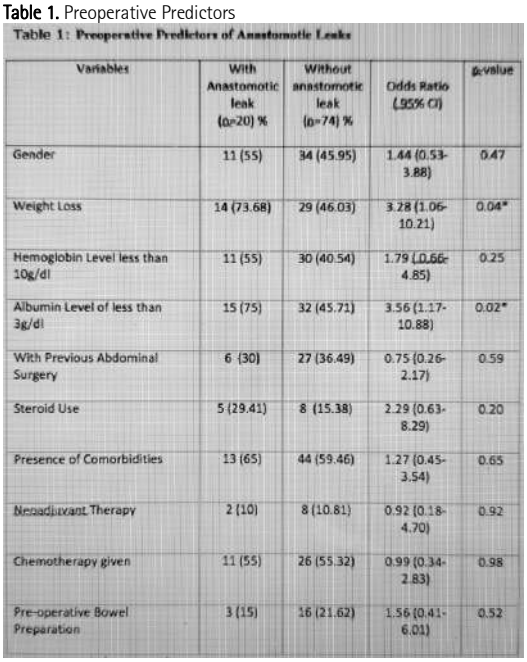

Table 1: Preoperative Predictors of Anastomotic Leaks

Variables	With Anastomotic leak (n=20) %	Without anastomotic leak (n=74) %	Odds Ratio (95% CI)	p-value
Gender	11 (55)	34 (45.95)	1.44 (0.53-3.88)	0.47
Weight Loss	14 (73.68)	29 (46.03)	3.28 (1.06-10.21)	0.04*
Hemoglobin Level less than 10g/dl	11 (55)	30 (40.54)	1.79 (0.66-4.85)	0.25
Albumin Level of less than 3g/dl	15 (75)	32 (45.71)	3.56 (1.17-10.88)	0.02*
With Previous Abdominal Surgery	6 (30)	27 (36.49)	0.75 (0.26-2.17)	0.59
Steroid Use	5 (29.41)	8 (15.38)	2.29 (0.63-8.29)	0.20
Presence of Comorbidities	13 (65)	44 (59.46)	1.27 (0.45-3.54)	0.65
Neoadjuvant Therapy	2 (10)	8 (10.81)	0.92 (0.18-4.70)	0.92
Chemotherapy given	11 (55)	26 (55.32)	0.99 (0.34-2.83)	0.98
Pre-operative Bowel Preparation	3 (15)	16 (21.62)	1.56 (0.41-6.01)	0.52

Lower GI EE-LGI-049

The Analysis about the Changes of Gut Microbiome after 8-Week Administration of Proton Pump Inhibitor

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Background/Aims Although the long-term administration of proton pump inhibitors (PPIs) has been proven to induce the changes of gut microbiota, study about the short-term effect of PPIs is lacking. We aimed to verify the influence of 8 weeks of PPI treatment on the gut microbiome.
Methods Patients who were given 8 weeks of Ilaprazole (20 mg, once daily PO) in the treatment of gastroesophageal reflux diseases were prospectively enrolled in our study. Enrolled subjects were educated to avoid changes in eating habits and other medications. The fecal samples were collected for microbiome analysis before and right after PPI administration. The microbial 16S rDNA of the fecal sample was collected, amplified and analyzed by the polymerase chain reaction method and sequenced using the Illumina MiSeq® System. Microbial information was obtained using the NCBI 16S database and we analyzed the variety of species and the variation of the microbiota.
Results Nine patients were finally analyzed in our study. There was no significant change in species diversity when compared before and after PPI administration. The results of classifying gut microbiota in the colony as genus showed increases in *Streptococcus*, *Agathobaculum*, and *Murimonas*. As for species, eight species were significantly increased (such as *Streptococcus*), and one species, *Sutterella wadsworthensis* was decreased after PPI administration. When gut microbiota was classified as genus and species, 12 genus and 28 species showed statistical differences in their composition fraction.
Conclusions The short-term (8 weeks) administration of Ilaprazole were found to affect the abundance and composition ratio of gut microbiome at the level of a strain, although there was no significant change in the cluster diversity of gut microbiome.
Keywords Proton pump inhibitor; Ilaprazole; Gut microbiota; 16s rDNA

Lower GI EE-LGI-050

The Effect of Endoscopist's Experience and Withdrawal Time on Adenoma Detection Rate

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Background/Aims Adenoma detection rate (ADR) is an important factor in assessing the quality of colonoscopy, which is known to be closely related to the withdrawal time. We retrospectively investigated whether the experience of the endoscopist and withdrawal time affected the ADR.
Methods During 12-month period, three gastroenterologists performed 1,670 colonoscopies. One was a professor with 15 years of experience, another was a fellow with 1-year career, and the other was a fellow who first started endoscopy. We compared the withdrawal time and ADR in three gastroenterologists. The withdrawal time was calculated by the time difference between the first picture of cecum and the last picture on PACS in patients who did not undergo biopsy or polypectomy. The ADR was investigated in the pathological result of the patient who undergo biopsy or polypectomy.
Results A professor with 15 years of experience performed 825 colonoscopies, with average withdrawal time of 6 minutes 57 seconds and ADR of 33.7%. A fellow with 1-year career performed 512 colonoscopies, with average withdrawal time of 9 minutes and 36 seconds and ADR of 27.5%. A fellow who first started endoscopy performed 333 colonoscopies, with average withdrawal time of 12 minutes and a second, and ADR of 24.6%. As an endoscopist had more experience, he showed shorter withdrawal time (416.86 seconds vs 575.86 seconds vs 721.18 seconds, p<0.001). However, despite the short withdrawal time, the more experience an endoscopist had, the higher the ADR was (33.7% vs 27.5% vs 24.6%, p=0.003).
Conclusions We can conclude that the ADR of the experienced endoscopists tended to be high despite their short withdrawal time. On the other hand, in the case of beginner, even though he showed relatively lower rate of adenoma detection than the experienced ones, he was able to reach the appropriate ADR by observing colon for longer period of time.
Keywords Colonoscopy; Adenoma detection rate; Withdrawal time

Lower GI EE-LGI-051

Effect of Gamma-Glutamyltransferase Level and Diabetic Status on Incidence of Digestive Cancer: A Nationwide Population-Based Study

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Background/Aims Elevated serum gamma-glutamyltransferase (GGT) is associated with the incidence of digestive cancer. However, it is not clear whether the relationship between GGT and digestive cancer will be constant in accordance with diabetic status. Therefore, the aim of this study was to assess the association of GGT with digestive cancer stratified by diabetic status.
Methods A total of 8,120,665 persons who received general medical check-up from January 2009 to December 2009 by the National Health Insurance Service were included. Subjects were classified according to quartile of GGT level (male: <21, 21–29, 30–47, and ≥48 IU/L; female: <13, 13–15, 16–22, and ≥23 IU/L) and incidence rates of esophageal, stomach, and colon cancer were analyzed for each group using Cox proportional hazards models. Stratified analyses were conducted by diabetic status (normal, prediabetes, and diabetes).
Results During the 8-year follow-up, 129,853 cases of digestive cancer newly occurred. The highest GGT quartile group had an increased risk of digestive cancer compared to the lowest (esophagus: hazard ratio [HR], 2.408; 95% confidence interval [CI], 2.184 to 2.654; stomach: HR, 1.121; 95% CI, 1.093 to 1.149; colon: HR, 1.185; 95% CI, 1.158 to 1.211). When analyzed stratified by diabetic status, effect of GGT was predominant regarding the risk of esophageal cancer. However, the syngenetic effect with GGT and diabetes were identified in the incidence of stomach and colon cancer (stomach: HR, 1.283; 95% CI, 1.237 to 1.331; colon: HR, 1.342; 95% CI, 1.299 to 1.386, the highest GGT quartile in diabetes). In addition, groups with higher GGT in prediabetes showed higher risk of colon cancer compared to groups with lower GGT in diabetes.
Conclusions Higher GGT was closely linked to the incidence of digestive cancer. The effect of GGT on the incidence of digestive cancer varies on type of cancer and diabetic status.
Keywords Gamma-glutamyltransferase; Diabetes; Gastrointestinal neoplasm; Cohort studies

Lower GI EE-LGI-052

Effect of Bowel Preparation on Bowel Cleanliness and Physiological Indexes according to Gender, Age, Diabetes, and Constipation

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Background/Aims A number of many factors are recognized to affect the quality of bowel preparation quality, including sex, comorbidities, age, gender, comorbidities, and socio-economic status, but the exact impact of some factors such as less-studied factors such as constipation and diabetes mellitus and constipation remains to be defined examined. This aim of the study is to explore the changes in intestinal cleanliness, blood glucose, electrolytes, and blood pressure according to patient characteristics after bowel preparation using standard oral compound polyethylene glycol electrolyte powder (PEG-ELP).
Methods This was a prospective cohort study of patients who underwent had to undergo colonoscopy at the Air Force Medical University Affiliated Tangdu Hospital, from June to December 2015. Bowel preparation was carried out with PEG-ELP was used for bowel preparation on the morning of the examination. Blood glucose, blood electrolytes, and blood pressure were measured before/after preparation. Bowel preparation was scored using the Ottawa bowel preparation scoring system.
Results Bowel cleanliness of patients with constipation was poorer than in those without (p=0.019). There were significant changes in blood glucose and sodium levels after preparation with PEG-EPL in patients >66 years of age (both p<0.05). There were no differences in bowel cleanliness and biochemical indicators when analyzing the results according to gender and history of diabetes (all p>0.05).
Conclusions The effects of bowel preparation with PEG-EPL varies according to age and history of constipation. Novel strategies could be necessary to improve bowel cleanliness preparation in patients with suffering from constipation. For elderly patients, PEG-EPL should be taken under supervision and the changes in blood glucose and electrolytes should be monitored.
Keywords Colonoscopy; Bowel preparation solutions; Blood glucose; Blood pressure; Blood electrolytes

Lower GI EE-LGI-053

Crystal Crater Sevelamer-Induced Rectal Ulcer: A Rare Cause of Lower Gastrointestinal Bleeding from a Common Medication

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Background/Aims Sevelamer carbonate is a widely available and used medication for the treatment of hyperphosphatemia in patients with chronic kidney disease. Gastrointestinal side effects are common, however, there are only two published case reports of sevelamer causing lower gastrointestinal bleeding.
Results A 35-year-old male with end-stage renal disease secondary to IgA nephropathy presented with bright red stools. On the day of admission, while undergoing maintenance hemodialysis, patient had sudden onset passage of bright red stools, 11 episodes approximately 100–150 mL per episode with slight rectal pain. Initial laboratory examinations showed a low hemoglobin at 8.4 g/dL from a baseline of 9.1 g/dL, which went further down to 6 g/dL, normal prothrombin and partial thromboplastin time. Colonoscopy showed edematous rectal mucosa with intervening normal pinkish mucosa approximately 3 to 4 cm from the anal verge with ulcerations and whitish exudates, with the largest measuring 5 cm. Endoscopic biopsies of the rectal ulcers showed fragments of colonic mucosa with severe active inflammation, dense fibrinopurulent exudate, granulation tissue, and few yellow brown, crystalline materials, which are morphologically consistent with sevelamer crystals. Sevelamer was discontinued, patient was sent home with Mesalazine (Salofalk) enema 2 g per rectum once daily at bedtime for 1 week. As of the time of this case report, approximately 6 months after, hematochezia has not yet recurred.
Conclusions Though sevelamer induced rectal ulcers causing gastrointestinal bleeding are rare, attending nephrologists, gastroenterologists and pathologist should be aware of the possibility of the drug's effects as well as the typical morphological features on biopsy to establish the diagnosis-which would lead to prompt recognition and discontinuation of the offending drug.
Keywords Gastrointestinal bleeding; Sevelamer; Drug-induced; Rectal ulcer; Pathology

Lower GI EE-LGI-054

Effects of Ursodeoxycholic Acid on Metabolic Profile in Obese Animal Model

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Background/Aims Microorganisms in the body affect metabolism, and the representative one is the intestinal microbiota. Ley et al. suggested that obesity is associated with changes in the intestinal microbiota. Bile acids are known to act on the growth and inhibition of intestinal microorganisms. Therefore, the administration of ursodeoxycholic acid (UDCA) is expected to change the microbial environment in the intestine. This study aims to investigate the metabolic indices in the animal model when UDCA is administered.
Methods The first study was conducted for 8 weeks by comparing three groups: control, high fat diet (HFD) and HFD+UDCA. The second study compared the two groups of HFD and HFD+UDCA for 5 weeks to confirm reproducibility, and as another control, synthetic bile acid (obeticholic acid) was added.
Results Compared to the control group, the weight gain rate of the HFD group was significantly increased, but the increase was slowed in the group receiving the UDCA (Fig. 1). There was no statistically significant difference in blood glucose in the UDCA group, but significantly decreased in the obeticholic acid group. HOMA-IR also decreased in the UDCA group, but more significantly in the obeticholic group.
Conclusions The high fat diet speeds up the rat's weight gain. Concurrent administration of UDCA in high fat diet slows weight gain. Concurrent administration of UDCA does not have a positive effect on blood glucose but reduces insulin resistance. Weight gain due to high fat diet may be slowed down by bile acids, which may have the effect of suppressing obesity.
Keywords Ursodeoxycholic acid; Obesity; Microbiota; Bile acid

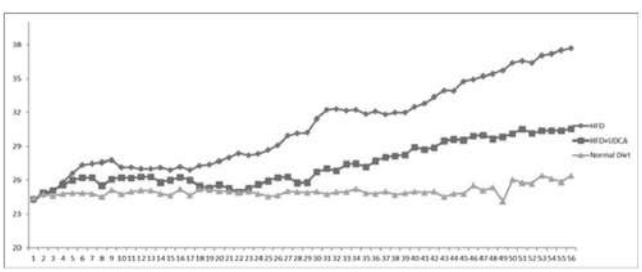

Fig. 1. Weight change by week.
HFD, high fat diet; UDCA, ursodeoxycholic acid.

Lower GI EE-LGI-055

Efficacy and Safety of New Lactobacilli Probiotics for Unconstipated Irritable Bowel Syndrome: A Randomized, Double-Blind, Placebo-Controlled Trial

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Background/Aims Irritable bowel syndrome (IBS) is a common and chronic gastrointestinal disorder. Probiotics may benefit IBS symptoms, however, results of trials are conflicting. This study aimed to investigate whether these novel probiotics could provide improve abdominal symptoms in patients with unconstipated IBS.
Methods Fifty Vietnamese patients with unconstipated IBS were randomly assigned to either the probiotics or placebo groups. During the intervention, participants took the probiotic supplement named Lactobacillus, or placebo capsule once a day. Patients weekly recorded their subject global assessment (SGA) and assessed with the visual analogue scale (VAS) during the 4-week study period. Patients with SGA score of 2 points or more or a decrease of more than 30% in VAS score were considered responders. Patients who weekly responded for more than 2 of the 4 weeks were considered overall responders.
Results There was no significant difference in demographic characteristics between the groups. Overall responder rates of improvement of global IBS symptoms assessed by SGA score were significantly higher in the probiotics group (80.8%) than in the placebo group (45.8%) (p=0.009). The overall responder rates assessed by VAS score were also higher in the probiotics group (69.2% vs 41.7%, p=0.048). There were no adverse events in either group during the study period.
Conclusions Our findings suggest that the new combination of Lactobacilli appears to be promising in the relief of abdominal symptoms in Vietnamese patients with unconstipated IBS.
Keywords Irritable bowel syndrome; Probiotics; Lactobacillus

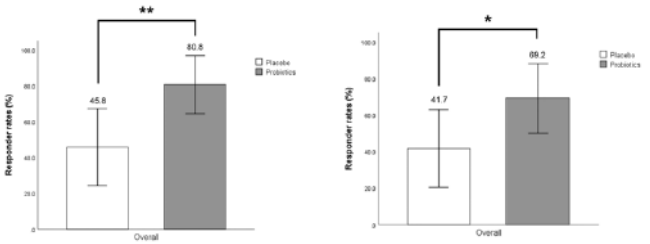

Fig. 1. Overall responder.

Lower GI EE-LGI-056

Primary Aortosigmoid Fistula: A Rare Cause of Obscure Overt Gastrointestinal Bleeding

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Background/Aims The etiology of obscure overt gastrointestinal (GI) bleeding can be very difficult to diagnose especially if the cause is very rare. One of this is primary aortosigmoid fistula which is a connection from the abdominal aorta to any part of the sigmoid colon. Its incidence is fewer than 1%. Endoscopy and radiologic procedures can be used to diagnose this rare case. We report a 76-year-old Filipino male who was diagnosed to have aortosigmoid fistula.
Methods A 76-year-old Filipino male was referred to Chinese General Hospital because of 2 months history of intermittent hematochezia. EGD and colonoscopy showed insignificant findings. On physical examination, there was a pulsating mass at the hypogastric area. Patient was referred for enteroscopy.
Results Based on the clinical presentation, enteroscopy was deferred. Mesenteric computed tomography (CT) angiography revealed a saccular infrarenal abdominal aortic aneurysm and paraaortic complex mass lesion suggestive of dissection. Patient underwent open surgical repair. Intraoperatively, infrarenal saccular aneurysm and aortosigmoid fistula were seen. Bilateral aneurysmectomy was done. Patient had no recurrence of GI bleeding since then and was stable.
Conclusions Patients who have obscure overt GI bleeding should be screened for other potential causes. Enteroscopy is not always the choice to diagnose these cases. Radiologic studies can help like in the case, mesenteric CT angiography aided in the diagnosis without the need for enteroscopy. In the background of abdominal aortic aneurysm and GI bleeding, primary aortosigmoid fistula should be considered. Prompt diagnosis can lead to prompt management which can increase patient's survival.
Keywords Case report; Primary aortosigmoid fistula; Abdominal aortic aneurysm; Obscure overt GI bleeding

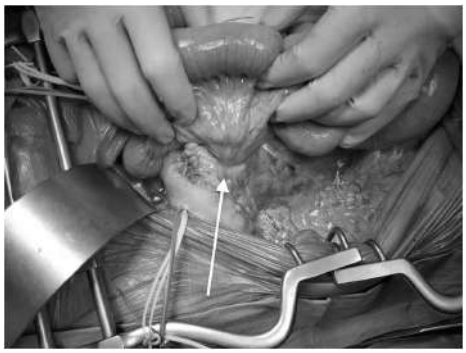

Fig. 1. Aortosigmoid fistula.

Lower GI EE-LGI-057

Small Bowel Necrosis Associated with Catastrophic Antiphospholipid Syndrome: A Case Report

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Background/Aims Antiphospholipid syndrome (APS) is a systemic disease characterized by the development of thromboembolic complications and/or abortion, and with increase in the titers of antiphospholipid antibodies persistently. The catastrophic APS (CAPS) is a very fetal condition characterized by widespread thromboembolism following a triggering factor (e.g., infection, trauma, neoplasia, and obstetric) in antiphospholipid antibody positive patients. The survival rate of CAPS is known to reach about 50%.
Results We report the case of a 29-year-old man who had no underlying disease and presented with new-onset, abdominal pain and diarrhea. A contrast-enhanced computed tomography (CT) scan showed focal colitis of ascending colon. Despite the use of proper antibiotics and analgesics, abdominal pain and fever did not improve and the patient's condition rapidly deteriorated. Extensive thromboembolism and whole jejunal necrosis were found in the follow-up CT scan, for which an emergency laparotomy: Jejunal excision and duodeno-ileostomy was performed. Histopathologic examination of resected tissues revealed multiple ischemic necrosis and inflammation. Laboratory tests for serum antiphospholipid (anticardiolipin IgM) and lupus anticoagulant antibodies were positive. Using Low-molecular-weight heparin (LMWH) and Intravenous Immunoglobulin, the patient's condition improved gradually, and he was discharged 15 days of hospitalization after replacing LMWH as a non-vitamin K antagonist oral anticoagulant.
Conclusions This case emphasizes the need for short-term follow-up imaging when the clinical course of the patients with gastrointestinal infection has progressed despite adequate treatment. And we highlight that catastrophic APS should be suspected in patients with unexplained ischemic bowel and intestinal necrosis that appears following infection and proper treatment should be given immediately to improve survival.
Keywords Antiphospholipid syndrome; Catastrophic antiphospholipid syndrome; Small bowel necrosis; Jejunectomy

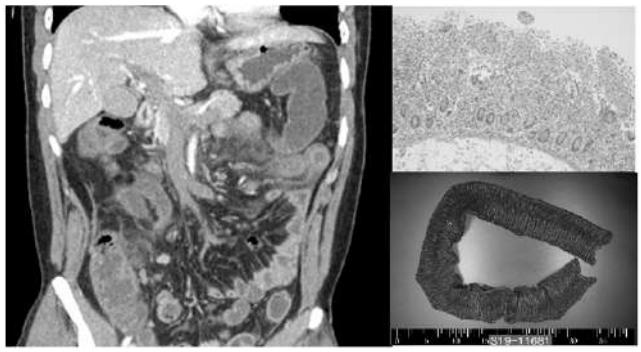

Fig. 1. Catastrophic antiphospholipid syndrome.

Lower GI EE-LGI-059

Endoscopic Predictors of Deep Submucosa Invasion in Pedunculated T1 Colorectal Cancer

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Background/Aims The depth of tumor invasion is an important factor in the management of T1 colorectal cancer (CRC). To date, many reports have been suggested about endoscopic features predicting deep submucosa invasion (SMI). However, most of them were restricted to non-pedunculated CRC. Pedunculated polyps are considered difficult to evaluate invasion depth due to its polypoid morphologic trait. Therefore, this study aimed to determine the endoscopic predictors of deep SMI in pedunculated T1 CRC.
Methods We performed a retrospective study from January 2012 through June 2019 in a tertiary referral center. A total of 149 pedunculated T1 CRCs treated by endoscopic resection or surgery were eligible. We divided them into a superficial SMI group (n=121) and a deep SMI group (n=28) according to the depth of SMI (less or more than 3000 μm, respectively) We included endoscopic size, mucosal depression, chicken-skin mucosa (CSM) and a large nodule (≥10 mm) as the features of predicting deep SMI.
Results Endoscopic size was statistically different between the superficial SMI group and deep SMI group (16.40±4.42 mm vs 18.63±4.52 mm, p=0.018). In addition, CSM (40% vs 64.3%, p=0.020) and a large nodule (1.7% vs 10.7%, p=0.016) were both statistically significant predictors for deep SMI. Multivariate analysis determined that the only risk factor for deep SMI was CSM (OR, 3.25; 95% CI, 1.29-8.13; p=0.012) (Table 1).
Conclusions The presence of CSM was associated with an increased risk of deep SMI. Other features such as endoscopic size and a large nodule of polyps could also help to predict the deep SMI and identify candidates for endoscopic resection or surgery.
Keywords Endoscopy; Colonoscopy; Polyps; Colon cancer; Rectal cancer

Table 1. The Risk factors of deep Submucosa Invasion in Pedunculated T1 Colorectal Canter

	OR(95% CI)	*p* value
Endoscopic size	1.09 (0.99-1.19)	0.076
Depression	1.24 (0.49-3.13)	0.652
CSM	3.25 (1.29-8.13)	0.012
Large nodule (≥10 mm)	8.26 (0.65-40.00)	0.121

OR, odds ratio; CI, confidence interval

CSM, chicken-skin mucosa

Lower GI EE-LGI-060

Fecal Microbiota Transplant for Refractory Pseudomembranous Colitis

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Background/Aims Pseudomembranous colitis (PMC) refers to inflammation of the large intestine due to overgrowth of *Clostridium difficile* bacteria, mainly caused by the use of antibiotics. Recurrence rate of 15% to 30% despite standard treatment of oral vancomycin or metronidazole. There has been growing interest in the use of fecal microbiota for refractory PMC.
Methods In 5 years, we had approximately 300 PMC patients at Bucheon Saint Mary's Hospital. Six patients were refractory to standard treatment of either oral vancomycin or metronidazole. Administered fecal solution (200 mL) from a donor into intestinal tract of a recipient. Primary end point was clinical resolution (including improvement in diarrhea and endoscopic finding) and negative conversion of CDT.
Results All six patients had history of previous antibiotics usage and symptoms of PMC, which refers to watery diarrhea (more than 3 loose stools in 24 hours) and with positive CDT. Endoscopic features of PMC showed whitish plaques over edematous colonic mucosa with friability. Laboratory tests revealed five out six patients had WBC count of more than 15,000 mm^3 and one patient had ileus and shock as a manifestation (1 non-severe, 4 severe and 1 fulminant PMC). All patients received standard treatment for a week or 2 weeks. With no improvement, all six patients underwent FMT with cessation of antibiotic therapy. There were clinical resolution and improvement in endoscopic findings in five patients with negative conversion of CDT. Also, great falls in WBC and CRP levels, supposing improvement in inflammation. One patient with fulminant PMC ended up with dead (due to heart failure). Five patients showed improvement in endoscopy and were symptom free in outpatient follow-up after 12 weeks.
Conclusions Several successful treatments of FMT cases has been reported. Only a short number of patients, but still FMC has shown promising results of treating refractory PMC with cure rate of 83% in our clinic.

Lower GI EE-LGI-061

The Endoscopic Findings of the Upper Gastrointestinal Tract in Patients with Ulcerative Colitis and Its Correlation with Disease Extent and Upper Gastrointestinal Symptoms

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Background/Aims Ulcerative colitis (UC) is a chronic idiopathic inflammatory disease of the gastrointestinal (GI) tract that affects the mucosal lining of the colon. Currently most of the evaluation is done by lower GI endoscopy, so the role of upper GI endoscopy is limited. We attempted to determine if UC actually affects the upper GI mucosa and to determine its correlation with the extent of colon involvement or upper symptoms.
Methods We performed retrospective cohort study of 240 patients with UC who had at least one upper endoscopy after diagnosis from January 2010 to August 2019. We reviewed all upper endoscopic images and checked clinically significant lesions including aphtha, multiple erosions, ulcers. The patients with those findings were then classified according to the extent of colorectal involvement and upper GI symptoms.
Results Of 240 patients with UC, 33 (13.7%) showed clinically significant upper GI lesions. Among them ulcers were found in 20 patients (60.6%), aphtha in three patients (9.1%), duodenitis in two patients (6%), multiple erosions in eight patients (24.2%). In terms of symptoms, the positive rate of upper GI endoscopy in symptomatic patients (20.5%) was higher than that of asymptomatic (10.5%). There was no significant difference in the positive rate according to the extent of colon involvement, but the positive rate (38%) was significant higher in patients with pancolitis with upper symptoms.
Conclusions Various lesions (aphtha, multiple erosions, ulcers, and duodenitis) are detected in upper GI endoscopy about 13.7% of all UC patients. Compared to Crohn's disease (30% to 75%) the percentage is much less, but cannot be ignored. Furthermore, patients with upper GI symptoms have higher positive rate. However, extent of colon invasion was not correlated with the findings. But upper GI endoscopy should be performed in case of symptomatic patients with pancolitis.
Keywords Ulcerative colitis; Upper gastrointestinal tract; Endoscopy; Ulcer; Symptom

Lower GI EE-LGI-062

The Effect of Serosa on Active Smooth Muscle Contraction in Small Intestine

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Background/Aims The gastrointestinal tract is covered by the serosa, a layer of epithelial cells. The serosa supports and binds each the gastrointestinal tract. However, the biomechanical roles of serosa on the active contraction of intestinal smooth muscles are not studied. In this study, biomechanical effects of the porcine intestinal serosa on the active contraction are investigated.
Methods Five of experimental pigs (3 to 4 months) was sacrificed by the stomach surgery in a living state to obtain the specimens (width: 10 mm, length: 10 mm, and thickness: 3 mm) from small intestine. The isometric muscle contraction experiments were performed for the cases with (n=25) and without (n=25) the serosa (thickness of 0.2 to 0.5 mm) for five pigs using a muscle contraction inducer (acetylcholine: 1 mM) as described. The contractile forces of the specimens were measured in the transverse direction of the intestine.
Results The muscle contractile force was decreased after reaching the maximum muscle contractile force. The maximum contractile force for without the serosa (11.72±1.38 mN) was higher than that for with the serosa (10.94±1.84 mN). The time intervals reaching the peak contractile force were similar for both with and without cases (p>0.05). The relaxation time intervals (from the peak contractile force to the initial force) were different between the with and without case (p<0.05). The relaxation time interval for the with case was shorter than that for the without case as much as 11%.
Conclusions When the smooth muscle is relaxed, the serosa works as a compressed spring to apply a tensional force to the muscle. This would help to return quickly to the initial muscle length during relaxation. If this function of the serosa is changed by any other cause, abnormal contraction of the intestine could be occurred.

Lower GI EE-LGI-063

The Clinical Significance of Colonoscopy in Patients with Computed Tomography-Diagnosed Acute Diverticulitis

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Background/Aims International guideline recommends performing a colonoscopy after an episode of acute diverticulitis. The aim of this study was to assess the colonoscopy results and its clinical significance in patients with acute diverticulitis on computed tomography (CT) scan.
Methods From January 2006 to December 2016, medical records of patients with acute diverticulitis diagnosed on CT scan who underwent complete colonoscopy within 1 year of diagnosis were reviewed retrospectively. Patient's characteristics, CT findings and colonoscopy results were reviewed. Analysis for prevalence and factors associated with advanced colorectal neoplasia (ACN) were also performed.
Results Among the 235 patients with acute diverticulitis diagnosed on CT scan, 77 patients without exclusion criteria were finally included. The mean age was 49.7±15.3 years and 51 patients (66.2%) were men. The lesion was in the right colon in 68 patients (88.3%) and all the lesions were shown as bowel wall thickening on CT scan. Fluid collection was noted in 11 patients (14.3%), abscess in three patients (3.9%) and lymphadenopathy in seven patients (9.1%) on CT scan. The 97.4% of the patients were improved with conservative treatment. Mean interval from diagnosis to colonoscopy was 40.2±56.4 days. Adenomatous polyps were found in 19 patients (24.7%), among them, five patients (6.5%) had advanced adenoma. Colorectal adenocarcinoma was found in four patients (5.2%) and all of them were over 70 years old. The prevalence of ACN was higher in patients over 60 years and admitted for longer than 10 days. On multivariate analysis, age over 60 years was identified as independent risk factor for ACN.
Conclusions Colonoscopy detected ACN in 11.7% of patients with acute diverticulitis. Because patients over 60 years have a higher risk of ACN, follow-up colonoscopy is needed after the diagnosis of acute diverticulitis.
Keywords Acute diverticulitis; Colorectal neoplasia; Colonoscopy

Lower GI EE-LGI-064

Case Series of Malakoplakia Involving Colon Diagnosed in Immunocompromised Patients

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Background/Aims Malacoplakia is known for very rare chronic granulomatous inflammatory disease. Malacoplakia is microscopically characterized histiocytes containing lamellated calcium and iron, called Michaelis-Gutmann bodies, named after those first described in 1902. Genitourinary tract is reported as the most commonly involved site, but gastrointestinal tract is rarely involved. Here, we described the five cases of malakoplakia involving the colon.
Methods We retrospectively analyzed the data of patients since 2006.
Results During the 14 years period, five cases malakoplakia involving colon was diagnosed at out hospital. Involved sites were various, but right-sided colon was mainly involved. Two cases were involved at ascending colon, two cases at cecum, and the other one at hepatic flexure. The average age was 64 years (range, 60 to 74 years). And medical history showed a similarity in immunocompromised condition including organ transplantation, cancer, or systemic disease. Three patients received solid organ transplantations (1 kidney, 1 heart, and 1 lung). Two patients had cancer history (1 gastric cancer and 1 ampulla of Vater cancer). One patient had systemic sclerosis disease. And three patients had no symptoms and they were diagnosed by screening colonoscopy. But, two patients had symptoms, one had perianal mass with pain and the other one had chronic diarrhea with severe iron deficiency anemia. In colonoscopy findings, two of them showed low elevated mucosal lesions, two erosive lesions and the other one ulcerative lesion. All these lesions were diagnosed by positive Michaelis-Gutmann bodies with von Kossa stain. One patient took an oral antibiotic (the 3rd-generation cephalosporin) for 4 weeks and received the follow-up colonoscopy after 6 months, which showed complete healing of previous erosive/ulcerative lesions.
Conclusions We reported five cases of colonic malakoplakia. All patients were under immunosuppressed conditions associated with solid organ transplantation, chemotherapy, or systemic autoimmune disease. We should keep in mind this disease entity when we perform screening colonoscopies in immunocompromised patients.
Keywords Malakoplakia

Lower GI EE-LGI-065

Difference of Vitamin D Level between *Clostridium difficile* Enteritis and Other Acute Infectious Enteritis in Children

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Background/Aims *Clostridium difficile* infection (CDI) has recently been reported that there has been a steady increase in community-acquired CDI, which is not related to the use of antibiotics. And the association between vitamin D concentration and CDI are reported in adults. We proceed to the study to investigate the relationship between vitamin D level and functional gastrointestinal disorders, CDI and other acute infectious enteritis in children.
Methods Of whom visited hospital with digestive system symptoms and who for 2 years from December 2015 to March 2017. Two hundred and fifty-seven patients were enrolled who performed vitamin D level and confirmed gastrointestinal infection with multiplex-PCR and/or stool culture and *C. difficile* toxin. Three patients of FGIDs group is matched with one CDI patient according to age and gender. And three groups were divided; functional gastrointestinal disorder (FGID) group who met the Rome III criteria; CDI group; and other gastrointestinal infectious group.
Results Vitamin D level is lower in other infectious group than in the CDI group (12.80±5.62 ng/mL vs 18.48±9.63 ng/mL, p=0.003), but difference between FGIDs group and CDI group is not identified (p>0.05).
Conclusions Vitamin D level of bacterial and viral gastroenteritis is lower than the FGIDs group and CDI group. And vitamin D level is not different between FGIDs group and CDI group. These results suggest that FGIDs and CDI children are more susceptible to the decrease of vitamin D level than acute infectious enteritis in healthy children. Further prospective studies with healthy control groups without gastroenteritis symptoms are needed to establish Vitamin D role in gut immunity.
Keywords Vitamin D; *Clostridium difficile*; Gastrointestinal infection disease; Children; Functional gastrointestinal disorder

Table 1. Comparison of Vitamin D Levels

	FGIDs group (n=61)	CDI group (n=22)	Another infectious group (n=31)	*p*-value
Vitamin D level (ng/ml)	17.54±8.77	18.48±9.63	12.80±5.62	0.003

FGID, functional gastrointestinal disorder; CDI, *Clostridium difficile* infection.

Lower GI EE-LGI-066

Predictors of the Use of Biologic Therapy in Inflammatory Bowel Disease among Filipino Gastroenterologists

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Background/Aims The threshold of using biologics in the management of inflammatory bowel disease (IBD) in Asia is perceived to be high. High cost of biologics, lack of reimbursement by national health care services, low familiarity with biologic use, route of administration and other factors are key issues which contribute to clinicians' aversion for its use. The aim of this study is to determine the factors that may contribute or deter the use of biologics by gastroenterologists managing patients with IBD in the Philippines.
Methods A cross-sectional survey that included determination of physicians' years of clinical practice, academic center affiliation, number of IBD conferences attended, number of IBD cases seen per month and prior use of biologics was performed among 167 Filipino gastroenterologists. A univariate and multivariate logistic regression analysis were conducted to assess predictive factors for the use of biologics by gastroenterologists in patients with IBD.
Results A total of 79 gastroenterologists used biologics in the treatment of IBD. The predictors for biologic use in IBD are as follows: >17 years in practice (69%, p=0.001), number of IBD conference attended (56.10%, p=0.018), and the number of IBD patients seen per month (p=0.001). Factors hindering the use of biologic therapy include the cost of treatment (22%), physician's prior experience with biologics (26%) and adverse effects (40%). On multivariate analysis, the predictor for biologic use for IBD is number of IBD cases seen per month (p=0.000). The negative predictors were nonattendance to IBD conferences (p=0.022) and the number of years after gastroenterology training before year 2000 (p=0.000).
Conclusions here is a low utilization of biologic therapy by specialists treating IBD in the Philippines. The identified predictors for biologic utilization, if addressed properly may influence the uptake of biologic therapy in IBD patients.
Keywords Inflammatory bowel disease; Biologic therapy; Filipino

Lower GI EE-LGI-067

A Pilot Study on the Assessment of Q Methodology for Quality of Care in Patients with Inflammatory Bowel Disease in Korea

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Background/Aims Inflammatory bowel disease (IBD), including Crohn's disease and ulcerative colitis, is a chronic inflammatory disorder of the gastrointestinal tract that requires lifetime management. Therefore, many studies have tried to establish questionnaires or parameters to assess the quality of care for IBD patients. However, there is no study that investigates the type of patients using the Q methodology, which is subjective and systematically studied, to identify and categorize patient's opinions and subjective thinking. The purpose of this study is to investigate the subjective thinking and necessity of IBD patients.

Methods Q-methodology, which provides a method of analyzing the subjectivity of each item, was used. Thirty-four selected Q-statements received from 50 adults were classified into a shape of normal distribution using a 9-point scale. The collected data was analyzed using a QUANL PC program.

Results Four types of attitudes toward life sustaining treatment were identified. Type I is called physician dependent type. Type II is called relationship focused type. Type III is called information driven type. Type IV is called social awareness type.

Conclusions The results of this study show that IBD patients have four types when they receive treatment. Based on this study, further individualized therapeutic approach is needed for IBD patient.

Keywords Quality of care; Inflammatory bowel disease patients; Q methodology

Table 1. Demographic Characteristics and Factor Weights of P-sample (n=50)

Q-satatement	Z-score			
	Type 1	Type 2	Type 3	Type 4
1. I want to help	1.52	0.71	1.70	0.92
2. Difficulty in finding a professional faculty	0.01	-1.09	1.24	1.89
3. Internet search	-0.59	-1.66	-0.67	-1.56
4. The Importance of Medical Staff	1.31	0.32	-1.10	0.52
5. Implementing Hospital Directives	0.94	-1.56	-0.63	-0.63
6. Nurses for hospitals	-1.37	-1.57	0.09	-1.65
7. Difficulty re-describing the disease state	-0.97	0.40	0.46	-0.37
8. Medical professionals	1.63	1.71	2.04	1.95
9. Urging attitude of medical staff	1.39	1.60	1.04	1.20
10. Experience sharing	0.06	0.36	0.04	0.26
11. No immediate education required	-1.03	-0.50	-1.52	-1.84
12. Attitude of the nurse	-1.09	-0.68	-0.49	-1.51
13. Difficulty finding information	0.08	-0.21	-0.42	0.22
14. Positive medical staff's attitude	1.26	-0.49	0.07	0.44
15. The pain of the family	-0.34	1.56	-0.24	0.70
16. Same attendee	-1.45	-0.76	-0.51	-1.26
17. Knowledge of illness that is not helpful	-1.71	-1.12	-1.39	-1.18
18. Helpful Medical staff	0.98	-0.24	1.07	0.95
19. The Need for education whenever you want	-0.02	0.05	-0.87	-0.02
20. Other patient's experience	0.68	-0.02	-1.15	0.03
21. Helpful words	1.32	-1.08	-0.83	-0.22
22. Find disease management methods	0.84	1.20	1.53	0.73
23. Family discomfort	-0.14	1.65	1.82	0.93
24. Other patient's consolation	-0.26	0.15	1.34	-0.99
25. A constant fight	0.92	0.63	1.34	0.26
26. Unbearable disease	-1.08	1.25	0.31	-0.50
27. Unhelpful hospital seminar	-1.62	-0.95	-1.33	-1.46
28. Time to receive information	0.07	-0.85	-0.79	-0.69
29. New Therapeutic option	0.77	-0.31	0.23	0.82
30. Change in social awareness	0.14	0.48	-0.66	1.22
31. Campaign Needs	-0.25	-0.02	-0.50	0.70
32. Supportive medical staff	0.22	0.03	-0.29	-0.62
33. Medical staff for me	-1.62	-0.86	-0.75	0.56
34. Relationship maintenance method	-0.62	1.85	-0.19	0.19

The positive Z-score is the content to agree with the negative Z-score is the opposite content.
Highly positive Z-scores strongly agree.
High negative Z-score strongly opposes.

Lower GI EE-LGI-068

Association between Fatty Liver on Abdominal Sonography and Colorectal Adenoma: A Retrospective in Korean Adults

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Background/Aims Several studies have found metabolic syndrome shares similar risk factors with the colorectal adenoma. The relationship between fatty liver and colorectal adenoma is controversial. The aim of this study was to assess the relationship between fatty liver and colorectal adenoma.

Methods This retrospective study included examinees who underwent colonoscopy for screening at the general health check-up center of SAM hospital between January 2016 and December 2016. Examinees with colorectal adenoma found by colonoscopy were compared with those without colorectal adenoma. The comparison points were age, gender, smoking status, medical history, body mass index (BMI), visceral fat area, waist-hip ratio (WHR), presence of colon diverticulosis, and severity of fatty liver on abdominal sonography.

Results This study included 940 examinees. The overall prevalence of colorectal adenoma was 24.9% (235/940). Colorectal adenoma was found in 175 males (74.5%) and 60 females (25.5%). The mean age of examinees with and without colorectal adenoma was 54±9.5 and 49.2±9.7 years (p<0.001). On multivariate analysis, age (odds ratio [OR], 1.063; 95% confidence interval [CI], 1.045 to 1.081; p<0.001), and severe fatty liver (OR, 3.505; 95% CI, 1.191 to 10.316, p=0.017) were associated with an increased risk of colorectal adenoma.

Conclusions Age, and severe fatty liver were risk factors for colorectal adenoma in our study. Severe fatty liver might affect the pathogenesis of colorectal adenoma. Old examinees with severe fatty liver might be high risk candidate for colorectal adenoma during colonoscopy.

Keywords Colorectal adenoma; Fatty liver; Colonoscopy

Table 1. Comparison of the Clinical Features between Examinees with and without Colorectal Adenoma

Variables	Colorectal adenoma (n=235)	Control (n=705)	*p* value
Gender			0.004
Males	175(74.5)	452(64.1)	
Females	60(25.5)	253(35.9)	
Age	54±9.5	49.2±9.7	<0.001
DM			0.042
Present	24(10.2)	44(6.2)	
Absent	211(89.8)	661(93.8)	
Smoking			0.022
Smoker	90(38.3)	213(30.2)	
Non smoker	145(61.7)	492(69.8)	
Fatty liver			0.042
Absent	102(43.4)	348(49.4)	
Mild fatty liver	75(31.9)	208(29.5)	
Moderate fatty liver	50(21.3)	142(20.1)	
Severe fatty liver	8(3.4)	7(1.0)	
BMI	24.8±3.0	24.67±3.2	0.558
Visceral fat area, cm^2	87.53±30.70	88.17±33.63	0.787
Waist-hip ratio	0.91±0.55	0.90±0.51	0.231
Colon diverticulosis			0.679
Present	17(7.2)	59(8.4)	
Absent	218(92.8)	646(91.6)	

Data are presented as number (%) or mean±SD.
DM, diabetes mellitus; BMI, body mass index.

Table 2. Multivariate Analysis of the Factors for Colorectal Neoplasia

Variables	OR(95% CI)	*p* value
Age	1.063(1.045-1.081)	<0.001
Gender		
Female	1	
Male	1.399(0.954-2.052)	0.086
Fatty liver		
Absent	1	
Mild fatty liver	0.993(0.690-1.428)	0.939
Moderate fatty liver	0.924(0.613-1.392)	0.771
Severe fatty liver	3.505(1.191-10.316)	0.017
DM		
Absent	1	
Present	1.115(0.642-1.938)	0.699
Smoking		
Absent	1	
Present	1.341(0.942-1.910)	0.104

OR, odds ratio; CI, confidence interval; DM, diabetes mellitus.

Lower GI EE-LGI-069

Treatment Results of Anal Fistula by Fistulostomy of Thai Nguyen National Hospital

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Background/Aims Evaluation of the results of surgical treatment of anal fistula surgical incision open fistula (fistulostomy) postoperative period.
Methods The study was 55 patients treated surgically with anal fistula. Evaluation of the results of surgical treatment of anal fistula surgical incision open fistula (fistulostomy) postoperative period. The level of pain after anal fistula surgery, according to Watts, Goligher distribution based on subjective perception of the patient and the amount of pain medication used. Grade 1: no pain Grade 2: mild pain (analgesia regimen after surgical treatment without using pain medicine). Grade 3: moderate pain (requires another injection of another painkiller within 24 hours). Grade 4: severe pain (need 2 doses of vaccine more other painkillers in 24 hours). Grade 5: severe pain (plunger 3 different doses of painkillers or more in 24 hours). Function of anal autonomy after surgery, assessing the level according to standards of Watts (1964), Kelly (1972), Corman (1972). Degree 0: Defecation function is completely normal. Grade 1: Uncontrollable with steam, still autonomy with liquid and solid manure. Grade 2: Uncontrollable with steam, liquid manure, also control with solid manure. Grade 3: Uncontrollable both with liquid and solid manure- Evaluation of surgical outcome in patients re-examined Good: no recurrence, normal anal autonomy Moderate: no recurrence, loss of anesthesia level 1 or accompanied by complications, surgical scar pain, anal stenosis Poor: recurrent leakage or anal incontinence of degree 2 degree 3.
Results One hundred percent of patients with anal fistula surgery did not have bleeding complications after surgery; 36,4% patients had pain after surgery; autonomic function of the anus was normal (0) 87.3%. There were 12,7% had losing anal control (1). The mean healing time after 4 to 8 weeks is 60%.
Conclusions Fistulostomy surgery for anal fistula treatment is an effective treatment. Surgeons need to respect surgical rules to reduce recurrent fistula rate.
Keywords Anal fistula; Fistulostomy; Results

Lower GI EE-LGI-071

Epidemiology of Small Bowel Cancer: A Single Center Retrospective Study

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Background/Aims Small bowel cancer has an area of nearly 90% of the intestine, but is very rare. We investigated the location, histologic type of small bowel cancer.
Methods We retrospectively analyzed the patients with histologically confirmed small bowel cancers reported at Samsung medical center between 1994 and 2018.
Results Small bowel cancer was diagnosed in 1,310 patients during 1994 to 2018 (male 849, female 461). Mean age at diagnosis was 56.6 years old (male 56.1, female 57.7). The most common location of small bowel tumors was the duodenum (n=690, 63.9%), followed by the ileum (n=226, 20.9%) and the jejunum (n=164, 15.2%). The most common histologic type was adenocarcinoma (n=389, 36.0%), followed by lymphoma (n=268, 24.8%), carcinoid (n=174, 16.1%), gastrointestinal stromal tumor (n=148, 13.7%) and sarcoma (40 cases, 3.7%). In duodenum, adenocarcinoma (46%), carcinoid (24%) was common, sarcoma (51%), adenocarcinoma (27%) in jejunum and lymphoma (70%) was the most common in ileum.
Conclusions As the cancers vary according to their location, proper diagnosis and treatment will be required.
Keywords Small bowel cancer; Adenocarcinoma; Neuroendocrine tumor; Lumphoma

Lower GI EE-LGI-072

Listeria Monocytogenes Sepsis and Meningitis after Infliximab Treatment for Steroid Refractory Ulcerative Colitis

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Background/Aims Infliximab, a chimeric anti-tumor necrosis factor-α monoclonal antibody, is an effective therapy for steroid refractory ulcerative colitis. However, serious opportunistic infections of Listeria monocytogenes or Legionella have rarely occurred in immunocompromised patients after Infliximab treatment.
Methods A 75-year-old woman was admitted to the emergency room due to high fever (39.9°C) and bloody diarrhea one day after her latest discharge. She was diagnosed with left-sided ulcerative colitis and also was treated with mesalazine (5-aminosalicyclic acid) and prednisolone. She was hospitalized for 3 weeks for ganciclovir treatment of cytomegalovirus (CMV) colitis due to a lack of symptom improvement and positive CMV polymerase chain reaction.
Results After 2 weeks of hospitalization, she was found to have worsened symptoms on sigmoidoscopy and blood tests. Infliximab (Remicade®) was administered due to lack of response to treatment with mesalazine and prednisolone. After administration with Infliximab, her symptoms improved dramatically and she was discharged. However, 1 day after discharge, the patient was admitted to the emergency room due to high fever and bloody diarrhea and rehospitalized. Listeria monocytogenes was identified in the blood cultures. On the 4th day, from day 7 (nonconsecutive) of Infliximab administration, the patient developed sepsis. On cerebrospinal fluid results, bacterial meningitis was found, which could be diagnosed as meningitis associated with Listeria monocytogenes sepsis. Eventually, she fully recovered after 3 weeks treatment of intravenous ampicillin and gentamycin.
Conclusions A patient with steroid refractory ulcerative colitis developed Listeria monocytogenes sepsis and meaning it is 7 days after first administration of infliximab. This is to be considered in future application of infliximab.
Keywords Infliximab; Listeria monocytogenes; Sepsis; Meningitis; Ulcerative colitis

Lower GI EE-LGI-073

Risk Factors of Advanced Colorectal Neoplasm in Patients with Early Gastric Cancer

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Background/Aims Colorectal neoplasm is commonly found in patients who are diagnosed with gastric cancer. However, the association between early gastric cancer and synchronous colorectal neoplasm was not fully evaluated.
Methods The patients who were diagnosed with early gastric cancer and underwent perioperative colonoscopy between October 2008 and September 2018 were reviewed. Clinical characteristics of the patients and risk factors of advanced synchronous colorectal neoplasm were evaluated.
Results A total of 509 patients were enrolled in this study. Mean age was 62.5±11.3 years, and 379 (74.5%) were male. All patients were treated by endoscopic resection (n=267, 52.5%) or surgical resection (n=242, 47.5%). On perioperative colonoscopy, the incidence of overall colorectal neoplasm was 59.3%. The incidence of advanced synchronous colorectal neoplasm (number ≥3, size ≥10 mm, with high-grade dysplasia, with villous histology, or serrated adenoma/polyp ≥10 mm) and synchronous colorectal cancer were 30.5% (n=155) and 1.4% (n=7), respectively. The patients with advanced colorectal neoplasm were significantly associated with old age (≥65 years; p<0.001) and hypertension (p=0.004). In multivariate analysis, male (odds ratio [OR], 1.729; 95% confidence interval [CI], 1.028 to 2.907, p=0.039) and old age (OR, 2.473; 95% CI, 1.594 to 3.837, p<0.001) were significant risk factors of advanced synchronous colorectal neoplasm.
Conclusions During preoperative workup of early gastric cancer, perioperative colonoscopy should be considered in patients with male and old age to improve overall outcome.
Keywords Colonoscopy; Colorectal neoplasm; Early gastric cancer

Lower GI EE-LGI-074

Do We Provide Enough Information to Pathologist to Obtain a Quality Report Back? An Audit to Enhance the Quality of Histopathology Reports in a Limited Resource Setting in South Asia

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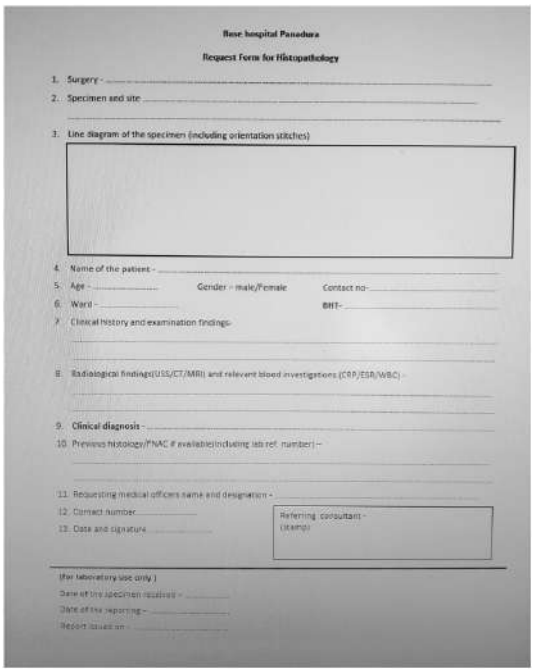
[1]Department of Surgery, University of Sri Jayewardenepura, Colombo, and [2]Department of Surgery, Panadura Base Hospital, Panadura, Sri Lanka

Background/Aims Histopathology is essential in surgical decision making. Adequate clinical details should be provided to histopathologist to obtain a quality report. We experienced shortcomings in histopathology reporting due to deficiencies in patient detail provision.
Methods An audit was done by analyzing 100 histopathology specimen forms sent from surgical unit of Base Hospital Panadura, Sri Lanka. After identifying deficiencies new form including patient demographic details, contact number, clinical details, relevant blood and biochemical investigation results, clinical diagnosis, space for a line diagram of specimen with orientating stitches if possible and contact details of the person filled the form, was developed (Fig. 1). A space for a line diagram was not found in forms of other countries to the best of our knowledge. Hundred new format forms were prospectively analyzed to identify a change.
Results Conventional forms designed for biochemical studies (health 350) had been using as histopathology specimen forms as well. Percentages of properly written details were as follows; patient demographic data (87%), clinical history (42%), relevant biochemical results (8%), radiological findings (2%), clinical diagnosis (1%). Orientation or a line diagram of the specimen was not mentioned in any forms. For further clarifications, histopathology department had to contact or get down the medical officer who filled the form in 68%, delaying final report. After introduction of new format details received were as follows; patient demographic data (100%), clinical history (100%), relevant biochemical results (88%), radiological findings (90%), clinical diagnosis (96%). Line diagram with orientation stitches was included in all relevant specimens. Reports has been issued 3 days (median) earlier.
Conclusions Considerable deficiency in clinical details provision with conventional forms was noted in our cohort. Simple intervention of introduction of a spaced, well formatted specimen form helped to overcome that deficit. This could be implemented in other hospitals as well.
Keywords Quality; Histopathology reporting


Base hospital Panadura

Request Form for Histopathology

1. Surgery -
2. Specimen and site
3. Line diagram of the specimen (including orientation stitches)
4. Name of the patient -
5. Age - Gender - male/Female Contact no-
6. Ward - BHT-
7. Clinical history and examination findings-
8. Radiological findings(USS/CT/MRI) and relevent blood investigations (CRP/ESR/WBC) -
9. Clinical diagnosis -
10. Previous histology/FNAC if available(including lab ref. number) -
11. Requesting medical officers name and designation -
12. Contact number
13. Date and signature

Referring consultant - (stamp)

(For laboratory use only)
Date of the specimen received -
Date of the reporting -
Report issued on -

Fig. 1. Histopathology form, new format.

Lower GI EE-LGI-075

Terminal Ileum Diverticulitis Mimicking Acute Appendicitis

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Department of Internal Medicine-GI/Hepatology, Daegu Fatima Hospital, Daegu, Korea

Background/Aims The majority of small-bowel diverticula are asymptomatic. They are usually incidentally discovered during laparotomy, barium studies. Dyspepsia, abdominal discomfort, malabsorption, obstruction, volvulus, and bleeding can occur but it is not common. Terminal ileum diverticulitis is a very rare disease that may lead to an acute abdomen mimicking appendicitis. Most patients are asymptomatic. The acute complications of ileal diverticula are rare. The management of ileal diverticulitis is similar to that of colonic diverticulitis.
Methods We report a young man with uncommon terminal ileum diverticulitis because of right lower quadrant pain. Abdomen ultrasound showed small sac-like outpouching lesion with increased echogenicity of surrounding fat in thickened terminal ileum, suggesting inflamed diverticulum. Computed tomography showed similar finding.
Results The patient was treated conservatively. After the patient recovered, healed terminal diverticulum was seen on colonoscopy.
Conclusions We need to consider terminal ileum diverticulitis for right lower quadrant pain. We can use many diagnostic tools including abdomen ultrasound. Exact diagnosis is important and it can treat conservatively without surgery. The symptom of terminal ileum diverticulitis is similar to appendicitis but we need to know difference.
Keywords Ileum; Diverticulitis; Ultrasound

Lower GI EE-LGI-076

Inflammatory Myofibroblastic Tumor of the Terminal Ileum

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Departments of [1]Internal Medicine-GI/Hepatology, and [2]Pathology, Pusan National University Hospital, Busan, Korea

Background/Aims A 68-year-old woman was referred to our hospital for evaluation of a suspected subepithelial tumor (SET) in the terminal ileum, which was incidentally detected on screening colonoscopy. The patient had no past medical, surgical, or family history. Colonoscopy revealed a solid, round, yellowish-white SET covered with normal mucosa, measuring about 10 mm in diameter, at the terminal ileum (Fig. 1A). Endoscopic ultrasonography with a miniature probe showed a heterogenous, hypoechoic mass, mainly located in the 3rd layer of the colonic wall, confirming that the lesion was SET. Contrast-enhanced abdominal computed tomography (CT) showed neither remarkable abnormal findings in the gastrointestinal tract nor significant lymphadenopathy.
Methods We decided to perform endoscopic submucosal dissection (ESD) for accurate diagnosis, and en bloc resection was achieved successfully (Fig. 1B).
Results Histopathological examination of the ESD specimen revealed that the completely resected mass was located in the deep mucosal and submucosal layers and mainly composed of spindle shaped myofibroblasts with fibrous stroma infiltrated by inflammatory cells, such as plasma cells and lymphocytes (Fig. 1C). Immunohistochemical staining was positive for smooth muscle actin but negative for S-100 protein, desmin, CD34, and anaplastic lymphoma kinase (Fig. 1D). Mutations in c-KIT (exons 11, 9, 13, and 17) or PDGFRα (exons 12 and 18) were not identified. The tumor was finally diagnosed as inflammatory myofibroblastic tumor (IMT). During follow-up at 1 year and 3 years after ESD, the patient was asymptomatic and underwent follow-up colonoscopy and CT with no evidence of recurrence.
Conclusions In conclusion, to the best our knowledge, this is the first case of IMT in the terminal ileum that was successfully treated endoscopically with ESD without need for further surgical intervention. IMTs should be included in the differential diagnosis of SET in the terminal ileum, especially when histological findings show spindle cell proliferation.
Keywords Subepithelial tumor; Terminal ileum; Endoscopic submucosal dissection; Inflammatory myofibroblastic tumor

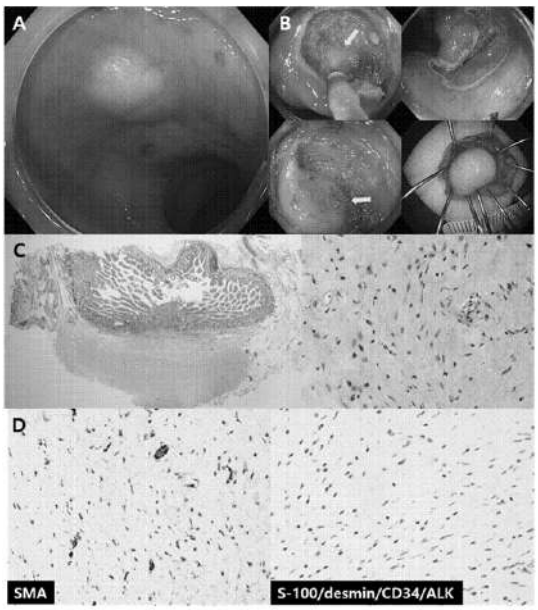

Fig. 1.

Lower GI EE-LGI-077

Colonic Malakoplakia

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Departments of [1]Internal Medicine-GI/Hepatology, and [2]Pathology, Pusan National University Hospital, Busan, Korea

Background/Aims A 60-year-old man with C3 tetraplegia was referred to our department for evaluation of abdominal pain and hematochezia. He was diagnosed with adrenal insufficiency 5 years prior and has been taking low dose prednisolone (7.5 mg) once a day. On physical examination, he was hemodynamically stable and was afebrile. The abdomen was soft with mild tenderness on palpation in the periumbilical area without peritoneal signs. Laboratory studies were notable with a hemoglobin level of 10.7 g/dL, total protein 4.09 g/dL, and albumin 2.21 g/dL. Inflammatory marker (C-reactive protein) was mildly elevated to 1.83 mg/dL. Serology for human immunodeficiency virus was negative. Tumor markers, such as carcinoembryonic antigen, carbohydrate antigenic determinant (CA19-9), and α-fetoprotein, were within the normal range. Antineutrophil cytoplasmic antibody was negative, and rheumatic factor was within the normal range. Stool for acid-fast bacillus and *Clostridium difficile* toxin were negative; no pathogens were cultured, and no parasites was identified.
Methods Sigmoidoscopy revealed diverse, multiple polypoid lesions (3 to 10 mm) with erythema, edema, and friability surrounding the entire lumen on the sigmoid colon (Fig. 1A). The number and size of the polypoid lesions increased compared with the endoscopic findings obtained a year prior. The lesions easily bled on contact. Multiple biopsies of different sites were taken.
Results Histopathological examination of the biopsy specimens revealed nodular mixed inflammatory cells and infiltration of the epithelioid histiocytes in lamina propria. von Kossa stains highlighted the targetoid structures in the histiocytes (Fig. 1B, Michaelis- Gutmann bodies). Based on these findings, the patient was diagnosed with colonic malakoplakia.
Conclusions Although malakoplakia of the colon is very rare, it should be considered in the differential diagnosis of polypoid colonic lesions, especially in immunocompromised or malnourished patients.
Keywords Malakoplakia; Michaelis-Gutmann body; Diverse mucosal lesions

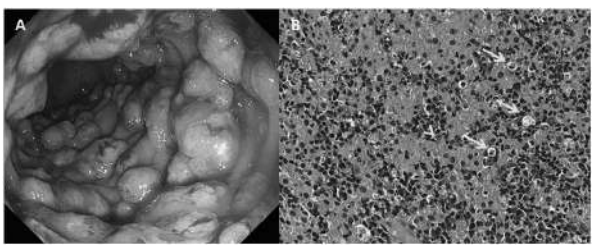

Fig. 1.

Lower GI EE-LGI-078

Plasmablastic Lymphoma with Crohn's Disease

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Department of Internal Medicine-GI/Hepatology, Korea University Ansan Hospital, Ansan, Korea

Background/Aims The risk of developing lymphoma in the treatment of Crohn's disease causing anxiety and often avoids proper treatment. Plasmablastic lymphoma is a rare and serious disease related to a poor prognosis of diffuse large B-cell lymphoma. Only a few cases of plasmablastic lymphoma with Crohn's disease have been reported in the literature. Here we report a case of plasmablastic lymphoma developed in a 72-year old woman being treated with azathioprine and adalimumab for a short period of time.
Results A 72-year old woman presented with abdominal pain for 2 months. She had an abdominal computed tomography (CT) scan at another hospital on June 2018. CT findings confirmed r/o small bowel tumor or r/o Crohn's disease and were transferred to our hospital for further evaluation. we diagnosed small bowel Crohn's disease and started treatment with mesalazine 2 g based on other hospital CT readings and blood test findings. Intermittent abdominal pain remained even after the start of treatment, adding and gradually increasing the azathioprine agent to control symptoms. One year after the start of treatment, abdominal pain, constipation, and vomiting deteriorated, and a small bowel CT examination was conducted in the emergency room. CT scan confirmed r/o small bowel cancer. Since hospitalization, explorative laparotomy surgery has been conducted. The biopsy revealed plasmablastic lymphoma (CD 79a+, MUM-1+).
Conclusions Plasmablastic lymphoma can emerge in Crohn's disease patients on immunosuppressive treatment and physicians must be aware of this possibility. Our case suggests that further investigation is required to assess whether the development of plasmablastic lymphoma is related to immunosuppressive therapy or severe Crohn's disease itself. In the future, further studies are necessary to identify lymphoma risk markers in Crohn's disease patients and construct an effective prevention algorithm.
Keywords Plasmablastic lymphoma; Crohn disease; Inflammatory bowel disease

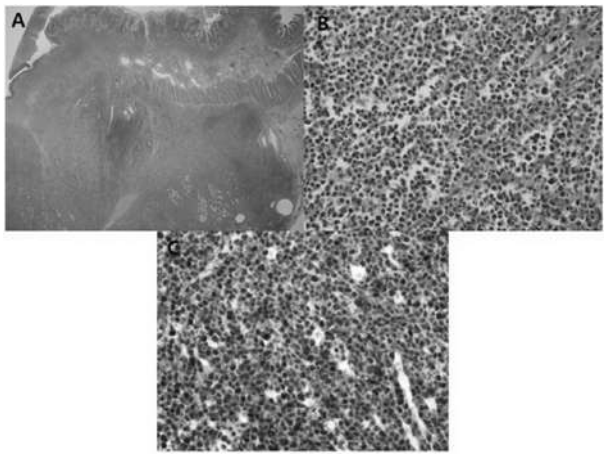

Fig. 1. Histological findings.

Lower GI EE-LGI-079

Study Some Clinical Characteristics, Endoscopic Images of Bleeding Ulcerative Colitis at Viet Tiep Friendship Hospital Hai Phong in 5 Years from 2012 to 2017

Thieu Van Le[1,2]

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Background/Aims To study a number of clinical and endoscopic images of bleeding ulcerative colitis in 5 years from 2012 to 2017.
Methods A cross-sectional description of 36 patients bleeding ulcerative colitis.
Results The age group is 30 to 49 years (61.11%), the youngest 19, the oldest age 65. Average age 40.21 ± 19.38. The ratio of male to female is 1.12. There are 25% of patients with fever. 69.44% of patients had weight loss. Localized lesions on the endoscope were mainly rectal and half abdominal left (72.22%). Most patients have stage 2 and 3 damage in Baron (72.22%).
Conclusions Bleeding ulcerative colitis is mainly seen between the ages of 30 and 49, the proportion of men and women is similar, the main clinical symptoms are loose stools, endoscopic lesions mainly in the rectum and colon left.
Keywords Bleeding ulcerative colitis

Lower GI EE-LGI-080

Introduction of Enhanced recovery after colorectal surgery Protocol in a Limited Resource Setting in South Asia a Surgical Audit

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Background/Aims Enhanced recovery after colorectal surgery (ERAS) protocol is a multimodal perioperative care pathway aiming to reduce stress response to surgery. Although ERAS has proven promising results in Western countries, the data from developing countries are scarce.
Methods ERAS protocol was introduced into University Surgical Unit of the Colombo South Teaching Hospital, Sri Lanka with few modifications to overcome resource limitations. Elective colorectal cancer resections performed with this protocol from 2011 to 2019 were audited.
Results One hundred and twelve colorectal resections were performed (71.4% laparoscopic or laparoscopic-assisted). Median age was 60 years old. Male to female ratio was 1.08:1. Mobilization was started on postoperative day 1. Oral clear fluids were started on postoperative day 1 and normal diet was established by day 3. Seventy percent of the patients had bowel opening on postoperative day 3. Naso-gastric intubation was done in 40% of the cases and median day of removal was day 2. Median day of catheter removal was postoperative day 2. Five (4.4%) who underwent laparoscopic-assisted low anterior resections had anastomosis leaks. Three patients needed laparotomy. Median days of hospital stay were 5 days (range, 3 to 21 days). No difference was observed between open and laparoscopic groups. Thirty-day mortality rate was zero.
Conclusions Favorable outcomes of ERAS in our center are compatible with published data. Modifications made to overcome resource limitations without dampening the principles of ERAS, were successful and well tolerated by our cohort. This can be implemented in the limited resource centers in the region.
Keywords Enhanced recovery after colorectal surgery; South Asia; Modifications

Lower GI EE-LGI-081

Capecitibine Induced Ileocolitis with Acute Colonic Pseudo Obstruction

Gautam Kumar and Itish Patnaik

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Background/Aims Capecitabine is an oral prodrug of 5-fluorouracil. It is antineoplastic drugs used for the treatment of patients with pancreaticobiliary and other gastrointestinal malignancies. Gastrointestinal side effects ranging mild nausea to severe stomatitis and diarrhea is seen up to 10% of the patients. Occurrence of ileo-colitis with pseudo obstruction is rare.
Methods A 56-year male with Carcinoma gall bladder underwent radical cholecystectomy followed by extended hepatectomy. He received Capecitabine adjuvant chemotherapy for 15 days. Post chemo he developed fever, generalized pain abdomen and loose stools mixed with blood. There was no neutropenia. He was started on empirical antibiotics, intravenous hydration and supportive measures including antimotility drugs. He developed obstipation later on. Abdominal X-rays showed dilated colonic loops suggestive of pseudo obstruction. Colonoscopy showed diffuse colonic and ileal erythema and erosions. Histopathology showed mixed inflammatory infiltrate lamina propria and crypt atrophy. Immunohistochemistry for cytomegalovirus was negative. His stool culture and *Clostridium difficile* toxin samples were also negative. A diagnosis of chemotherapy-induced ileocolitis with intestinal pseudo obstruction was made. He was kept on NPO and started on TPN, colonoscopy guided flatus tube was inserted. His abdominal distension and pain improved and he was started with oral feed. Repeat colonoscopy after 4 weeks showed normal mucosa.
Results Enterocolitis is an uncommon complication of capecitabine therapy. In our case pseudo obstruction was precipitated by antimotility drugs and it was managed conservatively along with colonic decompression. There was diffuse colonic and terminal ileal injury suggesting effect of Capecitabine on rapidly proliferating intestinal cells.
Conclusions Only a small number of patients treated with Capecitabine develop enterocolitis but it may result in the need for hospitalization and increased risk of death.

Lower GI EE-LGI-082

Metachronous Colonic MALT Lymphoma Presenting as Diminutive Polyps in a Patient with Early Gastric Cancer

Ga Young Jung[1,2], Chang Min Lee[1,2], Chang Yoon Ha[1,2], Hyun Jin Cho[1,2], Tae Hyo Kim[1,2], Woon Tae Jung[1,2], and Ok Jae Lee[1,2]

[1]Department of Internal Medicine, Gyeongsang National University College of Medicine, Jinju, and [2]Department of Internal Medicine-GI/Hepatology, Gyeongsang National University Hospital, Jinju, Korea

Background/Aims Mucosa-associated lymphoid tissue (MALT) lymphomas are uncommon, accounting for 5% of all non-Hodgkin lymphoma. Gastric MALT lymphoma is the prototype seen in association with *Helicobacter pylori*. Colonic MALT lymphoma is rare and comprises only 2.5% of the MALT lymphomas. Its etiology and treatment are not well established.
Results A 73-year-old Korean woman presented with symptoms of chronic diarrhea and flatulence for the past 3 to 4 months. She had received endoscopic submucosal dissection (ESD) for early gastric cancer (well-differentiated adenocarcinoma within mucosa) and *H. pylori* eradication 9 years ago. The patient had also taken colonoscopy 3 years ago and a tiny rectal hyperplastic polyp was removed. Her systemic examination was unremarkable, while her routine labs revealed mild anemia. An upper endoscopy revealed ESD-induced scar and *H. pylori* was negative. Colonoscopy revealed several diminutive sessile polypoid lesions in cecum and ascending colon, and they were removed by biopsy forceps. The histopathology and immunophenotyping were consistent with extra nodal marginal zone of MALT lymphoma. Computed tomography revealed no abnormality of colon or intra-abdominal lymphadenopathy, but only gallbladder stone. The patient refused further evaluation.
Conclusions Colonic MALT lymphoma is rare, but can present as colonic polyps. Endoscopic biopsy and histologic evaluation should be required for even diminutive polyps.
Keywords Colonic neoplasms; Colon polyp; Lymphoma; B-cell; Marginal zone

Lower GI EE-LGI-083

Thrombotic Thrombocytopenic Purpura Presented as Ischemic Colitis: A Case Report

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Background/Aims Thrombotic thrombocytopenic purpura (TTP) is a disease that causes thrombocytopenia, hemolytic anemia, fever, neurological symptoms, and kidney disease. The disease cause is not clear, but it may occur in connection with infections, drugs, malignancies, bone marrow transplantation, chemotherapy and complications of colitis caused by enterohemorrhagic *Escherichia coli* such as *E. coli* O157:H7. Ischemic colitis is mainly caused by a decrease in tissue blood flow in older people. The association with TTP was reported for the first time in 1989, but few cases have been reported. So, we report a case of TTP with thrombocytopenia, fever and hemolytic anemia during treatment with ischemic colitis.
Methods A 58-year-old female patient was admitted to Jeju National University Hospital with bloody stools and abdominal pain. She was being treated with Atorvastatin/Ezetimibe for hyperlipidemia. All laboratory examinations including complete peripheral blood cell counts, blood biochemistry were within normal limits. All tests for autoantibodies were negative. There was mild tenderness on the left lower quadrant side of the abdomen on physical examination. The Sigmoidoscopy finding revealed inflammation and swelling of mucosa on the sigmoid colon. Histologic findings were consistent with nonspecific colitis. Conservative treatment including fluid infusion has started. No pathogens were identified in stool culture. On hospital day 7, fever with thrombocytopenia and anemia occurred. The platelet count was 17,000/μL with hemoglobin of 11.4 g/dL. Schistocytes were observed on the peripheral blood smear. On hospital day 8, Methylprednisolone infusion and plasma exchange were started.
Results After hospital day 15, thrombocytopenia and fever were improved and plasma exchange was discontinued. The patient was discharged on hospital day 25.
Conclusions Because of the high mortality rate of untreated TTP, early recognition and prompt initiation of the management of TTP is important. This case report represents that ischemic colitis can be an atypical presentation of TTP.
Keywords Ischemic colitis; Thrombotic thrombocytopenic purpura

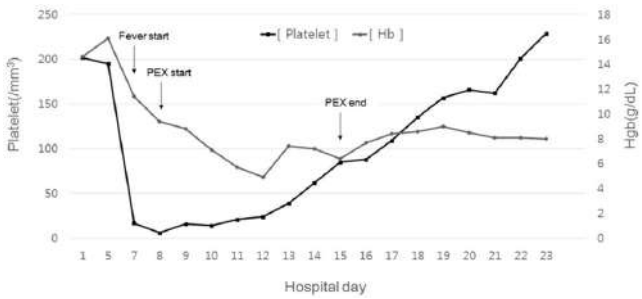

Fig. 1. Clinical courses.

Lower GI EE-LGI-084

Protein-Losing Enteropathy due to *Strongyloides* Spp. Hyperinfection in an Immunocompetent Adult

Anthony Gerodias[1], Enrik John Aguila[2], Ian Homer Cua[2], and Ferdinand Gerodias[3]

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Background/Aims *Strongyloides* infection is prevalent in tropical countries like the Philippines but local data is sparse. It is a soil-transmitted helminth, infecting individuals via penetration of intact skin. Gastrointestinal clinical presentation is myriad; ranging from asymptomatic, loose stools, and abdominal pain. On rare instances, it presents with protein-losing enteropathy brought about by inflammatory exudation and increase in mucosal permeability from direct mucosal invasion of the parasites.
Methods A 61-year-old male presented with 7 months history of persistent watery stools associated with crampy abdominal pain, unrelieved by Loperamide. Gastroscopy revealed non-erosive gastritis in the corpus. Colonoscopy was unremarkable. He was managed conservatively, however he developed significant weight loss of 3 months duration with anorexia, generalized body weakness, and bipedal edema. Blood tests showed eosinophilia and hypoalbuminemia. Enteroscopy was done revealing normal-appearing mucosa. Biopsy of the jejunum revealed eosinophilic infiltrates and *Strongyloides* spp. larva. He was treated with Ivermectin and had improvement of symptoms since.
Results We highlight the importance of having a high index of suspicion for parasitic superinfection causing protein-losing enteropathy for patients who present with chronic diarrhea, weight loss and bilateral leg swelling in a tropical country like the Philippines. In our patient, despite the preliminary negative endoscopy workup, the team decided for enteroscopy and jejunal biopsy with the suspicion of intestinal parasitic infection. Demonstration of *Strongyloides* spp. clinched the diagnosis. This led to definitive treatment with Ivermectin and hence, was completely cured of the disease.
Conclusions This case emphasizes better awareness for helminthic infections such as *Strongyloides* infections, especially for patients who present with chronic diarrhea in persons living in tropical countries. We recommend improved epidemiologic data collection, which may lead to increased disease clinical recognition, early diagnosis, treatment, and measures of prevention.
Keywords *Strongyloides* ; Protein losing enteropathy

Lower GI EE-LGI-085

Clinical Characteristics and Treatment Outcomes of Autoimmune Enteropathy in Children

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Background/Aims Pediatric autoimmune enteropathy (AIE) is a rare disease that causes intractable diarrhea in children. Through this study, we present seven cases of pediatric patients diagnosed with AIE. Our study aids in understanding the clinical and genetic characteristics of this rare genetic condition and the considerations in its management.
Methods From December 1996 to September 2019, seven cases who were diagnosed as AIE in Seoul National University Children's Hospital were retrospectively analyzed. The clinical sources of all AIE cases were reviewed, including electronic medical records, histopathologic material, radiologic images, and laboratory findings.
Results Initial symptoms were diarrhea (in six children) and hematochezia (in one patient). Later, all patients had severe diarrhea which started in the early months of life. Among the five patients tested on gene studies, forkhead box P3 (FOXP3) mutations were identified in four patients, and all of them were males. All patients initially received steroid treatment. Patients with a partial and transient response were considered for alternative agents. Three patients (42.9%) remained in remission under tacrolimus monotherapy, one patient (14.3%) with tacrolimus and prednisolone combination therapy, one patient (14.3%) with tacrolimus, prednisolone, and cyclosporine combination therapy, one patient (14.3%) had died of fulminant hepatitis, and one patient (14.3%) had died of septic shock. All patients were treated with tacrolimus for more than 1 year. Estimated glomerular filtration rate (eGFR) decreased in six patients (85.7%) and increased in one patient (14.3%).
Conclusions In this study, all patients treated with tacrolimus showed amelioration of symptoms. However, histological characteristics did not correlate with symptom improvement. Therefore, the efficacy of treatment can be assessed by symptoms and frequent endoscopic biopsies are not required. For long-term use of tacrolimus, close observation of eGFR is recommended to detect nephrotoxicity early.
Keywords Autoimmune enteropathy; IPEX syndrome; Forkhead box P3 protein; Intractable diarrhea of infancy; Child

Lower GI EE-LGI-086

The Characteristics of Colon Neoplasm in Pyogenic Liver Abscess

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Background/Aims Many previous studies suggest that the pyogenic liver access is related to colon neoplasm, especially colon cancer. In this study, we analyzed clinical feature and risk factors between polyp group and non-polyp group, and characteristics of the colon polyps.
Methods We reviewed patients diagnosed liver abscess with image study from January 1, 2009 to December 31, 2018. Among them, patients who performed colonoscopic exam were chosen as a research group. We have regrouped into groups with and without colon polyp, and analyzed each clinical features and risk factors. Statistical analysis was performed using logistic regression analysis.
Results Of the 79 patients who performed the colonoscopic exam with liver abscess, 40 patients were classified as polyp group and 39 patients as non-polyp group. Hospitalization period was 20.1 days for polyps group and 21.6 days for non-polyp group. Risk factor analysis showed 15 of 40 (22.5%) patients with diabetes mellitus in polyp group, six of 39 (15.4%) in non-polyp group, nine of 40 (22.5%) patients with hepatobiliary diseases in polyp group and 12 of 39 (30.8%) in non-polyp group. Patients with long-term use of proton pump inhibitor were five of 40 (12.5%) in polyp group, five of 39 (12.8%) in non-polyp group. Categorized by the classification, Ip were eight of 40 (20%), Ips were four of 40 (10%), Is were 17 (42.5%) and IIa were four out of 40 (10%). Categorized by pathology, adenoma, low grade dysplasia were 15 of 40 (15%), adenoma, high grade dysplasia were four of 40 (10%), carcinoma were five of 40 (12.5%), hyperplastic polyp were six of 40 (15%).
Conclusions No clinical and statistical significant differences were observed between two groups. However, significant number of polyps was observed in Is. In addition, adenoma, low grade dysplasia was found to be the most frequent, suggesting that even the lower grade neoplasms could develop into liver abscess.

Lower GI EE-LGI-087

A Case of Isolated Polypoid Ganglioneuroma in Rectum

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Background/Aims Ganglioneuromas of the gastrointestinal (GI) tract are rare benign neoplasms, made up of ganglion cells, nerve fibers, and supporting cells of the enteric nervous system. GI ganglioneuromas are classified as isolated polypoid ganglioneuroma, ganglioneuromatous polyposis, and diffuse ganglioneuromatosis. Diffuse ganglioneuromatosis is associated with genetic disorders, such as multiple endocrine neoplasia syndrome (type 2b) and neurofibromatosis (type I). Isolated polypoid ganglioneuromas, however, are not associated with a systemic disease.
Methods A 34-year old man came to Seoul Medical Center hospital for a medical check up. A single polyp on the rectum was inadvertently discovered during colonoscopy. Visually the polyp looked like a serrated hyperplastic polyp and we have performed an endoscopic mucosal resection for the polyp.
Results Resected polyp was diagnosed as ganglioneuroma on pathologic examination and the patient had no history of a systemic disease. And there were no specific findings on abdominal computed tomography. Herein we report a case of solitary ganglioneuroma of the rectum.
Conclusions As suggested by the case, the possibility of isolated polypoid ganglioneuroma should not be neglected when one finds a rectal polyp during colonoscopy and the analysis of its pathological nature gets made.
Keywords Ganglioneuroma; Rectum

Lower GI EE-LGI-088

The Relation Between Clinical Factors and Endoscopic Finding in Pediatric *Clostridium difficile* Associated Disease.

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Background/Aims *Clostridium difficile* associated disease (CDAD) is increasing in children as well as in adults. We tried to find associations between the clinical factors, laboratory results and degree of endoscopic severity in pediatric CDAD.
Methods We retrospectively reviewed the patients who were diagnosed as *C. difficile* infection or pseudomembranous colitis (PMC) from June, 2018 to July 2019 in Department of Pediatrics, Dongsan Medical Center.
Results Among total of 48 patients, male patients were more dominant (n=28, 58.3%) compared to female patients. The average age was 4.7±4.5 years (range, 0.4 to 16.5). The main symptom at presentation was hematochezia with or without mucus as most common (n=20, 41.7%). The interval between the initial symptom onset to diagnosis was 21.3±39.5 days. For diagnosis of *C. difficile* infection, toxin assay was done in 12 out of 48 (25.0%), toxin erythrocyte sedimentation rate polymerase chain reaction (PCR) test in 46 (95.9%), and *C. difficile* stool culture in 47 (97.9%). Only one case showed all positive result of the three-diagnostic test, and 23 cases (50.5%) showed positive result both on PCR test and *C. difficile* culture. Toxins were positive in 39 cases (81.3%) and all were toxin B. Among them, five cases (12.8%) were co-positive with binary toxin. The endoscopy was done in 28 cases (28/48, 58.3%); abnormal endoscopic findings were found in 87.5% of toxin-negative patients on PCR test. Erosions and ulcerations were found in 18 (37.5%), pseudomembranes in 11 (22.9%), and multiple lymphoid hyperplasia in nine (18.8%). Duration of main symptom was positively related with endoscopic finding of pseudomembrane formation (p=0.003). Total bilirubin was significantly lower (p=0.047) and antibiotics administration history was significantly more frequent in PMC (p=0.031).
Conclusions PMC was positively related with symptom duration, lower total bilirubin level, and antibiotics administration history in pediatric CDAD.
Keywords *Clostridium difficile*; Pseudomembranous colitis; Children

Lower GI EE-LGI-089

Risk Factor of Lymph Node Metastasis in Endoscopically Resected T1 Colorectal Cancer

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Background/Aims Early colorectal cancer is defined as a carcinoma confined to the submucosa, regardless of lymph node (LN) status. The risk of LN metastasis in early colon cancer is ranging from 6.3% to 17%, and submucosal invasion more than 1,000 μm, lymphovascular invasion (LVI), poor differentiation and tumor budding are well-known risk factor. We aimed to clarify the risk factors for LN metastasis in early colorectal cancer.
Methods We retrospectively analyzed the clinicopathologic features of endoscopically resected 262 submucosal invasive colon cancers from 2007 to 2017. Of them, we analyzed 141 tumors which underwent subsequent colectomy with LN dissection because of unfavorable pathologic findings.
Results The overall LN metastasis rate was 18.4% (26/141). In the univariate analysis, LVI (p=0.017) and tumor budding (p=0.008) were associated with LN metastasis. In the multivariate analysis, LVI and tumor budding were significantly associated with LN metastasis (odds ratio [OR], 3.834; 95% confidence interval [CI], 1.146 to 12.824; p=0.029 and OR, 3.658; 95% CI, 1.308 to 10.230; p=0.013, respectively) and moderately-differentiated adenocarcinoma was also associated with LN metastasis (OR, 2.808; 95% CI, 1.047 to 7.529; p=0.040). Submucosal depth was not associated with LN metastasis both in univariate and multivariate analysis.
Conclusions In our study, LVI, tumor budding, and moderately-differentiated adenocarcinoma were associated with LN metastasis in endoscopically resected submucosal invasive colorectal cancer which underwent subsequent radical colectomy with LN dissection. Submucosal invasion depth was not associated with LN metastasis.
Keywords T1 cancer; Lymph node metastasis

Table 1. Univariate and Multivariate Analysis

	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Sex		0.551		
Male	1.000			
Female	0.076 (0.380-1.876)			
Age		0.579		
<65 yrs	1.000			
≥65 yrs	1.273 (0.542-2.988)			
Location				
Right colon	1.000			
Left colon	2.348 (0.865-6.375)	0.094	2.038 (0.709-5.855)	0.186
Rectum	0.512 (0.057-4.626)	0.551	0.246 (0.023-2.616)	0.245
Pathology				
Well-differenciated, n (%)	1.000			
Moderately-poorly diff, n (%)	2.53 (0.987-6.485)	0.053	2.808 (1.047-7.529)	0.040
Poorly-differenciated, n (%)	0	>0.999		>0.999
Submucosal invasion depth (μm)				
x<1000 vs. x≥1000	1.023 (0.269-3.887)	0.973		
x<2000 vs. x≥2000	1.087 (0.460-2.570)	0.850		
x<3000 vs. x≥3000	1.694 (0.695-4.128)	0.247		
LVI	3.483 (1.199-10.118)	0.022	3.834 (1.146-12.824)	0.029
budding	4.167 (1.598-10.866)	0.008	3.658 (1.308-10.230)	0.013

OR, odds ratio; CI, confidence interval; LVI, lymphovascular invasion.

Lower GI EE-LGI-090

Influence of Diet Habit on Clinical Course in Inflammatory Bowel Disease Patients

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Background/Aims Diet habits are known to play an important role in the development and clinical course of the disease. Our study was performed to evaluate the effect of diet habit on the clinical outcome in inflammatory bowel disease patients.
Methods This retrospective cohort study involved 27 patients who completed a food frequency questionnaire (FFQ) two times apart over 2 years. Total calorie intake and carbohydrate, lipid, and protein intake rates were investigated by using FFQ and nutrient analyzing program provided by Korean Genome and Epidemiology Study. Dividing the patients into two groups according to the clinical response, we evaluated the effect of diet habits between two groups. Poor clinical response was defined as corticosteroid use more than 3 months in 1 year, use of biologic agents, and disease related hospital admission.
Results In total 27 patients, mean age was 30.3 years; 89% were male, 74% had Crohn's disease and 26% had ulcerative colitis. Total dietary intakes for patients ranged from 1,038 to 3,390 kcal/day (mean, 1,986 kcal), of which 14%, 21% and 65% of protein, lipid, and carbohydrate, respectively. There were no significant differences in diet habits between the first and second FFQ in all patients. On the other hand, patients with poor clinical response tended to have higher rates of protein intake in the first FFQ, but there was no statistical significance (14.1% vs 12.9%, p=0.08). In the analysis of second FFQ, the patients with poor clinical response tend to have higher rate of protein intake (14.1% vs 13.4%, p=0.08) and lipid intake (23.3% vs 18.8%, p=0.09) and lower carbohydrate intake (61.2% vs 66.8%, p=0.06).
Conclusions This study showed that IBD patients with poor clinical response tended to take higher protein and lipid and lower carbohydrate.
Keywords Inflammatory bowel disease; Diet habit

Lower GI EE-LGI-091

Chronic *Clostridium difficile* Infection as a Cause of Refractory RLQ Tenderness in Ileocecal Crohn's Disease

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Background/Aims Crohn's disease often occurs in the ileocecal area and can manifest itself as right lower quadrant (RLQ) mass, pain or tenderness. If RLQ pain and tenderness persist despite the use of 5-aminosalicylic acid (5-ASA) or immunosuppressant, there is a possibility of selecting biologic agent as a refractory disease.
Methods A 28-year-old man visited the hospital with chronic RLQ pain for 2 months. There was no vomiting, diarrhea, and fever. His abdomen was soft and flat, and the bowel sound was normoactive. There was severe tenderness on the RLQ to suprapubic area and a fistula opening was observed around the anus. The abdominal computed tomography showed segmental wall thickening in terminal ileum to ascending colon with pericolic infiltration and lymphadenopathy in RLQ region. Prominent cobble stone appearance and luminal stenosis confined to ascending colon was observed at colonoscopy. Serologic study showed ANCA (–), ASCA (+), IFN-r (–).
Results For 4 months, Pentasa and Feroba were administered, but RLQ pain continued to wax and wane. The patient was hospitalized due to worsening of RLQ pain and *Clostridium difficile* toxin was detected in the stool. Metronidazole was prescribed for 2 weeks. One month later, he was hospitalized again because of recurred RLQ pain and tenderness worsened. *C. difficile* toxin was still detected in his stool and also prescribed 2 weeks of metronidazole then Pentasa and azathioprine. However, after another 1 month, he re-admitted with the same symptoms and revealed the stool *C. difficile* toxin still positive. So, we changed the prescription by vancomycin for 3 weeks including tapering. After that, his RLQ pain and tenderness have not recurred for 6 months of follow up.
Conclusions If Crohn's disease patients have chronic RLQ pain and tenderness that does not respond to 5-ASA or immunosuppressant, it would be better to check stool *C. difficile* toxin before choosing a biologic agent.
Keywords Enterocolitis; Pseudomembranous; Crohn disease; Chronic pain; Causes; Vancomycin

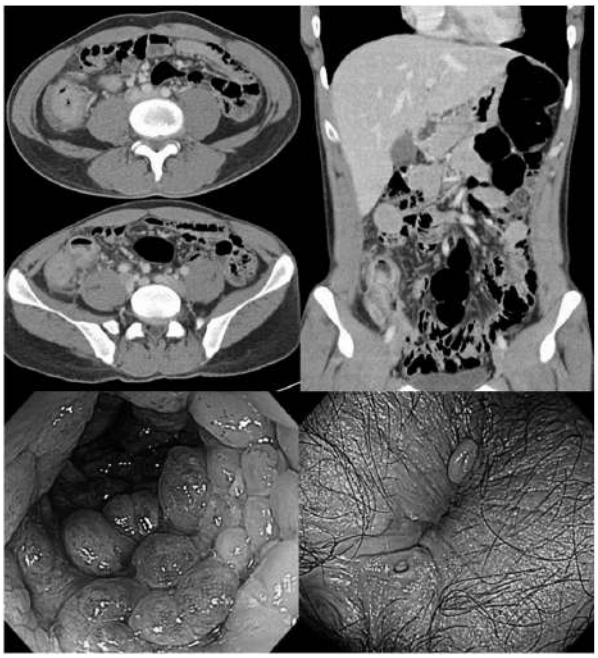

Fig. 1. Computed tomography and colonoscopy.

Fig. 1. Intestinal perforation on computed tomography.

Lower GI EE-LGI-092

Intestinal Perforation due to Paradoxical Reaction during Intestinal Tuberculosis Treatment

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Background/Aims Intestinal tuberculosis is known to be one of the most frequent diseases of extra-pulmonary tuberculosis. Intestinal tuberculosis is mostly ulcerative and can lead to complications such as bleeding, intestinal obstruction, perforation, and fistula formation. It is also known that intestinal perforation during the treatment of tuberculosis is very rare. The case we report is an intestinal perforation case, a rare complication during the treatment of intestinal tuberculosis.
Results A 55-year-old male patient visited the hospital with abdominal discomfort. The patient lost weight with diarrhea and we performed colonoscopy to determine the cause. Linear ulcers with bleeding were observed in the ileocecal area and biopsy was performed. Histopathologic findings diagnosed intestinal tuberculosis with granulomatous inflammation and started treatment. After 3 months, follow-up endoscopy was done, and the ulcer size was reduced and the bleeding was little. Three days later, the patient comes to the emergency room for pain in the lower abdomen and he was hospitalized with a small bowel obstruction diagnosis. Antibiotics and conservative treatments were performed, but abdominal pain continued to increase, so abdomen computed tomography (CT) was taken to evaluate the possibility of perforation. Intraperitoneal air, peritonitis, and intestinal perforation were identified on CT. Surgical small bowel segmental resection was performed. The patient then received anti-tuberculosis (anti-TB) treatment for 6 months and the treatment was completed.
Conclusions This patient had a paradoxical response phenomenon during the treatment of intestinal tuberculosis. Despite the initiation of anti-TB treatment and follow-up of the disease, there were sudden clinical symptoms and intestinal perforation complications. However, despite spontaneous intestinal perforations in such a paradoxical response phenomenon, which did not affect the prognosis of intestinal tuberculosis. anti-TB treatment was completed.
Keywords Intestinal tuberculosis; Paradoxical reaction; Intestinal perforation; Abdominal tuberculosis

Lower GI EE-LGI-093

Unveiling Aggressive Mucosa-Associated Lymphoid Tissue Lymphoma as Overt Obscure Gastrointestinal Bleeding

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Background/Aims This is a case of an aggressive mucosa-associated lymphoid tissue lymphoma (MALToma), with pulmonary involvement (occurring in one out of 10 patients), presenting with hematochezia. On literature search, no local data has been reported as of the moment.
Results An esophagogastroduodenoscopy and colonoscopy was done which revealed no source of active or recent bleeding. Red blood cell (RBC) tagging, computed tomography (CT) angiogram, enteroscopy and video capsule endoscopy were subsequently performed and all were unremarkable. A magnetic resonance imaging of the abdomen revealed a focal fusiform dilatation of the small bowel loop in the proximal terminal ileum with a length of 9 cm and diameter of 5 cm and a second area of focal small bowel loop in the distal jejunum with a length of 8 cm with multiple mesenteric lymph nodes. He subsequently underwent exploratory laparotomy, segmental jejunoileal resection with end to end anastomosis and mesenteric lymph node biopsy. Final histopathology with immunohistochemical stains is compatible with MALToma of small intestines (SI). Postoperatively patient had unremarkable hospital stay, with no recurrence of bleeding. He had a total of 23 units of packed RBC transfusion. He was referred to medical oncology service and a CT scan was done and revealed pulmonary involvement. He was discharged stable. He is currently undergoing chemotherapy with rituximab, cyclophosphamide, vincristine and prednisone for six cycles in Taiwan and is with good response.
Conclusions Overt obscure gastrointestinal bleeding is an uncommon manifestation of MALToma. Diagnostic evaluation and imaging are very important in identifying the specific cause of SI bleeding to guide in a refined and timely approach of management, as this is a life-threatening condition. A multidisciplinary team approach is an integral part in the management of cases such as this.
Keywords Overt obscure gastrointestinal bleeding; MALToma

Lower GI EE-LGI-094

A Variant of Hemophagocytic Lymphohitiocytosis Accompanied by Atypical Pneumonia Associated with Crohn's Disease: A Case Report

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Background/Aims Hemophagocytic lymphohitiocytosis (HLH) is a rare disease that can lead to life threatening. Overseas, there have been reports of patients with Crohn's disease (CD) who developed HLH associated with cytomegalovirus (CMV) or Epstein-Barr virus infection after treatment with thiopurine or immunosuppressant. As far as we have confirmed, this is the first report of CD with HLH in South Korea. We report a case of 58-year-old CD patient accompanied by a HLH variant and atypical pneumonia during oral steroid therapy.
Methods We reviewed medical records of the case retrospectively.
Results A 58-year-old man presented with fever, chill and dark stool. Imaging showed splenomegaly and laboratory tests revealed pancytopenia with elevated inflammatory markers. Due to a history of CD, he was on oral steroids and oral mesalazine since 2 months ago. Duodenoscopy and flexible sigmoidoscopy showed that there were no evidence of bleeding or CD worsening. After multiple negative cultures, persistent fever/pancytopenia, and days of empiric broad spectrum antibiotics, our differential shifted to HLH. A bone marrow biopsy showed the histiocytes were increased in number and also revealed active hemophagocytosis. Additional serum tests showed normal triglycerides/ferritin and elevated fibrinogen/LDH level. CMV real-time quantitative polymerase chain reaction were negative. Our case does not meet the full criteria for diagnosing HLH but hemophagocytosis was confirmed by bone marrow examination, so we assessed the case as a variant of HLH. The patient had a dry cough during hospitalization and worsened. Chest X-ray/ computed tomography showed bilateral parahilar infiltrate suggestive of atypical pneumonia, such as pneumocystis pneumonia or viral pneumonia (Fig. 1). After initiation of trimethoprim and sulfamethoxazole treatment, the patient improved.
Conclusions The clinicians should be aware that complications such as HLH and opportunistic infections may occur, even in the absence of thiopurine, anti-TNF or other immunosuppressive agents while treating CD patients with solely oral steroids and mesalazine.
Keywords Hemophagocytic lymphohitiocytosis; Crohn disease; Hemophagocytosis; Opportunistic infection

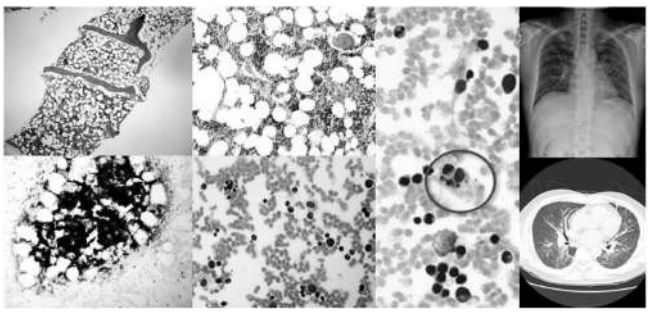

Fig. 1. Hemophagocytosis and pneumonia.

Lower GI EE-LGI-095

Primary Amyloidosis Caused by Monoclonal Gammopathy of Undetermined Significance Diagnosed via Colonoscopic Biopsy: A Case Report

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Background/Aims Amyloidosis is a group of disorders characterized by extracellular deposition of insoluble amyloid fibrils resulting in various organ dysfunction. Secondary (AA) amyloidosis frequently involves gastrointestinal tract. In contrast, gastrointestinal tract involvement is less common in primary (AL) amyloidosis, with pathologically diagnosed disease and symptomatic disease occurring in 8% and 1% of patients, respectively.
Methods We report a case of primary amyloidosis caused by monoclonal gammopathy of undetermined significance (MGUS) diagnosed via colonoscopic biopsy.
Results A 68-year-old man visited gastroenterology department for watery diarrhea began 5 days ago. He had a history of chronic obstructive pulmonary disease and recurrent admission history because of pneumonia. Complete blood count showed white blood cell 10,360/mm^3, hemoglobin 15.9 g/dL, and platelet 422,000/mm^3. Biochemical tests showed total protein 4.9 g/dL, albumin 2.3 g/dL, C-reactive protein 14.21 mg/dL. The serological tests revealed negative tests for ANA, ANCA. Abdominal computed tomography scan showed diffuse wall thickening of small and large bowel loops, consistent to enterocolitis. Stool cultures, toxin assay for *Clostridium difficile*, tuberculosis screening tests were negative. Despite antibiotics treatment, diarrhea was persisted. Serum and urine free light chains were detected. Colonoscopy showed diffuse edematous mucosal changes and multiple ulcerations of entire colon. Histologic examination revealed deposition of amorphous materials in the lamina propria. Staining with Congo red showed the classical apple-green birefringence under polarized light microscopy, diagnostic for amyloidosis. Bone marrow aspiration showed hypocellular marrow with the normal hematopoietic cells. Plasma cells were 2% and no evidence of myeloma was seen, consistent to MGUS. The symptoms were improved after corticosteroid treatment without complication.
Conclusions Amyloidosis should be considered in the differential diagnosis in all cases of enterocolitis of uncertain etiology. Colonoscopy and endoscopic biopsy are mandatory in patients with unexplained enterocolitis.
Keywords Amyloidosis; Enterocolitis; Monoclonal gammopathy; Colonoscopy; Biopsy

Lower GI EE-LGI-096

Small Bowel Perforation due to Fish Bone Intake: A Case Report

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Background/Aims Small bowel perforation due to foreign body ingestion is a rare case. Ingested foreign matter is usually released naturally without any problem. However, ingested foreign body can cause serious complications with a very low possibility. Intestinal perforation is the most common complication of foreign body intake. In this paper, we discuss a rare case of perforation in the distal part of the jejunum as a result of swallowing a foreign body in an elderly patient without gastrointestinal disease or previous history of surgery.
Methods An 80 year-old women visited our center for abdominal pain. She has no previous history of intestinal problems. The initial vital signs were stable. Physical examination revealed tenderness at the lower abdomen. Laboratory results were as follow: white blood cell 12,310/mm^3, hemoglobin 10.4 g/dL, platelet 201,000/mm^3, neutrophil count 9,601.8/mm^3, creatinine 1.53 mg/dL and C-reactive protein 11.12 mg/dL. On computed tomography, hyperdense linear lesions of about 1.6 cm were seen in the middle small bowel loop of the left lower quadrant, and inflammatory changes were observed around the bowel wall (Fig. 1). Laparoscopic examination revealed a small, sharp fishbone penetrating the small intestinal wall in the distal jejunum, and the lesion was removed by surgery. The patient was discharged 8 days after surgery without any complications.
Conclusions The patient experienced bowel perforation at the distal-portion of the jejunum, despite normal bowel physiology with no history of intestinal disease or intra-abdominal surgery. Our case shows that intestinal perforation due to foreign body intake should be considered in the differential diagnosis of acute abdominal pain. Appropriate history taking and imaging techniques will help the doctor make the correct diagnosis. Surgery is the best way to identify and treat intestinal perforation caused by the ingestion of foreign bodies.
Keywords Small bowel perforation; Fish bone; Fishbone; Foreign body; Foreign material

Fig. 1.

Lower GI EE-LGI-097

Roasted Coffee Extract Inhibited Cholesterol Absorption by Interfering with Lipid Digestion Enzyme and Micellar Cholesterol Properties

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Background/Aims *Coffea arabica* L. (Rubiaceae) infusion (common plant name "coffee") is one of the most widely consumed beverages. Roasting coffee transforms the chemical and physical properties of green coffee beans into roasted coffee products. Among its major constituents including caffeine and chlorogenic acid, caffeine has been shown to decrease lipogenesis genes expression resulted in the reduction of hepatic triglyceride and cholesterol accumulation. Thus, roasted coffee could also have a potential for lipid lowering effects. However, it remains uncleared whether roasted coffee extract (RCE) has anti-hyperlipidemic effects. Therefore, the aim of this study was to investigate the effect of RCE on lipid digestion enzyme and micellar cholesterol formation.
Methods Roasted coffee was extract by ultrasound-assisted extraction method with various time (5, 10 and 20 minutes). The inhibitory property of RCE on pancreatic lipase was determined using fluorometric method. The percentage of lipase enzyme inhibition was calculated as compared to the initial activity measured in the absence of pancreatic lipase enzyme inhibitor. In addition, cholesterol micelles particle size and solubility were quantified using particle size analyzer and colorimetric assay, respectively.
Results RCE in all extraction time at 100 mg/mL increased mixed micelle particle sizes. Interestingly, ultrasound-assisted extraction of roast coffee for 5 minutes highly elevated cholesterol micelle size. Furthermore, RCE significantly reduced cholesterol solubility and also showed strong inhibitory effects against pancreatic lipase enzyme.
Conclusions RCE has a lipid-lowering effect in *in vitro* by interfering with pancreatic lipase enzyme activity and cholesterol micellar complex formation. Accordingly, RCE could be developed as nutraceutical product to prevent dyslipidemia-induced obesity and insulin resistance.
Keywords Caffeine; Chlorogenic acid; Cholesterol micelles; Pancreatic lipase; Roasted coffee extract

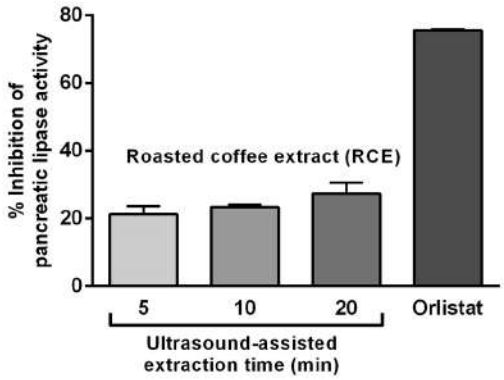

Fig. 1. Roasted coffee extract (RCE) inhibited pancreatic lipase activity.

Lower GI EE-LGI-098

Complicated Gastrointestinal Manifestations of Disseminated Tuberculosis in the Immunocompetent Host: A Report of Two Cases

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Background/Aims Tuberculosis (TB) remains one of the world's most problematic and fatal communicable diseases. Pulmonary tuberculosis is the most common manifestation, however, extrapulmonary infection may occur and the gastrointestinal tract may be involved 1% of the time. Disseminated tuberculosis, involving 2 or more noncontiguous sites, may occur in compromised immune systems but rarely in the immunocompetent host. We report here two cases of disseminated TB presenting as massive gastrointestinal bleeding and small bowel obstruction in the immunocompetent host.
Results A 34-year old Filipino male with no known comorbids presented with jaundice, diarrhea, melena, fever and weight loss. Laboratories showed elevated transaminases (4x), elevated alkaline phosphatase (5x), and conjugated hyperbilirubinemia. Hepatitis and human immunodeficiency virus screening were all negative. MRCP showed hilar stricture for which ERCP (endoscopic retrograde cholangiopancreatography) with stenting was done. EGD (esophagogastroduodenoscopy) only showed erosive gastritis. Colonoscopy revealed ileocecal ulcers suggestive of tuberculosis (Fig. 1). The patient was started on Anti-koch's medication, however, massive gastrointestinal bleeding occurred which led to his demise. Postmortem studies revealed disseminated TB involving the lungs, liver, pancreas, spleen, and gastrointestinal tract particularly the ileum with transmural ulcerations and caseation necrosis. A 43-year old Filipino male with no known comorbids presented with billous vomiting, abdominal pain and distention. Initial SFA was unremarkable. The patient deteriorated before other workups could have been done. Post-mortem studies showed caseation necrosis and Langhans type giant cells consistent with tuberculosis in the lungs, urinary system, and the entire gastrointestinal tract. Examination of the abdomen showed tan, white plaques of tuberculous implants on the serosa of all intestinal segments with multiple adhesions.
Conclusions Disseminated TB is rare in the immunocompetent host but should always be considered in the differential diagnosis of gastrointestinal diseases since timely initiation of treatment results in excellent prognosis while a delay may lead to catastrophic complications.
Keywords Tuberculosis; Gastrointestinal tuberculosis; Disseminated tuberculosis

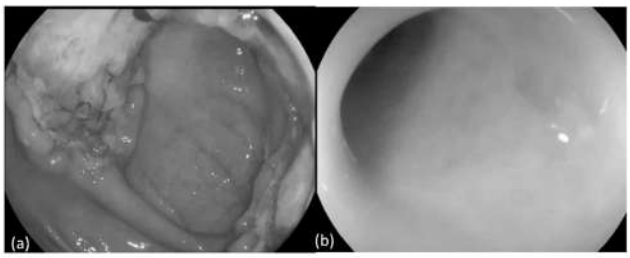

Figure 1. Colonoscopy findings: (a) circumferential friable ulceronodular lesions at the ileocecal valve and cecum with deformed and incompetent valve;
(b) normal-looking terminal ileum

Lower GI EE-LGI-099

A Case of Polypoid Arteriovenous Malformation of Colon with Tubular adenoma

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Background/Aims We report a case of polypoid colonic arteriovenous malformation (AVM) with tubular adenoma that was found incidentally on screening colonoscopy in a 32-year-old male patient.
Methods A 32-year-old man underwent screening colonoscopy in a health screening center. During colonoscopy, a pedunculated polyp was identified in the distal sigmoid colon. He was referred to our institution for colonoscopic polypectomy. Repeat colonoscopy for polyp resection revealed a 1.2-cm long pedunculated polyp overlaid with hyperemic mucosa in the sigmoid colon (Fig. 1). The polyp was looped with a snare and resected clearly through conventional polypectomy. No immediate or delayed bleeding was noted after polypectomy. In biopsy after polypectomy, tubular adenoma with low grade dysplasia was observed along with abnormal vessels with thickened walls in the mucosal layer (Fig. 2) the immunohistochemistry for CD 34 was positive, and using Verhoeff's elastic stain and Prussian blue iron stain the diagnosis of colonic AVM was confirmed.
Results Vascular lesions of the bowel include angiodysplasia, venous ectasia, telangiectasia, hemangiomas, AVM, and Dieulafoy lesions. Although some of these lesions can be mildly elevated, only hemangiomas and AVM are polypoid, and the latter only rarely so. True AVMs are congenital, usually single, containing thick-walled arterioles and venules without intervening capillaries. Colonic polypoid AVM has been reported in about 15 cases so far, which is rare. However, no case of colonic AVM with tubular adenoma has been reported to date.
Conclusions We report the first case of a colonic polypoid AVM with tubular adenoma found by chance in a young male patient and successfully removed by polypectomy.
Keywords Colonic arteriovenous malformation; Tubular adenoma; Colon polypectomy

Figure 1. Endoscopic examination shows a 1.2-cm-long pedunculated polyp overlaid with hyperemic mucosa in the distal sigmoid colon.

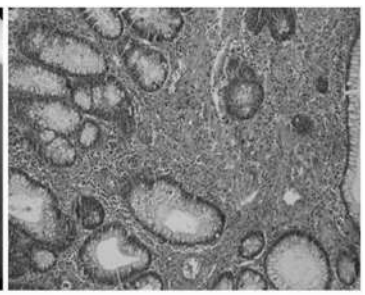

Figure 2. Irregularly dilated and thick walled blood vessels and hemorrhage are observed in the mucosa, which are associated with tubular adenoma (hematoxylin and eosin staining, magnification ×100)

Lower GI EE-LGI-100

A Case of Ectopic Peritoneal Paragonimiasis Mimicking Tuberculous Peritonitis

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Background/Aims Paragonimiasis is a parasitic disease caused by Paragonimus species. Lung is the most common site, but other organs such as the central nervous system, liver, intestine, peritoneal cavity, and abdominal wall are also known to be involved.
Methods A 57-year-old male was admitted for recurrent lower abdominal pain over 4 weeks. Physical examination revealed mild right lower quadrant tenderness. Laboratory findings revealed no abnormalities with normal eosinophil count. He went through computed tomography scan and there was diffuse peritoneal infiltration and subtle wall thickening of right colon with multiple reactive lymph nodes (Fig. 1A). He underwent colonoscopy and esophagogastroduodenoscopy (EGD), and no abnormal finding was found. We suspected tuberculous peritonitis and performed exploratory laparotomy. Intraoperative findings showed multiple small whitish nodules and abscess on the peritoneum. Pathologic reports confirmed that there were numerous eggs of *Paragonimus westermani* (Fig. 1B). ELISA was positive for antibodies against *P. westermani* in the serum. Retrospective history results revealed that he had consumed freshwater crabs.
Results He was treated with praziquantel (25 mg/kg, 3 times daily for 3 days) and his pain was resolved after treatment.
Conclusions Human infection of Paragonimus species occurs by ingestion of raw or pickled freshwater crustaceans, such as crab or crayfish with metacercariae. The metacercariae excyst in the duodenum, and then pass through the intestinal wall, peritoneal cavity, diaphragm, and pleural cavity to the lung. Due to this mi-gratory route, ectopic infections can occur such as peritoneum. The diagnosis of ectopic infection can be made when worms or eggs of characteristic shape are found on tissue. ELISA for antibodies or molecular identification by PCR can be helpful for diagnosis.
Keywords Paragonimiasis; Peritoneum

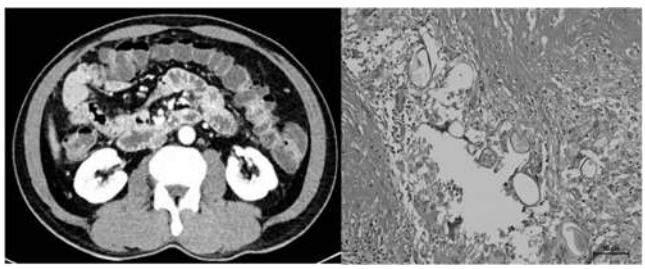

Fig. 1. (A) Computed tomography. (B) Eggs of *Paragonimus westermani* (H&E).

Lower GI EE-LGI-101

Intestinal Pseudo-Obstruction with Concomitant Ureterohydronephrosis and Bile Duct Dilatation, a Rare Clinical Manifestation of Systemic Lupus Erythematosus: A Case Report

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Background/Aims Intestinal pseudo-obstruction (IpsO) is an uncommon gastrointestinal manifestation of systemic lupus erythematosus (SLE) and is largely underrecognized. Only 13 cases of lupus-related IpsO were reported in Asia and none so far has been published in the Philippines. IpsO has a possible association with ureterohydronephrosis and bile duct dilatation. The co-manifestation of these three dilated hollow viscera is a rare occurrence with only four reported cases in the past. The objective of this case report is to document IpsO as a recognized clinical manifestation of SLE and to establish its apparent association with ureterohydronephrosis and bile duct dilatation, a rare clinical entity termed as visceral muscle dysmotility syndrome or generalized megaviscera of lupus, as documented in previous case reports.
Methods We present a case report of a 39-year-old female patient, known to have SLE who presented with persistent diarrhea, vomiting and abdominal distention.
Results Imaging studies showed dilated bowel loops on SFA, diffuse colonic wall thickening, dilatation of the common bile duct and ureterohydronephrosis with no evidence of mechanical obstruction on whole abdominal CT scan with triple contrast. Colonoscopy revealed internal hemorrhoids and nonspecific colitis only. She eventually underwent exploratory laparotomy which showed dilated small and large bowels but no evidence of mechanical obstruction was noted. Cyclophosphamide pulse therapy was initiated which resulted to rapid resolution of patient's symptoms.
Conclusions Awareness and high index of suspicion is important in the diagnosis of IpsO secondary to SLE. Early recognition of this disease entity is crucial to avoid complications, unnecessary surgical intervention and repeated invasive procedures. Immunosuppressive therapy is still the initial and first-line treatment for IpsO secondary to SLE. Co-manifestation of dilatation of 3 hollow viscera especially in patient known to have SLE, should lead to suspicion of generalized auto-immune smooth muscle/enteric nerve injury.
Keywords Case report; Systemic lupus erythematosus; Intestinal pseudo-obstruction; Ureterohydronephrosis; Bile duct dilatation

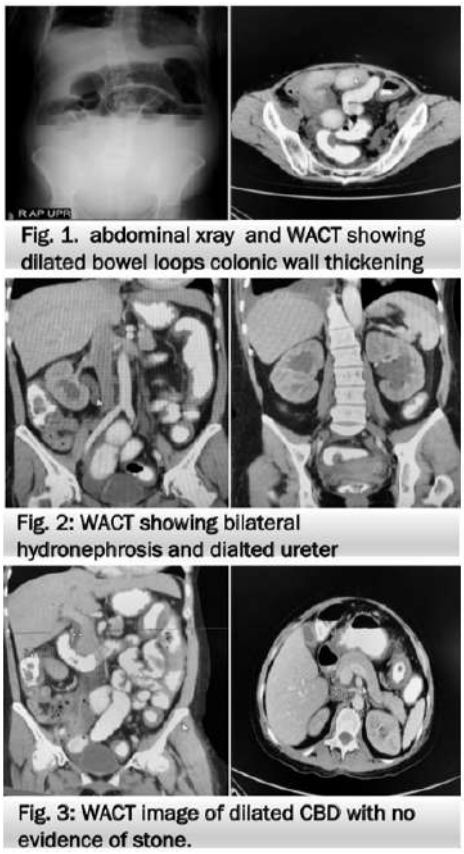

Fig. 1. Abdominal X-ray and computed tomography scan images.

Lower GI EE-LGI-102

Risk Factors Associated with Hospital-Onset *Clostridium difficile* Infection Based on Clinical Presentation at the Time of In-Patient Admission at Makati Medical Center

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Background/Aims *Clostridium difficile* infection (CDI) is one of the most frequent healthcare infections. In Makati Medical Center (MMC), CDI is a problem and poses high burden on cost. Few data are available on strategies to identify patients at increased risk for CDI. This study identified risk factors associated with hospital-onset CDI based on in-patient clinical presentation at time of admission at MMC.
Methods A Case-control study involved adult patients who developed CDI more than 48 hours after admission at MMC from January to December 2015. Control group was taken from electronic medical records and analyzed to determine variables for CDI.
Results Significant variables included age ≥71 years, alcoholics, cardiovascular diseases, diabetes mellitus and chronic kidney disease, on mechanical ventilator, NGT and proton pump inhibitor (PPI). Patients who were started on cephalosporins, penicillins and carbapenems were the ones likely hospital-onset (HO)-CDI.
Conclusions CDI is proven to be common among elderly, more comordities, on mechanical ventilator and PPI were most at risk for HO-CDI.
Keywords *Clostridium difficile* infection

Lower GI EE-LGI-103

A Rare Case of Malignant Anorectal Gastrointestinal Stromal Tumor-Hospital Kuala Lumpur Experience

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[1]Department of Surgery, University Malaya Medical Centre, Kuala Lumpur, and [2]Department of Surgery, Hospital Kuala Lumpur, Kuala Lumpur, Malaysia

Background/Aims Gastrointestinal stromal tumor (GIST) is a rare type of malignant stromal tumor of the gastrointestinal tract. Anorectal involvement is far more uncommon. Surgery is the primary treatment modality to achieve cure. The advancement of immunohistochemistry testing and targeted therapy, Tyrosine Kinase Inhibitor, Imatinib has resulted in paradigm shift in GIST management as adjunct to surgery. This report presents a rare case of anorectal GIST operated post neoadjuvant Imatinib.
Methods A 30 years old man presented with a large prolapsed polypoidal anorectal mass, 2 cm from anal verge on colonoscopy. Histopathology from excision biopsy showed GIST with reactivity towards CD117, CD14, vimentin and h-Caldesmon. Computed tomography scan showed no distant metastasis. Magnetic resonance imaging (MRI) showed involvement of anal sphincter and right puborectalis muscle. Imatinib was given for 12 months prior to surgery.
Results Repeated MRI post neoadjuvant Imatinib showed clear fat plane with ureter, bladder and seminal vesicles with partial reduction of tumor size. Abdominoperineal resection, wide local excision with vertical rectus abdominis myocutaneous flap were successfully done with R0 resection. Histopathology showed GIST with extensive area of post therapy changes and nodal metastases. IHC positive for Desmin. Adjuvant Imatinib were completed for 3 months.
Conclusions GIST tumor, although rare, must be considered when dealing with bowel related mass. R0 resection is important to achieve cure. Targeted therapy for GIST has proven to have significant role as neoadjuvant and adjuvant therapy. No available guideline for duration of neoadjuvant and adjuvant Imatinib is available to date. Further randomized controlled trial study is essential to establish guidelines on TKI therapy duration.
Keywords Gastrointestinal stromal tumor; Glivec; Imatinib; Anorectum; Colorectal

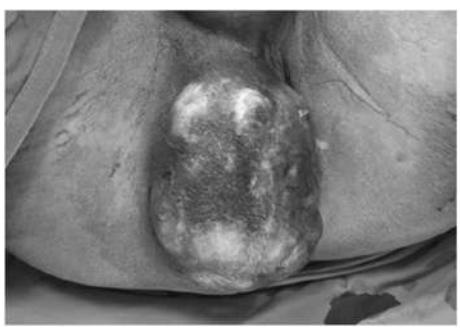

Fig. 1. Anorectal gastrointestinal stromal tumor.

Lower GI EE-LGI-104

A Case of Ascending Colon Mass in an Immunocompetent Individual Secondary to Intestinal Tuberculosis Masquerading as Metastatic Colon Cancer

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Institute of Digestive and Liver Diseases, St. Luke's Medical Center, Quezon City, Philippines

Background/Aims The incidence of tuberculosis (TB) is increasing all over the world. Although pulmonary involvement is more frequent, 3% of patients present with abdominal involvement, which requires differential diagnosis from malignancy. Any region of the gastrointestinal tract can be involved with TB. Intestinal TB accounts for 1% to 3% of TB worldwide.
Results This is a case of 40-year-old female, immunocompetent, without known comorbidities, went to our institution for 5 months history of right lower quadrant pain, unintentional significant weight loss and alternating constipation-diarrhea. Computed tomography scan of the abdomen revealed a large lobulated soft tissue mass in the region of the ascending colon with prominent lymph nodes and subcentimeter hepatic hypodense nodules. Initially seen by surgery service, in which diagnosis of metastatic ascending colon mass was primarily considered, thus patient was appraised surgery and possible neo-adjuvant chemotherapy. Referred for colonoscopy which revealed a mass lesion at the ascending colon. The histopathology revealed unremarkable colonic mucosa. On the other hand, *Mycobacterium tuberculosis* polymerase chain reaction and TB culture also yielded negative results. Since the diagnosis is still unclear, this patient presented with intestinal lesion + exposure to TB + evidence of TB on chest X-ray + originating from endemic region, prompt initiation of anti-TB therapy was done. Patient was managed as a case of Disseminated Tuberculosis (pulmonary, hepatic, lymph nodes, intestinal involvement).
Conclusions Malignancy and tuberculosis may masquerade each other leading to misdiagnosis. Therefore, considering the upsurge of tuberculosis and immigration of individuals from the endemic areas, mindfulness of this association should be always endured in mind.
Keywords Case report; Ascending colon mass; Intestinal tuberculosis

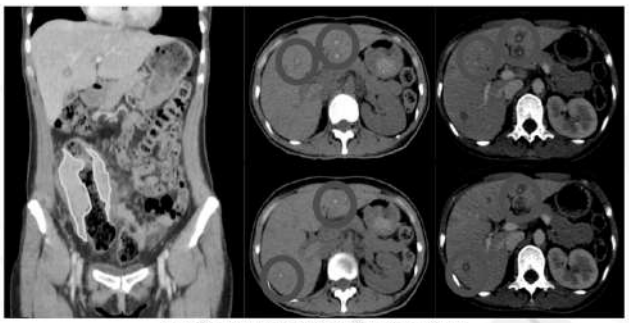

Figure 1. Whole Abdominal CT Scan Images

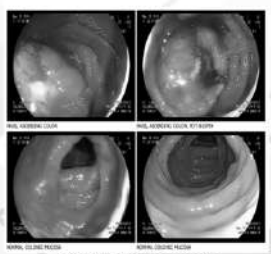

Figure 2. Colonoscopy

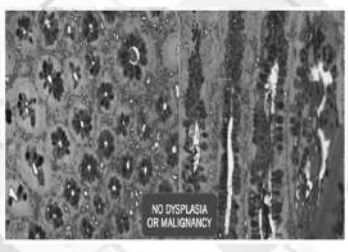

Figure 3. Histopathology Images

Lower GI EE-LGI-105

A Rare Case of an Ileal Dieulafoy's Lesion Manifesting as Obscure, Overt Gastrointestinal Bleeding

Withdrawn

Lower GI EE-LGI-106

Clinical Significance of Anti-Saccharomyces Cerevisiae Antibody in Korean Pediatric Patients with Crohn's Disease

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[1]Department of Pediatrics-GI/Hepatology, Samsung Medical Center, Seoul, and [2]Department of Pediatrics-GI/Hepatology, Kyungpook National University Hospital, Daegu, Korea

Background/Aims The usefulness of anti-*Saccharomyces cerevisiae* antibody (ASCA) for the diagnosis and prognosis of pediatric Crohn's disease (CD) have been reported in Caucasians. However, there is little known in Korean pediatric patients in spite of different environmental and genetic backgrounds. We aimed to evaluate whether ASCA titers are associated with diagnostic findings, disease activity, Paris classification phenotypes and response to infliximab (IFX) treatment in Korean pediatric patients with CD.
Methods Sixty-one CD patients 19 years or younger, diagnosed and treated between December 2008 and February 2016 at Samsung Medical Center and followed for at least 2 years, were included. ASCA IgG/IgA was detected by enzyme-linked immunosorbent assay (ELISA). Data was collected included disease activity, Paris classification phenotype, clinical manifestation, laboratory tests and Simple Endoscopic Score for Crohn Disease (SES-CD) at diagnosis, after IFX treatment.
Results The ASCA IgG prevalence was 44.3% (27/61) and IgA was only 8.2% (5/61) at diagnosis. After IFX treatment, ASCA IgG was 42.1% (24/57) and IgA was 3.5% (2/57). There was no difference in ASCA titers between genders. The mean age, clinical manifestations and laboratory tests at diagnosis did not differ between the groups. The phenotype as determined by the Paris classification also did not differ between the groups. There was no statistically significant difference between ASCA titers and SES-CD. Patients who had been treated with mucosal healing (SES-CD=0) were not associated with ASCA, but patients who did not have a mucosal healing were associated with ASCA titers at diagnosis and after IFX treatment ($p<0.05$).
Conclusions In our study, although the association with clinical features was less than that of the Western country, ASCA seemed to correlate well with mucosal damage in CD. ASCA may be a good non-invasive marker in predicting mucosal healing following treatment in children with CD.
Keywords Anti-*Saccharomyces cerevisiae*; Crohn disease; Antibody

Lower GI EE-LGI-107

Higher Levels of Disease-Related Knowledge Reduce Medical Acceleration in Patients with Inflammatory Bowel Disease

Jihye Park, Hyuk Yoon, Cheol Min Shin, Young Soo Park, Nayoung Kim, and Dong Ho Lee

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Background/Aims The step-up therapy for inflammatory bowel disease is an approach of adding or changing therapies if first-line or less toxic approaches are unsuccessful within an appropriate period. We determined whether higher levels of disease-related knowledge reduce medical acceleration in patients with inflammatory bowel disease.
Methods Follow-up data of patients newly enrolled in our hospital for inflammatory bowel disease and who answered the questionnaire regarding disease-related knowledge of inflammatory bowel disease were analyzed.
Results Between April 2017 and January 2019, 442 patients were enrolled (mean age, 39.5 years; males, 68.8%); 290 patients (65.5%) had ulcerative colitis and 152 (34.3%) had Crohn's disease. The mean disease duration was 49.4 months. During the mean follow-up of 11.4 months, 126 patients (28.4%) underwent step-up therapy and 316 (71.3%) underwent maintenance therapy. The prevalence of maintenance therapy increased with increasing questionnaire scores (p for trend=0.007). Cox proportional hazards analysis revealed that high questionnaire scores (≥16) (hazards ratio [HR], 0.499; 95% confidence interval [CI], 0.299 to 0.834, p=0.008) and previous biologics use (HR, 0.515; 95% CI, 0.303 to 0.874; p=0.014) were negatively associated whereas previous corticosteroid use (HR, 1.757; 95% CI, 1.190 to 2.594, p=0.005) was positively associated with the use of step-up therapy.
Conclusions Disease-related knowledge among patients could reduce the requirement of step-up therapy in inflammatory bowel disease. The questionnaire score and previous use of corticosteroid and biologics were independently predictive of step-up therapy in patients with inflammatory bowel disease.

Lower GI EE-LGI-108

Practical Strategy for Optimizing the Timing of Anti-Tumor Necrosis Factor-Alpha Therapy in Crohn's Disease: A Nationwide Population-Based Study

Sang Youn Shin, Jae Myung Cha, Min Seob Kwak, Jun Ki Min, Min Kyu Chae, Ji Hyun Ahn, Sa Ra Jeong, and Ye Rim Cho

Department of Internal Medicine, Kyung Hee University Hospital at Gangdong, Seoul, Korea

Background/Aims There is little consensus on the optimal timing of anti-tumor necrosis factor (TNF) therapy to decrease the rates of hospitalization and surgery in Crohn's disease. We aimed to assess the real-world outcomes of anti-TNF therapy and estimate the optimal timing of anti-TNF therapy in Korean patients with Crohn's disease.
Methods Claims data were extracted from the Korean Health Insurance Review and Assessment Service database. Incident patients diagnosed with Crohn's disease between 2009 and 2016, with at least one anti-TNF drug prescription, and with follow-up duration >6 months were stratified according to the number of relapses prior to initiation of anti-TNF therapy: groups A (≤1 relapse), B (2 relapses), C (3 relapses), and D (≥4 relapses). The cumulative survival curves free from emergency hospitalization and surgery were compared across groups.
Results Among the 2,173 patients analyzed, the best and worst prognoses were noted in groups A and D, respectively. The incidences of emergency hospitalization and surgery decreased significantly as the use of anti-TNF agents increased. The 5-year rate of hospitalization was significantly lower in group A than in groups C and D (p=0.004 and p=0.020, respectively), but similar between groups A and B. The 5-year rate of surgery was lower in group A than in group C (p=0.024), but similar among groups A, B, and D.
Conclusion In Asian patients with Crohn's disease, anti-TNF therapy reduces the risk of emergency hospitalization and surgery and should be considered before three relapses, regardless of disease duration.
Keywords Biological therapy; Crohn disease; Outcome

Lower GI EE-LGI-109

Deep Neural Network-Based Predication for the Risk of Advanced Colorectal Neoplasia

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Background/Aims No risk prediction algorithm using deep neural network (DNN) was developed to predict the risk of advanced colorectal neoplasia (ACRN). This study aimed to compare DNN models and simple clinical score models for the prediction of ACRN in colorectal cancer screening.
Methods Datasets of screening colonoscopy (n=121,794) at Kangbuk Samsung Hospital as well as database of screening colonoscopy (n=3,738) at Gangdong Kyung Hee University Hospital were used for development of DNN-based model. Two DNN models were developed and compared with two conventional risk prediction models, Asian-Pacific Colorectal Screening (APCS) and Korean Colorectal Screening (KCS) models, to predict ACRN. The area under the receiver operating characteristic curves (AUROCs) of the models was compared in both internal and external validation datasets.
Results In the internal test set, the AUROCs of DNN model 1 and AUROCs score were 0.713 and 0.661 (p<0.001), and the AUROCs of DNN model 2 and KCS score were 0.730 and 0.667 (p<0.001), respectively. However, in the external test set, the prediction performances were not significantly different between two DNN models and corresponding APCS and KCS score, respectively (both p>0.1).
Conclusions Simple score models for risk-stratification of ACRN could be as useful as DNN-based models when input variables are limited. However, further studies on this issue may be warranted to predict a risk of ACRN in colorectal cancer screening because DNN-based models are currently being improved.
Keywords Colorectal neoplasia; Deep learning; Deep neural network; Prediction; Screening

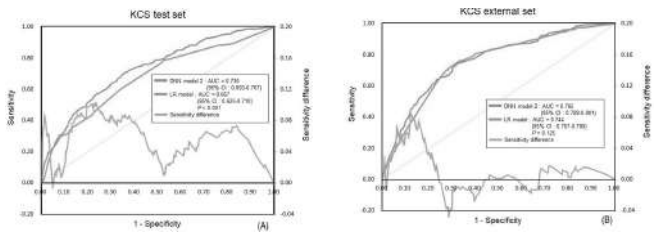

Fig. 1.
KCS, Korean Colorectal Screening; DNN, deep neural network; AUROC, area under the receiver operating characteristic curve; LR, logistic regression; CI, confidence interval.

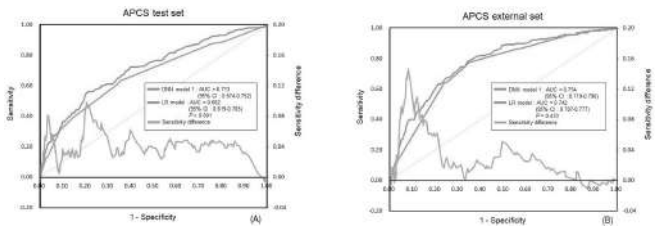

Fig. 2.
APCS, Asian-Pacific Colorectal Screening; DNN, deep neural network; AUROC, area under the receiver operating characteristic curve; LR, logistic regression; CI, confidence interval.

Motility EE-MO-01

Clinical Implications of the Gastroesophageal Reflux Disease Questionnaire in Patients with Suspected Laryngopharyngeal Reflux Symptoms

Youngdong Kim, Cheol Min Shin, Woo Jin Jeong, Hyuk Yoon, Young Soo Park, Nayoung Kim, and Dong Ho Lee

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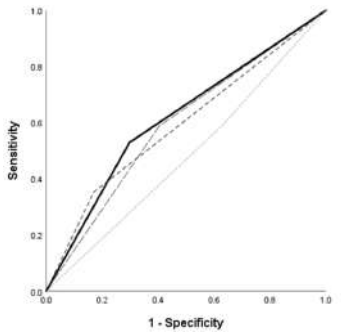
Background/Aims To evaluate the usefulness of Gastroesophageal Reflux Disease Questionnaire (GerdQ) in patients with suspected laryngopharyngeal reflux (LPR) symptoms (globus, cough, hoarseness and throat pain).
Methods A total of 111 patients with suspected LPR symptoms were incorporated from either otorhinolaryngology or gastroenterology clinic. Patient's laryngoscopic findings were graded by reflux finding score (RFS, n=98), and RFS ≥7 was considered as positive LPR. Patient's LPR symptoms were evaluated using reflux symptom index (RSI). Erosive esophagitis by endoscopy (n=111) or abnormal results on 24-hour multichannel intraluminal impedance-pH testing (n=111) were used as diagnostic references for gastroesophageal reflux disease (GERD). Esophageal motor function was evaluated using high-resolution esophageal manometry (n=111).
Results Ninety-one of 98 subjects (92.9%) were diagnosed as LPR but only 17 of 111 (15.3%) had GERD. For GerdQ, the cutoff value of 9 showed the highest area under curve (AUC) to diagnose GERD by receiver operating curve analysis (AUC, 0.616); the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were 52.9%, 70.2%, 24.3% and 89.2%, respectively. For RSI, the cutoff value of 13 showed the highest diagnostic yield (AUC, 0.654) to diagnose LPR; the sensitivity, specificity, PPV, and NPV were 75.3%, 40.0%, 95.9% and 8.0%, respectively. In patients with GERD (n=17), both distal and proximal baseline impedance levels (3 cm and 15 cm above esophagogastric junction, respectively) were decreased (p<0.05) and proximal extent of reflux were increased (p<0.001). However, there was no difference in esophageal body motor function between patients with or without GERD (p>0.05).
Conclusions GERD is infrequent among patients with suspected LPR symptoms. In this population, the sensitivity of GerdQ is low thus it has a limited role to diagnose GERD.
Keywords Laryngopharyngeal reflux; Reflux finding score; Gastroesophageal reflux questionnaire; Reflux symptom index



GerdQ score	AUC	P
7	0.480	0.796
8	0.592	0.229
9	**0.616**	**0.130**
10	0.591	0.232

Fig. 1. Receiver operating characteristic curve of the Gastroesophageal Reflux Disease Questionnaire (GerdQ) in the diagnosis.
AUC, area under curve.

Motility EE-MO-02

The Efficacy and Safety of GCWB104 (Flos Lonicera Extract) in Functional Dyspepsia: A Single-Center, Randomized, Double-Blind, Placebo-Controlled Study

Yonghoon Choi[1], Nayoung Kim[1], Gi Tark Noh[1], Ju Yup Lee[2], and Dong Ho Lee[1]

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Background/Aims GCWB104 is a newly formulated extract obtained from Flos Lonicera, a dried bud of the genus *Lonicera japonica* thunberg, and it shows significant mucosal protective effects in gastritis and gastric ulcers *in vivo*. The aim of this study was to investigate the efficacy and safety of GCWB104 in functional dyspepsia (FD).
Methods In this single-center, double-blind, randomized clinical trial, 92 subjects diagnosed with FD using Rome III criteria were allocated to either the test group (300 mg of GCWB104, containing 125 mg of Flos Lonicera extract, twice daily) or the placebo group (300 mg placebo, twice daily). The total and individual symptom score improvement of the gastrointestinal symptom rating scale (GSRS), change in antioxidant level, and adverse effects were compared before and after 8 weeks of administration.
Results Table 1 shows the GSRS score and blood antioxidant biomarker level changes. The difference of the total GSRS score before and after 8 weeks of administration was significant between the GCWB104 and control groups (p=0.0452). Thirteen of 15 individual symptoms of the GSRS improved in the GCWB104 group, while six symptoms improved in the control group. In addition, statistically significant differences between the two groups were observed in rumbling, loose stool, and stool urgency. In the analysis of change in antioxidant level, blood 8-hydroxy-2'-deoxyguanosine (8-OHdG) levels showed significant reductions (p=0.0324). There were no adverse events related to GCWB104.
Conclusions GCWB104 showed efficacy in improving FD symptoms and safety. It also reduced irritable bowel symptoms and showed antioxidant effects.
Keywords Flos Lonicera; Functional dyspepsia; Antioxidant; Gastrointestinal symptom rating scale

Table 1. GSRS Score and Blood Biomarker Level Changes at 8 Weeks after Treatment

Change of GSRS (Mean ± SD)	GCWB104 (*n* = 38)	Control (*n* = 35)	*P*-value [a]
GSRS total	-6.16 ± 5.52***	-3.34 ± 6.00***	**0.0452**
Abdominal pain	-0.42 ± 0.76**	1.19 ± 2.42	0.1696
Heartburn	-0.74 ± 0.89***	-0.46 ± 0.85**	0.1506
Rumbling	-0.58 ± 0.79***	-0.11 ± 0.80	**0.0146**
Abdominal distension	-0.71 ± 0.84***	-0.37 ± 0.65**	0.0626
Loose stools	-0.32 ± 0.66*	-0.03 ± 0.71	**0.0353**
Urgency for defecation	-0.32 ± 0.70*	-0.06 ± 0.54	**0.0147**
Sensation of incomplete emptiness	-0.34 ± 0.71**	-0.17 ± 0.75	0.4924
Change of blood biomarker level	**GCWB104 (*n* = 38)**	**Control (*n* = 35)**	***P*-value [a]**
8-OHdG	-0.21 ± 0.43	0.01 ± 0.43	**0.0324**

Test group, *Lonicera japonica Thunb* (GCWB104), 125 mg twice a day; control group, placebo drug of *Lonicera japonica Thunb* (GCWB104) 0 mg and maltodextrin 45.3 mg twice a day
GSRS: Gastrointestinal Symptom Rating Scale

SD, standard deviation; 8-OHdG, 8-hydroxy-2'-deoxyguanosine.

Motility EE-MO-03

Association between Leukocyte Count and Erosive Esophagitis in Health Check-up Subjects

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Background/Aims Obesity is reported to be associated with gastroesophageal reflux disease. Furthermore, visceral adipose tissue is a source of inflammatory cytokines and is associated with systemic inflammation, subclinical bowel inflammation. This study aimed to evaluate whether leukocyte count is associated with erosive esophagitis.
Methods This study included 1,116 subjects (aged 40–80 years) during health checkups underwent upper endoscopy and bioelectrical impedance analysis at Korea cancer center hospital healthcare center from January 2017 to December 2018. The odds ratios for erosive esophagitis were calculated using multiple logistic regression across leukocyte count quartiles (Q1: ≤4,760, Q2: 4,770–5,590, Q3: 5,600–6,560, and Q4: ≥6,570 cells/μL) after adjusting for confounding variables.
Results Of 1,116 subjects, 140 (12.5%) were diagnosed with erosive esophagitis. The prevalence of erosive esophagitis was 25 (8.9%) in Q1, 28 (10.0%) in Q2, 34 (12.1%) in Q3, and 53 (19.1%) in Q4. The incidence of erosive esophagitis gradually increases with an increase in leukocyte quartiles. Compared with the lowest quartile of leukocyte counts, the corresponding odds ratio of the highest quartile of leukocyte counts for erosive esophagitis was 1.99 (95% confidence interval, 1.19 to 3.36; p=0.021) after adjusting for age, sex.
Conclusions Inflammatory marker, especially leukocyte counts, were positively related to a higher risk of erosive esophagitis in routine check-up subjects.
Keywords Erosive esophagitis; Leukocyte count; Inflammation

Table 1. Demographic Characteristics of Subjects Association between Obesity and FGID

	Non-Obese (N=102)	Obese (N=193)	*P* value
No	160.6 ± 87.2	142.0 ± 84.5	*0.078*
Sex			*0.017*
- F	38 (37.3%)	45 (23.3%)	
- M	64 (62.7%)	148 (76.7%)	
Age	54.2 ± 16.9	53.2 ± 14.4	*0.598*
Smoking			*0.441*
- -	1 (1.0%)	0 (0.0%)	
- 99	0 (0.0%)	1 (0.5%)	
- No	77 (75.5%)	141 (73.1%)	
- Yes	24 (23.5%)	51 (26.4%)	
Alcohol			*0.257*
- -	1 (1.0%)	0 (0.0%)	
- No	47 (46.1%)	99 (51.3%)	
- Yes	54 (52.9%)	94 (48.7%)	
BMI	22.5 ± 1.7	30.3 ± 6.4	*< 0.001*
Obese3			*< 0.001*
- Normal	102 (100.0%)	0 (0.0%)	
- Obese	0 (0.0%)	118 (61.1%)	
- severe	0 (0.0%)	75 (38.9%)	
A.Functional esophageal disorders			*0.936*
- missing	9 (8.8%)	18 (9.3%)	
- Rome III	16 (15.7%)	33 (17.1%)	
- WNL	77 (75.5%)	142 (73.6%)	
A1.Functional Heartburn			*0.957*
- missing	2 (2.0%)	4 (2.1%)	
- Rome III	9 (8.8%)	19 (9.8%)	
- WNL	91 (89.2%)	170 (88.1%)	
A2.Functional Chest Pain of Presumed Esophageal Origin			*0.652*
- missing	7 (6.9%)	15 (7.8%)	
- Rome III	5 (5.9%)	7 (3.6%)	
- WNL	89 (87.3%)	171 (88.6%)	
A3.Functional Dysphagia			*0.377*
- missing	3 (2.9%)	4 (2.1%)	
- Rome III	2 (2.0%)	10 (5.2%)	
- WNL	97 (95.1%)	179 (92.7%)	
A4.Globus			*0.696*
- missing	3 (2.9%)	4 (2.1%)	
- Rome III	1 (1.0%)	2 (1.0%)	
- WNL	98 (96.1%)	187 (96.9%)	
B1.Functional Dyspepsia			*0.021*
- missing	3 (2.9%)	5 (2.6%)	
- Rome III	7 (6.9%)	2 (1.0%)	
- WNL	92 (90.2%)	186 (96.4%)	
B1a.Postprandial Distress Syndrome (PDS)			*0.049*
- missing	2 (2.0%)	3 (1.6%)	
- Rome III	6 (5.9%)	2 (1.0%)	
- WNL	94 (92.2%)	188 (97.4%)	
B1b.Epigastric pain Syndrome (EPS)			*0.149*
- missing	2 (2.0%)	4 (2.1%)	
- Rome III	2 (2.0%)	0 (0.0%)	
- WNL	98 (96.1%)	189 (97.9%)	
C1.Irritable Bowel Syndrome (IBS)			*0.010*
- missing	7 (6.9%)	2 (1.0%)	
- Rome III	13 (12.7%)	17 (8.8%)	
- WNL	82 (80.4%)	174 (90.2%)	
C1.IBS U			*0.555*
- Rome III	22 (21.4%)	64 (33.2%)	
- WNL	70 (68.6%)	129 (66.8%)	
C1.IBS M			*0.555*
- missing	0 (0.0%)	2 (1.0%)	
- Rome III	26 (25.5%)	52 (26.9%)	
- WNL	76 (74.5%)	139 (72.0%)	
C1.IBS D			*1.000*
- Rome III	24 (23.5%)	45 (23.3%)	
- WNL	78 (76.5%)	148 (76.7%)	
C1.IBS C			*0.410*
- missing	0 (0.0%)	2 (1.0%)	
- Rome III	20 (19.6%)	30 (15.5%)	
- WNL	82 (80.4%)	161 (83.4%)	
C3.Functional Constipation			*0.587*
- missing	0 (0.0%)	2 (1.0%)	
- Rome III	8 (7.8%)	15 (7.8%)	
- WNL	94 (92.2%)	176 (91.2%)	

FGID, functional gastrointestinal disorder; F, female; M, male; BMI, body mass index.

Motility EE-MO-04

Prevalence of Functional Gastrointestinal Disorder by Rome III Criteria in Korean Obese Subjects

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Background/Aims There is insufficient evidence for a relationship between functional gastrointestinal disorder (FGID) and obesity. The purpose of this study was to investigate the different prevalence of symptoms in FGID between non-obese and obese subjects.
Methods A total of 295 subjects was evaluated in Eunpyeong St. Mary's Hospital, Korea, between March 2016 and August 2019. An FGID questionnaire was asked. Rome III criteria was used for diagnosis of FGID. The subjects with body mass index (BMI) ≥30 kg/m^2 were defined as severe obesity and 25≤ BMI <30 kg/m^2 were defined as mild-moderate obesity.
Results Among 295 subjects, 193 were obese and 102 were non-obese. One hundred eighteen were mild-moderate obese and 75 were severe obese. The BMI (kg/m^2) was 30.3±6.4 in obese subjects, and 22.5±1.7 in non-obese subjects (p<0.001). There was no difference between groups in age, smoking and alcohol. There was difference in the prevalence of functional dyspepsia (FD) (1% vs 6.9%, p=0.021) and irritable bowel syndrome (IBS; 8.8% vs 12.7%, p=0.001) in obese and non-obese subjects. There was no difference in both groups regarding the prevalence of functional dysphagia (2.0% vs 5.2%, p=0.377) and functional constipation (7.8% vs 7.8%, p=0.587). There was higher prevalence of IBS symptoms subjects with non-obese than mild-moderate obese and severe obese (12.7% vs 9.3% vs 8.0%, p=0.035).
Conclusions Obese subjects have a lower tendency of symptom prevalence of FD and IBS than non-obese subjects in Korea.
Keywords Functional gastrointestinal disorder; Functional dyspepsia; Irritable bowel syndrome; Obesity; Obese

Motility EE-MO-05

Efficacy of *Dolichos lablab* L. on Irritable Bowel Syndrome: Open-Label Prospective Pilot Trial

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Background/Aims Pathophysiology of irritable bowel syndrome (IBS) is poorly understood and management of IBS remains a challenge. *Dolichos lablab* L. (DL), a bean species, has traditionally been used for treating gastrointestinal disorders in China and Korea. However, no studies have investigated its use for treating IBS. The aim of this study is to examine the efficacy of DL on the symptom relief of IBS.
Methods Twenty adult patients with IBS were enrolled. Eligible patients satisfied Rome IV criteria for diagnosis of IBS. After a 2 week observation period, all participants received DL extract capsules for 8 weeks. Primary endpoint was the mean change of abdominal pain from baseline assessed by visual analogue scale (VAS) score for 8 weeks of treatment. Secondary endpoints were the changes in abdominal pain from baseline as week 4, patient-reported symptom improvement including stool frequency and consistency, and IBS-quality of life (IBS-QoL) at week 8.
Results The VAS scores of abdominal pain at week 8, were significantly decreased (p<0.0001). Overall symptomatic improvement was observed in 13 participants (65%) at week 4 and 17 participants (85%) at week 8. Compared to baseline, the participant's IBS-QoL and frequency of defecation were significantly lower at 8 weeks after the administration of DL. Adverse events were observed in two participants and no drug-related severe adverse event was observed.
Conclusions Treatment with DL was associated with relief of abdominal pain, overall symptomatic improvement and decreased frequency of defecation. The results showed the potential therapeutic application of DL in the treatment of IBS. Future studies with greater statistical power are needed to clarify the possible effects of DL in the treatment of IBS patients.
Keywords *Dolichos lablab* L.; Irritable bowel syndrome; Abdominal pain; Defecation

Motility EE-MO-06

Response of Proton Pump Inhibitor According to Functional Dyspepsia Subtype

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Background/Aims Functional dyspepsia (FD) is a common clinical condition characterized by chronic or recurrent upper abdominal pain or discomfort without organic disorder. Proton pump inhibitor (PPI) has been proposed as the first line of therapeutic option in FD. There are two subtypes of FD based on clusters of symptoms; postprandial distress syndrome (PDS) and epigastric pain syndrome (EPS). We conducted a systematic review to evaluate whether PPI therapy provides different symptomatic relief according to FD subtypes.

Methods With an expert librarian, we completed an extensive search of publications in the Medline, Embase, and Cochran Library, and KoreaMed from 2005 to present. Two review authors independently assessed eligibility and trial quality, and extracted data. We collected data on relief of dyspeptic symptoms after PPI treatment according to FD subtypes.

Results We identified four randomized controlled trials (RCTs) that evaluated the efficacy of PPI in FD patients with epigastric pain or burning as the predominant symptom, including two involving the EPS subtype based on the Rome III criteria. PPI was more effective than placebo for the treatment of predominant epigastric pain or burning (risk ratio [RR], 1.22; 95% confidence interval [CI], 1.04 to 1.44) with no observed heterogeneity (χ^2, 0.02; p=0.99; I^2=0%). Regarding postprandial fullness or early satiety as the predominant symptom, there were two RCTs that defined the PDS subtype. No significant difference was observed between the PPI and placebo groups in patients with the PDS subtype (RR, 1.56; 95% CI, 0.91 to 2.70) without heterogeneity.

Conclusions PPIs should be recommended as a first line treatment for functional dyspepsia in patient with EPS.

Keywords Functional dyspepsia; Proton pump inhibitor; Epigastric pain syndrome; Postprandial distress syndrome

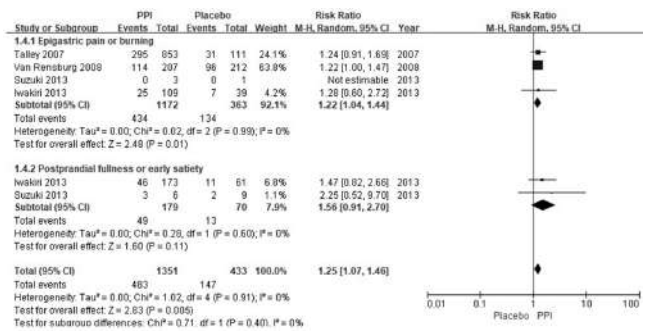

Fig. 1. Forest plot of randomized controlled trials.
PPI, proton pump inhibitor; CI, confidence interval.

Motility EE-MO-07

Systematic Review with Meta-Analysis: Defecography in Subjects without Defecatory Symptoms

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Withdrawn

Background/Aims Defecography is one of the useful diagnostic tools for the assessment of defecatory disorders. There have been no formal systematic reviews of defecography data in healthy populations. Therefore the aim of the present study was to establish normative data in order to aid identification of clinically significant defecographic abnormalities.

Methods We carried out a systematic review following the guidance in the Preferred Reporting Items for Systema[illegible]es (PRISMA) statement. We searched the databases Medli[illegible]guage publications.

Results Pooled means (95% c[illegible]ectal angle measured by central axis method at rest, squeeze and evacuation were 112.1° (range, 109.8° to 114.4°), 100.5° (range, 96.5° to 104.5°) and 121.7° (range, 118.9° to 124.5°), respectively. Pooled means of total evacuation time and proportion of rectum evacuated were 17 seconds (range, 15 to 18.9 seconds) and 77.9% (range, 76% to 79.8%), respectively. Pooled means of diagnostic descent was 3.4 cm (range, 3.2 to 3.6 cm). The pooled mean prevalence of large rectocele (>2 cm in size) and high-grade rectal intussusception was 16.5% (range, 11.4% to 21.6%) and 22.8% (range, 17.4% to 28.3%), respectively.

Conclusions This study is first to evaluate reference values for defecography. The prevalence of rectal structural diseases is not negligible in asymptomatic individuals.

Keywords Defecography; Healthy; Rectum; Emptying

Motility EE-MO-08

Efficacy of DA-5204 for Gastroesophageal Reflux Disease: A Randomized, Double-Blind, Placebo-Controlled Pilot Study

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Background/Aims Proton pump inhibitor (PPI) alone is not satisfactory for the treatment of gastroesophageal reflux disease (GERD). Therefore, we investigated the efficacy of DA-5204 (Stillen 2X, 90 mg of *Artemisia asiatica* 95% ethanol extract per tablet) and PPI combination therapy on GERD in comparison to PPI alone.

Methods This randomized, double-blind, placebo-controlled study randomly assigned 70 patients with endoscopically proven esophageal mucosal injury (Los Angeles classification A or B) into two groups: pantoprazole 40 mg once daily with DA-5204 twice daily (DA-5204 group) or pantoprazole 40 mg once daily with placebo twice daily (placebo group) for 4 weeks. The primary endpoints were endoscopically effective (normal mucosa or minimal change) or complete healing (normal mucosa) rates, and secondary endpoint was sufficient relief (≥50% reduction) of reflux symptoms using Gastroesophageal Reflux Disease Questionnaire (GerdQ).

Results Final analyses included 29 patients with the DA-5204 group and 30 patients with the placebo group. At weeks 4, there was a significantly difference of the endoscopically effective healing rate between the two groups (DA-5204 group vs placebo group, 93.1% vs 56.7%; p=0.001) as well as the complete healing rate (DA-5204 group vs placebo group, 82.8% vs 33.3%; p<0.000). The rates of sufficient relief for reflux symptoms according to GerdQ tended to be higher in the DA-5204 group than in the placebo group, with no significant difference.

Conclusions Our findings suggest that combined therapy with PPI and DA-5204 is more effective in treating GERD than PPI alone.

Keywords *Artemisia asiatica*; Proton pump inhibitor; Gastroesophageal reflux disease; Reflux esophagitis

Motility EE-MO-09

The Prevalence of Small Intestinal Bacterial Overgrowth and Its Impact on the Intestinal Symptoms in Patients with Lactose Intolerance

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Background/Aims Lactose intolerance and small intestinal bacterial overgrowth (SIBO) share symptoms such as abdominal discomfort, diarrhea, and bloating. The aim of the study was to investigate the prevalence of SIBO and its impact on intestinal symptoms in patients with lactose intolerance.
Methods This prospective study enrolled patients who complained of symptoms related to dairy products intake. All patients completed a nutritional survey that allowed to assess the degree of tolerance to milk products and symptom questionnaire. Lactose intolerance quick test and glucose breath test were performed to determine lactose intolerance and SIBO.
Results Of the 52 patients enrolled, 37 (71.2%) were diagnosed with lactose intolerance. Among them, 12 patients (32.4%) were diagnosed with SIBO. Patients with both lactose intolerance and SIBO have higher tendency of symptom score including bloating, satiety, flatulence and nausea than those of patients with lactose intolerance without SIBO. Nausea symptom was found to be predictive for SIBO (odds ratio, 4.1; p=0.042).
Conclusions SIBO is common in patients with lactose intolerance. SIBO might be the cause of symptoms in patients with lactose intolerance. Therefore, clinicians may need to consider the possibility of SIBO in patients with lactose intolerance before restrictive diets.
Keywords Small intestinal bacterial overgrowth; Lactose intolerance; Intestinal symptoms

Motility EE-MO-10

Metabolomic Signatures for Effects of Interventions on Severe Obesity in Children and Adolescence

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Background/Aims Childhood obesity has been increased worldwide and many clinical and public interventions have been tried to reduce the morbidities. However, there was no reliable biomarkers to identify the high-risk groups or good response groups to specific interventions. The purpose of this study is to identify the metabolic signatures associated with interventions to control weight in obese children.
Methods Forty obese children from "Intervention for Children and Adolescent Obesity via Activity and Nutrition study" were selected according to the response to the interventions. Half of the children were responders (n=20) and the others were non-responders (n=20). Physiological data and blood samples were collected at baseline, intervention after 6 months, and 18 months. Total 120 samples were collected and quantitative analysis of the metabolites of serum samples were applied using CE-TOFMS and the biocrates Absolute IDQ p180 kit with LC-TOFMS.
Results Total 194 metabolites (111 metabolites in cation mode and 83 metabolites in anion mode) in 120 samples were detected on the basis of human metabolome technologies' standard library. Nine metabolites (1- or 3-Methylhistidine, 3-Hydroxypropionic acid, 8- or 2-Hydroxyoctanoic acid-1, alanine, asparagine, cystine, indole-3-acetic acid, N-acetylalanine, tyrosine) showed significant changes between baseline and 18months samples in responders and non-responders ($p<0.05$). Alanine, asparagine, cystine, indole-3-acetic acid, tyrosine were also revealed relative areas of each metabolites in 0, 6, 18 months, respectively in metabolic pathway mapping.
Conclusions Our study shows significantly different metabolomic profiling in responder and non-responder groups according to the interventions. This result calls for further researches about the biomarkers regarding to the responses to specific treatments or interventions to the larger group of obese children.
Keywords Metabolomics; Obesity; Child; Adolescent; Weight loss

Motility EE-MO-11

Sigmoid Volvulus in Parkinson Disease: A Systematic Review of Case Reports

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Background/Aims Parkinson disease (PD) is a neurodegenerative disorder associated with gastrointestinal dysfunction, including intestinal obstruction caused by sigmoid volvulus. Several cases have been reported, but its specific incidence is unknown and it still remains to be underrecognized. This review aims to systematically summarize the clinical characteristics and course of disease of PD patients reported to have sigmoid volvulus.
Methods A systematic literature search of all reported cases of sigmoid volvulus in PD patients was done. Patients' characteristics and disease course were extracted, including clinical presentation, diagnostic findings, intervention, outcome, and descriptive analysis was done. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guided the methodological conduct and reporting.
Results Eight publications from 1965 to 2018 met the selection criteria, with a total of 19 cases. Based on Newcastle Ottawa scale, two studies were appraised as high, and six as moderate methodological quality, primarily due incomplete data reported. The median age was 73 years (range, 59 to 87 years) and, male to female ratio was 5:1. The primary symptoms upon consultation were abdominal distention (n=12), abdominal pain (n=10), and constipation (n=10). The radiographic findings were suggestive of sigmoid volvulus. Eleven cases (69%) underwent successful endoscopic detorsion and decompression, but seven among these cases eventually had recurrence of sigmoid volvulus within 6 months. Five cases (31%) underwent colectomy with colostomy, one of which initially had successful endoscopic detorsion, and eventually underwent surgical intervention. Overall, 77% (n=10) of patients who underwent either endoscopic decompression or surgical intervention had recurrence of sigmoid volvulus.
Conclusions PD patients have increased risk to develop recurrent sigmoid volvulus, even after endoscopic decompression or surgical intervention. Early recognition and management is important to prevent its further complications.
Keywords Parkinson disease; Sigmoid volvulus; Systematic review; Case reports

Motility EE-MO-12

A Case of Refractory Cyclic Vomiting Syndrome Successfully Treated with Oral Valproic Acid

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Background/Aims A 26-month-old girl visited our clinic with recurrent severe nausea and vomiting episodes for about 6 months.
Methods Each of the episode usually took 3 to 7 days of duration and the initial 2 to 3 days showed very severe and intensive nausea and vomiting. It was repeated with a relatively regular cycle of 1-month-interval and the symptom attack was separated by times of comparative wellness.
Results The diagnostic work-ups to rule out any organic diseases were processed including esophagogastroduodenoscopy, upper gastrointestinal series, abdominal computed tomography scan, brain magnetic resonance imaging, blood analysis, urine analysis, and stool examination. We checked for the possibility of metabolic disease through blood and urine analysis and also checked for possibility of porphyria. The all investigations showed negative results and we started the treatment under the impression of cyclic vomiting syndrome (CVS). With rescuing treatment with intravenous hydration of normal saline and 10% dextrose with lorazepam or diphenhydramine, we tried to find any effective preventive agent for the patient. We tried amitriptyline, propranolol, cyproheptadine, erythromycin, riboflavin, and topiramate. None of the medication was effective in alleviating or preventing her recurrent nausea and vomiting, and she had to be hospitalized about one to two times per month. Because of poor intravenous line assessment, she had to be instituted central line assess. Finally we decided to start valproic acid at an initial dose of 10 mg/kg/day in two divided doses, and slowly increased up to 25 mg/kg/day. About 3 months later, with the valproic acid level in blood maintaining the therapeutic range, her symptoms did not recur again. She is now on valproic acid at a dose of 15 mg/kg/day, and she does not show any adverse result on regular blood and urine test with good growth velocity.
Conclusions We report a refractory pediatric CVS case which was successfully treated with valproate as a prophylactic management.
Keywords Cyclic vomiting syndrome; Children; Valproic acid

Motility EE-MO-13

The Effects of Calcium Channel Blockers in Type II Achalasia

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Background/Aims As high-resolution esophageal manometry (HREM) is widely used, We can easily examine physiologic changes of esophageal motility disorders. Calcium channel blockers (CCBs) are drugs commonly used in the treatment of achalasia. The CCBs inhibit cellular uptake of calcium, thereby impeding contraction and promoting relaxation. Especially, dihydropyridine (nifedipine) has been used to relieve symptoms in achalasia. We report physiological changes of achalasia type II patient according to using CCBs by HREM.
Results A 51-year-old man presented with swallowing difficulty and postprandial chest discomfort (Eckardt scores, 6 points). The esophagogastroscopy showed edematous mucosa in entire esophagus without abnormal esophageal lesions or food stagnation. Performed histologic examination revealed that eosinophilic esophagitis could be excluded. The results of HREM were as follows; the median IRP (4 seconds), 39.9 mmHg (range, 18.6 to 49.7); the median DCI, 590 mm Hg.s.cm; and 100% panesophageal pressurization. As the results, we diagnosed type II achalasia according to the Chicago classification version 3.0. To alleviate the symptoms, the patient was given amlodipine 5 mg/day. The follow-up HREM after 7 months of CCBs administration was executed. The median IRP (4 seconds) value decreased from 39.9 mmHg to 14.4 mmHg, and the panesophageal pressurization pattern also decreased from 100% to 90%, while the DCI value deceased to 454 mm Hg.s.cm. Eckardt scores were also improved from 6 to 2 points. These results are consistent to lower esophageal sphincter relaxation of CCBs as previously known. On the other hand, the smooth muscle contraction force of the esophagus body was reduced, showing lower the DCI value.
Conclusions HREM allow easily us to examine the esophageal changes associated with the use of drugs such as CCBs in patients with esophageal motility disorders, and help us to understand the physiology of the esophagus and to proceed with the selection of appropriate treatment regimens.
Keywords High-resolution manometry; Achalasia; Calcium channel blockers; Esophagus

Fig. 1. Coffee-bean shaped volvulus.

Motility EE-MO-14

Sigmoid Volvulus in Parkinson Disease, with Severe Hypokalemia and Hypomagnesemia Causing Cardiac Arrhythmia: A Case Report

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Background/Aims Parkinson Disease (PD) is a neurodegenerative disorder that may present with gastrointestinal dysfunction, including dysphagia, constipation, asymptomatic megacolon, and rarely, intestinal obstruction. In the Philippines, there is no available data in the prevalence of PD, particularly those associated with sigmoid volvulus.
Methods We report a case of a 64-year-old Filipino female with advanced PD for 15 years, with a history of sigmoid volvulus that was managed conservatively, who had 2 weeks history of non-tender abdominal distention, and loose watery stool ($\geq$200 mL/bout) twice per day. She had normal vital signs, with soft grossly distended tympanitic abdomen, with diffused high-pitched bowel sounds. Abdominal radiography showed a coffee-bean-shaped colon, suggestive of sigmoid volvulus. Blood tests showed severe hypokalemia (1.43 mmol/L), and eventually, hypomagnesemia (0.61 mmol/L), manifested as sinus bradycardia with prolonged PR and QT interval, and wide QRS on ECG, not associated with any cardiac symptoms.
Results She was advised for immediate surgical intervention, but was eventually deferred due to persistence of bowel movement, radiographic evidence of decrease in bowel dilatation, and absence of signs and symptoms of complete bowel obstruction. The cardiac arrhythmia was resolved upon correction of electrolytes. Echocardiography showed unremarkable findings. Colonoscopy revealed elongated and redundant colon, with absence of bowel obstruction, suggesting spontaneous resolution of sigmoid volvulus. She was eventually discharged, but was advised for elective sigmoid resection; however, her relatives refused surgical intervention.
Conclusions Early recognition and management of gastrointestinal dysfunction among patients with Parkinson Disease, particularly sigmoid volvulus, is key to prevent further complications.
Keywords Parkinson disease; Sigmoid volvulus; Hypokalemia; Hypomagnesemia; Cardiac arrhythmia

GI Cancer EE-GI-01

Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio as Prognostic Markers in Patients with Locally Advanced Esophageal Squamous Cell Carcinoma Treated with Neoadjuvant Chemoradiotherapy

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Background/Aims Neutrophil-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) have been known as prognostic factors in solid malignancies. This study investigated the prognostic values of NLR and PLR in localized esophageal cancer.
Methods A total of 50 patients with localized esophageal squamous cell carcinoma who received neoadjuvant chemoradiotherapy (CRT) were analyzed retrospectively. NLR and PLR were measured after neoadjuvant CRT. Using receiver operating characteristic curve analysis, the optimal cutoff values were determined as 2.74 for NLR and 163.1 for PLR. The patients were divided into low NLR group (NLR $\leq$2.74, n=21) and high NLR group (NLR >2.74, n=29), and also low PLR group (NLR $\leq$163.1, n=22) and high PLR group (NLR >163.1, n=28). Outcome measures of interest were overall survival (OS).
Results The mean age was 66.6 years (range, 46 to 87 years) and 88% were male. After a median follow-up of 19.6 months, high NLR and high PLR were significantly associated with worse OS compared to low NLR and low PLR, respectively (91.3% vs 23.9%, p$\leq$0.001; 80.8% vs 31.3%, p=0.001, respectively). On multivariate analysis, both high NLR and high PLR were significantly associated with worse OS (hazard ratio [HR], 10.37; p<0.001; HR, 2.78; p=0.037, respectively).
Conclusions NLR and PLR were independent prognostic factor for OS in patients with localized esophageal squamous cell carcinoma after neoadjuvant CRT.
Keywords Esophageal neoplasms; Neutrophils; Lymphocytes

GI Cancer EE-GI-02

Clinical Characteristics, Endoscopic Images and Histopathology of Colorectal Cancer at 108 Military Central Hospital from 2018 to 2019

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Background/Aims Study on clinical features, endoscopic images and histopathology of colorectal cancer at 108 Military Central Hospital.
Methods A cross-sectional and prospective study of all patients diagnosed with colorectal cancer from January 2018 to the end of June 2019 at 108 Military Central Hospital. Using CV colposcopy 180 of Olympus Japan. Histopathological examination is performed at the Department of Pathology.
Results During the 18-month period at 108 Military Central Hospital, there were 182 colorectal cancer patients with 72% of male patients, 28% of female patients; male to female ratio, 2.57:1; middle age average, 63.03±11.27 years (range, 27 to 86 years). Common clinical symptoms: abdominal pain (68.7%), bloody stools (61.0%), weight loss (58.8%), stool disorders (38.5%), anemia (24.7%), intestinal obstruction (8.2%), nausea (7.7%). Endoscopic images: tumors in rectum (30.2%), sigma colon (29.2%), corner of the liver in the colon (13.2%), and colon up (10.4%). Macroscopic form: tumors with the highest form (47.8%), ulcerative form (26.9%), ulcerative form (18.7%), infiltrates (6.6%). Estimated tumor size according to the circumference of the colon: the tumor accounts for ≥3/4 of the circumference (49.5%), accounting for 1/2 circumference (34.1%), occupy the entire circumference (14.3%), accounting for 1/4 circumference (2.2%). The average size of the tumor: 5.9±3.1 cm (range, 1.4 to 16.9 cm). Histopathological **Results** adenocarcinoma (94.5%), mucous carcinoma (5.5%), mainly differentiated in moderate levels (92.3%).
Conclusions Clinical and subclinical signs of colorectal cancer are very typical. However, the rate of detecting colorectal cancer at an early stage in Vietnam is still low. Therefore, it is necessary to have a screening strategy for early detection and effective treatment of colorectal cancer.
Keywords Colorectal; Colorectal cancer; Histopathology; Endoscopy

GI Cancer EE-GI-03

Tolerability and Safety of Adenovirus-Mediated Double Suicide Gene Therapy with Chemotherapy in Locally Advanced Pancreatic Cancer: Phase I Trial

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Background/Aims Locally advanced pancreatic cancer (LAPC) is challenging. We aimed to evaluate the tolerability and safety of Ad5-yCD/mutTK(SR39)rep-ADP (Ad5-DS), a replication-competent adenovirus-mediated double suicide gene therapy in combination with gemcitabine in LAPC patients.
Methods Newly diagnosed LAPC patients were enrolled in a single-center, open label, 3+3 dose-escalation phase I trial (NCT02894944). Ad5-DS was injected into the pancreatic mass with endoscopic ultrasound guided fine needles in combination with oral 5-fluorocytosine and valganciclovir, and standard dose of intravenous gemcitabine. The doses of Ad5-DS in cohorts 1 to 3 were 1×10^{11}, 3×10^{11}, and 1×10^{12} VP/mL, respectively. Patients were observed for dose limiting toxicity (DLT) for 8 weeks after Ad5-DS injection. Toxicity within 12 weeks, tumor response in 12 weeks, disease progression in 6.5 months, and detection of adenoviral DNA particle in 8 weeks were also assessed.
Results Among eleven patients enrolled; nine completed the evaluation period; and two withdrew their consent. No DLT was reported; thus, maximum tolerated dose was not reached. No additional toxicity was reported in 9 to 12 weeks. One patient showed partial response and eight showed stable disease at 12 weeks. Two patients showed disease progression at 6.5 months (with a median of progression-free survival, 11.4 months). At 8 weeks, serum adenoviral DNA particles were detected in four patients (with a median of 55 days).
Conclusions Combination of intratumoral Ad5-DS in addition to gemcitabine is safe and well-tolerated in patients with LAPC. A phase II clinical trial is needed to evaluate its clinical efficacy.
Keywords Double suicide gene therapy; Ad5-yCD/mutTK(sr39)rep-ADP; Locally advanced pancreatic cancer

GI Cancer EE-GI-04

Gastric Metastasis of Anaplastic Thyroid Carcinoma: A Case Report

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Background/Aims Most common site of metastasis for anaplastic thyroid carcinoma (ATC) is lungs, liver and regional lymph nodes. Gastrointestinal metastasis is unusual. We report a case who presented ATC accompanied with gastric, lung and pancreas metastases.
Methods A 64-year-old female with hypertension presented with palpable neck mass and hoarseness. Fine needle aspiration revealed ATC. At that time, she had upper gastroscopy from outside medical center which detected 7-mm-sized EGC at antrum, posterior wall and biopsy was proven as signet ring cell cancer. She underwent endoscopic submucosal dissection (ESD) from our medical center and histopathologic result was large cell carcinoma with rhabdoid phenotype. Chest computed tomography (CT) and abdomen CT, positron emission tomography-CT were done and about 3.6-cm-sized pancreas metastatic cancer and metastatic lung nodules, Lt. para-aortic lymph node metastasis were detected.
Results Our initial diagnosis was anaplastic thyroid cancer with lung and pancreas metastasis and early gastric cancer (double primary cancer). But second histopathologic revision of ESD tissue was done and Pax-8 resulted as positive, so the final diagnosis was ATC multiple metastasis.
Conclusions Stomach is rare site of ATC metastasis, and metastatic lesions to the stomach are often difficult to distinguish from that of primary gastric cancer. This case could be the useful reference for similar cases.
Keywords Anaplastic thyroid carcinoma; Gastric metastasis

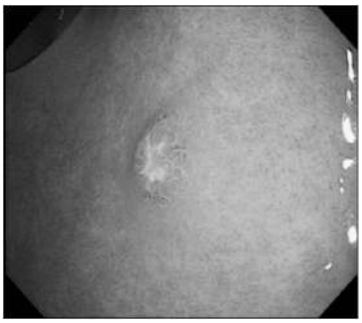

Fig. 1. Upper endoscopic finding.

GI Cancer EE-GI-05

TisN1M0 Rectal Cancer

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Results Seventy-year-old female was referred to our hospital for endoscopic removal of colon polyps found in routine colonoscopy. She had never taken colonoscopy before, and the findings from recent colonoscopy showed 2 cm sized laterally spreading tumor in ascending colon that was biopsy proven to be tubulovillous adenoma with low grade dysplasia, and diffuse irregular nodular mucosa that was encircling the entire rectum with biopsy result of tubular adenoma with low grade dysplasia. Endoscopic submucosal dissection was done for 2 cm sized LST in ascending colon and the histopathology showed well differentiated adenocarcinoma with submucosa invasion up to 1 mm, with clear deep and lateral resection margins, no lymphovascular invasion, and no perineural invasion. Rectum showed diffuse nodular mucosa encircling the entire rectum. Despite its benign appearance, the patient was referred to surgical department and received laparoscopic ultra low anterior resection as the lesion involved entire rectum. Pathology of resected rectum revealed well differentiated intramucosal adenocarcinoma (Tis) confined to mucosa without lymphovascular invasion. However, histopathology of regional lymph node showed that one perirectal lymph node had definite metastatic focus of adenocarcinoma. PET-CT was done to determine other metastasis, but no abnormal hypermetabolic lesions suggesting metastasis were found. After discussing the case with oncologist, the patient received concurrent chemotherapy and RT for stage IIIa rectal cancer.
Conclusions This case is of interest because Tis carcinoma had involvement of lymph node metastasis. It is well understood that carcinoma confined to mucosa in colon is unlikely to metastasize as lymphatic channels are not present in mucosa. Current TNM staging limits Tis tumors to stage 0 with no involvement of lymph node or distant metastasis (N0M0). However, findings from our study suggest that further classification of Tis tumors may be needed and clinicians must consider possibility of metastasis even in Tis tumors. Although some studies have reported cases of local recurrence or distant metastasis during follow up, to our knowledge this is the first case that reported identification of lymph node metastasis of Tis tumor at the same time as surgical resection.

Keywords Rectal cancer; Carcinoma *in situ*; Lymph node; Metastasis

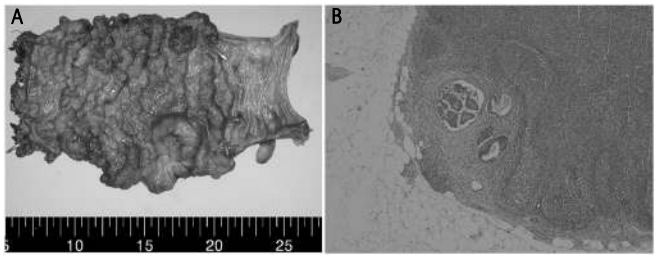

Fig. 1. (A) Large intestine (sigmoid colon, rectum) diffuse nodular mucosa encircling the entire rectum. (B) Metastasis in pericolic lymph node (H&E, ×100).

GI Cancer EE-GI-06

Lymphoblastic Lymphoma Presenting as Huge Abdominal Masses

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Background/Aims Lymphoblastic lymphoma (LBL) is one of the immature or precursor lymphoid cell neoplasms. B-cell LBL only accounts for less than 10% of cases of LBL and those with abdominal involvement have been rarely reported.
Methods An 18-year-old woman presented to the emergency department with a 2-week history of diffuse abdominal pain. On physical examination, there were tender palpable abdominal masses in the right upper quadrant and periumbilical areas.
Results Initial laboratory data showed leukocytosis (12,470/μL) with elevated C-reactive protein (17.99 mg/dL) and lactate dehydrogenase (397 U/L) levels. Abdominopelvic computed tomography and positron emission tomography showed three huge heterogeneous enhancing masses with hypermetabolism (10×7.8 cm, 3.1×9.6 cm, and 4.2×5.1 cm) in the abdominal cavity. There was no significant lesion on upper and lower endoscopy. Ultrasound-guided gun biopsy using an 18-gauge needle for the right upper quadrant mass was performed without complication. Microscopic findings showed a malignant small round cell tumor. Immunohistochemical (IHC) staining showed positivity for cluster of differentiation (CD)10, CD19, CD79a, and PAX-5 and negativity for CD1a, CD3, and terminal deoxynucleotidyl transferase (Fig. 1). The final pathologic diagnosis was B-cell LBL. The patient received intensive acute lymphocytic leukemia (ALL)-type chemotherapy.
Conclusions LBL predominates in young adults and adolescents and shows a slight male predominance. While T-cell LBL predominantly involves the mediastinum, B-cell LBL more frequently involves the skin, subcutaneous tissue or bone. LBL with abdominal involvement is rare. For precise diagnosis, core needle biopsy or excisional biopsy with IHC staining is essential. In LBL, current treatment strategies are based on intensive multidrug ALL-type chemotherapy, including central nervous system prophylaxis and/or mediastinal radiation therapy, depending on protocol design and early therapeutic response.
Keywords Lymphoblastic lymphoma; Abdominal masses; B-cell

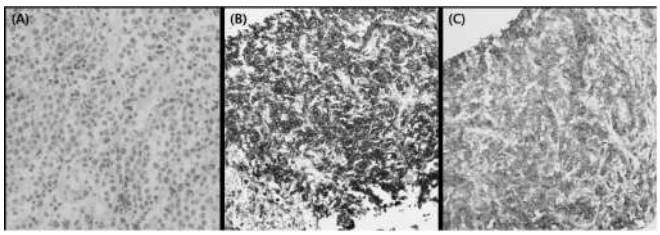

Fig. 1. Microscopic findings.

GI Cancer EE-GI-07

Primary Breast Cancer with Metastasis to the Stomach: A Case Report

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Background/Aims Breast cancers rarely metastasize to gastrointestinal tract. However, in such cases, a significant amount of time (median of 57 months) usually intervenes between the primary diagnosis and the appearance of gastric lesions, and usually develop more commonly from invasive lobular carcinoma rather than invasive ductal carcinoma. In this report, we present the case of a 72-year-old female who was diagnosed with metastatic carcinoma of the stomach from a breast primary that initially presented as melena.
Methods Gastric metastasis has non-specific symptoms such as abdominal pain, anorexia, nausea, vomiting and bleeding thus making a diagnostic dilemma. Our patient presented with a 3-day history of melena with associated loss of consciousness and body weakness.
Results Gastroscopy was done which revealed a firm, nodular lesion with two central areas of depression and a whitish base. Biopsy was done and immunohistochemistry revealed a GATA-3 positive and mammaglobin negative tumor. Final immunomorphologic diagnosis was an adenocarcinoma consistent with a breast primary. The patient was primarily managed with chemotherapy using paclitaxel, and also underwent palliative radiotherapy to the entire stomach at a dose of 36 Gy in 12 fractions.
Conclusions Despite the rarity of gastric metastasis, patients diagnosed with breast carcinoma presenting with nonspecific gastrointestinal symptoms should nonetheless be approached with a high index of suspicion for metastatic disease in addition to the consideration of a gastric primary.
Keywords Breast cancer; Metastasis; Gastric; Radiotherapy; Chemotherapy

GI Cancer EE-GI-08

Primary Diffuse Large B-Cell Lymphoma of the Stomach Presenting as Acute Pancreatitis: A Case Report

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Background/Aims The stomach is the extra nodal site most commonly involved by non-Hodgkin lymphomas. Diffuse large B-cell lymphoma is the most common histotype category arising in this organ. This is an aggressive lymphoma usually presenting as limited disease, being associated or not to *Helicobacter pylori* infection and mucosa-associated lymphoid tissue-type areas. Lymphoma involved with pancreas is rare.
Methods a case report.
Results A 45-year-old man was with history of recent discovery diabetes, presented with acute onset epigastric pain. On evaluation, raised serum lipasemia and radiological features of acute pancreatitis were detected. Upper endoscopy revealed thickened folds in proximal and distal stomach, which on histopathology revealed large B-cell lymphoma. Computed tomography scan showed a gastric process infiltrating the pancreas with ganglionic metastasis. Bone marrow biopsy revealed a marrow infiltrated with 5% of large cell B cells. Subsequently, the patient developed a upper gastrointestinal bleeding leading to death before treatment begins (R-CHOP chemotherapy) .
Conclusions In this patient, pancreatitis was the initial presentation of primary gastric lymphoma; however, a good and timely evaluation can be effective in early diagnosis and successful treatment .
Keywords Secondary pancreatitis; Large B-cell lymphoma; Diagnosis

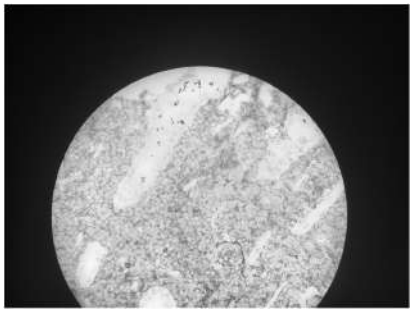

Fig. 1. Histology revealed gastric infiltration.

Pancreatobiliary EE-PB-01

Withdrawn

Pancreatobiliary EE-PB-02

Randomized Controlled Trial Comparing Different Needle Types during Endoscopic Ultrasound-Guided Fine-Needle Aspiration in Peripancreatic Mass

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Background/Aims Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) has become an indispensable method for sampling peripancreatic masses. To help overcome the limitations of cytology-based diagnosis, different types of needles have been proposed to obtain tissue samples for histological examination during EUS-FNA. Recently, a novel EUS-guided fine needle biopsy (EUS-FNB) needle was developed to increase tissue acquisition in order to improve diagnostic yield. This study set out to investigate the usefulness of this novel EUS-FNB needle in terms of obtaining proper histology compared with the conventional EUS-FNA needle.
Methods This investigation takes the form of a prospective, single-blind, randomized study in a single academic hospital. The primary outcome is the acquisition rate of an appropriate and sufficient specimen for histologic assessment. A conventional FNA needle (CEFN, Expect) and a novel EUS-FNA biopsy needle (NEFN, Acquire) were compared. Furthermore, we assess the feasibility of determining K-ras mutation status in in each needle type.
Results The study enrolled 56 consecutive patients. Technical success rates were 96.6% (28/29) for CEFN and 100% (27/27) for NEFN. No complications occurred during or after either procedure. For a cytologic diagnosis, an adequate sample was obtained in 89.7% (26/29) for CEFN versus 96.3% (26/27) for NEFN (p=0.612). For histologic diagnosis, a sample showing biopsy adequacy score of 4 or more was obtained in 37.9% (11/29) for CEFN versus 88.9% (24/27) for NEFN (p<0.001). K-ras mutation analysis using histologic specimens was available in 12 (41.4%) cases of the CEFN group and 24 (88.9%) cases of the NEFN group. This difference was significant (p<0.001).
Conclusions The findings of this study suggest that NEFN could possibly be an effective and reliable alternative compared with CEFN in terms of tissue acquisition rate and quality of histologic sampling.
Keywords Endoscopic ultrasound; Fine-needle aspiration; Biopsy; Pancreas; Lymph node

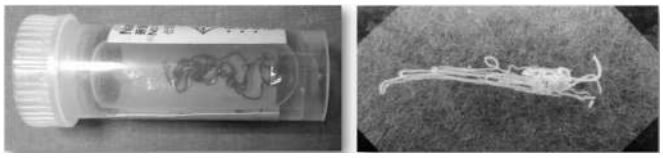

Fig. 1. Adequate histologic sample.

Pancreatobiliary EE-PB-03

Predicting Variceal Bleeding in Patients with Biliary Atresia

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Background/Aims Variceal bleeding is the main cause of morbidity and mortality in children with portal hypertension and biliary atresia. The aim of this study was to predict high-risk varices by analyzing various clinical factors, thus improve prognosis of patients with biliary atresia.
Methods A total of 157 patients with biliary atresia who underwent Kasai portoenterostomy were enrolled in a single center. Clinical data including laboratory values, endoscopic findings and values of transient elastography (FibroScan) were analyzed retrospectively.
Results The bleeding group and the non-bleeding group showed statistically significant differences in several variables. The FibroScan value (hazard ratio [HR], 1.05; 95% confidence interval [CI], 1.03 to 1.07; p<0.01) was higher in bleeding group. The bleeding group had values of lower albumin after 3 months of operation (HR, 0.28; 95% CI, 0.11 to 0.73; p=0.01), higher bilirubin after 3 months of operation (total bilirubin: HR, 1.18; 95% CI, 1.04 to 1.33; p=0.01; direct bilirubin: HR, 1.21; 95% CI, 1.05 to 1.41; p=0.01). Gastric varix (HR, 4.10; 95% CI, 1.62 to 10.36; p<0.01) was more frequent in bleeding group. And the presence of red sign was also predictive of bleeding. The FibroScan cutoff value with the predictive power of bleeding was 31.5 kPa (HR, 7.7; 95% CI, 3.36 to 17.73; p<0.01).
Conclusions Several clinical factors including high value of transient elastography (FibroScan), gastric varix or red sign of endoscopy and low albumin or high bilirubin values after 3 months of Kasai operation can be useful in predicting variceal bleeding in patients with biliary atresia.

Pancreatobiliary EE-PB-04

Comparison of 2012 and 2017 International Consensus Guideline in Terms of Mural Nodule for Predicting Malignant Intraductal Papillary Mucinous Neoplasms

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Background/Aims The mural nodule is a key point of differential diagnosis of malignant intraductal papillary mucinous neoplasm (IPMN). As the consensus guideline of IPMN was revised in 2017, the criteria for the worrisome feature and high risk stigmata of the mural nodule were changed. The purpose of this study was to investigate the predictive rate of malignancy between 2012 and 2017 guideline.
Methods We retrospectively analyzed patients who underwent surgery caused of cystic neoplasm from March 2011 to August 2018. A total of 61 patients were included. Among these patients, MCN and main duct type IPMN were excluded. Finally, total of 25 patients were included.
Results Fourteen patients were male and the median age was 68 years old. Four patients were diagnosed as malignant IPMN. The median serum CA 19-9 was 8.5 IU/mL; carcinoembryonic antigen was 2.5 IU/mL; and median largest cyst size was 35 mm. Computed tomography (CT) and magnetic resonance imaging (MRI) were revealed CE mural nodules in three cases and non-CE mural nodule in four cases. Endoscopic ultrasound (EUS) was revealed mural nodule in seven cases. Total 11 patients have mural nodule that was proven by CT/MRI/EUS. Nine patients have a mural nodule 5 mm or more at EUS or CE mural nodule at CT/MRI. The sensitivity of malignant IPMN diagnosis was 100%; the specificity was 66.6%; and the positive predictive value was 36.4% in 2012 guideline. When we investigate the mural nodule based on the 2017 guideline; there were 100% of sensitivity; 76.2% of specificity and 44.4% of positive predictive value.
Conclusions The 2017 revised guideline have slightly higher specificity and positive predictive value than those of the 2012 guideline for malignant IPMN diagnosis. The 2017 revised guideline was more accurate method to detect malignancy in terms of mural nodule.
Keywords Intraductal papillary mucinous neoplasm; Mural nodule; Fukuoka; Pancreatic cancer

Table 1. Result of Mural Nodule

Total (N=25)	CT/MR (N=25)	EUS (N=11)	sum
mural nodule	7(50/76.2/28.6)	7(100/44.4/28.6)	11(100/66.6/36.4)
CE mural nodule	3(50/95.2/66.7)	N/A	3(50/95.2/66.7)
NCE mural nodule	4(0.0/80.9/0.0)	N/A	4(0.0/80.9/0.0)
CE mural nodule + EUS mural nodule (> 5mm)	9(100/76.2/44.4)		

Values are presented as number (sensitivity [%]/specificity [%]/PPV [%]).
CT, computed tomography; MRI, magnetic resonance imaging; EUS, endoscopic ultrasound; N/A, not available; PPV, positive predictive value.

Table 2. Comparison of Two Guideline in Terms of Mural Nodule

	Sensitivity	Specificity	PPV
2012 guideline (high risk + worrisome)	100%	66.6%	36.4 %
2017 guideline (high risk + worrisome)	100%	76.2%	44.4 %

PPV, positive predictive value.

Pancreatobiliary EE-PB-05

Gender Difference in Patients with Metastatic Pancreatic Cancer Who Received FOLFIRINOX

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Background/Aims Although FOLFIRINOX is very powerful regimen in patients with metastatic pancreatic cancer (MPC), serious side effects could not be negligible and dose reduction is necessary in many patients. This study aimed to investigate the relationship between gender and dose reduction pattern of FOLFIRINOX in patients with MPC.
Methods The study involved seventy-two MPC patients who received four or more FOLFIRINOX registrations at Seoul National University Bundang Hospital, which started chemotherapy from 2013 to 2017. Linear mixed model estimates were used for analysis of relationship between gender and dose reduction pattern.
Results Male were 43 and female were 29. There was no difference of median age (60.4 years in male and 63.8 years in female, p=0.124), BMI (23.2 vs 23.2 kg/m^2, p=0.933), and initial CA 19-9 (2,479.1 and 2,439.5, p=0.972). BSA was significantly higher in male (1.7 and 1.6, p<0.001) (Table 1). There was no significant difference in overall survival between male and female (p=0.100) (Fig. 1) and initial relative dose. However, there was a statistically significant difference in dose reduction pattern of FOLFIRINOX between male and female according to time (p=0.001) (Fig. 2).
Conclusions Although female received less relative chemotherapeutic agent than male during the follow-up, there was no difference of survival. Gender differences in FOLFIRINOX chemotherapy should be considered when this regimen would be used for patients with MPC.
Keywords Metastatic pancreatic cancer; FOLFIRINOX; Gender difference; Dose reduction pattern; Side effect

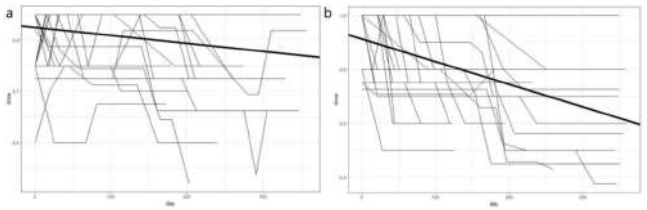

Fig. 2. Dose reduction pattern of FOLFIRINOX between male and female (linear mixed model). (A) Male, (B) female, p=0.001.

Pancreatobiliary EE-PB-06

Involvement of Nrf2/HO1 Signaling in 5-Fluourouracil Resistance of Pancreatic Cancer Cell Line

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Background/Aims Chemoresistance is a leading cause of morbidity and mortality in pancreatic cancer. The antioxidant transcription factor NF-E2-related factor 2 (Nrf2) which plays an important role of tumor angiogenesis and invasiveness are upregulated in pancreatic cancer (PC) and correlated with poor survival. We investigated the role of Nrf2 in 5-fluorouracil (5FU) chemoresistance development in pancreatic cancer cell lines.
Methods We generated 5FU chemoresistant PC cells (BxPC3, CFPAC) with increasing doses of 5FU. Alterations in signaling pathway effectors, stemness, and epithelial-mesenchymal transition (EMT)-related markers were determined by quantitative real-time polymerase chain reaction and Western blot analysis. *In vitro*, the ability of cell migration and invasion were also measured by transwell and wound healing assay.
Results We found that Nrf2 was overexpressed in both BxPC3/5FUR and CFPAC/5FUR compared to parental cells, and it induced the upregulation of antioxidant and detoxifying genes such as heme oxygenase 1 (HO1), NAD(P)H quinone dehydrogenase 1 (NQO1) and superoxide dismutase 2 (SOD2). 5FUR PC cells showed increased level of stemness gene of Nanog, and induction of EMT-related protein of N-cadherin and ZEB1. *In vitro*, 5FUR PC cells migrated more efficiently and showed an increased invasion. After silencing of Nrf2 in BxPC3/5FUR and CFPAC/5FUR, we found that downregulation of Nrf2 resulted in decreasing Nrf2 target gene such as HO1 and NQO1. In addition,Nrf2 silencing also downregulated the EMT related protein such as N-cadherin and ZEB1.
Conclusions These results elucidated the Nrf2 related 5FU chemoresistance mechanism and suggest Nrf2/HO1response mechanism as a promising target for anticancer treatment to overcome chemoresistance.
Keywords Pancreatic cancer; Chemotherapy; Chemoresistance

Pancreatobiliary EE-PB-07

Peroxiredoxin-2 Inhibits Pancreatic Neuroendocrine Tumor Proliferation by Suppressing Reactive Oxygen Species-Related Signaling Pathway: A Preliminary Result

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Background/Aims Peroxiredoxin (PRX) which are major cellular antioxidants have been indicated in multiple oncogenic signaling pathways. In this *in vitro* study, the role of PRX2 in human pancreatic neuroendocrine tumor (pNETs) cell line was investigated.
Methods QGP-1, a human pNET cell line was cultured and the expression of PRX2 was analyzed at transcript and protein levels. Baseline reactive oxygen species (ROS) levels were detected by DCF-DA with FACS, and they were compared with those from other pancreatic cancer cell lines (BxPC3 and CFPAC). To validate the resistance to the oxidative stress, MTT assay with H_2O_2 was analyzed. After specific silencing of PRX2 with siRNA, ROS-related signaling pathway, migration assay using the scratch-wound assay and proliferation assay were analyzed.
Results Western blot showed PRX2 level was remarkably high in QGP-1 cell lines within both cytosol and nucleus fractions. Baseline ROS level revealed that there was no definite difference of ROS levels between QGP-1 and other pancreatic cancer cell lines. MTT assay with H_2O_2 revealed moderate resistance to oxidative stress of QGP-1 cell line compared to the other pancreatic cancer cell lines. Silencing with PRDX2 siRNA induced phosphorylation of ERK, AKT and JNK. The scratch-wound assay showed no definite change after PRDX2 silencing in QGP-1 cell line. However, proliferation assay revealed that proliferation was relatively increased by siPRDX2 in QGP-1 compared to other pancreatic cancer cell lines.
Conclusions These results suggest that presence PRX2 may play a suppressive role in proliferation of pNETs by suppressing ROS-related signaling pathway.
Keywords Pancreatic neuroendocrine tumor; Peroxiredoxin; Somatostatinoma

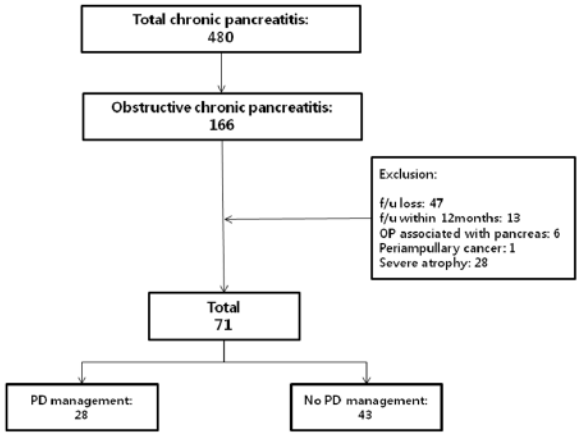

Fig. 1. Flowchart of patient inclusion.
F/U, follow-up; PD, pancreatic duct.

Pancreatobiliary EE-PB-08

Morphological Advantages of Endoscopic Treatment in Obstructive Chronic Pancreatitis

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Background/Aims Chronic pancreatitis (CP) is associated with recurrent abdominal pain. Ductal hypertension has been suggested as a major factor in the mechanism of pain in CP. Many studies investigating pain relief after endoscopic treatment of pancreatic duct (PD) are available, but the number of studies regarding the morphological changes to pancreas such as PD caliber and pancreatic volume is far fewer. As such, we analyzed the changes of ductal caliber and parenchymal volume after endoscopic treatment of PD in patients with obstructive CP.
Methods In this retrospective study, we compared two groups of patients with obstructive CP that either received endoscopic management of PD or conservative treatment without such endoscopic management. After we obtained age, sex, etiology of CP, diabetic status, smoking and alcohol abuse status from the database, we compared the incidence for changes in pancreatic parenchymal volume and PD caliber between two groups.
Results In our study population, total of 166 patients were diagnosed with obstructive CP between January 2006 and December 2016. Except exclusion criteria, 71 patients were available for the final analysis. Twenty-eight of those patients received endoscopic treatment of PD and 43 received conservative treatment without any endoscopic treatment (Fig. 1). Statistical analysis showed that diabetes and endoscopic PD management were significant predictors for progression of PD caliber and in pancreatic parenchyma, and that only PD management influenced the pancreatic volume loss.
Conclusions Endoscopic management of PD in obstructive CP have advantages on morphologic change such as pancreatic volume loss and progression of PD caliber in long follow-up period.
Keywords Chronic pancreatitis; Diabetes; Endoscopic retrograde cholangiopancreatography

Pancreatobiliary EE-PB-09

Treatment Outcome of Endoscopic Papillectomy on Ampullary Tumors with High-Grade Adenoma or Early Adenocarcinoma

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Background/Aims Endoscopic papillectomy (EP) is widely used for the curative treatment of ampulla of Vater tumors replacing surgical resection. However, there are scarce data on the treatment outcome in tumors with high-grade adenoma (HGD) or early adenocarcinoma. The aim of this study was to evaluate the outcome after EP of ampullary tumor with HGD or early adenocarcinoma.
Methods From January 2005 to December 2018, all the patients underwent EP as an initial curative treatment for ampullary tumors with HGD or early adenocarcinoma at Seoul National University Hospital were retrospectively reviewed. All the patients were recommended to undergo subsequent surgical resection and patients who refused to undergo surgery were followed at 1 month with endoscopy. If residual tumor was identified at follow-up endoscopy, it was considered as incomplete resection, and progression free survival of patients without incomplete resection was evaluated.
Results A total of 230 EP were performed during study period. Among them, 80 were eligible (46 HGD and 34 adenocarcinoma). One patient with adenocarcinoma was died after the procedure related complication (massive hemorrhage). Within 1 month after the procedure, 13 received subsequent surgical resection and presence of residual tumor on surgical specimen was nine of 13 (69.2%). Twenty-one had residual tumor on follow-up endoscopy (incomplete resection rate of 35%) and five were lost to follow-up. Among patients without incomplete resection (n=40), tumor was recurred in 13 patients during the follow-up period and the median progression-free survival was 963 days (95% confidence interval, 525 to NA).
Conclusions Incomplete resection rate and probability of remaining tumor in surgical specimen were remarkably high after the EP of ampullary tumors with HGD or early adenocarcinoma. In addition, tumors recurred frequently in long-term follow-up even after the complete resection. EP should only be used selectively in tumor with HGD or early adenocarcinoma.
Keywords Endoscopic papillectomy; Ampulla of vater; Neoplasm; Neoplasm recurrence; Local; High-grade adenoma

Pancreatobiliary EE-PB-10

Percutaneous Cholangioscopic Treatment of Common Bile Duct Stones in Patients with Surgically Altered Anatomy

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Background/Aims Endoscopic retrograde cholangiopancreatography is difficult in the patients with surgically altered anatomy and common bile duct (CBD) stones. Percutaneous transhepatic cholangioscopic lithotomy (PTCSL) may be considered as an alternative method in these patients. However, clinical studies on PTCSL for the treatment of CBD stones in patient with surgically altered anatomy were still relatively few and had small cases. The aim of this study is to evaluate the clinical efficacy and safety of PTCSL in the patients with surgically altered anatomy and CBD stones.

Methods We conducted a retrospective cohort study of all percutaneous transhepatic cholangioscopy (PTCS) performed between September 2004 and March 2019 at a single tertiary referral hospital. The PTCS database at our institution was searched for prospectively collected data. Consecutive patients with surgically altered anatomy who underwent PTCSL for the treatment of CBD stones were included.

Results During the study period, 45 patients with surgically altered anatomy underwent PTCSL for the treatment of CBD stones. The surgical methods included Billroth II gastrectomy in 17 patients, Roux-en-Y gastrectomy in 12 patients, Roux-en-Y choledochojejunostomy in 16 patients. The mean size and number of stones were 15.4 mm and 2.2, respectively. Electrohydraulic lithotripsy was used to fragment the stones in 38 patients (84%). Papillary balloon dilation (6 to 12 mm) was used in 30 patients (67%) to facilitate stone removal. Complete stone clearance was achieved in 45 patients (100%), and the mean number of PTCSL sessions was 1.9. Acute cholecystitis was observed in one patient after PTCSL, and the patient recovered uneventfully following cholecystectomy. No other procedure related complication was identified.

Conclusions Although different technical approaches for biliary access in patients with surgically altered anatomies are highly dependent on local expertise and endoscopic equipment, PTCSL is an effective and safe alternative therapy for CBD stones in patients with surgically altered anatomy.

Keywords Bile duct stones; Surgically altered anatomy; Percutaneous transhepatic cholangioscopic lithotomy

Pancreatobiliary EE-PB-11

The Need for Laparoscopic Cholecystectomy in the Patient without Gallbladder Stone after Common Bile Duct Stone Clearance

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Background/Aims Cholecystectomy after endoscopic removal of the common bile duct (CBD) stones is generally recommended to prevent recurrence of biliary complications. The rate of following these recommendation is low. The aim of this study was to evaluate the need for laparoscopic cholecystectomy in the patient without gallbladder (GB) stone after CBD stone clearance.

Methods From January 2009 to December 2018, we retrospectively analyzed 2,150 patients with EST and CBD stone removal at Keimyung University Hospital. We excluded 808 patients who were followed for less than 3 months. One thousand three hundred forty-two patients were enrolled in this study. We divided the patient into four groups according to GB status. Three hundred forty-two patients had previously undergone cholecystectomy (group A), 465 had a calculous GB and underwent cholecystectomy after EST (group B), 243 had a calculous GB *in situ* (group C), and 292 had an acalculous GB *in situ* (group D). Long-term complications, including recurrence of CBD and acute cholecystitis were evaluated.

Results During the median follow-up of 37 months (range, 3 to 128 months) total biliary complication occurred in 250 patients (25%). The rate of late complications was higher in group C (46.5%) than in group B (16.8%; p<0.001). There was no significant difference in the rate of recurrent CBD stone between group B (16.8%), group C (23.0%) and group D (18.2%; p=0.055). Cumulative total biliary complication rate was higher in group C (46.5%) than group D (20%; p<0.001). Acute cholecystitis occurred more frequently in group C (22.9%) than in group D (2.4%; p<0.001).

Conclusions No significant difference in cumulative CBD stone recurrence rate according to GB status. Cholecystitis is more common in patients with GB stone. Patients without GB stone do not require unconditional preventive cholecystectomy.

Keywords Cholecystectomy; Gallbladder *in situ*; Endoscopic sphincterotomy; Biliary complication; Common bile duct stone

Pancreatobiliary EE-PB-12

Preoperative Biliary Drainage with Partially Covered Self-expandable Metal versus Plastic Stents for the Patients with Malignant Distal Bile Duct Obstruction: Preliminary Study

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Background/Aims Although need for preoperative biliary drainage (POBD) in patients with resectable malignant distal bile duct obstruction is controversial, POBD usually has been performed with plastic stent in these patients. However, after placement of plastic stent for POBD, cholangitis due to stent occlusion could be happened and cause the surgery delay. Therefore we suspected that larger diameter stent could reduce the incidence of these complications. The aim of this study was to compare the effectiveness of partially covered self-expandable metal stents (PCSEMS) or plastic stents for POBD.

Methods Thirty-nine patients with malignant distal biliary obstruction between January 2015 and April 2019 was enrolled for the prospective study. They underwent randomly assigned POBD with plastic stents or PCSEMS placement. Following POBD, 13 patients were excluded (nine patients refused surgery, two patients had distant metastasis, one patient had major vascular invasion, and one patient was not operable because of comorbidity) and 26 patients of them had surgery.

Results There was no statistically significant difference in baseline characteristics of patients between the two groups. Procedure related adverse events (pancreatitis in two patients, cholangitis in one patient) was happened only in metal stent group. During the follow-up period, stent occlusion in four patients were happened only in plastic stent group (p=0.047). Reintervention rate was 15.8% in plastic stent group and 10.0% in PCSEMS group (p=0.475). There was no significant difference in surgery related adverse events between two groups (33.3% in plastic stent group, 36.4% in PCSEMS group, p=1.000).

Conclusions Stent occlusion rate after POBD in patients with resectable malignant distal biliary obstruction was lower in PCSEMS group than plastic stents group. Otherwise, POBD and surgical outcomes were similar in both groups. A prospective randomized controlled trial with larger patients is warranted to verify these results.

Keywords Preoperative biliary drainage; Partially covered self-expandable metal stent; Malignant distal bile duct obstruction

Pancreatobiliary EE-PB-13

Diagnostic Accuracy of Administrative Database for Bile Duct Cancer by International Classification of Diseases, 10th Revision Edition Codes in a Tertiary Institute In Korea

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Background/Aims Administrative database provides valuable information for large cohort studies, especially when tissue diagnosis is rather difficult such as the diagnosis for bile duct cancer (BDC). However, studies regarding accuracy of administrative database for BDC have not been reported. The aim of this study was to evaluate the diagnostic accuracy of administrative database for BDC by International Classification of Diseases (ICD)-10 codes in a tertiary institute.

Methods Study and control groups were collected from 2003 to 2016 at Seoul National University Bundang Hospital. Cases of BDC were identified in the National Health Insurance Service (NHIS) database by ICD-10 code supported by V code. The control group was selected from cases without ICD-10 codes for BDC. A definite or possible diagnosis was defined according to pathologic reports. Medical records, images, and pathology reports were analyzed to evaluate ICD-10 codes for BDC. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for BDC were analyzed according to diagnostic criteria and cancer locations.

Results A total of 1,707 patients with BDC and 1,707 controls were collected. Among those with BDC, 1,320 patients (77.4%) were diagnosed by definite criteria. Most (99.4%) of them had adenocarcinoma. Rate of definite diagnosis was the highest for ampulla of Vater (AOV, 88.9%), followed by that for extrahepatic (85.0%) and intrahepatic (68.4%) BDCs. False positive cases commonly had hepatocellular carcinomas. For overall diagnosis of BDC, sensitivity, specificity, PPV, and NPV were 99.94%, 98.33%, 98.30%, and 99.94%, respectively. Diagnostic accuracies were similar regardless of diagnostic criteria or tumor locations.

Conclusions Administrative database for BDC identified by ICD-10 code and NHIS provided very useful information regarding tumor location in relation to AOV and histology of BDC.

Keywords National Health Insurance Service; Bile duct cancer; International Classification of Diseases

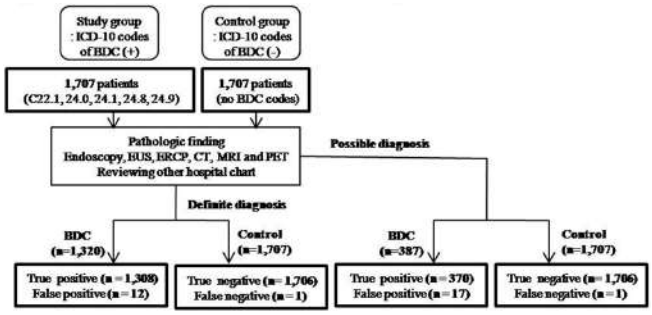

Fig. 1. Proposed study algorithm for the inclusion and classification of subjects.
ICD-10, International Classification of Diseases-10; BDC, bile duct cancer; EUS, endoscopic ultrasound; ERCP, endoscopic retrograde cholangiopancreatography; CT, computed tomography; MRI, magnetic resonance imaging; PET, positron emission tomography.

Pancreatobiliary EE-PB-14

A Different Clinical Significance of Preoperative C-Reactive Protein/Albumin Ratio in Patients with Perihilar and Distal Bile Duct Cancer

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Background/Aims C-reactive protein/albumin (CRP/albumin) ratio has been identified as a prognostic factor in cancers. However, the role in biliary cancers has not been examined. This study aims to assess the role of CRP/albumin in curatively resected extra-hepatic bile duct cancers (EBDC).
Methods Between March 2005 and February 2018, patients who underwent curative resection because of EBDC in Seoul National University Bundang Hospital were identified. Their medical records were retrospectively reviewed.
Results Men were 143 (60.8%) and mean age was 68 years (range, 41 to 85 years). Of 235 patients, 61 had perihilar bile duct cancer and 174 had distal bile duct cancer. Median follow-up and recurrence free survival (RFS) was 22 and 17 months. The prognostic cut-off point of CRP/albumin ratio for recurrence was 0.18. Overall survival was associated with age older than 65 (hazard ratio [HR], 1.937; 95% confidence interval [CI], 1.275 to 2.944), advanced staging (stage I, II: HR, 1.963; 95% CI, 1.261 to 3.056; stage III: HR, 2.158; 95% CI, 1.155 to 4.031), increased CA 19-9 (HR, 1.735; 95% CI, 1.069 to 2.816), and CRP/albumin ratio ≥ 0.18 (HR, 1.638; 95% CI, 1.102 to 2.434). RFS was associated with advanced staging (stage I, II: HR, 1.750; 95% CI, 1.127 to 2.717), venous invasion (HR, 1.742; 95% CI, 1.097 to 2.767), perineural invasion (HR, 2.427; 95% CI, 1.114 to 5.287), and CRP/albumin ratio ≥ 0.18 (HR, 1.702; 95% CI, 1.144 to 2.531).
Conclusions Preoperative CRP/albumin ratio is associated with recurrence and overall in patients with resected EBDC. Further studies are necessary to assess the role of preoperative CRP/albumin ratio in EBDC.
Keywords Bile duct cancer; C-reactive protein; Albumin; Prognosis

Pancreatobiliary EE-PB-15

Physician-Controlled Guidewire Insertion Improves Technical Success Rate of Endoscopic Ultrasound-Guided Hepaticogastrostomy

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Background/Aims Among endoscopic ultrasound (EUS)-guided biliary drainage procedures, EUS-guided hepaticogastrostomy (HGS) might be most complex because of variations in the course of the intrahepatic bile duct compared with the common bile duct or gallbladder. Appropriate guidewire insertion is essential. Liver impaction technique can reportedly prevent wire shearing, and improve the technical outcomes of guidewire insertion. This technique might be challenging if the intrahepatic bile duct is not very dilated, and difficult to visualize on EUS images during the procedure. To overcome these disadvantages, we recently attempted EUS-HGS using physician-controlled guidewires (PCGW). The present study aimed to determine the technical feasibility and safety of PCGW during EUS-HGS.
Methods The present study included 122 consecutive patients who were scheduled to undergo EUS-HGS between October 2017 and April 2019. The primary endpoint was the technical success rate defined as bile duct puncture, guidewire insertion, tract dilation, and metal stent deployment. Guidewire insertion was considered to have failed if an assistant endoscopist was required for manipulation.
Results The intrahepatic bile duct was punctured in 120 of 122 patients. The guidewire was inserted into the biliary tract and manipulated by other endoscopists in 96 patients. We attempted PCGW for the 23 patients in whom the guidewire could not initially be inserted. A guidewire was inserted using PCGW in all 23 of these patients, thus improving the technical success rate of guidewire insertion from 80% to 100%. After tract dilation, we deployed covered metal stent and plastic stents in 117 and two patients, respectively. The overall technical success rate of EUS-HGS was 119 (97.5%) of 122. Adverse events comprising bile peritonitis or leakage developed in five patients.
Conclusions PCGW might contribute to improve the success rate of EUS-HGS.
Keywords Endoscopic ultrasound-guided hepaticogastrostomy

Pancreatobiliary EE-PB-16

Early versus Delayed Cholecystectomy for Acute Mild Gallstone Pancreatitis: A Systematic Review and Meta-Analysis

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Background/Aims Acute pancreatitis is one of the most common gastrointestinal disorders requiring hospitalization, and gallstones remain the commonest cause. After resolution of the initial attack, approximately one-third of patients may experience recurrence in 2 weeks. Cholecystectomy is therefore considered as definitive treatment for acute mild gallstone pancreatitis (MGP). However, the optimal timing of cholecystectomy remains controversial. The objective of this meta-analysis was to investigate the outcomes between early laparoscopic cholecystectomy (ELC) and delayed laparoscopic cholecystectomy (DLC) for patients with MGP.
Methods Medline, Embase, and Cochrane Library were electronically searched for relevant studies through June 30, 2019. The primary outcome was conversion to open cholecystectomy (COC). The secondary outcomes included operative time (OT), length of hospital stay (LOS), postoperative complications, biliary-related complications, gallstone-related events, and readmission.
Results This meta-analysis enrolled 16 studies, including six randomized controlled trials and 10 retrospective studies. A total of 4,190 patients were included, of which 1,930 were in the ELC group and 2,260 in the DLC group. No significant differences were found in the rate of COC (risk ratio [RR], 0.91; 95% confidence interval [CI], 0.71 to 1.16) (Fig. 1), postoperative complications (RR, 0.78; 95% CI, 0.56 to 1.08), OT (RR, 0.19; 95% CI, −3.72 to 4.11), and biliary-related complications (RR, 1.20; 95% CI, 0.43 to 0.3.39). The LOS was significantly shorter in the ELC group (RR, −2.02; 95% CI, −3.24 to −0.81). The rate of gallstone-related events (RR, 0.06; 95% CI, 0.04 to 0.11) and readmission (RR, 0.29; 95% CI, 0.12 to 0.74) was also significantly reduced in the ELC group.
Conclusions Compared with DLC, ELC does not increase the risk of COC, postoperative complications, OT, and biliary-related complications, but reduce LOS, gallstone-related events and readmission for patients with MGP.
Keywords Gallstone pancreatitis; Cholecystectomy; Timing; Meta-analysis

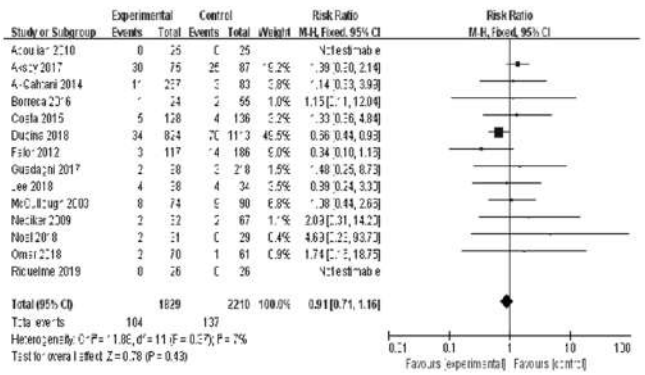

Fig. 1. Forest plot comparing conversion to open cholecystectomy between
CI, confidence interval.

Clinical Spectrum of Septicemia in Biliary Infections According to Causative Organism

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Background/Aims We aimed to evaluate the clinical characteristics and outcomes of biliary septicemia caused by cholangitis/cholecystitis according to causative organisms.
Methods We performed a retrospective cohort study of 208 patients diagnosed as cholangitis or cholecystitis with bacterial septicemia from January 2013 to December 2015. All patients had clinical evidences of biliary tract infections, and they had blood isolate that caused septicemia.
Results Gram-negative bacteria caused 64.9% (135/208) episodes of septicemia, gram-positive bacteria 32.7% (68/208) episodes, and both 2.4% (5/208), respectively. The most common infecting bacteria were *Escherichia coli* in gram-negative species, and *Bacillus* species in gram-positive species. There were no differences in mortality, readmission rate, and the need for emergency decompression procedures between gram-positive and negative septicemia groups. In univariate analyses, previous gastrectomy history, common bile duct (CBD) dilatation on the computed tomography scan, and serum aspartate aminotransferase were associated with gram-positive bacteremia. Among them, CBD dilatation and previous gastrectomy history were strongly associated with gram-positive septicemia in multivariate analysis (p=0.01, p<0.01, respectively).
Conclusions In approximately one-third of biliary infections with septicemia, gram-positive bacteria were isolated. Clinically, CBD dilatation and previous gastrectomy history were related to those organisms, and it would help the choice of empirical antibiotics.
Keywords Biliary tract; Septicemia; Gram-positive bacteria

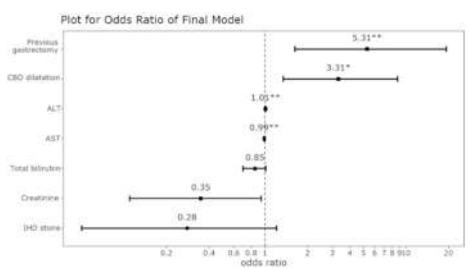

Fig. 1. Odds ratio for gram-positive bacteremia.
CDB, common bile duct; ALT, alanine aminotransferase; AST, aspartate aminotransferase; IHD, intrahepatic bile duct.

The Safety and Efficacy of a Large-Bore Full Covered Biliary Metallic Stent in Malignant Biliary Obstruction

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Background/Aims In patients with unresectable malignant biliary obstructions, self-expanding metallic stent (SEMS) is widely used. However, SEMS is susceptible to occlusions by tumor ingrowth, outgrowth, and sludge formation. To overcome these adverse effects, we developed a large-bore dumbbell-shaped full covered SEMS (FCSEMS-L). The efficacy and safety of FCSEMS-L were compared with conventional FCSEMS (FCSEMS-C) in malignant biliary obstructions.
Methods Patients with unresectable distal malignant biliary obstruction was retrospectively enrolled between January 2011 and February 2018. A total of 90 patients were included. A FCSEMS-L was inserted endoscopically in 46 patients, and a FCSEMS-C was inserted in 44 patients. Clinical characteristics, complications, and prognosis were also analyzed.
Results The two groups did not differ significantly in mean age, male to female ratio, and their underlying disease. Stent occlusion occurred in seven patients (15.2%) who received FCSEMS-L and in 18 patients (40.9%) who received FCSEMS-C (p=0.027). Stent occlusion due to sludge impaction was occurred in three patients with FCSEMS-L, and occurred in 13 patients with FCSEMS-C (p=0.018). There are no difference in mean follow-up period (FCSEMS-L 193.2 days vs FCSEMS-C 278.8 days, p=0.236), stent migration (p=0.559), and cumulative stent patency (p=0.078). Complications, including cholangitis and pancreatitis, were found to be acceptable and resolved by conservative management in both groups.
Conclusions Although the use of a FCSEMS-L produced no significant differences in stent patency or stent migration rate, the FCSEMS-L can be used safely in the human bile duct and prevent stent occlusion effectively due to sludge impaction.
Keywords Malignant biliary obstruction; Self-expanding metallic stent; Stent occlusion

Factors Associated with Positive Brush Cytology during Endoscopic Retrograde Cholangiopancreatography in Patients with Biliary Stricture

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Background/Aims Bile duct brush cytology during endoscopic retrograde cholangiopancreatography (ERCP) is the standard method of sampling a biliary stricture. We aimed to determine the factors affecting positive brush cytology.
Methods Data were collected by retrospectively reviewing the medical records of 65 consecutive patients with indeterminate biliary stricture on imaging who underwent brush cytology at our institution from March 2017 to May 2019. We analyzed the relationship of age, sex, final diagnosis, stricture length and location, maximum diameter of the upstream dilated bile duct, serum total bilirubin, carcinoembryonic antigen, and carbohydrate antigen 19-9 with the yield of positive brush cytology.
Results The final diagnosis was benign stricture in two cases and malignancy in 63 cases (42 bile duct cancer, 18 pancreatic cancer, and three gallbladder cancer). The cytopathological diagnoses obtained were 14 negative for malignancy (21.5%), 14 atypical cells (21.5%), 11 suspicious of malignancy (16.9%), and 26 malignancy (40.0%). There were no factors associated with the four cytopathological results. When patients with atypical cells were included in the positive cytology according to the final diagnosis, type of malignancy and grade of cellular differentiation were significant indicators of positive diagnosis by brush cytology (p=0.004 and 0.038, respectively). The maximum diameter of the upstream bile duct from the stenosis tented be toward longer in the positive cytology when the location of stricture was extrahepatic bile duct (p=0.057). The sensitivity, specificity, and accuracy of brush cytology for malignant biliary strictures were 81.0%, 100%, and 81.5%, respectively.
Conclusions Our results showed good diagnostic yields of brush cytology during ERCP for biliary stricture when atypical cells included as malignant results. Predictors of positive yield include type of malignancy and grade of cellular differentiation. Upstream bile duct dilatation tended to have a higher probability of the positive cytology.
Keywords Brush cytology; Biliary stricture

Pancreatobiliary EE-PB-20

Endoscopic Management of Post-liver Transplant Biliary Complications

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Background/Aims Biliary complications are the most complications after liver transplantation. Most post-liver transplant biliary complications (PLTBC) involve anastomotic strictures (AS), nonanastomotic strictures, bile leakage (BL) and bile duct stones. Endoscopic retrograde cholangiopancreatography (ERCP) is the mainstay treatment for the majority of PLTBC with a lower complication rate and shorter hospital stay.
Methods The data were retrospectively collected from patients who had PLTBC and had been referred for ERCP to the Department of Gastroenterology, Yangon General Hospital from November 2016 to September 2019.
Results Nine patients with PLTBC underwent ERCP in this period. There were four patients with AS, two patients with BL, two patients with both BL and AS and one patient with common bile duct stones. AS were treated with sphincterotomy, biliary dilatation with Soehendra dilatation catheter and controlled radial expansion balloon, and multiple straight plastic stents (SPS) placement with stent exchange and/or placement of additional stents every few months until the stricture resolved. One patient had resolved the stricture sites, but one failed. The remaining AS patients had delayed response. BL was treated with placement of SPS to bridge the leak with sphincterotomy. Resolution of BL was treated in one patient, but one had delayed response. In patients with both BL and AS, sphincterotomy and SPS placement to stricture and leakage sites were performed. One patient was successful, but delayed in response in the other patient. Patient with common bile duct stones was successfully treated with sphincterotomy, temporary placement of double pig tail stent and consecutive complete stone removal with extraction balloon. The response of ERCP to PLBC in some patients was delayed because they cannot attend regular stent exchange for social and financial reasons.
Conclusions ERCP is the first line treatment for the majority of PLTBC.
Keywords Liver transplantation; Bile leak; Stricture; Endoscopic retrograde cholangiopancreatography

Pancreatobiliary EE-PB-21

The Role of Single Operator Peroral Cholangioscopy for the Diagnosis and Treatment of Intraductal Papillary Neoplasm of Bile Duct

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Background/Aims Intraductal papillary neoplasm of bile duct (IPNB) is a precursor of invasive carcinoma. However, it can be miss or underdiagnosed by cross-sectional imaging studies and/or cholangiography. Recently, as single operator peroral cholangioscopy (SO-POC) which is easy to maneuver in high image quality has been developed, SO-POC are emerging as one of the diagnostic methods of bile duct diseases. In this study, we evaluated the usefulness of SO-POC for diagnosis and management of IPNB.
Methods Data from consecutive patients undergoing SO-POC and diagnosed as IPNB were analyzed. SO-POC was performed with direct POC using an ultra-slim endoscope and/or SpyGlass direct visualization system. All POC findings were reviewed by two experienced investigators. All of IPNB cases were diagnosed as IPNB according to the criteria of World Health Organization 2010 by one expert pathologist.
Results A total of 30 patients with IPNB diagnosed by POCs was analyzed. In 16 patients (53.3%), IPNB was not observed in computed tomography and SO-POC was performed for the evaluation of dilated bile duct (n=7) and management of stones (n=7). In 17 patients (56.7%), direct POC with narrow band image and/or I-SCAN was used for evaluation of IPNB. Irregular tortuous and dilated vessels (p=0.012) was found to be significantly associated with invasiveness. POC-guided target biopsy was performed technically successful in all patient. In 11 patients (36.7%), management plan was changed after confirmation of IPNB extent by POC.
Conclusions SO-POC is useful to detect the IPNB which was not observed by cross-sectional imaging studies and decide the management plan of IPNB.

Pancreatobiliary EE-PB-22

Clinical Impact of Common Bile Duct (CBD) Angulation on the Recurrence of CBD Stone: A Meta-Analysis and Review

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Background/Aims As for the risk factors contributing to the recurrence of choledocholithiasis after successful endoscopic clearance, local and systemic factors—diabetes, obesity, and hyperlipidemia would be involved. Local factors were the presence of bile sludge, common bile duct (CBD) diameter, and CBD angulation. Among them, it is still equivocal whether acute CBD angulation is more preferable to the recurrence of CBD stone.
Methods We searched PubMed, Embase, CINAHL, the Cochrane Library databases, and google website for randomized controlled trials reported in English and undertaken up until August 2019. A meta-analysis of all randomized controlled trials for the recurrence of CBD stone between the patients with acute CBD angulation and the others.
Results We identified 8 randomized trials (1,776 patients), and the total recurrent rate of CBD stone was 18.8% (334 / 1776). A CBD angle $\leq 145^{\circ}$ was found to be significantly associated with an increased risk of recurrent CBD stone (OR=2.65, p<0.01). In two prospective studies, acute CBD angulation was not proven statistically to be associated with the recurrence (p=0.39).
Conclusions Approximately 20% of patients with CBD stone had recurrence after the complete clearing of CBD stone, and a CBD angle $\leq 145^{\circ}$ could increase the risk of recurrence. A large scaled prospective study should be necessitated.
Keywords Common bile duct; Choledocholithiasis; Recurrence

Pancreatobiliary EE-PB-23

Effect of Microvascular Invasion on Clinical Outcomes among Curative-Intended Resection for Cholangiocarcinoma

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Background/Aims Surgery is the only curative treatment for patients with cholangiocarcinoma. However, even after surgery, the survival rate is not satisfactory and there is a lack of research on related risk factors. Recently, several reports have suggested that microvascular invasion is associated with a poor postoperative prognosis of the patients with hepatocellular carcinoma. We sought that microvascular invasion may be associated with a poor clinical outcome in patients with surgically resectable cholangiocarcinoma.
Methods A total 91 patients underwent resection with curative intent for cholangiocarcinoma from 2007 to 2017 were collected from our hospital. We searched data including clinicopathological characteristics, disease-free survival and overall survival with comparing among patients with or without microvascular invasion.
Results Among 91 patients, 49 patients had microvascular invasion and 42 patients had not. Microvascular invasion was associated with poor histologic type, lesser R0 resection, higher incidence of lymphatic invasion, progressive staging, adjuvant chemotherapy and adjuvant radiotherapy. The median overall survival days were 492 (MiVi), 1,008 (no MiVi) and median disease free survival days were 367 (MiVi), 760 (no MiVi). The cumulative survival ratio and incidence rate were seen significantly difference at microvascular invasion (p=0.012). On multivariable analysis, microvascular invasion was an independent risk factor of overall survival (hazard ratio, 3.34; 95% confidence interval, 1.40 to 7.97; p=0.007), but disease-free survival was not seen statistical significance.
Conclusions Cholangiocarcinoma was known poor prognosis even-after curative-intent surgery. About half of patients after surgery, microvascular invasion had remained and it was associated with poor clinical outcomes.
Keywords Cholangiocarcinoma; Microvascular invasion; Postoperative outcome

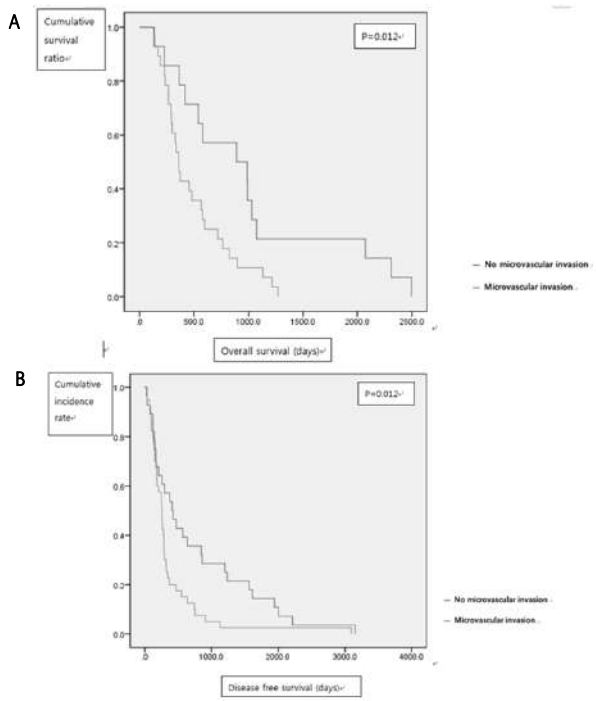

Fig. 1. Cumulative overall survival (A) and disease-free survival (B).

Pancreatobiliary EE-PB-26

Endoscopic Ultrasound-Fine Needle Aspiration for an Abdominal Cyst in a 1-Year-Old Infant: Experience with Endobronchial Ultrasound Scope

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Background/Aims Endoscopic Ultrasound-Fine Needle Aspiration (EUS-FNA), which is currently mainly used for histological diagnosis of pancreatic disease, is widely used because of its usefulness. However, many of these studies have been conducted in adults, and only a few have been conducted in children. Generally the convex type ultrasound endoscope which is commonly used in the adult case is also used in children. We report a case of an intra-abdominal cyst in a 1-year-old infant which EUS-ENA was performed by using an endobronchial ultrasound scope.
Methods The case is a 1-year-old female infant. Resection of the tumor combined with the bile duct, and Roux-en-Y reconstruction were performed for retroperitoneal mature teratoma. The patient developed peritonitis postoperatively and subsequently developed an intra-abdominal abscess, which was relieved by percutaneous drainage and conservative treatment. During the course of treatment, a peripancreatic encapsulated cystic lesion was observed, and an intra-abdominal abscess or residual teratoma was suspected. EUS-FNA was adopted as a policy to evaluate the nature of the content fluid in order to investigate the cause of the cyst. Because of the risk of scope insertion, endobronchial ultrasound scope (EBUS scope, BF-UC260FW, Olympus) was selected. Sedation was performed by intravenous anesthesia.
Results The endoscope was inserted orally, and the cystic lesion was depicted from the stomach. The lesion was 30 mm in size and a debris-like echo was found inside. After checking the blood flow through the puncture route, we punctured by using a 19-G needle (ViziShot 2, Olympus) and aspirate the contents, and the lesion disappeared. There were no complications associated with the procedure.
Conclusions There is no report on the use of the EBUS scope in intra-abdominal lesions via the gastric route. We report this case as a valuable case of the feasibility of EUS-ENA by using an endobronchial ultrasound scope in a pediatric patient.
Keywords Endoscopic ultrasound-fine needle aspiration; Pediatric; Endobronchial ultrasound; Endobronchial ultrasound scope; Endoscopic ultrasound-fine needle aspiration

Pancreatobiliary EE-PB-24

Clinical Impact of Recombinant Human Soluble Thrombomodulin for Disseminated Intravascular Coagulation Associated with Severe Acute Cholangitis

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Background/Aims Acute cholangitis is sometimes a critical systemic condition due to infection of bile juice. The mortality rate of acute cholangitis has been reported to range from 2.7% to 10%. According to the Tokyo guideline (TG13), endoscopic biliary drainage (EBD) is recommended for moderate or severe acute cholangitis. However, when disseminated intravascular coagulation (DIC) occurs with acute cholangitis, EBD may sometimes be challenging. Recently, recombinant human soluble thrombomodulin (rTM) has been developed as a key drug for DIC. In this study, the clinical benefit of rTM for patients with sepsis-induced DIC caused by acute cholangitis was evaluated.
Methods DIC was treated using only rTM without any anticoagulant drugs. In this retrospective study, patients were divided into two groups: the rTM therapy group; and the non-rTM therapy group. The primary outcome was the DIC resolution rate at 7 days after starting treatment. As secondary outcome, the 28-day mortality rate was evaluated.
Results Seventy-one patients were enrolled. All patients had severe acute cholangitis complicated with sepsis-induced DIC. Thirty-five patients were treated by rTM, and 36 patients were treated without rTM for DIC. The rate of resolution of DIC at day 7 was significantly higher in the rTM group than in the non-rTM group (82.9% [29/35], 55.6% [20/36], p=0.0012). Compared with the non-rTM group, the survival rate of the r-TM group was significantly higher (p=0.029). Univariate analysis showed that the factors-related to decreased survival were non-rTM (hazard ratio [HR], 3.869; 95% confidence interval [CI], 1.079 to 13.874, p=0.038), SIRS (+) (HR, 2.908; 95% CI, 1.009 to 8.388; p=0.048), and CRP >10 (HR, 4.212; 95% CI, 1.458 to 12.171; p=0.008).
Conclusions rTM treatment was an impact factor associated with improved DIC and survival rates in patients with severe acute cholangitis.
Keywords Disseminated intravascular coagulation; Recombinant human soluble thrombomodulin

Pancreatobiliary EE-PB-27

A Case of Mixed Acinar-Neuroendocrine-Ductal Carcinoma of the Pancreas

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Background/Aims Pancreatic cancer is one of the most lethal cancer with dismal prognosis. Pancreas cancer can arise from exocrine (ductal and acinar cell) and endocrine cells. Among them, ductal adenocarcinoma is the most common and acinar cell and neuroendocrine carcinoma are relatively rare. Pancreatic cancer with multiple lineage is even more rare and tumors with trilineage (ductal, acinar and neuroendocrine) differentiation is exceptional. Here, we report a case of mixed acinar-neuroendocrine-ductal carcinoma.
Methods A 66-year-old male was referred to university hospital for epigastric pain and weight loss (−7 kg per month). Medical history was significant for diabetes mellitus type II and a 25-pack year smoking history. His serum aspartate aminotransferase, alanine aminotransferase, and total bilirubin level were normal. CA19-9 level was also within normal range (16.14 U/mL; reference range, 0 to 35 U/mL) at admission. Computed tomography (CT) and magnetic resonance imaging revealed an about 6.3-cm-sized ill-defined, low attenuation mass in the pancreas tail. The mass was abutted the posterior wall of gastric body and showed splenic vein encasement and obliteration. On positron emission tomography-CT, the mass showed an intense fluorodeoxyglucose uptake (SUV max 8.5), without evidence of distant metastasis (Fig. 1A). He diagnosed as pancreas tail cancer and underwent distal pancreatectomy and splenectomy.
Results On hematoxylin and eosin stain, the malignant mass has acinar, neuroendocrine, and ductal adenocarcinoma component simultaneously. Immunohistochemical analysis revealed positive expression of chromogranin A, synaptophysin, CK19, and Ki-67 (Fig. 1B). Unfortunately, genomic analysis didn`t for personal reasons. His pathologic cancer stage was IIb (pT3N1M0) and discharged without any complication. The patient has experienced an early recurrence (2 months after the operation) and is under palliative chemotherapy with FOLFIRINOX regimen.
Conclusions There is lack of reported data about clinical presentation and progress of the trilineage pancreatic cancer. Therefore, we should continue to report this rare disease to improve prognosis and establish optimal therapy.
Keywords Pancreas cancer

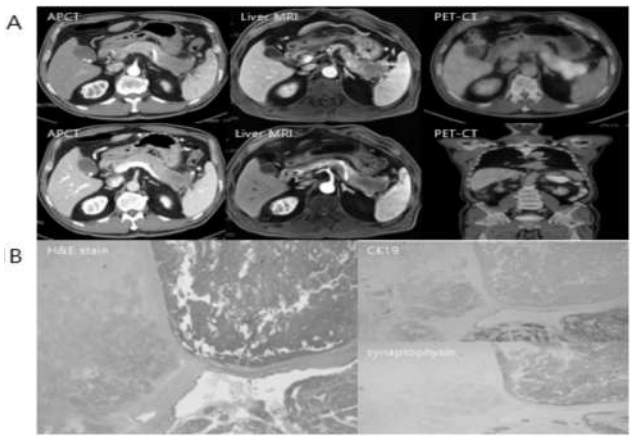

Fig. 1. (A, B) Imaging and pathologic finding.

Pancreatobiliary EE-PB-28

A Case of Retroperitoneal Ganglioneuroma: Masquerader of Pancreatic Head Mass

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Background/Aims Differential diagnoses of a pancreatic head mass include both pancreatic and extrapancreatic lesions.
Methods We report a case of retroperitoneal ganglioneuroma that was difficult to differentiate from pancreatic head mass.
Results A 22-year-old female presented with incidental finding of pancreatic head mass. The patient had no symptoms. Past medical history and family history were noncontributory. She was a 0.3 pack-year smoker and drank a bottle of Soju three times a week. Physical examination showed soft and flat abdomen. No mass was palpable. Complete blood count, biochemical panel were all within normal. CA19-9 was less than 2 U/mL. Transabdominal ultrasonography showed a hypoechoic lesion in pancreatic head. Abdominal computed tomography demonstrated a 6.2-cm-low density mass in pancreatic head with delayed enhancement and encasement of superior mesenteric vessels. Magnetic resonance imaging of the pancreas revealed a 5.6-cm mass between pancreatic head and inferior vena cava. Superior mesenteric artery was traversing the mass. The patient underwent complete surgical excision. The mass was dissected easily from the superior mesenteric vessels. Gross appearance of the resected specimen showed an 8.0x7.0x4.5-cm well encapsulated round solid mass (Fig. 1A). Cross-section showed yellow to whitish glittering surface and no necrosis or hemorrhage. Microscopic examination showed mature neural tissue with scattered large ganglion cells (Fig. 1B). There was no pancreatic tissue. There was no atypical mitosis or necrotic area. The patient recovered uneventfully and was discharged. Final diagnosis was retroperitoneal ganglioneuroma.
Conclusions Ganglioneuroma is a rare tumor derived from primordial neural crest cells in the sympathetic nervous system and composed entirely of mature ganglion cells and Schwannian stroma. Most cases had been reported from pediatric population. Treatment of choice is complete resection. Because local recurrence has been reported, periodic surveillance with cross-sectional imaging is necessary. Although it is a rare tumor, ganglioneuroma should be included in differential diagnoses of pancreatic head mass.
Keywords Ganglioneuroma; Retroperitoneal space; Pancreatic neoplasm

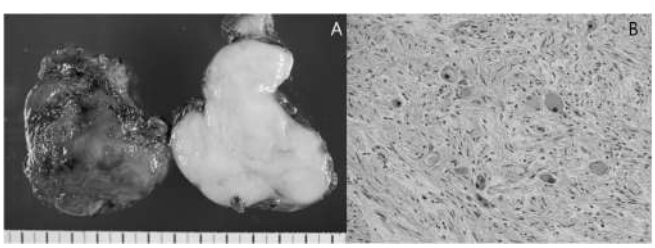

Fig. 1.

Pancreatobiliary EE-PB-29

Hypertriglyceridemia Induced Acute Severe Pancreatitis in a Pregnant Patient: Medical Management

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Background/Aims Hyper triglyceride induced acute pancreatitis (AP) was one of the recognized etiologies predisposing to AP, the risk of pancreatitis increases only when serum TG exceeds >1,000 mg/dL and severity of AP may correlate with levels of hypertriglyceridemia and it is the third most common cause of AP. Gestational hypertriglyceridemia is a common entity and in turn may aggravate the risk of AP. Management of Hypertriglyceridemia induced AP is typically different than the actual mentioned guidelines for management of AP and has additional diagnostic and therapeutic challenges related to gestational hypertriglyceridemia in pregnancy.
Methods We present a case of hypertriglyceridemia induced acute severe pancreatitis in pregnant woman with no previous history of lipid abnormality with pregnancy being the only known initiating factor for hypertriglyceridemia.
Results Improved with conservative management.
Conclusions Hypertriglyceridemia-induced AP is a rare complication of pregnancy and a differential for nonobstetric abdominal pain. Initial management may defer from other etiologies of AP which also include bringing down serum triglycerides to safe levels (TG <1,000 mg/dL).

Pancreatobiliary EE-PB-30

Endoscopic Management of Post-liver Transplant Biliary Complications

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Withdrawn

Background/Aims Biliary complications are the most complications after liver transplantation. Most post-liver transplant biliary complications (PLTBC) involve anastomotic strictures (AS), non-AS, bile leakage (BL) and bile duct stones. Endoscopic retrograde cholangiopancreatography (ERCP) is the mainstay treatment for the majority of PLTBC with a lower complication rate and shorter hospital stay.
Methods The data were retrospectively collected from patients who had PLTBC and had been referred for ERCP to the Department of Gastroenterology, Yangon General Hospital from November 2016 to September 2019.
Results Nine patients with PLTBC underwent ERCP in this period. There were four patients with AS, two patients with BL, two patients with both BL and AS and one patient with common bile duct stones. AS w[illegible]omy, biliary dilatation with Soehandra dilatation cathete[illegible]nsion balloon, and multiple straight plastic stents (SPS) p[illegible]e and/or placement of additional stents every few month[illegible]e AS patient had resolved the stricture sites, but one failed. The remaining AS patients had delayed response. BL was treated with placement of SPS to bridge the leak with sphincterotomy. Resolution of BL was successful in one patient, but one had delayed response. In patients with both BL and AS, sphincterotomy and SPS placement to stricture and leakage sites were performed. One patient was successful, but delayed in response in the other patient. Patient with common bile duct stones was successfully treated with sphincterotomy, temporary placement of double pig tail stent and consecutive complete stone removal with extraction balloon. The response of ERCP to PLTBC in some patients was delayed because they cannot attend regular stent exchange for social and financial reasons.
Conclusions ERCP is the first line treatment for the majority of PLTBC.
Keywords Liver transplantation; Stricture; Bile leak; Endoscopic retrograde cholangiopancreatography

Pancreatobiliary EE-PB-31

A Case of Isolated Pancreatic Metastasis from Renal Cell Carcinoma 5 Years after R0 Resection

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Background/Aims Pancreatic metastasis from advanced malignancy is rare and portion of pancreatic metastasis range between 2% and 5% among all pancreatic malignancies. The most common malignancy that metastasize to pancreas is renal cell carcinoma (RCC) followed by lung cancer, breast cancer and colorectal cancer. We report a case of pancreatic mass diagnosed as metastasis from RCC.
Results A 46-year-old man admitted to our gastroenterology department for the evaluation of pancreatic mass. He had past medical history of diabetes mellitus and underwent right radical nephrectomy due to about 13-mm-sized renal mass 5 years ago. Renal mass was diagnosed as clear cell RCC and R0 section was done. Abdominal computed tomography for follow up study from urology department showed two about 3-cm-sized heterogeneously enhancing mass at head and uncinate process of pancreas with dilatation of distal pancreatic duct. Pancreatic magnetic resonance image showed about 3-cm-sized early enhancing masses at neck and uncinate process of pancreas with distal pancreatic duct dilatation. Endoscopic ultrasound showed about 3-cm- and 2-cm-sized hypoechoic mass at neck and uncinate process of pancreas, retrospectively. Endoscopic ultrasound guided fine needle aspiration of pancreatic mass was performed and pathologic examination of aspirated specimen revealed metastatic RCC. Positron emission tomography showed two hypermetabolic foci at uncinate process and neck of pancreas with no other metastatic lesion. The patient underwent surgery for resection of pancreatic metastasis. However, the surgery was terminated due to 3-mm-sized metastatic mass found at surface of segment 3 of liver. The patient is current on chemotherapy for treatment of multiple metastasis from RCC.
Conclusions In this case, pancreatic metastasis occurred 5 years after R0 resection of RCC. Long-term follow-up is needed even after R0 resection in RCC because late metastasis is possible.
Keywords Pancreas; Metastasis; Renal cell carcinoma

Pancreatobiliary EE-PB-32

Xanthogranulomatous Cholecystitis: Hard to Differentiate from Gallbladder Cancer

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Background/Aims Xanthogranulomatous cholecystitis (XGC) is a rare, benign inflammatory condition of the gallbladder (GB) that manifests as focal or diffuse inflammation of the GB wall, and differential diagnosis with gallbladder cancer (GBCA) by radiological findings is challenging. The aim of this study was to identify clinical differences between XGC and GBCA in the practical setting.
Methods From January 2014 to January 2019, 26 patients was suspicious of XGC and 33 of GBCA by abdominal computed tomography (CT) scan or ultrasound. Sixteen out of 26 XGC patients underwent surgery. Of 16 XGC patients, eight patient was confirmed as XGC and three as GBCA. Eight cases of XGC and 14 GBCA were compared by their clinical characteristics including presence of hepatobiliary stone and laboratory findings.
Results Mean age of GBCA group was statistically older than XGC group (68.93±10.5 vs 56.75±18.6, $p<0.05$), and GB stone was more frequently observed in the XGC group than the GBCA group (14% vs 75%, $p<0.05$). Among various laboratory tests, only alkaline phosphatase levels showed a statistically significant difference (138.5±81.0 in GBCA vs 271.6±140.9 in XGC, $p<0.05$). Asymptomatic elevation of aspartate aminotransferase and alanine aminotransferase levels seemed to be more pronounced in the GBCA group compared to the XGC group, but it was not statistically significant .
Conclusions XGC seems to occur at younger age than GBCA. Comorbidity with GB stone may also be associated with the onset of XGC.
Keywords Xanthogranulomatous cholecystitis; Gallbladder cancer

Pancreatobiliary EE-PB-33

Because of the Addition with Tigecycline-Induced Acute Pancreatitis: A Case Sharing

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Background/Aims Tigecycline (TGC) is a new broad-spectrum antibiotic. Gastrointestinal effects of nausea and vomiting are the most common side effects. We report a case of severe acute pancreatitis (AP) associated with TGC. We take this opportunity to remind clinicians to measure the lipase rate.
Methods The following methods were induced: laboratory data, observation, physical assessment and follow up image study later.
Results This is a 34-year-old male who was admitted to intensive care unit due to hypoxemic respiratory failure post intubated. Shock was noted despite fluid resuscitation, requiring usage of vasopressor. Autoimmune profile and viral serology were checked. Chest X-ray (CXR) showed bilateral interstitial infiltration; *Pneumocystis jiroveci* pneumonia with adult respiratory distress syndrome was suspected. Hence, antibiotics with piperacillin/tazobactam levofloxacin, sulfamethoxazole /trimethoprim and caspofungin were used. After the above mentioned treatment, the vasopressor was able to be tapered off. The oxygenation and CXR were also improved. Hyperkalemia was noted, which was probably related to sulfamethoxazole /trimethoprim. Hence, sulfamethoxazole /trimethoprim was shifted to caspofungin. However, persistent thrombocytopenia and coagulopathy then developed. Increased procalcitonin, deterioration of renal function were also noted. New infection was suspected. Abdominal computed tomography was arranged, which showed acute necrotizing pancreatitis, hence TGC was discontinued. Culture of discharge from previous central venous catheter insertion wound revealed yeast. His condition then progressed rapidly with hemodynamic unstable and refractory to fluid resuscitation. After discussion with family members about his critical condition and grave prognosis, they all requested do not resuscitate and preferred comfort care.
Conclusions Hence, TGC-induced AP is still considered a rare phenomenon. However, serum amylase and lipase levels should be closely monitored. Therefore, the mechanism of TGC-induced AP should be more attention. Clinicians should pay attention to clinical symptoms and pancreatic enzyme levels to monitor the development of pancreatitis.
Keywords Acute pancreatitis; Potential adverse drug event; Tigecycline

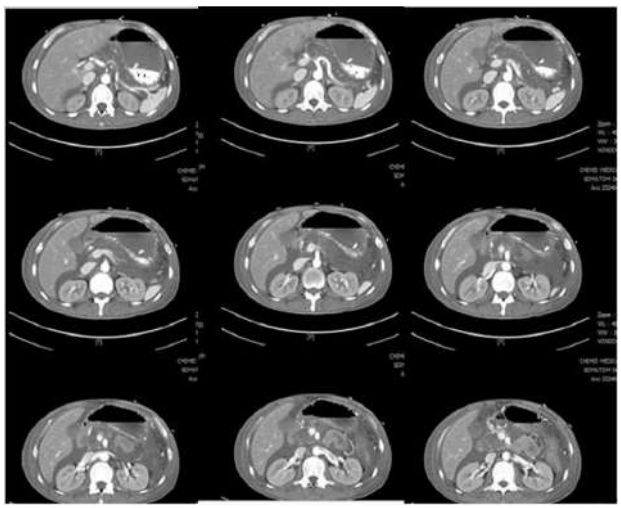

Fig. 1. 108/07/23 Abdominal computed tomography: necrotizing pancreatitis involving almost the entire pancreas is considered.

Pancreatobiliary EE-PB-34

Cholecystectomy Due to Cholecystitis in the Dialysis Patients: A Nationwide Population-Based Cohort Study in Korea

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Background/Aims Chronic cholecystitis and cholelithiasis are common in dialysis. Gallstone disease was higher in patients with end-stage renal failure (ESRD), and gallstone disease was detected in 28% in the dialysis patients and 82% are asymptomatic. It is still not unveiled that acute cholecystitis and incidences of cholecystectomy are more common or not compared with age-matched controls without chronic kidney disease. Also, patients undergoing peritoneal dialysis (PD) show higher incidences of gastrointestinal symptom and sign, but it is not well known that PD patients show a higher incidence of cholecystitis. The study aims to know the incidence and risk of acute cholecystitis which needed cholecystectomy in the dialysis population and to investigate clinical characteristics and difference between dialysis modality in ESRD patients. We compared ESRD patients and age-matched control group using the National Health Insurance Service-National Sample Cohort.
Methods Korean National Health Insurance database was used and excerpted data from the insurance claim of the International Classification of Diseases code of dialysis and acute cholecystitis. We included all new patients starting dialysis between 2004 and 2013 and selected the same number of the control group.
Results Among the 71,092 dialysis and same numbers of control, 6,454 dialysis patients (9.1%) developed cholecystitis, and 749 controls (1.1%) appreciated cholecystitis. The overall incidence of cholecystitis was remarkably higher in the dialysis patient (incidence rate ratio [IRR], 11.85; 95% confidence interval [CI], 10.98 to 12.80). Incidence of cholecystitis was not affected by age increment and showed higher incidence even in the youngest age (0–29) group (IRR, 12.86; 95% CI, 6.30 to 30.54; p<0.001). It showed similar incidences of cholecystitis between dialysis and control in different income levels and comorbidities.
Conclusions Dialysis patients showed higher incidence of acute cholecystitis needed laparoscopic cholecystectomy. Patients with gastrointestinal problems should be screened to detect acute cholecystitis in the dialysis clinic.
Keywords Dialysis; Cholecystitis; Gallstone

Pancreatobiliary EE-PB-35

A Case of Pancreatic Tuberculosis Mimicking Solid Pseudopapillary Neoplasm

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Background/Aims Pancreatic tuberculosis is a rare disease that can be easily mistaken for pancreatic tumor.
Methods A 32-year-old woman with a Philippine nationality who did not have a specific medical history was transferred to department of gastroenterology at Busan Paik Hospital due to finding pancreatic tail mass on abdominal computed tomography (CT) after complaining of an abdominal pain at a local clinic.
Results In laboratory examinations, CA 19-9 was at a normal level 25.55 U/mL, and a tumor which suspected to be a solid pseudopapillary neoplasm (SPN) of 4.2x3.6 cm was detected using pancreas magnetic resonance imaging. The patient was transferred to department of surgery. Preoperative pancreatic CT showed suspected SPN although there were no specific findings in laboratory examinations. Distal pancreatectomy and splenectomy were performed and found that the pancreatic mass was accompanied by abscess. Postoperative laboratory examinations showed increase in Amylase 272 U/L and Lipase 179 U/L level compared to normal. This histological examination showed chronic granulomatous inflammation with central necrosis. The acid-fast bacilli staining using the biopsy showed no acid-fast bacilli, however, the TB-PCR showed *Mycobacterium* tuberculosis complex. We did not observe any evidence for pulmonary tuberculosis. The patient was diagnosed with pancreatic tuberculosis and she is currently undergoing antituberculosis treatment at department of infectious medicine.
Conclusions Pancreatic tuberculosis is a rare disease and easily mistaken for pancreatic tumor due to its clinical diversity and imaging similarity in many cases. We report a case of diagnosing pancreatic tuberculosis postoperatively after suspecting SPN by clinical and imaging presentation of this patient.
Keywords Pancreatic tuberculosis; Solid pseudopapillary neoplasm

Pancreatobiliary EE-PB-36

Endoscopic Retrograde Cholangiopancreatography in Patients with Cirrhosis: An 8-Year Retrospective Study

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Background/Aims Patients with cirrhosis are at an increased risk of adverse events after endoscopic retrograde cholangiopancreatography (ERCP) because of liver dysfunction. Limited data exist regarding ERCP performed in patients with cirrhosis. We aimed to investigate the indications, success rate, therapeutic yields, and complications of ERCP for the treatment of patients with cirrhosis at a high-volume center.
Methods All patients with cirrhosis undergoing ERCP at our center from January 2011 to December 2018 were retrospectively identified from a prospectively collected database. The baseline characteristics, indications, ERCP findings, ERCP interventions, and complications were collected.
Results During the study period, a total of 235 patients (mean age, 64.9 years; range, 32 to 92 years; 107 females) underwent 274 ERCP procedures. Indications for ERCPs included common bile duct stones (n=185, 67.5%), common bile duct stricture (n=84, 30.7%), and others. Overall, ERCP was successfully performed in 267 of 274 procedures (97.4%), and failed major papilla cannulation was the only cause for unsuccessful ERCP. The ERCP findings included choledocholithiasis (n=187, 70%), benign common bile duct stricture (n=59, 22.1%), and malignant common bile duct stricture (n=21, 7.9%), respectively. Therapeutic interventions were performed during 267 procedures, including sphincterotomy (n=234, 87.6%), stone extraction (n=187, 70%), and stent insertion (n=80, 30%). ERCP-related complications were mild with a rate of 9.5% (26/274), including post-ERCP pancreatitis (n=12, 46.2%), bleeding (n=9, 34.6%), and cholangitis (n=5, 19.2%). No severe pancreatitis or perforation was noted.
Conclusions ERCP seems to be a feasible and effective intervention for patients with cirrhosis, with acceptable complication rates. Large scale studies comparing ERCP performed in cirrhotic and non-cirrhotic patients are warranted.
Keywords Endoscopic retrograde cholangiopancreatography; Cirrhosis; Indication; Complication

Pancreatobiliary EE-PB-37

Comparison between Conventional Smear and Liquid-Based Preparation in Endoscopic Ultrasonography-Fine Needle Aspiration Cytology of Pancreatic Lesions

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Background/Aims The present study aimed to compare the diagnostic accuracy between conventional smear (CS) and liquid-based preparation (LBP) in endoscopic ultrasonography-fine needle aspiration cytology (EUS-FNAC) of pancreatic lesions through a conventional meta-analysis and diagnostic test accuracy (DTA) review.
Methods Using 31 eligible studies, the diagnostic accuracy of cytologic examination in CS and LBP was evaluated through a conventional meta-analysis. In addition, in the DTA review, sensitivity, specificity, diagnostic odds ratio (OR), and area under the curve (AUC) of the summary receiver operating characteristic (SROC) curve were calculated.
Results Overall concordance rates were 82.8% (95% confidence interval [CI], 79.8% to 85.5%) and 94.0% (95% CI, 84.4% to 97.8%) in CS and LBP, respectively. CS with rapid on-site evaluation (ROSE) showed a higher concordance rate than CS without ROSE. In CS, the pooled sensitivity and specificity were 87.6% (95% CI, 86.5% to 88.6%) and 90.1% (95% CI, 87.9% to 92.0%), respectively. The diagnostic OR and AUC of the SROC curve were 80.42 (95% CI, 43.84 to 147.55) and 0.9560, respectively. In LBP, the pooled sensitivity and specificity were 80.6% (95% CI, 76.8% to 84.0%) and 97.0% (95% CI, 91.5% to 99.4%), respectively. The diagnostic OR and AUC of the SROC curve were 57.21 (95% CI, 23.61 to 138.64) and 0.9433, respectively.
Conclusions Higher concordance rates were found in CS with ROSE and LBP in EUS-FNAC of pancreatic lesions. Regardless of the cytologic preparation method, EUS-FNAC is a useful and accurate diagnostic tool for pancreatic lesions.
Keywords Pancreas; Endoscopic ultrasonography-fine needle aspiration cytology; Conventional smear; Liquid-based preparation; Diagnostic test accuracy review

Pancreatobiliary EE-PB-38

Antibiotic Use in Patients with Acute Cholecystitis after Percutaneous Cholecystostomy

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Background/Aims Currently, evidence regarding the strategies of antibiotic use in patients with acute cholecystitis after receiving percutaneous cholecystostomy is limited. Hence, we aimed to investigate the outcomes in patients with inoperable acute cholecystitis receiving narrow or broad-spectrum antibiotics after percutaneous cholecystostomy.
Methods Total 117 patients receiving percutaneous cholecystostomy were categorized into moderate and severe acute cholecystitis defined by the Tokyo guideline and then divided into group A (narrow-spectrum antibiotic use) and group B (broad-spectrum antibiotic use) (Table 1). The clinical outcomes and complications were analyzed.
Results In moderate acute cholecystitis (n=80), group A patients (n=62) had similar early recurrent rate (11.3% vs 16.7%, p=0.544) and a shorter length of hospital stay (13.4±8.6 vs 18.6±9.4 days, p=0.009) as compared with group B patients (n=18). No in-hospital mortality occurred in moderate acute cholecystitis. In severe acute cholecystitis (n=37), both groups had similar length of hospital stay (16.3±12.2 vs 20.9±9.5 days, p=0.051), early recurrent rate (0% vs 16.7%, p=0.105) and in-hospital mortality rate (5.3% vs 16.7%, p=0.340). Although group B patients with severe cholecystitis had higher serum levels of Alk-P and higher proportion of underlying malignancy, ASA class IV and septic shock, the clinical outcomes were not inferior to patients in group A.
Conclusions In moderate acute cholecystitis after percutaneous cholecystostomy, patients receiving narrow-spectrum antibiotics have comparable clinical outcomes as those treated with broad-spectrum antibiotics. However, in severe acute cholecystitis, broad-spectrum antibiotics might still be necessary to rescue these patients.
Keywords Acute cholecystitis; Percutaneous cholecystostomy; Antibiotic strategy

Table 1. Clinical Characteristics and Outcomes Stratified by Severity of Acute Cholecystitis and Antibiotic Groups (N=117)

Severity grade by Tokyo guideline	Moderate, grade II (n=80)			Severe, grade III (n=37)		
Variables	Group A* (n=62)	Group B# (n=18)	*p* value	Group A (n=19)	Group B (n=18)	*p* value
Age, years	71.2±16.2	77.2±12.7	0.174	71.4±20.4	76.7±10.4	0.855
Male	37 (59.7)	11 (61.1)	0.913	17 (89.5)	15 (83.3)	0.660
BT, °C	37.3±0.8	37.5±0.7	0.190	37.4±0.8	37.4±0.9	0.915
MAP, mmHg	98.7±18.1	98.0±17.2	0.708	99.1±19.8	84.8±25.4	0.012
PR, bpm	90.5±18.3	96.1±15.7	0.384	91.8±24.1	102.5±25.8	0.236
RR, /min	19.5±1.5	20.3±3.0	0.466	19.8±2.3	21.2±3.4	0.028
Laboratory						
WBC, 1000/cumm	14.3±5.6	16.0±7.7	0.568	13.7±7.51	16.6±8.2	0.149
Cr, mg/dL	1.2±1.2	1.13±0.4	0.545	1.6±0.8	2.0±1.4	0.421
ALT, U/L	54.4±61.4	108.4±145.4	0.097	36.3±42.7	64.3±82.3	0.377
Alk-P, U/L	123.3±82.3	141.5±73.6	0.107	87.2±38.8	192.3±156.6	0.006
TB, mg/dL	1.9±1.9	1.8±1.9	0.985	1.5±1.1	2.7±2.8	0.362
CRP, mg/dL	13.7±9.6	16.9±2.0	0.213	13.8±10.2	17.4±8.8	0.316
Comorbidity						
Cardiovascular	30 (48.4)	11 (61.1)	0.342	11 (57.9)	14 (77.8)	0.197
Diabetes	8 (12.9)	5 (27.8)	0.132	4 (21.1)	7 (38.9)	0.235
Pulmonary	6 (9.7)	0 (0.0)	0.226	1 (5.3)	1 (5.6)	1.000
Renal	2 (3.2)	0 (0.0)	1.000	4(21.1)	1 (5.6)	0.340
Neurologic	6 (9.7)	3 (16.7)	0.409	3 (15.8)	3 (16.7)	1.000
Malignancy	12 (19.4)	1 (5.6)	0.162	0 (0.0)	6 (33.3)	0.006
ASA classifications						
II	6 (9.7)	0 (0.0)	0.328	1 (5.3)	1 (2.7)	1.000
III	56 (90.3)	17 (94.4)	0.586	17 (89.5)	8 (44.4)	0.003
IV	0 (0.0)	1 (5.6)	0.225	1 (5.3)	10 (55.6)	0.001
Hospital-acquired	2 (3.2)	1 (5.6)	1.000	1 (5.3)	3 (16.7)	0.340
Acalculous cholecystitis	3 (4.8)	1 (5.6)	0.540	0 (0.0)	3 (16.7)	0.105
Septic shock	2 (3.2)	2 (11.1)	0.217	3 (15.8)	11 (61.1)	0.007
Clinical outcomes						
Early recurrence	7 (11.3)	3 (16.7)	0.544	0 (0.0)	3 (16.7)	0.105
In-hospital mortality	0 (0.0)	0 (0.0)	-	1 (5.3)	3 (16.7)	0.340

*Group A included patients treated with amoxicillin/clavulanic acid, ampicillin/sulbactam, first-and second-generation cephalosporins
#Group B included patients treated piperacillin/tazobactam, third and fourth-generation cephalosporins, fluoroquinolone and carbapenem

WBC, white blood cell; ALT, alanine aminotransferase; CRP, C-reactive protein.

Pancreatobiliary EE-PB-39

A Case of Xanthogranulomatous Cholecystitis Showing Positive IgG4 Stain, Mimicking Gallbladder Cancer, in a Patient with IgG4-Associated Cholangiopathy

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Background/Aims Xanthogranulomatous cholecystitis (XGC) is a rare form of chronic cholecystitis. Radiologically, it has abnormal thickening of the gallbladder (GB) wall, with the extension of inflammatory process to adjacent organs, such as colon and liver. It is utmost important to differentiate XGC from the GB cancer to avoid the unnecessary surgery.
Methods XGC is a rare form of chronic cholecystitis. Radiologically, it has abnormal thickening of the GB wall, with the extension of inflammatory process to adjacent organs, such as colon and liver. It is utmost important to differentiate XGC from the GB cancer to avoid the unnecessary surgery.
Results The cholangiogram of endoscopic retrograde cholangiopancreatography showed the partial improvement of stricture of distal bile duct. Previous endobiliary biopsy of bile duct was negative for malignancy, however, it was strongly positive for IgG4 stain (>60/HPF), confirming the IgG4-associated cholangiopathy. He underwent laparoscopic cholecystectomy due to suspicion of malignancy. The surgical specimen of GB showed acute and chronic inflammatory cells infiltration, including neutrophil, lymphocytes and plasma cells and its immunohistochemical stain was strongly IgG4 positive, suggesting IgG4-related disease.
Conclusions A XGC showing overlapping histologic features IgG4 related occurred in a patient with IgG4-associated cholangiopathy, which is rare and needs differentiation from the GB malignancy.
Keywords Xanthogranulomatous cholecystitis; IgG4-associated cholangiopathy; Gallbladder cancer; Cholecystitis

Pancreatobiliary EE-PB-40

Gallstone Ileus: A Rare Complication of a Common Disease

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Background/Aims Gallstone ileus is an uncommon complication of gallstone disease, typically preceded by biliary symptoms, followed by a later onset of acute mechanical bowel obstruction or peritonitis. Plain abdominal X-ray may show dilated bowels, aerobilia and ectopic gallstone. Computed tomography scan remains the gold standard imaging modality and may reveal choledocho-intestinal fistula with aerobilia, perforation, intra-abdominal collection and location of ectopic gallstone. Surgical approach consists of single stage surgery (emergency enterolithotomy, fistula closure and cholecystectomy), two stage surgery (emergency enterolithotomy and elective cholecystectomy+fistula closure), or emergency enterolithotomy only. This report presents a case of gallstone ileus in a 67-year-old lady.
Methods The patient presented to our center with sudden onset of acute intestinal obstruction. Physical examination revealed a dehydrated patient with gross abdominal distension and hyperactive bowel sounds. Fluid resuscitation, analgesia and antibiotics were given.
Results Blood investigations revealed normal renal and liver function test, absence of leukocytosis, and normal acid-base balance. A CECT abdomen showed an irregular hyperdense material impacted in the terminal ileum near the ileocaecal junction resulting in proximal bowel dilatation and presence of aerobilia. She underwent emergency laparotomy, ileal enterolithotomy and stone retrieval. Patient recovered well on day 6 and scheduled for elective cholecystectomy and fistula closure 2 months later.
Conclusions Gallstone ileus must be considered in patient with underlying gallstone disease presenting with acute intestinal obstruction. Surgical approach should be tailored according to patient's fitness status surgeon's capability at the time of presentation.
Keywords Gallstone; Ileus; Intestinal; Obstruction; Enterolithotomy

Fig. 1. Gallstone in terminal ileum.

Pancreatobiliary EE-PB-41

Comparative Study on the Outcomes, Safety and Complications of Endoscopic Retrograde Cholangiopancreatography in Elderly Patients 80 Years Old and above versus Young Adult Age Group: A Single Center Retrospective Study

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Background/Aims Endoscopic retrograde cholangiopancreatography (ERCP) has been a very useful diagnostic and therapeutic procedure in patients suffering from pancreaticobilliary disease. This has been increasingly seen among elderly Filipino patients. Because of significant comorbidities accompanying advancing age, the elderly may be at greater risk of developing complications related to ERCP. This study aims to evaluate the outcomes, safety and complications associated with ERCP performed in the elderly patients 80 years old and above compares with young adult group.
Methods Retrospective analysis of patients more than 80 years and 18–35 years old referred for ERCP at Chinese General Hospital between January 2008 to June 2019 were reviewed from endoscopy and medical records. The demographic profile, comorbidities, indications, ERCP findings/intervention, outcomes, ERCP and medical-related complications were analyzed.
Results The overall success rate was 90% in the elderly group and 96% in young adults. Most common cause of failed ERCP was due to failure of cannulation secondary to pancreatic head mass in the elderly (5%) versus (0.5%) of young adult group. Periprocedural complications were similar in both age groups. Most common early ERCP-related complication was pancreatitis which was comparable in both age groups. Early and late complications in the elderly were primarily due to other underlying medical conditions like coronary artery disease and pneumonia.
Conclusions ERCP-related complications were comparable between age groups. The study therefore conclude that ERCP for various indications is generally safe in the elderly patients.
Keywords Endoscopic retrograde cholangiopancreatography; Safety; Outcomes of endoscopic retrograde cholangiopancreatography in the Elderly

Pancreatobiliary EE-PB-42

Tuberculosis of the Gallbladder: A Diagnostic Dilemma

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Withdrawn

Background/Aims Because of its rarity and similar manifestation with calculous, acalculous cholecystitis or cystic duct obstruction, most cases of the gallbladder tuberculosis are misdiagnosed. A preoperative diagnosis of this disease is difficult, thus awareness among clinicians needs to be improved.
Methods A 24-year-old male who presented with similar features of acute cholecystitis with choledocholithiasis. He had no other comorbidities and no history of tuberculosis.
Results Patient underwent e… pancreatography (ERCP) and laparoscopic cholecystectomy… Magnetic resonance cholangiopancreatography showed… the intrahepatic and extrahepatic ducts, with beaded appearance of… ducts with smooth tapering at the confluence suggestive of inflammatory process. ERCP with stenting was repeated. Tuberculosis of the gallbladder was considered based on the histopathologic findings of caseating granuloma with Langhans giant cells. Patient was started on antituberculosis medications for 6 months.
Conclusions Since Tuberculosis of the gallbladder can be managed medically, it should be considered as part of the differential diagnosis in patients presenting with calculous, acalculous cholecystitis or cystic duct obstruction, especially in endemic area like the Philippines.
Keywords Gallbladder; Tuberculosis; Cholecystitis

Pancreatobiliary EE-PB-43

Acute Pancreatitis Complicated with Diabetic Ketoacidosis: A Rare Case Report

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Background/Aims In clinical practice, the development of diabetic ketoacidosis (DKA) secondary to acute pancreatitis (AP) is rare. AP precipitates a more severe episode of DKA due to marked depletion of the intravascular volume. The aim of this paper is trying to present the complicated relationship of AP and DKA.
Methods The following methods were executed: observation, listening, talks, medical history collection, physical assessment, direct care.
Results This 73-year-old female had a past history of hypertension. She presented to emergent department with epigastric discomfort. The laboratory data showed leukocytosis, elevated lipase, hyperbilirubinemia, elevated aminotransferases, hyperglycemia, elevated ketone body. Abdominal computed tomography (CT) revealed AP. She was admitted due to new-onset DKA and AP. After admission, her insulin regimen was continued after resolution of DKA. Aggressive fluid resuscitation with 6-L crystalloid fluid was given. However, progressive dyspnea was noted. Endotracheal intubation was performed on June 5, 2018. Abdominal CT showed acute necrotizing pancreatitis and suspicious multiple focal infarctions in the both lobes of liver. We change antibiotic to Doripenem because of elevated infection parameters. After treatment, the clinical condition improved a lot. After hemodynamic status stabilized, we started diuretic therapy. Abdominal CT was repeated; progression of ascites and misty mesentery was noted. We consulted radiologist for evaluation of drainage. However, high operative risk was informed. Medical treatment was suggested. After diuresis, extubation was performed successfully on June 22, 2018. She recovered well. She was discharged on July 3, 2018.
Conclusions DKA may mask a coexisting AP. AP can worsen hypovolemic shock and metabolic derangement in DKA. Aggressive hydration, insulin/dextrose infusion and initiation of a fibrate resulted in correction of acidosis. Continuous to monitor AP complications such as acute respiratory distress syndrome, pancreatic necrosis, infection, and pseudocysts are very important.
Keywords Acute pancreatitis; Diabetic ketoacidosis

Pancreatobiliary EE-PB-44

Differentiation of Adenomyomatosis of the Gallbladder from Malignancy Using Endoscopic Ultrasound

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Background/Aims Adenomyomatosis is a benign lesion of gallbladder. It is usually asymptomatic and found accidentally with radiologic modalities. When thickening of gallbladder wall is detected, the lesion's malignant potential is evaluated using various radiologic modalities. Endoscopic ultrasound (EUS) is an effective tool for differentiating gallbladder lesions, since there is no anatomical barrier between the probe and gallbladder. The purpose of our study is to understand the accuracy and clinical significance of EUS in differentiating adenomyomatosis and malignancy of gallbladder.
Methods The medical records and images of patients who underwent EUS and subsequent cholecystectomy from January 2011 till May 2019 at Seoul National University Hospital were retrospectively analyzed. Patients whose surgical specimen's histologic diagnosis of adenomyomatosis or malignancy were analyzed at our study.
Results Total 93 patients were analyzed, 39 patients (41.9%) were histologically diagnosed adenomyomatosis, and 54 patients (58.1%) malignancy. Among adenomyomatosis group, 25 (64.1%) were previously diagnosed adenomyomatosis by EUS, followed by polyp (6, 15.4%), no wall thickening (5, 12.8%) and malignancy (1, 2.6%). Among malignancy group, 37 (68.5%) were previously diagnosed malignancy by EUS, followed by polyp (5, 9.3%). Adenomyomatosis, no wall thickening, adenoma and cholecystitis were also diagnosed (3, 5.6%) respectively. Median wall thickness by EUS were 7.0 mm (Interquartile range [IQR], 5.00 to10.00 mm) and 12.0 mm (IQR, 7.5 to 19.0 mm) respectively ($p<0.001$) in adenomyomatosis and malignancy groups. The number of patients who had intramural cystic space at EUS were 15 (38.5%) in adenomyomatosis group and two (3.7%) in malignancy group ($p<0.001$). At receiver operating characteristic (ROC) curve analysis between gallbladder wall thickness and diagnosis of gallbladder malignancy, area under ROC curve was 0.739.
Conclusions EUS is a useful tool for differentiating gallbladder adenomyomatosis from malignancy.
Keywords Gallbladder; Adenomyomatosis; Endoscopic ultrasound; Gallbladder malignancy

1ASL-KASL EE-1K-01

Profile of True HBsAg Status Confirmed by HBsAg Confirmatory Test

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Background/Aims Hepatitis B serologic testing needs a few steps of serologic testing in order to declare reactive result. HBsAg presence indicates infectious state of the disease. Reactive and borderline HBsAg results need to be repeated in order to conclude the final status. This study aimed to study the prevalence of true reactive, borderline and non-reactive among patients with borderline HBsAg results retested with HBsAg confirmatory test.
Methods Samples were collected between January 2015 and June 2017. Patients with borderline and weak reactive Cut-Off Index (COI) HBsAg results was retested and the results were grouped as nonreactive, reactive and invalid. Baseline demographic characteristic were noted.
Results The number of samples with borderline COI was 147 (22.9%) and weak reactive samples was 496 (77.1%). Among 85 borderline patients retested, 46 were nonreactive (54.1%), 20 were borderline (23.5%), and 19 weak reactive samples (22.4%). From 429 weak reactive patients retested, 101 (23.5%) was nonreactive, 15 (3.5%) was borderline, 311 (72.5%) was weak reactive, and two (0.5%) was reactive. The samples examined by HBsAg confirmatory test were 76 samples, with 67 reactive results (88.2%), eight non-reactive results (10,5%) and one non-valid result (1,3%). Samples with non-validity check results are not included in the reactive COP-setting analysis.
Conclusions Overall, this study found that retesting the same sample and repetition with new samples of HBsAg examination can decrease false positive results and can help the course of diagnosis and disease management in Hepatitis B patients.
Keywords Hepatitis B; HBsAg; HBsAg confirmatory test

Table 1. Baseline Characteristics of Patients Examined by HBsAg Confirmatory Test

Characteristics of Subject	n(%)	Reactive n(%)	Non Reactive n(%)
Sex			
Men	47 (63,5%)	42 (63,6)	5 (62,5)
Woman	27(36,5%	24 (36,4)	3 (37,5)
Age (Year)			
Child (0-11)	4 (5,4)	4 (6)	0
Teenagers (12-25)	5 (6,8)	3 (4,5)	2 (25)
Adult (26-45)	14 (18.9)	13 (19,7)	1 (12,5)
Elderly (46-65)	35 (47,3)	33 (50)	2 (25)
Oldest (>65)	16 (21,6)	13 (19,7)	3 (37,5)

1ASL-KASL EE-1K-02

Electrocardiogram Abnormality Findings of Hepatitis B and C Infected Patients

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Background/Aims Hepatitis B and C virus were the main causes of hepatitis. Both of them cause systemic problems in hepatitis patients. Some cases showed that there is a higher mortality risk in patients with hepatitis caused by a virus than the others. Higher mortality risk could be assessed using an electrocardiogram. This study aims to find electrocardiogram abnormality findings in both infections.
Methods This is a cross-sectional study. This study using subjects from all hepatitis patients in the first quarter in Sardjito general hospital, a tertiary hospital in Indonesia. All subjects with the previous cardiac diagnosis were excluded from this study. Hepatitis diagnosis was done by a clinician using the World Health Organization criteria. All subjects were undergoing electrocardiogram examinations. Abnormal electrocardiogram findings were based on prolonged QT-dispersion >50 ms.
Results Forty-six subjects were included in this study with a mean age was 51.22 years old. Most of the subjects (91.3%) were infected by the hepatitis B virus. There is no difference in sex between groups. The proportion of abnormality was higher in the hepatitis B virus group than the hepatitis C virus (73.81% vs 50%, respectively) (Fig. 1).
Conclusions Patients with hepatitis B infection tended to get a risk of cardiac complications higher than patients with hepatitis C infection. This study was conducted in a tertiary hospital, which is a primary and secondary hospital that may have different results.
Keywords Hepatitis B; Hepatitis C; Electrocardiogram; Cardiac

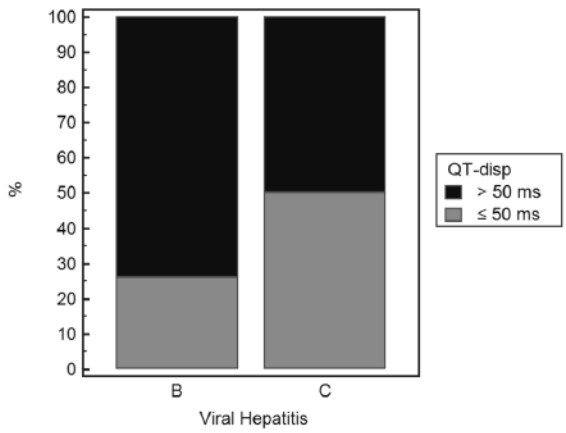

Fig. 1. The electrocardiogram abnormality proportion.
disp, dispersion.

1ASL-KASL EE-1K-04

Results of Endoscopic Hemostasis in Two Infants with Severe Gastrointestinal Bleeding after Open Heart Surgery

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Background/Aims We reported the results of endoscopic hemostasist wo infants with severe gastrointestinal hemorrhage after open congenital heart surgery with the cardiopulmonary bypass.
Methods A 3.5-month-old boy presented bloody stools 3 hours after operation with hemoglobin 60 g/L and was underwent the endoscopy 10 hours later with one bleeding small erosion in the left colon. One other 4-month-old girl presented bloody vomiting on the day after operation with hemoglobin 40 g/L and was underwent the endoscopy 24 hours later with similar lesion in the body.
Results Both patients had successfully endoscopic hemostasis with clip. They had transfusion more than 250 mL/kg before endoscopy.
Conclusions Endoscopy using clip was safe and effective in management of severe gastrointestinal hemorrhage after cardiovascular operations in infants.
Keywords Congenital heart disease; Surgery; Gastrointestinal hemorrhage; Endoscopy; Children

1ASL-KASL EE-1K-05

Nutritional Status in Children Under 5 Years Old with Short Bowel Syndrome at the Vietnam National Children's Hospital

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Background/Aims This was a descriptive study on a series of cases including 30 children under 5 years of age with short bowel syndrome (SBS) inpatients in the Nutrition Department at the National Hospital of Pediatrics.
Methods A descriptive study on a series of cases.
Results SBS was mainly in children under 6 months of age (70%), from 6 to 12 months (23.3%) and the lowest in the age group upper 12 months (6.7%). The most common cause of SBS was neonatal intestinal obstruction and necrotizing enterocolitis (36.7% and 33.3%, respectively), intestinal atrophy (10.0%), volvulus (13.3%) and the lowest prevalence was of megacolon with two cases (6.7%). The percentage of malnutrition in SBS patients was high, underweight (90%) and most children had severe malnutrition with underweight, stunting, and wasting, (67.7%, 63.3%, and 56.7%, respectively).
Conclusions The percentage of malnutrition in short bowel children was high.
Keywords Children; Malnutrition; Necrotizing enterocolitis; Short bowel syndrome

1ASL-KASL EE-1K-06

Prognosis Factors for Overall Survival of Vietnamese Patients with Hepatocellular Carcinoma Treated by Radiofrequency Ablation

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Background/Aims Hepatocellular carcinoma (HCC) is a common complication of liver cirrhosis which ranked the first of both prevalence and mortality in Vietnam. Radiofrequency ablation (RFA) is a local therapy to destroy tumor by heat; however, not many studies in our country have been conducted to analyze factors correlating to survival prognosis. This study was conducted to evaluate overall survival after 1, 2, and 3 years and prognostic factors relating in HCC patients treated by RFA.
Methods This study was an interventional, follow-up study on 130 HCC patients stage Barcelona (BCLC) 0 and A treated RFA from October 2012 to June 2018 in Gastroenterology Department of Bach Mai Hospital with mean follow-up time being 38.5±13.5 months.
Results The mean age was 57.5±10.2 years with the male to female ratio being 4.7:1; 97.7% of HCC patients had liver cirrhosis with the stage of Child-Pugh A and B being 87.7% and 10%, respectively. The most prevalent etiologies were hepatitis B virus and alcohol with the percentage of 73.5% and 45.4%, respectively. Overall survival time was 52.1 months (95% confidence interval, 48.1 to 56.1 months). Forty patients (30.8%) died during follow-up time with mean survival time being 26.4 months. The survival rate after 1 year, 2 years and 3 years were 95.3%, 85.4% and 75.4%, respectively There was no difference of survival rate among different groups of number of tumors, tumor size, types of needles, Child-Pugh score, initial alpha fetoprotein level. Cox-regression analysis recorded BCLC stage (0 and A) had correlation with survival prognosis ($p<0.001$ and $r=0.36$).
Conclusions RFA is a curative therapy to improve overall survival; BLCL stage is the only survival prognosis factor for HCC patients treated by RFA.
Keywords Hepatocellular carcinoma; Radiofrequency ablation; Overall survival

1ASL-KASL EE-1K-07

Expression of Cancer Stem Cell Markers Cluster Differentiation 44 (CD44), CD90, CD133, Epithelial Cells Adhesion Molecule and Alpha Fetoprotein Serum Level with Progressiveness of Advanced Liver Disease Patients

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Background/Aims The increasing of serum alpha fetoprotein (AFP) often to be a marker for hepatocellular carcinoma (HCC) patient with advanced stage. Nowadays, cluster differentiation (CD) 44, CD90, CD133, and epithelial cell adhesion molecule (EpCAM) were cancer stem cells biomarker which predict early marker for HCC and correlate with advanced liver disease progressiveness. Until now, none of cancer stem cell research for HCC conducted in Indonesia. Aim of study was to evaluate the role and expression of CD44, CD90, CD133, and EpCAM and also serum AFP level in relation with advance liver disease progressiveness.
Methods This is an observational study for 6 months, on 41 patients with chronic hepatitis B or C, liver cirrhosis, and HCC in Dr. Saiful Anwar General Hospital. Expression of CD44, CD90, CD 133 and EpCAM serum were measure using flowcytometry, and AFP serum levels using enzyme-linked immunosorbent assay. Patients characteristic data were analyzed by bivariate and multivariate statistics. Data also analyzed by correlative test and comparative test with significance level $p<0.05$. The prediction of factors influencing disease progression was analyzed using regression logistic tests.
Results There are 41 subjects classified into three groups: 16 chronic hepatitis, 15 cirrhosis, and 10 HCC at first observation. These expression of cancer stem cells significantly different in all groups, which are $CD44^+/CD90^+$ ($p=0.001$), $CD133^+/EpCAM^-$ ($p=0.004$), and serum AFP ($p=0.000$). On 6 months observation, only AFP significant in all groups ($p=0.002$). The expression of $CD44^+/CD90^+$ and $CD133^+/EpCAM^-$ had significant value at first observation, but have no significant result in advance liver disease progression ($p=0.213$, $p=0.669$, $p=0.937$).
Conclusions The expression of $CD44^+/CD90^+$, $CD133^+/EpCAM^-$ were significantly different in early observation of advanced liver disease patient groups but inconsistent with later observation.
Keywords CD44; CD90; CD133; Epithelial cell adhesion molecule; Advanced liver disease

1ASL-KASL EE-1K-08

External Validation of the Modified PAGE-B Score in Asian Chronic Hepatitis B Patients Receiving Antiviral Therapy

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Background/Aims Modified PAGE-B (mPAGE-B) score including age, gender, platelet count and albumin as constituents was recently proposed to predict hepatocellular carcinoma (HCC) risk among chronic hepatitis B (CHB) patients undergoing antivirals. Here, in the independent cohort, we externally validated the predictive performance of mPAGE-B and compared it with those of conventional HCC prediction models.
Methods We consecutively recruited CHB patients treated with lamivudine, entecavir, or tenofovir as the first-line antivirals. Patients with decompensated cirrhosis or HCC at baseline were excluded. Predictive performances of mPAGE-B and other models were assessed with comparison.
Results Among 1,330 patients, 9.6% developed HCC during follow-up (median, 62.0 months). The mPAGE-B provided the highest Harrell's c-index (0.769), followed by GAG-HCC (0.751), PAGE (0.744), REACH-B (0.686), CU-HCC (0.618) and Toronto HCC risk index (THRI, 0.542). The mPAGE-B showed the similar performance to PAGE-B and GAG-HCC and the better performance than REACH-B, CU-HCC and THRI. Cumulative HCC probabilities at 5 and 7 years were 0.0% and 0.0% in low-risk group (mPAGE score ≤ 8), 6.1% and 10.8% in intermediate-risk group (mPAGE score, 9 to 12) and 18.7% and 26.7% in high-risk group (mPAGE score ≥ 13), respectively (both $p<0.001$ between low- vs intermediate-risk groups and between intermediate- vs high-risk groups). C-indices of mPAGE-B score were 0.785 and 0.724 among subgroups treated with entecavir or tenofovir (n=1,011) and with lamivudine (n=319), respectively, which are overall similar to those of PAGE-B.
Conclusions The mPAGE-B showed acceptable predictive performances. Compared to PAGE-B, addition of albumin as a constituent provided the marginal benefit in HCC risk prediction.
Keywords Prediction; Hepatocellular carcinoma; Validation; Modified PAGE-B; Comparison

1ASL-KASL EE-1K-09

A New Treatment of Nonalcoholic Steatohepatitis

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Withdrawn

Background/Aims Recovery effect of glutamine hepatocellular damage in patients with different stages of nonalcoholic steatohepatitis (NASH). Nonalcoholic fatty liver disease is becoming the most common liver disorder worldwide. Specifically, NASH and fibrosis pose an enormous burden for patients and health-care systems. In the absence of approved pharmacological therapies, effective lifestyle interventions for NASH, such as dietary strategies and exercise training, are currently the therapeutic strategies of choice.

Methods Sixty-six non-diabe[illegible] internal medicine clinic. Patient diagnosed NASH with liver [illegible] alanine transaminase (ALT). NASH patients are treated wit[illegible] mg/daily L-glutamine. After 3 months, liver enzyme levels [illegible] enzyme changes are statistically meaningful or not.

Results The study population included 66 patients with NASH. Analyze t-test SPSS version 25.0 (IBM Corp.). ALT level are statistically analysed and p<0.01 is statistically meaningful. After 3 months, patient's ALT level are decreased with L-glutamine treatment 1,000 mg per daily statistically meaningful (p=0.001).

Conclusions The hepatocellular metabolic functions were altered in a manner that was dissociated both by different effects on different liver functions and by different effects of different stages of NASH. Thus, NASH has widespread consequences for metabolic liver function, even in simple steatosis. In this study, other effect (sex, other medication, etc.), motivation of patient (diet and exercise performance) are not considered. Besides of these factors, glutamine effect has got to see the light at the end of the tunnel. hepatic enzymes decreasing could be prevent chronic liver insufficiency and cirrhosis depends on NASH.

Keywords Nonalcoholic steatohepatitis; Glutamine effect; A new treatment

Table 1. Glutamine Treatment ALT Levels

		N	Standard Deviation	Standard Error	t	p	OR (95% CI)
ALT before t	[illegible]	66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
ALT after month[illegible] with glutamine	[illegible]	66	[illegible]	[illegible]			

ALT, elevated alanine transaminase; OR, odds ratio; CI, confidence interval.

1ASL-KASL EE-1K-10

Solid Lipid Nanoparticle of Alpha-Mangostin Exerts Diethylnitrosamine-Induced Hepatocellular Carcinoma via Alteration of PI3K/Akt Pathway

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Background/Aims Hepatocellular carcinoma (HCC) is the widely documented danger to the liver and 3rd most common reason for tumor death around the world. Identification of oncogene and its related possible pathway is crucial for understanding therapy resistance and effectual treatment. Researcher targeted the 5-bisphosphate 3-kinase/protein kinase B, phosphatidylinositol-4 and mitogen activated protein kinase's pathway to suppress the cell proliferation and expansion. We made attempt to fabrication the solid lipid nanoparticle (SLN) of alpha-mangostin and examine against the diethylnitrosamine (DEN)-induced HCC and explore possible mechanism of action.

Methods Double emulsion solvent displacement model was used for the preparation of alpha-mangostin-SLN. Intraperitoneal injection of DEN (200 mg/kg) was used for induction the HCC and various parameters were scrutinized. The genetic effects HP-SLN on Pdk1, Akt1, Pik3r1, Map3k1, Erbb2, Plk3ca using semi-quantitative RT-PCR analysis were assessed. Morphological and histopathological component of hepatic tissue were estimated.

Results Surface methodology suggests the 182.3 nm particle size and 0.230 polydispersity index for alpha-mangostin-SLN. Alpha-mangostin-SLN significantly (p<0.001) reduced the hepatic nodules (84.5%) and hepatic nodules (93.4%). Alpha-mangostin-SLN significantly (p<0.001) modulated the hepatic parameter viz., alpha fetoprotein (83.4%), carcinoembryonic antigen (50.4%), alanine aminotransferase (58.5%), alkaline phosphatase (68.4%), aspartate aminotransferase (65.8%), GGT (63.4%); nonhepatic parameter viz., blood urea nitrogen (56.4%), total protein (64.5%), albumin (63.4%), direct bilirubin (67.4%), bilirubin (63.4%); antioxidant parameter LPO (71.3%), SOD (60.3%), CAT (64.9%), GPx (58.3%), GST (63.4%) respectively. Alpha-mangostin-SLN significantly (p<0.001) modulated the expression of Pik3r1(58.4%), Akt1 (43.5%), Plk3ca (54.9%), Erbb2 (53.6%) and Map3k1 (43.6%). Morphological and histopathological studies advice and support the above result by alpha-mangostin-SLN.

Conclusions Collectively, we can conclude that alpha-mangostin-SLN regulated the PI3K and Akt pathways, which involved in reduction of hepatic cancer expansion and proliferation and its chemo-protective effect.

Keywords Liver cancer; Alpha mangostin; Diethylnitrosamine; Pi3k/Akt pathway; Inflammation

1ASL-KASL EE-1K-11

Prediction of Significant Fibrosis Using Metabolic and Genetic Factors in Patients with Biopsy-Proven Nonalcoholic Fatty Liver Disease

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Background/Aims Even though several forecasting models for predicting significant fibrosis in nonalcoholic fatty liver disease (NAFLD) have recently been presented, optimal noninvasive diagnostic tools are still debated. This study aimed to develop a simple risk scoring to predict significant fibrosis (F2 or higher) in biopsy-proven NAFLD patients and to test whether using recently discovered genetic variant information increases accuracy of the prediction of significant fibrosis.

Methods We enrolled 149 patients with biopsy-proven NAFLD. Fibrosis was determined by an experienced pathologist (F0–4). The PNPLA3 (rs738409 C>G), GCKR (rs1260326 C>T), MBOAT7 (rs641738 C>T) and HSD17b13 (rs72613567:TA) polymorphisms were detected by TaqMan assays. We used multivariable logistic regression analysis which was performed to build a new pediatric model for predicting significant fibrosis.

Results We used our data to develop a new model to predict significant fibrosis which included: age, body mass index, aspartate aminotransferase, alanine aminotransferase, total cholesterol, fasting glucose, albumin, platelet. The score had an area under the receiver operating characteristic curve (AUROC) of 0.68 in this cohort. The optimal cutoff point of 0.427 predicted significant fibrosis with sensitivity of 62.1% and specificity of 70.7%. Addiction of the 4 genetic information to this score, the score improved the accuracy of the prediction and good performance; AUROC was 0.802 and the optimal cutoff point of 0.391 predicted significant fibrosis with sensitivity of 78.7% and specificity of 76%.

Conclusions A score based on background characteristics, laboratory data, and knowledge of genotype (PNPLA3, GCKR, MBOAT7, and HSD17b13) is better than a score based on clinical profiles alone in determining the risk of significant fibrosis. The concept of adding genetic information to an existing prediction formula would be useful and this concept may help hepatologist in order to take further appropriate action.

Keywords Nonalcoholic fatty liver disease; Fibrosis; Genotype

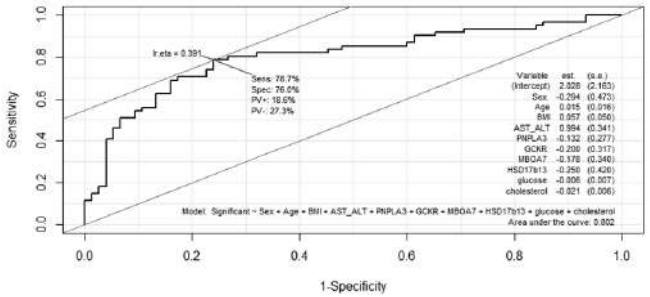

Fig. 1. Receiver operating characteristic curves with additional genotype.
BMI, body mass index; AST, aspartate aminotransferase; ALT, alanine transaminase.

IASL-KASL EE-IK-12

Hepatitis Delta Virus Infection in Patients with Chronic Hepatitis B Virus in Eastern Province Mongolia

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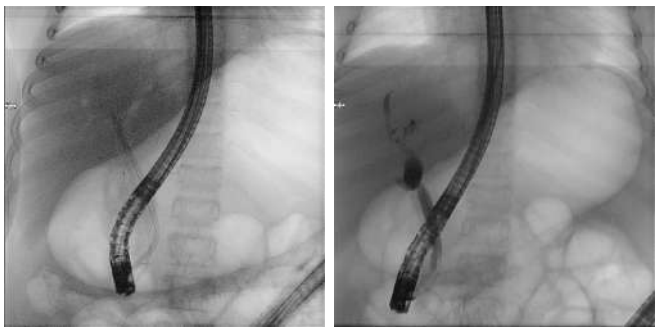
Background/Aims Hepatitis delta virus (HDV) is a serious cause of liver-related morbidity and mortality worldwide. The aim of our study was to determine the prevalence of HDV infection among patients positive for hepatitis B surface antigen (HBsAg) living in the Dornod province, which is in Eastern Mongolia.
Methods Total of 251 HBV infected patients visiting the outpatient clinic at Dornod Medical Center from 2017 to January 2019 were screened for anti-HDV antibodies using enzyme-linked immunosorbent assay. Anti-HDV-positive individuals were examined to determine the HDV-RNA level by RT-PCR assay. Liver transaminases were analyzed using a commercial biochemistry kit.
Results Of all patients, 115 were men (46%) and 136 were women (54%). The average age was 48 years (between 16 and 70 years). Anti-HDV was positive in 73% (183/251) and all were checked for HDV RNA and 98% were found positive (179/183) all of the patients. Anti-HDV antibody-positive patients showed significant liver cirrhosis higher (109/183) than anti-HDV antibody-negative patients (16/68).
Conclusions Our study showed HDV infection in HBsAg positive patients who live in eastern province Mongolia higher than other provinces of Mongolia. Thus liver cirrhosis most related to positive anti-HDV patients.
Keywords Hepatitis B virus; Hepatitis D virus; Eastern province

Table 1. Patient Demographic Data

Patient, N	4
Mean Age, Y (Range)	8 (5-9)
Gender M/F	2/2
Indication for transplantation (n)	Metabolic liver disorder (2) Budd Chiari (1) HCC (1)
Type of donor (N)	Cadaveric (3) Living (1)
Indication for ERCP (N)	Anastomotic stricture (4)

M, male; F, female; ERCP, endoscopic retrograde cholangiopancreatography.



IASL-KASL EE-IK-13

Safety and Feasibility of Endoscopic Management of Anastomotic Biliary Stricture after Orthotopic Liver Transplant in Children: A Preliminary Experience

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Background/Aims The biliary anastomosis stricture remains a common complication after orthotopic liver transplantation (OLT). Management of biliary complications, has continued to evolve over the last two decades. Endoscopic retrograde cholangiopancreatography (ERCP) with stent placement has demonstrated good results in adult and represents a reliable technique. Because a biliodigestive anastomosis is mainly performed in tertiary referral pediatric hospital, the role of ERCP in the endoscopic management of complications was limited. With the modification of surgical technique and the diffusion of tools like carbon dioxide insufflator, ERCP could support a conservative management even in early complications. In this study, we aimed to present our preliminary results in the endoscopic treatment of biliary strictures after duct-to-duct anastomosis in children after OLT.
Methods We retrospectively analyzed our ERCPs' database. Patient demographics, indications for OLT and ERCP, timing of presentation of biliary strictures, number of procedures per patient, technical and clinical outcomes including need for percutaneous or surgical interventions were recorded. Primary aim was defined as rate of adverse events after ERCP (safety). Technical success of ERCP (feasibility) was evaluated as secondary outcome.
Results Between 2016 and 2018, four OLT children with duct-to-duct anastomosis who underwent ERCP due to biliary complication were identified A total of 14 ERCPs were performed. One patient underwent a preliminary percutaneous drainage before ERCP. Demographic data and indication for ERCP are resumed in Table 1. General anesthesia, CO_2 insufflation and plastic stents were employed for all procedures. Technical success was achieved in 100% of procedures. A maximum of three simultaneous stent were placed. Timing of multi-stenting was established according to clinical judgement and radiological findings. No major adverse events were reported. A patient developed a mild post-ERCP pancreatitis resolved with conservative treatment.
Conclusions Our preliminary experience suggest that endoscopic management of stricture after liver transplantation with duct-to duct anastomosis is feasible and safe in expert hands. A longer follow up is required to properly assess clinical effectiveness.
Keywords Orthotopic liver transplantation; Stricture; Endoscopic retrograde cholangiopancreatography; Transplant; Multistenting

IASL-KASL EE-IK-14

Investigation of Aldose Reductase Inhibitory Potential of Phytoconstituents Rich Principles from the Whole Plant of *Hybanthus enneaspermus* (Linn) F. Muell.

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Background/Aims Many aldose reductase (AR) inhibitors obtained from natural sources and examples are quercitrin, guaijaverin, and desmanthin-1. *Hybanthus enneaspermus* (HE) is used to treat urinary infections, diarrhea, cholera, leucorrhoea, gonorrhea, dysuria, inflammation, sterility and diabetes in various system of medicine. Further it contains various phenolic and flavonoidal compounds which have been well known for free radical scavenging activity. Present aim is to evaluate AR inhibitory potential of phytoconstituents rich principles of whole plant of HE beneficial for treatment of diabetes related secondary complication.
Methods Hot extraction techniques using ethanol have been used for the extraction of numerous phytoconstituents of HE. Phytochemical analysis of the ethanolic extract was done through standard official methods. Total phenol, flavonoid and flavonol content have been determined with folin-ciocalteu reagent and aluminium trichloride method. Healthy adult Wistar albino rats (150–200 g) were taken for the study and experimental protocol has been approved by the Institutional Animal Ethics Committee. AR inhibitory activities of HE against rat lens AR enzyme were investigated *in vitro* using quercetin as a standard drug.
Results Phytochemical analysis revealed the presence of various secondary metabolites. There is the presence of significant amount of phenol, flavonoid and flavonol content in the ethanolic extract of HE. Significant AR inhibitory activity was found to be in HE [IC_{50} (49.46±2.26 µg/mL)] but was less compared to standard quercetin [IC_{50} (3.326±0.11 µg/mL)]. Value of Vmax, Km and Ki revealed that ethanolic extract of HE inhibited enzyme in a noncompetitive manner.
Conclusions From the results it was found that HE has significant AR inhibitory activity, which might be because of high level of phenolic and flavonoid content. Further it also support against diabetic complications in the future, but further evaluation is necessary to know the exact mode of action involved in this process.
Keywords Aldose reductase; Flavonoid; *Hybanthus enneaspermus*; Phenol; Rat lens

IASL-KASL EE-IK-15

Therapeutic Potential of Aegeline: An Important Phytochemical of *Aegle marmelos* for the Treatment of Human Diseases

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Background/Aims Herbal medicine is the best kinds of remedies not only to treat disorders but also have been used in the field of perfumery, nutraceuticals, fragrances, beverages, dyeing and cosmetics industry. Phenolic compounds, nitrogen compounds, carotenoids, ascorbic acid etc. are some of the best examples of phytochemical found in the Herbs, vegetables and fruits. Some of the best drugs ever discovered for the treatment of human disorders being available in the market are derived from herbal sources.
Methods Various pharmacological activities of *A. marmelos* have been evaluated and presented in the various literatures. Moreover other important analytical techniques have been also developed. Purpose of the present work is collection and discussion of important pharmacological activities of aegeline.
Results *A. marmelos* is subtropical tree belongs to Rutaceae family have been used in the traditional medicine for the treatment of fever, hepatitis, asthma, cardiac dysfunction, dyspepsia, inflammation, diabetes, seminal weakness and febrifuge. *A. marmelos* leaves contain numerous phytochemicals including eugenol, lupeol, citronellal, aegeline citral, cineol, skimmianine, cuminaldehyde and marmesinine. Aegeline had antidiabetic, antidyslipidemic and antihistamine potential. Aegeline has also significantly decreased the plasma triglyceride levels, total cholesterol, and free fatty acids accompanied with increase in high-density lipoprotein cholesterol (HDL-C) and HDL-C/total cholesterol ratio. Further evidence based uses and application of aeglin in various disorders have been also summarized and discussed.
Conclusions This work will be beneficial to all the scientific community for knowing the importance of *A. marmelos* and their phytochemical aeglin.
Keywords Aeglin; Herbal medicine; Pharmacological activity; Phytochemical; *Aegle marmelos*

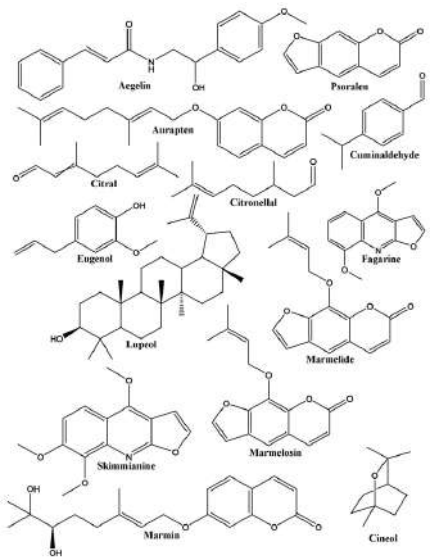

Fig. 1.

IASL-KASL EE-IK-16

Radiofrequency Endoscopic Ultrasound-Guided Ablation of a Pancreatic Neuroendocrine Tumor with Cystic Degeneration

Valerio Balassone[1], Hoonsub So[2], Vitor Magno Pereira[3], Jonathan Potts[4], Ivan Rb Orso[5], and Dong Wan Seo[2]

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Background/Aims Endoscopic ultrasound-guided radiofrequency ablation (EUS-RFA) is now an established treatment for unresectable pancreatic cancer and an appealing option for cystic tumors. Previous application with 1-Fr probe has been reported as creating vascular changes and central necrosis in pancreatic neuroendocrine tumor (NET).
Methods A 65-year-old man with an asymptomatic pancreatic NET (14 mm of diameter) with cystic degeneration and volume increase during follow-up imaging was referred to our tertiary center. A 18-gauge needle probe was employed for EUS-RFA with impedance monitoring (Starmed PRC). Previously the cyst was carefully aspirated to maximize the ablation effectiveness to the cystic wall.
Results Six ablations with 50 W for 10 seconds were performed under EUS guidance. Computed tomography scan after 24 hours and clinical course were unremarkable. Ninety-two percent of volume ablation with no recurrence was confirmed ad 2-year follow-up (6 mm of diameter).
Conclusions EUS-RFA with a 18-gauge probe was safe and effective in a pancreatic NET with cystic degeneration. A preliminary aspiration of the cyst is necessary to optimize the ablation area. Flexibility of the needle may represent a matter of improvement.
Keywords Radiofrequency ablation; Pancreas, Neuroendocrine tumor; Cystic; Ablation

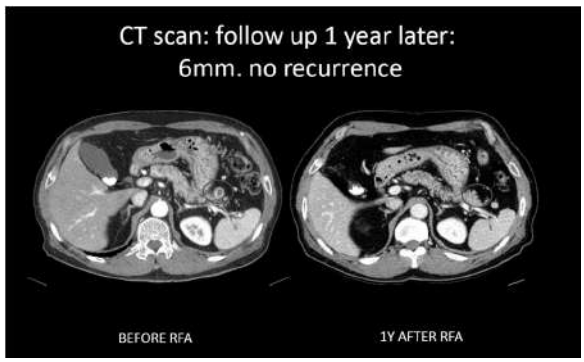

Fig. 1. Figure before and after radiofrequency ablation (RFA).
CT, computed tomography.

IASL-KASL EE-IK-17

Living Liver Donor Surgical Complication: Single Center Experience

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Background/Aims Korea is the one of the most common country to do living donor liver transplantation. Beside Seoul, there are no big living donor liver transplantation center except Daegu Catholic University Medical Center. We were reached to 500th living donor liver transplantation in 2017. We review our donor complication and find way to reduce the rate of morbidity.
Methods Institutional LT database was searched from May 8, 2005 to December 31, 2017. Their medical records and imaging studies were reviewed.
Results From May 8, 2005, we did first living donor hepatectomy, we did 512 living donor hepatectomy until December 31, 2017. Among them, 324 were male and 188 were female. Graft types were right liver graft in 457 (89.3%), left liver graft in 47 (9.2%), left lateral section graft in 2 (0.4%) and right posterior section graft in 6 (1.2%). Mean age of total donor was 30 years and Mean body mass index was 22 kg/m^2. Mean hospital days was 10 days. All of the donors, surgical complication occurred in 32 donors (6.3%). Minor complication was 10 cases (1.9%). Major complication was 24 case (4.7%). Between major complication, the most common complication was biliary complication (n=17) and the other complications were small bowel obstruction operation (n=2), bleeding control (n=2), pleural effusion drainage (n=2), portal vein stent insertion (n=1). There are no mortality. The most common complication was biliary complication which were 20 cases (3.8%). Among them intraoperative T-tube insertion were nine cases and three cases were PTBD insertion and three cases did endoscopic retrograde cholangiopancreatography. There are reoperation case was just one case, which was immediate right hepatic artery bleeding.
Conclusions Our center's complication was very low. But still biliary complication is the most common complication. When we meet abnormal biliary anatomy we must be careful and we try to reduce biliary complication.
Keywords Living donor liver transplantation; Biliary complication

Table 1. Alanine Transaminase in Vitamin E and Weight Loss

		With Vitamin E	Without Vitamin E	P value
Lost Weight	N(%) patients with improved ALT	19(79.2%)	53(41.4%)	0.001
	Absolute ALT change	-45.58 (+ 57.4)	-27.84 (+ 32.2)	0.215
Maintained/Gain Weight	N(%) patients with improved ALT	19(51.4%)	94(41.4%)	0.285
	Absolute ALT change	-36.55(±32.4)	-23.09(±33.1)	0.112

Values are presented as number (%) or mean±SD.
ALT, alanine transaminase.

IASL-KASL EE-IK-18

Interplay of the Effects of Vitamin E and Weight Changes on Alanine Transaminase Levels in Patients with Nonalcoholic Fatty Liver Disease

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Background/Aims There is evidence that vitamin E improves nonalcoholic fatty liver disease (NAFLD) activity scores (NAS) and alanine transaminase (ALT) levels in patient with NAFLD. However the relationship between vitamin E and weight loss on ALT has not been well characterized.
Methods Patients diagnosed with NAFLD on ultrasound from February 2007 to January 2017 with least 1 follow-up visit were included. Baseline demographic, clinical and biochemical characteristics were recorded. ALT levels and weight at last follow-up were compared to baseline in patient with or without vitamin E.
Results A total of 416 patients were included of which 61 (14.7%) were given vitamin E. Significantly more patients with vitamin E had elevated baseline ALT (58/61 [95.1%] vs 281/355 [79.2%], p=0.002). Patients given vitamin E also have higher baseline aspartate aminotransferase (49.1 vs 36.8, p=0.012)and lower HBsAg positivity (9.8% vs 24.5%, p=0.012). On follow up, significantly more patients on vitamin E had improvement in ALT (62.1% vs 48.4%, p=0.062) and normal (66.7% vs 14.9%, p=0.072) baseline ALT, but did not reach statistical difference. More underweight/normal patients improved ALT on vitamin E (72.7% vs 34%, p=0.019) compared to overweight/obese patients (60% vs 44.4%, p=0.062). The effect of vitamin E on ALT improvement was significant only in patients who lost weight (79.2% vs 41.4%, p=0.001) and not in patients who maintained/gained weight (51.4% vs 41.4%, p=0.285).
Conclusions Vitamin E significantly improves ALT levels in patients with NAFLD. However, this effect was only seen in patients who lost weight and was not demonstrated in patients who maintained or gained weight, which emphasizes the need for lifestyle changes and weight loss in patients with NAFLD.
Keywords Vitamin E, Alanine transaminase; Nonalcoholic fatty liver disease; Philippines

IASL-KASL EE-IK-19

Tuberculosis in Cirrhotics: A Prospective Study from Tertiary Care Hospital in Pakistan

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Background/Aims Tuberculosis (TB) is a global disease; about one-third of the world's population is infected with *Mycobacterium* TB. Immunosuppressive states like cirrhosis of the liver can lead to higher prevalence of TB than in the general population. Treatment of TB in immunocompromised set up is challenging.
Methods After ethical approval, a prospective observational study was conducted including 100 patients. Diagnosis of cirrhosis of liver (medical records and imaging) and TB (imaging and acid-fast bacillus [AFB] testing) were made as per standard protocols. Tubercular ascites in the setting of cirrhosis was diagnosed when high serum albumin ascites gradient, high protein ascites was present with a lymphocytic predominant high cell count fluid in the absence of alternate diagnosis. Any of the findings of high adenosine deaminase levels more than 33 U/L in ascitic fluid, detection of AFB or positive M. TB culture in body fluid was taken as a confirmatory test for diagnosis of tubercular ascites. Pyrazinamide was completely avoided and a 9 months 3 drug regime (rifampicin, isoniazid, and ethambutol) was used. The outcome of the treatment was noted, and all the data were analyzed using SPSS. Statistical significance was assumed at p<0.05.
Results In this study, the prevalence of TB was found in 10% of cirrhotic patients. Out of 79 male cirrhotics, six patients (three had extrapulmonary disease) had TB (5.1%). Sex distribution was not statistically significant (odds ratio, 3.13; 95% confidence interval [CI], 0.41 to 20.02). Among all cirrhotics, extrapulmonary cases (5%) out-numbered pulmonary cases (2%), but the difference was not statistically significant. In majority of cirrhotics, etiology was hepatitis C (66%) followed by chronic hepatitis B infection (27%). The most common complication seen in cirrhosis was sepsis. In overall cirrhotic patients, 60% were in Child' B (8-10). In this study, mortality was 13%.
Conclusions Prevalence of TB in cirrhotic patients was found to be 10%; most common etiology of cirrhosis was alcoholism. Extrapulmonary TB cases outnumbered the pulmonary TB cases in the present study.

1ASL-KASL EE-1K-20

Bioactivities and Protective Effects of Pectolinarigenin in Human Liver Diseases

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Background/Aims Plants are valuable source of phytochemical which are mainly used as food material but more specifically as a medicine since very ancient time in the world. Flavonoids are present in the fruits, vegetables, grains, wine and tea. Moreover strawberries, broccoli, apple, berries, grapes, citrus fruit and lettuce are some of the rich source of flavonoids. Pectolinarigenin is a natural flavonoidal compound found in *Eupatorium odoratum*, *Cirsium chanroenicum*, *Cirsium setidens*, *Clerodendrum phlomidis*, *Cirsium japonlcum*, *Chromolaena odorata* and *Trollius chinensis*.
Methods To know the potential role of pectolinarigenin in human liver disorders, various experiment have been conducted in the scientific field and data were collected from various literature database.
Results Pectolinarigenin is a natural flavonoid compound having molecular formula $C_{17}H_{14}O_6$ and molecular weight 314.28. Pectolinarigenin significantly inhibited cell proliferation, migratory and invasive abilities, markedly induced cell apoptosis and G2/M phase arrest of SMMC7721 and PLC5 cells. Administration of pectolinarigenin, for 2 weeks significantly decreased the levels of aspartate transaminase, alanine transaminase, alkaline phosphatase, and lactate dehydrogenase, indicating that compound have hepatoprotective activity. Pectolinarigenin also increased activity levels of glutathione, glutathione reductase, glutamate cysteine ligase, and glutathione S-transferases, as well as superoxide dismutase.
Conclusions Pectolinarigenin gained attention from researchers and clinicians due to their anticancer and hepatoprotective properties which could be used for liver disorder treatment. Further these studies will also support ongoing research of pectolinarigenin throughout world for their beneficial properties in all the scientific discipline.
Keywords Hepatoprotective; Liver diseases; Pectolinarigenin; Phytoconstituents; Anti-cancer

1ASL-KASL EE-1K-21

Evaluation of Flavonoid Rich Extract of *Hybanthus enneaspermus* in Streptozotocin-Nicotinamide Induced Diabetic Rats through Measurement of Antioxidant Enzymes (Superoxide Dismutase, Catalase, and Thiobarbituric Acid Reactive Substance), Liver Glycogen and Lipid Parameters in Liver Tissue

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Background/Aims To search of effective compound from *Hybanthus enneaspermus* used in the treatment of different type of disease including diabetes by tribal people in the country.
Methods The flavonoid rich fraction was isolated using ethyl acetate solvent. Different phytochemical analysis was carried out to know the chemical compositions. Male Charles Foster rats (range, 180 to 200 g) were used in this study. All the animal experiments were performed in accordance with the guidelines approved by the Ethical Committee. Effect of ethyl acetate fraction of *Hybanthus enneaspermus* (EHE) was evaluated at a dose of 45 and 90 mg/kg, p.o per day for 21 days in diabetic rats. Further effect of ethyl acetate fraction of EHE on blood glucose, body weight, enzymatic activity of superoxide dismutase (SOD), catalase (CAT) and thiobarbituric acid reactive substance (TBARS) were analyzed in the supernatant of the 10% liver tissue homogenate in 0.025 M Tris-HCl buffer, pH 7.5. Lipid parameters such as total cholesterol (TC), triglycerides (TG) and high-density lipoprotein cholesterol (HDL-C) levels were determined by enzymatic methods, further low-density lipoprotein-cholesterol (LDL-C), very low-density lipoprotein-cholesterol (VLDL-C), atherogenic index (AI) and HTR ratio were also determined. Effect of EHE on glucose uptake by rat hemidiaphragm was investigated.
Results The results showed that EHE contain significant amount of phenolic, tannin, flavonoid, flavonol and saponin content. All the tested lipid parameters (TC, TG, HDL-C, VLDL-C, AI, and HTR ratio) and antioxidant enzyme (SOD, CAT, and TBARS) level were significantly restored to the normal level in the EHE treated rats. Moreover, there was a significant increase in the body weight and glycogen contents in the EHE treated rats. Glucose uptake by hemidiaphragm was also enhanced in the presence of EHE.
Conclusions From the obtained data it was concluded that EHE has very impressive profile as an antioxidant and lipid lowering agents.
Keywords Antioxidant; Flavonoid; Lipid parameter; Liver tissue; Phytochemical

1ASL-KASL EE-1K-22

Determination of HBsAg Cutoff Index for Diagnosing Acute Hepatitis B

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Withdrawn

Background/Aims Diagnosis of hepatitis B infection could be challenging. The serologic test of HBsAg quantitatively could help the clinician to diagnose acute infection status. However, some studies showed that different populations showed different cut off index to diagnose acute hepatitis B. Population-based study needed to confirm this cut off index.
Methods All patients with hepatitis B infection suspects were included in this study. The gold standards for diagnosing acute hepatitis B were based on World Health Organization guidelines. All patients were examined for HBsAg quantitative. The data was analyzed using the receiver operating curve (ROC) analysis with MedCalc statistic program.
Results Six hundred and forty [illegible] this study. The result of ROC curve analysis showed that HBsAg COI [illegible]55 has area under the curve (AUC) 0.682 (95% confidence [illegible]6, p=0.095). This can be interpreted if HBsAg examination [illegible] it will provide a correct conclusion in determining the presence or absence of disease in 68 patients. The results of this study differ from the research conducted by Shao et al. (2012) which states that the initial HBsAg COI of 0.9–1.0 has a sensitivity value of 100% and a specificity of 60.3% and the initial HBsAg COI> 4.0 has a value sensitivity 41.9% and specificity 100% with AUC 0.933 with p-value 0.001.5 The result of Ning et al. (2012) obtained the initial COI of HBsAg 1,455 has specificity value 90.9% with AUC 0.905 (95% IK, 84.5% to 96.6%)
Conclusions HBsAg cut off index in every population could differ therefore every laboratory should make the local cut off index.
Keywords HBsAg; Hepatitis B; Cut off index

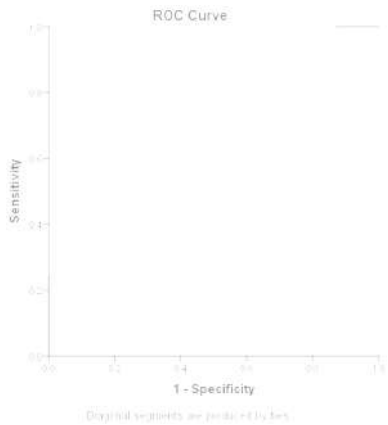

Fig. 1. Receiver operating curve (ROC) of HBsAg COI.

1ASL-KASL EE-1K-27

Health Benefits of Sophoricoside: Bioactive Compounds from *Sophora japonica*, Their Role in Disease Prevention and Treatment: *In Vitro* and In-Silico Docking Study

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Background/Aims Herbal drugs and their derived products play an important role in the human life and demand of herbal based products is continuously increasing in the world. Phytoconstituents have been placed in the modern medicine due to their health promoting aspects as large numbers of drugs prescribed in the modern medicine are derived from plants including active constituents. *Sophora japonica* is a tree native to Korea and China also called Japanese pagoda tree or Chinese scholar tree. Sophoricoside is an isoflavone glycoside present in the *S. japonica* plant.
Methods Pharmacological activities of sophoricoside have been evaluated through various *in vitro* and in-silico database methods and presented in the various databases. Present work describes the detailed data collection of sophoricoside for the development of medicine for the treatment of hepatic disorders. Various *In vivo* and In-silico data analysis and docking methodology have been used for the search of noble molecule from sophoricoside which will be having beneficial effect in the treatment of liver disorders.
Results Important pharmacological data's revealed that sophoricoside have estrogenic activity, anti-inflammatory, antioxidant, hepatoprotective, antidiabetic and immunomodulatory activity. Sophoricoside also protect hepatic cells against oxidative stress. Present work aim is to provide an overview of the pharmacological effects of sophoricoside and their mechanisms of actions in various diseases. Further docking score also provide better support to the current uses of sophoricoside in the modern medicine.
Conclusions Recent interest in avicularin has focused on pharmacological investigations which exhibit potent hepatoprotective activity. The present work will be helpful to the scientists of different field for discovery and development of new novel medicines from sophoricoside for the treatment of liver disorders.
Keywords Sophoricoside; Medicinal uses; Phytochemicals; Hepatoprotective; Docking study

1ASL-KASL EE-1K-28

Health Benefits of Bioactive Phytochemical Avicularin and Their Potential Role as Hepatoprotective Agent: *In Vivo* and In-Silico Data Analysis

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Background/Aims Flavonoids, alkaloids and terpenoids are the major class of phytochemicals which are beneficial for the treatment of human disorders including different types of cancer. Flavonoids have been well known for their anti-viral, anti-bacterial, anti-inflammatory, cardioprotective, anti-diabetic, anti-cancer and anti-aging properties. Avicularin is a glycoside of quercetin i.e., quercetin-3-α-l-arabino furanoside, and it has been found in *Lindera erythrocarpa*, *Lespedeza cuneata*, *Rhododendron schlipenbachii* and *Psidium guajava*.
Methods Various pharmacological activities of avicularin have been evaluated and presented in the various databases along with important analytical techniques. Present work describes the detailed data collection of avicularin for the development of medicine for the treatment of liver disorders. Various *in vivo* and in-silico data analysis have performed to know the therapeutic potential of avicularin in human being.
Results Important pharmacological data's revealed that avicularin have inflammatory, hepatoprotective, antiallergic, antioxidant, and anti-tumor activities. Avicularin also protect cardiomyocytes and hepatocytes against oxidative stress induced apoptosis. Avicularin can induce cytotoxicity in cancer lines and tumor tissues and has positive influence on human hepatocellular carcinoma and inhibit intracellular lipids accumulation. Role of avicularin in rheumatoid arthritis was also established with their underlying molecular mechanisms.
Conclusions Recent interest in avicularin has focused on pharmacological investigations which exhibit potent hepatoprotective activity. Present work deals the importance of pharmacological activity and analytical aspects of avicularin which summarized recent developments in the health promoting properties of avicularin.
Keywords Avicularin; Flavonoids; Medicinal uses; Phytochemicals; Hepatoprotective

1ASL-KASL EE-1K-30

Impact of Acute Kidney Injury for Prediction of Mortality in Patients with Variceal Bleeding

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Background/Aims Acute kidney injury (AKI) is a common complication in cirrhotic patients, but little is known of the impact of AKI in patients with variceal bleeding. This study evaluated the incidence of AKI using the International Club of Ascites-AKI criteria and their association with the prognosis of patients with variceal bleeding.
Methods We performed a retrospective cohort study using the data of cirrhotic patients with acute variceal bleeding evaluated at Gyeongsang National University Changwon Hospital in Korea between January 2015 and June 2019. The association between AKI and mortality was examined via univariate and multivariate analyses using the Cox proportional hazard model
Results A total of 134 episodes of acute variceal bleeding in 103 patients were enrolled. The sources of variceal bleeding were esophageal varices in 111 (82.8%) and gastric varices in 23 (17.2%). The mean age was 56.0 years. Over a mean follow-up period of 253.3 days, 57 patients (42.5%) of all the episodes developed AKI. At the diagnosis of AKI, 23 patients had stage 1a (40.4%), nine (15.8%) had stage 1b, 17 (29.8%) had stage 2, and eight (14.0%) had stage 3. In multivariate analysis, the independent factors for AKI were age per year (hazard ratio [HR], 1.03; 95% confidence interval [CI], 1.03 to 1.06) and Model For End-Stage Liver Diseases score (HR, 1.08; 95% CI, 1.03 to 1.14). The 42-day mortality rate was significantly higher in patients (n=20, 35.1%) with AKI than in patients without AKI (n=2, 2.6%, p<0.001). In addition, the presence of AKI was independent factor for 42-days mortality (HR, 5.58; 95% CI, 1.15 to 27.11).
Conclusions AKI occurred frequently in patients with acute variceal bleeding. Our study proposes that AKI predicts mortality in patients with variceal bleeding.
Keywords Acute kidney injury; Liver cirrhosis; Variceal bleeding; Mortality

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