

IDEN 2019

International
Digestive
Endoscopy
Network
2019

*Insights on Advanced GI Endoscopy
from World Leading Scholars*

June 13 Thu - **16** Sun, 2019
Grand Hilton, Seoul, Korea

www.iden.or.kr

Organized by



In collaboration
with



KOREA P-CAB, K-CAB tab.

GERD 치료의 시작, 케이캡정

실제 이미지*	성분·함량	제형	복약부 분류코드	효능·효과	응용·용량
	테고프라산 50mg 보혈약가 정 1,300원	연한 분출성의 비대칭삼각형 필름코팅정	232 소화성장애양제 보혈코드* 64000720	1. 미란성 위식도역류질환의 치료 2. 비미란성 위식도역류질환의 치료	1. 미란성 위식도역류질환의 치료 월 1회, 1회 50mg을 4주* 경구투여한다. 식도염이 치료되지 않거나 증상이 계속되는 환자의 경우 4주 더 투여한다. 2. 비미란성 위식도역류질환의 치료 월 1회, 1회 50mg을 4주* 경구투여한다.

Reference

1. *요양급여의 적용기준 및 방법에 관한 세부사항, 일부개정, 보건복지부 고시 제2019-38호(시행일자 2019.3.1)

K-CAB Tab. 50mg (Tegoprazan) ● Indication 1. Treatment of Erosive Gastroesophageal Reflux Disease 2. Treatment of Non-Erosive Gastroesophageal Reflux Disease ● **Dosage and Administration** Adult 1. Treatment of Erosive Gastroesophageal Reflux Disease - 50 mg once daily for 4 weeks. * For patients who do not heal or have persistent symptoms after 4 weeks, an additional 4-week treatment may be considered. 2. Treatment of Non-Erosive Gastroesophageal Reflux Disease - 50 mg once daily for 4 weeks. K-CAB can be taken without regard to food. ● **Precautions In Use 1. Contraindications** 1) Patients with Hypersensitivity to the tegoprazan, any of the product components or substituted benzimidazoles 2) Patients who take atazanavir, nefavir or rilpivirine-containing products (see 5. Drug Interactions) 3) Pregnant women or nursing mothers (see 6. Pregnant Women and Nursing Mothers) 2. **Warnings and Precautions** 1) Hepatic impairment: There is no data on patients with hepatic impairment. 2) Renal impairment (There is no data on patients with renal impairment.) 3) Elderly people (See 8. Geriatric use) 3. **Adverse Reactions** A total of 4 clinical studies were conducted with erosive gastroesophageal reflux disease and non-erosive gastroesophageal reflux disease patients. 258 patients were treated with tegoprazan 50 mg. Adverse events and adverse drug reactions (marked with *) reported during the clinical trials are as following. Common adverse events reported (≥1%) in tegoprazan 50 mg treatment group are presented in Table 1.

Table 1. Adverse events (%) reported in ≥1% patients from clinical trials

Body System	Adverse Events
Gastrointestinal	Nausea, diarrhea, dyspepsia, abdominal pain upper
Infections and Infestations	Nasopharyngitis, viral upper respiratory tract infection
General disorders and administration site conditions	Chest discomfort

Less common adverse events reported in <1% patients after administration of K-CAB 50 mg from clinical studies are listed below by body system: -**Gastrointestinal Disorders:** abdominal discomfort, constipation*, abdominal pain*, abdominal distension*, vomiting, eructation, abdominal pain lower, gastric ulcer*, and hemorrhage; erosive duodenitis*, flatulence, gastric polyps*, gastroesophageal reflux disease -infections and infestations: folliculitis*, gastroenteritis bacterial, latent tuberculosis -Laboratory investigations: aspartate aminotransferase increased, aspartate aminotransferase increased, gamma-glutamyltransferase increased*, blood bilirubin increased, blood creatine phosphokinase increased*. Blood urine present, Red blood cells urine positive -**General Disorders and Administration Site Conditions:** fatigue* -**Injury, Poisoning and Procedural Complications:** ligament sprain, concussion, excoriation, foot fracture, joint injury, muscle strain -**Musculoskeletal and Connective Tissue Disorders:** myalgia, arthralgia, tendinitis -**Nervous System Disorders:** headache, dizziness -**Skin and Subcutaneous Tissue Disorders:** angioedema, dermatitis, seborrheic dermatitis* -**Respiratory, Thoracic and Mediastinal Disorders:** cough, oropharyngeal pain -**Reproductive System and Breast Disorders:** vaginal discharge, vulvovaginal pruritus -**Hepatobiliary Disorders:** bile duct stone -**Renal and Urinary Disorders:** hypertonic bladder, nocturia -**Neoplasms Benign, Malignant and Unspecified:** breast cancer -**Cardiac Disorders:** ventricular extrasystoles* -**Blood and Lymphatic System Disorders:** lymphadenitis* -**Psychiatric Disorders:** insomnia -**Surgical and Medical Procedures:** dental implantation -**Ear and Labyrinth Disorders:** ear pain 4. **General Precautions 1.** In the presence of any alarm symptom (e.g., significant unintentional weight loss, recurrent vomiting, dysphagia, haematemesis or melena) and when gastric ulcer is suspected or present, malignancy should be excluded, as treatment with K-CAB may alleviate symptoms and delay diagnosis. 2) **Cyanocobalamin (Vitamin B12) Deficiency:** Daily treatment with any acid-suppressing medications over a long period of time (e.g., longer than 3 years) may lead to malabsorption of cyanocobalamin (vitamin B12) caused by hypoparathyroidism. Rare reports of cyanocobalamin deficiency occurring with acid-suppressing therapy have been reported in the literature. This diagnosis should be considered if clinical symptoms consistent with cyanocobalamin deficiency are observed. 3) **Bone Fracture:** Several published observational studies suggest that PPI therapy may be associated with an increased risk for osteoporosis-related fractures of the hip, wrist, or spine. The risk of fracture was increased in patients who received high-dose (defined as multiple daily doses) and long-term PPI therapy (a year or longer). Patients should use the appropriate dose and shortest duration of K-CAB therapy appropriate to the condition being treated. Patients at risk for osteoporosis-related fractures should be managed according to established treatment guidelines 4) Hypomagnesemia has been reported rarely in patients treated with PPIs for at least three months, in most cases after a year of therapy. In most patients, treatment of hypomagnesemia required magnesium replacement and discontinuation of the PPIs. For patients exposed to be on prolonged treatment or who take K-CAB with medications such as digoxin or drugs that may cause hypomagnesemia (e.g., diuretics), healthcare professionals may consider monitoring magnesium levels prior to initiation of treatment and periodically. Serious adverse events include tetany, arrhythmias, and seizures. 5) Decreased gastric acidity due to PPIs, increases counts of bacteria normally present in the gastrointestinal tract. Treatment with gastric acid suppressants may possibly increase the risk of gastrointestinal infections such as *Salmonella*, *Campylobacter* and *Clostridium difficile*. Published observational studies suggest that PPI therapy may be associated with an increased risk of *Clostridium difficile*-associated diarrhea (CDAD), especially in

hospitalized patients. This diagnosis should be considered for diarrhea that does not improve. CDAD has been reported with use of nearly all antibacterial agents. Patients should use the lowest dose and shortest duration of K-CAB therapy appropriate to the condition being treated. 6) No studies on the effects on the ability to drive and use machines have been performed for K-CAB, and the loss of this ability cannot be predicted from its pharmacological action. Nevertheless, when considering the patient's ability to drive and use machines, the clinical condition of the patient and the adverse reactions of the drug should be considered. 5. **Drug Interactions 1) Drugs Dependent on Gastric pH for Absorption** Due to its effects on gastric acid secretion, tegoprazan can reduce the absorption of drugs whose gastric pH is an important determinant of their bioavailability. Like with other drugs that decrease the intragastric acidity, the absorption of drugs such as ketoconazole, itraconazole, ampicillin ester, atazanavir, iron salts, erlotinib, gefitinib and mycophenolate mofetil (MMF) can decrease during treatment with tegoprazan. While absorption of drugs such as digoxin can increase during treatment with K-CAB. Because tegoprazan inhibits gastric acid secretion, co-administration of atazanavir, nefavir and rilpivirin with tegoprazan is expected to decrease plasma concentration of atazanavir, nefavir or rilpivirin which is dependent on gastric pH for absorption, results in a loss of the therapeutic effect. Therefore, concomitant use of atazanavir, nefavir and rilpivirin with K-CAB is contraindicated. 2) Tegoprazan is mainly metabolized by CYP3A4. Concomitant use of clarithromycin, a CYP3A4 inhibitor, with tegoprazan has increased AUC of tegoprazan and clarithromycin by 2.5 times and 1.25 times, respectively. 3) Tegoprazan has been shown to have no clinically significant effects on the pharmacokinetics of amoxicillin. 6. **Pregnant women and Nursing mothers 1) Pregnant women** There is no safety data for exposure to tegoprazan in pregnant women. In an embryo-fetal development study, short supermucous cervical ribs were observed with a higher incidence in rats. Therefore K-CAB is contraindicated during pregnancy. 2) **Nursing mothers** As it is not known whether tegoprazan is excreted into human milk, discontinue nursing while taking K-CAB. Excretion of tegoprazan into milk has been reported in rats. 7. **Pediatric use** Clinical safety and efficacy of tegoprazan in pediatric and adolescent patients have not been established. 8. **Geriatric use** In general, it should be administered to the elderly patients with caution, keeping in mind the greater frequency of decreased physiological functions, such as liver or kidney. 9. **Renal Impairment** Safety and efficacy of tegoprazan have not been established in patients with renal impairment. 10. **Hepatic Impairment** Safety and efficacy of tegoprazan have not been established in patients with hepatic impairment. 11. **Overdose** There have been no reports of significant overdose with tegoprazan. In clinical trials, there have been cases where up to 400 mg of this drug has been administered to healthy adults. In the event of an overdose with K-CAB, the patients should be monitored for poisoning symptoms and treatment should be supportive if necessary. 12. **How to store** 1) Keep K-CAB out of the sight and reach of children. 2) Be careful to replace it in another container as it is not desirable in terms of quality or causing accident. 13. **Information for Healthcare Professionals 13.1 Pharmacology** Tegoprazan is a potassium-competitive acid blocker (P-CAB) that reversibly blocks gastric acid secretion by competitively binding with potassium to the proton pump(H⁺/K⁺-ATPase) present in gastric wall cells. Tegoprazan binds in a concentration-dependent manner and blocks gastric acid secretion. Binding has reversibility. Tegoprazan inhibits the proton pump directly without activation by acid. 13.2 **Pharmacokinetics 1) Absorption** T_{max} of tegoprazan following single oral dose to healthy adults was ranged from 0.5 to 1.5 hours across the doses tested 50-400 mg. After single administration, the mean peak plasma concentration (C_{max}) and mean exposure level (AUC) tended to increase dose proportionally within the administration dose range. After 7 days of repeated administration, the mean peak plasma concentration of each dose group was similar to that observed in comparison with that of single administration. Food effects on bioavailability were evaluated after administration of 200 mg of oral tegoprazan fasting and after meals to healthy adults. Although there was a tendency to delay the T_{max} and decrease the C_{max} after food intake, there was no significant difference on the AUC_{0-∞} and pharmacodynamic parameter (the maintenance time of intragastric acidity above pH 4). 2) **Distribution** The proportion of *in vitro* non-protein-binding drug was 8.7 - 9.0% human in the concentration range of 1 - 10 μM. 3) **Metabolism and Excretion** Tegoprazan is mainly metabolized by CYP3A4. The main metabolite is metabolite M1 (dealkylated metabolite). After intravenous administration of tegoprazan to rats and dogs, amount of unchanged tegoprazan excreted in urine was less than 1%. After oral administration of [¹⁴C]-tegoprazan to rats, recovery of radioactivity at 168 hours (of dosing) were 98% and 97% in the female and male, respectively. 22% to 24% of the total radioactivity was excreted in urine, and 65% to 69% was eliminated in feces in both female and male rats. After oral administration to rats with biliary intubation, tegoprazan was excreted 41.4% in bile acid, 25.7% in urine and 28.4% in feces. And the total recovery of radioactivity was 97.7%. Less than 1% of unchanged tegoprazan was found 1% in bile acid and urine, 15% in bile, 6% of metabolite M1 was found in feces. Following the administration of tegoprazan to healthy male subjects, the plasma elimination half-life of unchanged tegoprazan and metabolite M1 were 4.1 hours and 22.8 hours, respectively. Urinary excretion rate of the unchanged tegoprazan was approximately 4.1% and clearance was 1.1L/hr. Urinary excretion rate of the major metabolite M1 was about 2.3% and the clearance was 0.5L/hr. 4) **Drug Interaction (I) Effects of other drugs on tegoprazan** ① Tegoprazan is metabolized in liver by CYP3A4. *In vitro* studies have shown that ketoconazole, a CYP3A4 inhibitor, significantly inhibited the metabolism of tegoprazan, and while inhibitors of CYP2A2, CYP2C3, CYP2C19, CYP2D6 did not significantly reduce the metabolism of tegoprazan. Concomitant use of tegoprazan with CYP3A4 inhibitors may elevate exposure of tegoprazan. ② Tegoprazan is a substrate of P-gp. *In vitro* studies have shown that the efflux ratio of tegoprazan was decreased by

verapamil, a P-gp inhibitor. Co-administration of tegoprazan and P-gp inhibitors may result in increase of exposure by increasing gastrointestinal absorption of tegoprazan. ③ In healthy adult subjects, co-administration of tegoprazan with clarithromycin (substrates and inhibitors of CYP3A4 and P-gp) resulted in increase of C_{max} and AUC of tegoprazan by 1.65 times and 2.5 times, respectively. AUC of clarithromycin increased slightly by 1.25 times and there was no significant increase of C_{max}. Neither adverse events nor adverse drug reaction clinically significant were observed. ④ **Effects of tegoprazan on other drugs** ⑤ *In vitro* studies have shown that tegoprazan showed competitive inhibition against CYP2C8 and CYP3A4. But, the IC₅₀ values were approximately 25-fold greater than the peak plasma concentration of the recommended human dose. ⑥ For OATP1B1, there was a difference in the inhibitory activity of tegoprazan depending on substrates and it is expected that the plasma concentrations of some drugs which are substrate for OATP1B1 may be increased slightly considering the C_{max} at the clinical doses. 13.3 **Clinical studies 1) Erosive Gastroesophageal Reflux Disease** A randomized, double-blind, active-controlled, comparative phase III study was conducted in 302 patients with erosive gastroesophageal reflux disease to evaluate K-CAB 50mg, 100mg or esomeprazole 40mg for up to 8 weeks. The cumulative healing rate at week 8 was 98.91%(91 patients), 98.90%(90 patients) and 49%(esomeprazole treatment group), demonstrating non-inferiority (Table 2).

Table 2. Cumulative healing rate of Erosive Gastroesophageal Reflux Disease at week 8

	K-CAB			Esomeprazole
	50mg	100mg	40mg	
PPS	N=92	N=91	N=88	
Number(%) of patients healed	91(98.91)	90(98.90)	87(98.86)	
Difference with 95% confidence interval	0.05	0.04		
	[-3.02, 3.11]	[-3.04, 3.12]		
p-value*	0.0001	0.0001		

* Non-inferiority margin -10%, significance level 0.025(one-sided test), PPS: Per Protocol Set 2) **Non-Erosive Gastroesophageal Reflux Disease** A randomized, double-blind, placebo-controlled, phase III study was conducted in 324 patients with non-erosive gastroesophageal reflux disease to evaluate K-CAB 50mg, 100mg or placebo for 4 weeks. The rate of patients with complete resolution of main symptoms, heartburn and reflux of gastric acid, at week 4 was 42.45%(45 patients)/106 patients), 48.48%(48 patients)/99 patients), 24.24%(24 patients)/99 patients), respectively in treatment group of K-CAB 50mg, 100mg and placebo, demonstrating superiority (Table 3).

Table 3. Percentages of patients with complete resolution of main symptoms at week 4 in non-erosive gastroesophageal reflux disease

	K-CAB			Placebo
	50mg	100mg		
FAS	N=106	N=99	N=99	
Symptom resolution [N(%)]	45 (42.45)	48 (48.48)	24 (24.24)	
p-value*	0.0058	0.0004		

* Chi-square test, significance level 0.05(two-sided test), FAS: Full Analysis Set 13.4 **Nonclinical Toxicology 1) Mutagenesis** Tegoprazan was negative in the bacterial reverse mutation test using *Salmonella* and *E. coli*. Tegoprazan was positive in the CHL cell chromosome aberration assay, but negative in the *in vivo* micronucleus test using rat bone marrow cells to induce micronucleus. 2) **Carcinogenesis** In a 2 year carcinogenicity study in rats, gastrointestinal neuroendocrine tumor was observed in the male 15 mg/kg/day (about 4.8 times AUC of the recommended human dose) group and the female 5 mg/kg/day (about 6.8 times AUC of the recommended human dose). 3) **Impairment of Fertility** No effects on fertility and early embryonic development were observed up to a high dose of 500 mg/kg/day. As a result of the embryo-fetal development studies, short supermucous cervical ribs were observed with a higher incidence in rats. The NOAEL for maternal rats was determined to be 500 mg/kg/day, which was 369 times the AUC of the human recommended dose, and the NOEL for embryos and fetuses was determined to be 20 mg/kg/day, which was 15.6 times the AUC of the human recommended dose. There were no effects on fetal development despite abortions and weight loss symptoms in the maximum dose(10mg/kg/day) group of rabbit. The NOAEL for maternal rabbits was determined to be 5mg/kg/day, which was 2 times the AUC of the human recommended dose, and the NOAEL for embryos and fetuses was determined to be 10 mg/kg/day, which was 4.8 times the AUC of the human recommended dose. In a pre- and post-natal development study and maternal function study in rats, tegoprazan and metabolite M1 were shown to be excreted in breast milk. And the NOAEL was determined to be 20 mg/kg/day, which was 8 times the AUC of the human recommended dose on the basis of the decreased survival rate of the first filial rats at 60mg/kg/day, the maximal dose.

WELCOME MESSAGE	3
ORGANIZATION	4
PROGRAM AT A GLANCE	6
FLOOR PLAN	8
CONFERENCE INFORMATION	9
SPEAKER INFORMATION	12
INVITED FACULTIES	13
EXHIBITION	15
ACKNOWLEDGEMENT	16
EXHIBITORS	20
SCIENTIFIC PROGRAM	23
• SESSION DESCRIPTION	24
• DAILY PROGRAM	
- JUNE 13 (THU)	27
- JUNE 14 (FRI)	31
- JUNE 15 (SAT)	39
- JUNE 16 (SUN)	47
POSTERS	49





Dear Colleagues and Friends,

It is my great pleasure to welcome you to the International Digestive Endoscopy Network 2019 (IDEN 2019) from June 13 to 16, 2019 in Seoul, Korea.

Since the first IDEN conference was held in 2011, the conference has grown into a truly international academic meeting and achieved tremendous growth. Under the basic philosophy of promoting and sharing the development of advanced digestive endoscopy research with the world, the IDEN conference brings together more than 1,000 participants from over 35 countries every year.

As a result of this achievement, this year, the IDEN has been founded as an international society to further dedicate itself to the development of the Gastrointestinal Endoscopy field, especially in the Asia region. This has been possible due to the active participation and generous support from many neighboring countries and distinguished experts from around the world. We thank all of you who have given their support to the process of the IDEN's establishment. IDEN will encourage mutual growth through the active exchange of information and communication among members and countries. Furthermore, we will not stop doing our best to educate future endoscopists and lead our clinical and laboratory research with the greatest expertise.

IDEN 2019 continues to follow in the tradition of past conferences. A specially designed scientific program featuring upper GI, lower GI and pancreatobiliary endoscopy will include various topics including hands-on courses for trainees and fellows as well as live demonstrations of cutting-edge techniques and skills for experts. To foster international collaboration, unique joint sessions with the World Endoscopy Organization (WEO), European Society of Gastrointestinal Endoscopy (ESGE) and Japan Gastroenterological Endoscopy Society (JGES) will be held. The 2019 Asian Young Endoscopist Award (AYEA) grew more with 64 participants which was offered to young and talented professionals.

IDEN is one of the world's most prestigious and influential networking forums where you can catch up on the rapidly changing developments and innovations in the advanced digestive endoscopy field.

We thank you for your participation, welcome you to IDEN 2019 and wish you a stimulating and fruitful conference as well as an unforgettable stay.

Sang Yong Seol

President

International Digestive Endoscopy Network



ORGANIZATION

IDEN BOARD MEMBERS

Honorary President	Yong Bum Yoon	National Medical Center, Korea
President	Sang Yong Seol	Inje University, Korea
Vice Presidents	Yong-Tae Kim	Seoul National University, Korea
	Hoon Jai Chun	Korea University, Korea
Congress Chairmen	Soo Teik Lee	Chonbuk National University, Korea
	Ho Gak Kim	Daegu Catholic University, Korea
Vice Chairmen	Hyung Gil Kim	Inha University, Korea
	Dong Ho Lee	Seoul National University, Korea
Secretary General	Jong-Jae Park	Korea University, Korea
Vice Secretaries General	Ki-Nam Shim	Ewha Womans University, Korea
	Moon Kyung Joo	Korea University, Korea
	Jae Young Jang	Kyung Hee University, Korea
	Bolor Otgondemberel	Asralt Med Hospital, IGIC, Mongolia
Scientific Committee	Ji Kon Ryu	Seoul National University, Korea
	Selçuk Dişibeyaz	Eskişehir Üniversit, Turkey
	Enkh-Amar Ayush	Mongolian National University, Mongolia
Editorial Committee	Eun Young Kim	Daegu Catholic University, Korea
	Ho Dang Quy Dung	Cho Ray Hospital, Vietnam
Treasurer	Ji Won Kim	SMG-SNU Boramae Medical Center, Korea
	Seong Hwan Kim	Eulji University, Korea
Education and Training Committee	Jeong Seop Moon	Inje University, Korea
	Kanat Batyrbekov	Scientific Research Institute of Traumatology and Orthopedics, Kazakhstan
	Davaadorj Duger	Mongolian National University, Mongolia
Informatics Committee	Jae Myung Park	Kangnam St. Mary's Hospital, Korea
	Rungsun Rerknimitr	Chulalongkorn University, Thailand
	Hery Djagat Purnomo	Diponegoro University, Indonesia
Public Affairs Committee (Liaison)	Young Koog Cheon	Konkuk University, Korea
	Vu Van Khien	108 Military Central Hospital, Vietnam
	Yerlan Abdirashev	National Scientific Center, Kazakhstan
Auditors	Don Haeng Lee	Inha University, Korea
	Sam Ryong Jee	Inje University, Korea
Steering Members	Sang Yong Seol	Inje University, Korea
	Yong-Tae Kim	Seoul National University, Korea
	Hoon Jai Chun	Korea University, Korea
	Joo Young Cho	CHA University, Korea
	Jong-Jae Park	Korea University, Korea
	Ji Kon Ryu	Seoul National University, Korea
	Ji Won Kim	SMG-SNU Boramae Medical Center, Korea
	Oyuntsetseg Khasag	Mongolian National University, Mongolia
	Cengiz Pata	Istinye Liv University, Turkey




ADVISORY COMMITTEE

Chang Duck Kim	Korea University, Korea
Myung-Hwan Kim	University of Ulsan, Korea
Jong Sun Rew	Chonnam National University, Korea
Yong Woon Shin	Inha University, Korea
Chang-Hun Yang	Dongguk University, Korea
Sei Jin Youn	Chungbuk University, Korea
Hyun Yong Jeong	Chungnam National University, Korea
Myung-Gyu Choi	The Catholic University of Korea, Korea

SCIENTIFIC COMMITTEE

Director		Ji Kon Ryu	Seoul National University, Korea
Co-Directors		Selçuk Dişibeyaz	Eskişehir Universit, Turkey
		Enkh-Amar Ayush	Mongolian National University, Mongolia
Vice Director		Sang Kil Lee	Yonsei University, Korea
Members	Upper GI	Gwang Ha Kim	Pusan National University, Korea
		Chan Hyuk Park	Hanyang University, Korea
		Soo-Jeong Cho	National Cancer Center, Korea
		Sung Woo Jung	Korea University, Korea
		Chul-Hyun Lim	The Catholic University of Korea, Korea
		Jun Chul Park	Yonsei University, Korea
	Lower GI	Ja Seol Koo	Korea University, Korea
		Hyun Gun Kim	Soonchunhyang University, Korea
		Eun Soo Kim	Kyungpook National University, Korea
		Eun Sun Kim	Korea University, Korea
		Ji Won Kim	Seoul National University, Korea
		Jun Lee	Chosun University, Korea
		Dong-Hoon Yang	University of Ulsan, Korea
	Pancreatobiliary	Sang Soo Lee	University of Ulsan, Korea
		Sang Hyub Lee	Seoul National University, Korea
		Jae Hee Cho	Gachon University, Korea
		Jong Jin Hyun	Korea University, Korea
		Tae Hoon Lee	Soonchunhyang University, Korea
		Se Woo Park	Hallym University, Korea
		Sang Myung Woo	National Cancer Center, Korea

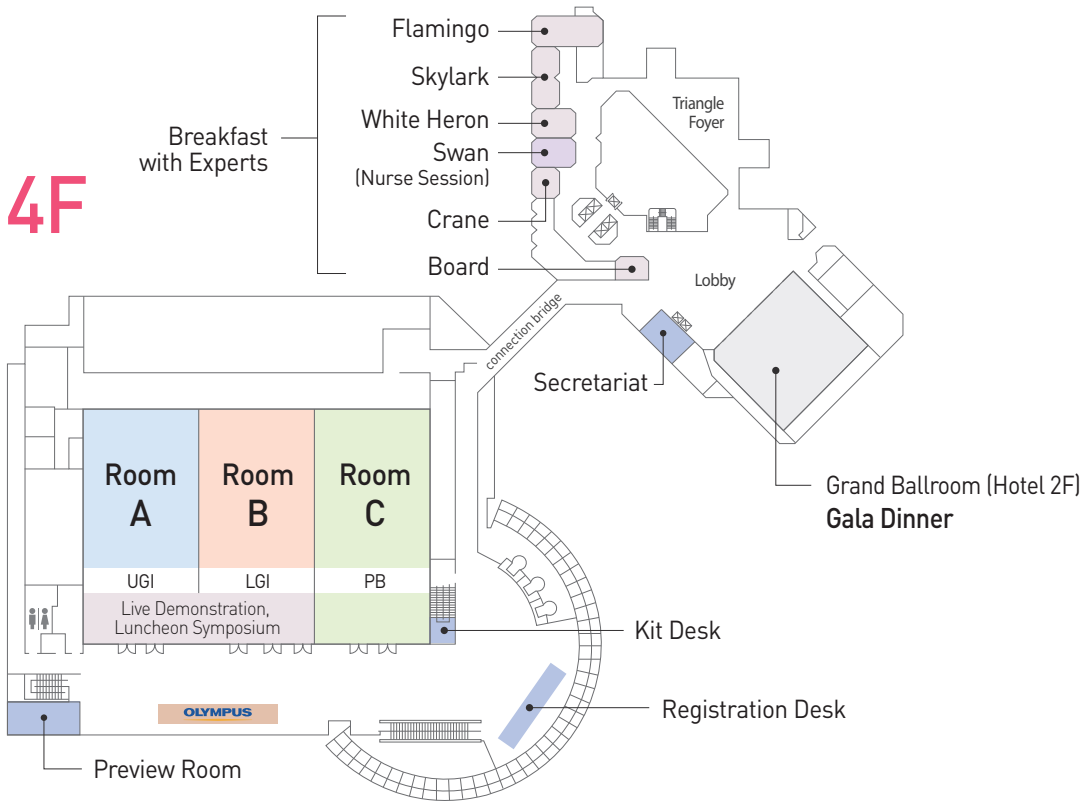
PROGRAM AT A GLANCE

	JUNE 13 (THU)	JUNE 14 (FRI)		
	AYEA ROOM B	UGI ROOM A	LGI ROOM B	PANCREATOBILIARY ROOM C
07:30		Registration		
08:00				
08:30				
09:00		UGI 1	LGI 1	PB 1
09:30		Exploring submucosal space	Real-time optical diagnosis for colorectal neoplasias	Optimal management of AOV adenoma/carcinoma
10:00		Coffee Break		
10:30				
11:00		UGI 2	LGI 2	PB 2
11:30		Cutting edge of endoscopic stenting in upper GI tract	[Asian Network] Efforts for perfect colonoscopy in Asia	Advances in EUS-guided tissue acquisition for solid tumors
12:00		Luncheon Symposium 1 		
12:30				
13:00				
13:30	Young Endoscopist Forum *Invitation Only	UGI 3	LGI 3	PB 3
14:00		[KSGE-WEO] Up-to-date in image-enhanced endoscopy	[KSGE-ESGE] Managing colorectal polyps; The cutting-edge	Endoscopic management of combined duodenal and biliary obstruction
14:30		Coffee Break		
15:00				
15:30		UGI 4	LGI 4	PB 4
16:00		[KSGE-ESGE] Current management of superficial esophagogastric junction neoplasms	Special situations encountered in colonoscopy	[Asian Network] Breakthrough endoscopic technologies in pancreaticobiliary malignancy
16:30				
17:00		Gala Dinner (Grand Ballroom)		
17:30				
18:00				
18:30				
19:00				

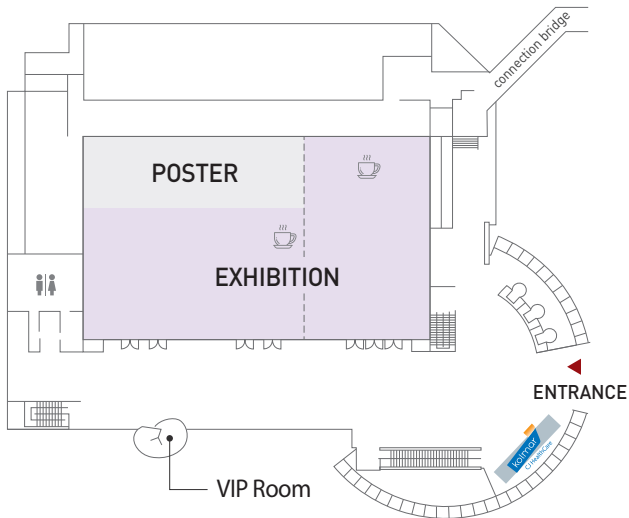


		JUNE 15 (SAT)				JUNE 16 (SUN)
		UGI	LGI	PANCREATOBILIARY	NURSE	AYEA
		ROOM A	ROOM B	ROOM C	SWAN	
07:30		Registration				
08:00		Breakfast with Experts				
08:30		(Flamingo, Skylark, White Heron, Swan, Crane, Board)				
09:00		Live Demonstration 1		PB 5	Hands-on Course *Invitation Only (Olympus K-TEC)	
09:30				[KSGE-JGES] Progress in pancreaticobiliary endoscopy: Two is better than one		
10:00		Coffee Break				
10:30		Live Demonstration 2				
11:00						
11:30	Poster & Exhibition	IDEN General Assembly				
12:00		Luncheon Symposium 2 OLYMPUS				
12:30						
13:00						
13:30		UGI 5	LGI 5	PB 6		Nurse Session
14:00		[KSGE-JGES] Innovation in GI endoscopy: Emerging technologies in the upper GI tract	Updates on small bowel endoscopy	What's your next choice for difficult or failed ERCP?	Gastrointestinal endoscope reprocessing: From basics to advanced application	
14:30		Coffee Break				
15:00		UGI 6	LGI 6	PB 7		
15:30		Innovative therapeutic endoscopy: Tips for difficult endoscopic resection procedure	[KSGE-JGES] Endoscopic diagnosis and treatment of colorectal lesions: Advances and the future	Role of endoscopy in patients with LFT abnormalities due to benign disease		
16:00						
16:30						
17:00						
17:30						
18:00						
18:30						
19:00						

FLOOR PLAN



3F





REGISTRATION DESK

Registration is open from June 14 to 15 in the 4F lobby of Convention Centre at the following times:

Operation Hours: June 14 (Fri)-15 (Sat), 07:30-17:30

On-site Registration Fees

Category	Fees	
	IDEN member	Non-member
Participant	USD 300	USD 320
Trainee / Fellow	USD 140	USD 160
Nurse / Technician (1 Day)	-	USD 120 (1 Day: USD 60)
Gala Dinner	USD 20	

* Registration fees **DO NOT include entrance to the Gala Dinner**. If you would like to attend the Gala Dinner, please purchase the ticket at the registration desk.

* **Registration Fees Include:**

- Admission to all scientific sessions, luncheon symposium, coffee breaks and exhibition
- Conference materials (bag, name tag, program book, etc.)

BADGE POLICY

For security purposes, participants and exhibitors are required to wear their name badges during the conference.

CERTIFICATE OF ATTENDANCE

Please send the email to the secretariat after the conference. Those who need a hard copy may receive it at the onsite registration desk after 16:00 of June 14 (Fri).



COFFEE BREAK

Coffee will be provided to participants at locations listed below.

Location	Poster/Exhibition Hall (3F)	3F & 4F Lobby
Time	All day during the conference	During coffee breaks

LUNCHEON SYMPOSIUMS

Lunch boxes will be provided during Luncheon Symposiums.

Location	Room A & B	
Operation Hours	 June 14 (Fri), 12:30-13:30	 June 15 (Sat), 13:00-14:00

CONFERENCE INFORMATION

OLYMPUS TECHNOLOGY UPDATE

- Olympus Innovation Strategy - "How AI makes Endoscopy Smarter?"

Place	White Heron (Hotel 2F)	
Date & Time	June 14 (Fri), 14:00-15:00	June 15 (Sat), 15:30-16:30
Remarks	This symposium is by invitation only. Invitations are available at the Olympus booth, 4F.	

BREAKFAST WITH EXPERTS

"Breakfast with Experts" is a small session that provides valuable interaction among 6 renowned experts and enthusiastic participants. These sessions are intended to give participants the opportunity for interactive discussion with faculty over current issues and interesting topics in digestive endoscopy. Please be aware that these are small sessions with limited attendance. If you would like to join, please inquire with our staff at the pre-registration desk.

BE 1	ESD for early gastric cancer: Eastern vs. Western Fabian Emura, EmuraCenter LatinoAmerica & University of La Sabana, Colombia
BE 2	The history of flexible robot assisted endoscopic interventions Kazuki Sumiyama, The Jikei University, Japan
BE 3	ESD technical tips & tricks Yoshikazu Hayashi, Jichi Medical University, Japan
BE 4	Image enhanced endoscopy-based prediction of histology of colorectal neoplasia: Pearl and pitfall Helmut Messmann, Klinikum Augsburg, Germany
BE 5	EUS in the diagnosis and treatment of pancreatic cystic tumors Marcin Polkowski, Medical Centre for Postgraduate Education, Poland
BE 6	Endoscopic transmural necrosectomy: Timing, indications, and methods Rungsun Rerknimitr, Chulalongkorn University, Thailand

GALA DINNER

June 14 (Fri), 17:30-19:00 | Grand Ballroom

The Gala Dinner will offer performances and feast. It will be an excellent occasion for us to enjoy the night with colleagues, celebrate our achievements and make for unforgettable memories.

The Gala Dinner is only for participants who purchased the ticket and invited faculties.

* Awards Ceremony of Travel Grant and Best Poster Presentation will be held in the Gala Dinner. Awardees are requested to attend the dinner.



CME CREDIT INFORMATION (Domestic Participants Only)

모든 연수 교육은 날마다 **입실/퇴실 총 두 번의 시간이 확인**되어야 평점을 받을 수 있습니다. 누락 등 사후 반영은 불가합니다.

- 출결 체크 위치: 4층 학술방 입구, 등록데스크 / 문의처: 4층 등록데스크

	소화기내시경 세부전문의	질 관리	소독
6월 14일(금)	1	2	-
6월 15일(토)	1	2	1

* 하루에 3시간 초과 체류 시 일일평점 부여

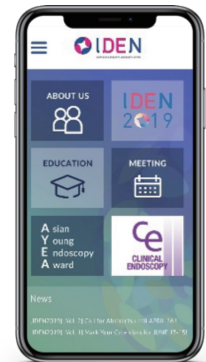
IDEN APP DOWNLOAD

TO DOWNLOAD

Scan the QR code or search for "IDEN" in the Google Play Store or Apple App Store.

WHY DOWNLOAD?

- Peruse our full agenda
- Session and invited speaker information
- Browse all abstracts
- My Schedule feature to plan your day
- Stay up-to-date with alerts and important news



EVENTS

LUCKY DRAW

Surprising gifts await you! Just visit the 15 exhibition booths and fill out the stamp sheet with exhibition stamps and drop it in the box at the fill-up desk in front of the Registration Desk. The drawing will be held after the last session each day. Be sure to be there to get amazing prizes!

- Drawing Location: Room B (4F)
- Drawing Dates & Times: June 14 (Fri), 16:50 / June 15 (Sat), 17:20



1st PRIZE
LG gram 14"
(1 person each day)



2nd PRIZE
LG Derma LED Mask
(2 persons each day)



3rd PRIZE
Samsung Portable
SSD 1TB
(2 persons each day)



4th PRIZE
Marshall
Bluetooth Speaker
(2 persons each day)



5th PRIZE
Clova AI Speaker
(3 persons each day)

BARCODE TAG EVENT

Scan your barcode on the name badge upon entering the session room and win a Starbucks Gift Card! Winners will be randomly selected each day and notified on the barcode screen. Please visit the registration desk if you win. 23 persons in total will receive a Starbucks Gift Card.



SPEAKER INFORMATION

PREVIEW ROOM (4F Lobby)

June 14 (Fri) - June 15 (Sat), 07:30-17:00

All speakers are requested to visit the preview room and submit their presentation materials at least 2 hours prior to presentation. If you intend to use your own computer, please come to the preview room to test it before your session.

GUIDELINES FOR POSTER PRESENTATION

Posters will be displayed on the dates and times below at the Poster/Exhibition Hall (3F).

Process	Time
Affixation	June 14 (Fri), 08:30-10:00
Exhibition & Presentation	June 14 (Fri), 09:00 - June 15 (Sat), 17:00
Removal	June 15 (Sat), 17:00

AWARDS & TRAVEL GRANTS

BEST POSTERS & DISTINGUISHED POSTERS

The IDEN 2019 committee will award the 'Best Posters' to the 4 most outstanding presenters and 'Distinguished Posters' to 19 outstanding presenters based on the abstracts. Awards Ceremony of Best Poster will be held in the Gala Dinner.



Best Poster

Certificate of award and cash prize of USD 200



Distinguished Poster

Certificate of award

TRAVEL GRANTS

The IDEN committee is pleased to present travel grants to participants coming from around the world. This year, 4 applicants will receive the grants.



Travel Grant

Certificate of award and grant of USD 500





Colombia

Fabian Emura (EmuraCenter LatinoAmerica & University of La Sabana)

France

Jean-Francios Rey (St. Laurent du Var)

Germany

Helmut Messmann (Klinikum Augsburg)

Helmut Neumann (University Medical Center Mainz)

Hong Kong

Philip WY Chiu (The Chinese University of Hong Kong)

Martin Chi Sang Wong (The Chinese University of Hong Kong)

India

Sundeep Lakhtakia (Asian Institute of Gastroenterology)

Italy

Cesare Hassan (Nuovo Regina Margherita Hospital)

Japan

Kazuhiro Gono (Olympus Medical Systems)

Yoshikazu Hayashi (Jichi Medical University)

Haruhiro Inoue (Showa University)

Toru Ito (Kanazawa Medical University)

Naomi Kakushima (Shizuoka Cancer Center)

Yuichi Mori (Showa University Northern Yokohama Hospital)

Shuntaro Mukai (Tokyo Medical University)

Takeshi Ogura (Osaka Medical College)

Masau Sekiguchi (National Cancer Center Hospital)

Kazuki Sumiyama (The Jikei University)

Hisao Tajiri (Jikei University)

Ryosuke Tonozuka (Tokyo Medical University)

Tomonroi Yano (Jichi Medical University)

Ichiro Yasuda (University of Toyama)

Takeuchi Yoji (Osaka International Cancer Institute)

Korea

Donghoon Baek (Pusan National University)

Sang-Woo Cha (Soonchunhyang University)

Jae Myung Cha (Kyung Hee University)

Dong Kyung Chang (Sungkyunkwan University)

Jae Hyuck Chang (The Catholic University of Korea)

Young Koog Cheon (Konkuk University)

Soo-Jeong Cho (Seoul National University)

Young Deok Cho (Soonchunhyang University)

Eunae Cho (Chonnam National University)

Jae Hee Cho (Gachon University)

Joo Young Cho (CHA University)

Jun-Hyung Cho (Soonchunhyang University)

Jung-Wan Choe (Korea University)

Eun Kwang Choi (Jeju National University)

Hyuk Soon Choi (Korea University)

Jun Ho Choi (Dankook University)

Myung-Gyu Choi (The Catholic University of Korea)

Hoon Jai Chun (Korea University)

Jaeyoung Chun (Yonsei University)

Seok-Ho Dong (Kyung Hee University)

Su Jin Hong (Soonchunhyang University)

Kyu Chan Huh (Konyang University)

Jong Jin Hyun (Korea University)

Hee-Hyuk Im (Soonchunhyang University)

Sung Ill Jang (Yonsei University)

Hyunjoon Jang (Hallym University)

Jung Won Jeon (Kyung Hee University)

Seok Jeong (Inha University)

Hyun Yong Jeong (Chungnam National University)

Moon Kyung Joo (Korea University)

Sung Woo Jung (Korea University)

Yunho Jung (Soonchunhyang University)

Hwoon-Yong Jung (University of Ulsan)

Hyoun Woo Kang (Dongguk University)

Bora Keum (Korea University)

Kyoung Oh Kim (Gachon University)

Gwang Ha Kim (Pusan National University)

Do Hoon Kim (University of Ulsan)

Myung-Hwan Kim (University of Ulsan)

Byung-Wook Kim (The Catholic University of Korea)

Seong-Eun Kim (Ewha Womans University)

Seong-Hun Kim (Chonbuk National University)

Young Seon Kim (Soonchunhyang University)

Yong-Tae Kim (Seoul National University)

Eun Ran Kim (Sungkyunkwan University)

Eun Sun Kim (Korea University)

Eun Young Kim (Daegu Catholic University)

Jae Gyu Kim (Chung-Ang University)

Jae J. Kim (Sungkyunkwan University)

Jung-Wook Kim (Kyung Hee University)

Ji Won Kim (SMG-SNU Boramae Medical Center)

Ji Hyun Kim (Inje University)

INVITED FACULTIES

Jin Kim (Korea Cancer Center Hospital)
Jinhong Kim (Ajou University)
Chan Gyoo Kim (National Cancer Center)
Tae Nyeun Kim (Yeungnam University)
Tae Hyeon Kim (Wonkwang University)
Hyun Gun Kim (Soonchunhyang University)
Hyung-Keun Kim (The Catholic University of Korea)
Hyung Kil Kim (Inha University)
Haeryoung Kim (Seoul National University)
Ho Gak Kim (Daegu Catholic University)
Gi-Young Ko (University of Ulsan)
Bong Min Ko (Soonchunhyang University)
Ja Seol Koo (Korea University)
Bo-In Lee (The Catholic University of Korea)
Dongki Lee (Yonsei University)
Han Hee Lee (The Catholic University of Korea)
Inseok Lee (The Catholic University of Korea)
Jaemin Lee (Korea University)
Jong Kyun Lee (Sungkyunkwan University)
Jun Lee (Chosun University)
Jung Min Lee (Wonkwang University)
Kee Myung Lee (Ajou University)
Kwang Jae Lee (Ajou University)
Sang Hyub Lee (Seoul National University)
Sang Woo Lee (Korea Univeristy)
Sang-Kil Lee (Yonsei University)
Seung Ok Lee (Chonbuk National University)
Soo Teik Lee (Chonbuk National University)
Tae Hoon Lee (Soonchunhyang University)
Woo Jin Lee (National Cancer Center)
Yong Kang Lee (National Health Insurance Ilsan Hospital)
Chul-Hyun Lim (The Catholic University of Korea)
Hyun Lim (Hallym University)
Yunjeong Lim (Dongguk University)
Hee Seok Moon (Chungnam National University)
Jong Ho Moon (Soonchunhyang University)
Seung-Joo Nam (Kangwon National University)
Woo Hyun Paik (Seoul National University)
Sang-Heum Park (Soonchunhyang University)
Seun Ja Park (Kosin University)
Se Woo Park (Hallym University)
Soo-Kyung Park (Sungkyunkwan University)
Soo-Heon Park (The Catholic University of Korea)
Seung Woo Park (Yonsei University)
Jae Myung Park (The Catholic University of Korea)

Jun Chul Park (Yonsei University)
Chan Hyuk Park (Hanyang University)
Chang-Hwan Park (Chonnam National University)
Jong Sun Rew (Chonnam National University)
Ki-Hyun Ryu (Konyang University)
Dong Wan Seo (University of Ulsan)
Sang Yong Seol (Inje University)
Yong Woon Shin (Inha University)
Geun Am Song (Pusan National University)
Tae Jun Song (University of Ulsan)
Sang Myung Woo (National Cancer Center)
Dong-Hoon Yang (University of Ulsan)
Min Jae Yang (Ajou University)
Jae Kook Yang (Soonchunhyang University)
Chang-Hun Yang (Dongguk University)
Sei Jin Youn (Chungbuk University)

Mongolia

Adiyasuren Battulga (UB Song-Do Hospital)

Norway

Lars Aabakken (Oslo University Hospital-Rikshospitalet)

Poland

Marcin Polkowski (Medical Centre for Postgraduate Education)

Portugal

Mario Dinis-Ribeiro (Instituto Portugues de Oncologia Francisco Gentil)

Singapore

Khek-Yu Ho (National University Health System)
Damien Meng Yew Tan (Singapore General Hospital)

Taiwan

Yu-Min Lin (Shin Kong Wu Ho-Su Memorial Hospital)
Hsiu-Po Wang (National Taiwan University)

Thailand

Nonthalee Pausawasdi (Mahidol University)
Rungsun Rerknimitr (Chulalongkorn University)

Turkey

Gürhan Sisman (Acibadem University)



EXHIBITION DATE & TIME

June 14 (Fri), 09:00-16:50

June 15 (Sat), 09:00-17:00

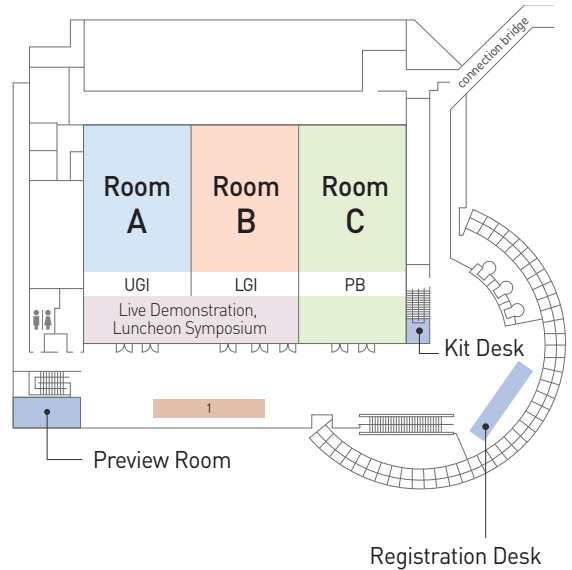
* In alphabetical order

4F	Olympus Korea Co., Ltd.	1
3F	Boston Scientific Korea Co., Ltd.	16
	Bukwang Pharm. Co., Ltd.	11
	Chong Kun Dang Pharm.	4
	CJ HealthCare	2
	COOK MEDICAL	7
	Daewon Pharmaceutical Corp.	26
	DAEWONG Pharmaceutical	6
	Dong-A ST	25
	Eisai Korea	21
	Endoaccess	32
	EVE Medical Co., Ltd.	17
	Hanmi Pharm. Co., Ltd.	22
	Ildong Pharmaceutical Co., Ltd.	9
	Il-Yang Pharm.	23
	Jeil Pharmaceutical Co., Ltd.	19
	JIN Commerce & Trading Co., Ltd.	10
	JW Pharmaceutical	5
	Korea Otsuka Pharmaceutical Co., Ltd.	8
	Korea United Pharm. Inc.	3
	M.I.Tech Co., Ltd.	30
	Medtronic Korea	15
	PENTAX Medical KOREA	27
	Pharmbio Korea inc.	20
	SHENT Co., Ltd.	12
	SK Chemicals	24
	SnC Publishing Inc.	28
	Standard Sci·Tech Inc.	14
	SUNTEK Medical Systems	18
	TAEWOONG MEDICAL	13
	World Endoscopy Organization (WEO)	29
	YUHAN Corporation	31

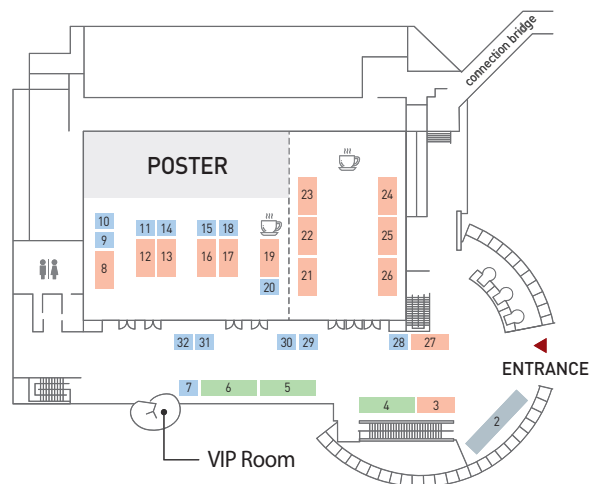
LOCATION

Poster & Exhibition Hall (3F, 4F)

4F



3F



ACKNOWLEDGEMENT

Platinum

Olympus Korea Co., Ltd.

OLYMPUS

Address. Majestarcity Tower One 2~3F, 12, Seocho-daero 38-gil Seocho-gu, Seoul, Korea
Tel. +82-1544-3200
Website. www.olympusmedical.co.kr

Company or Product Information

Olympus Korea was founded by Olympus Corporation which is the world leading optical device and system in the product field of digital imaging devices such as digital still camera and medical device, system such as endoscope, endo-therapy accessories and various surgical products. Moreover, Life science business is also run by Olympus Korea. Olympus Korea's medical division was founded in July 2004 and has maintained No.1 leadership in the endoscope market. Driven by its core-competence of optical technology and continuous marketing drive, Olympus Korea will not stop being as one of the overseas branch offices. It will keep investing in the technology and solutions R&D to be a more competitive company.

Gold

CJ HealthCare



Address. 100, Eulji-ro, Jung-gu, Seoul, Korea
Tel. +82-2-6477-0000
Website. www.cjp.co.kr

Company or Product Information

CJ Healthcare was established in 1984 as CJ CheilJedang Pharmaceutical Business Division, based on 30 years of pharmaceutical business know-how.

To achieve our business vision of 'Heal the World, Better Life,' we will develop global innovative new drugs with a spirit of creativity and innovation and repay the national citizens and customers for their support.

In October 2015, CJ Healthcare achieved a tremendous success in out licensing the technology of K-CAB Tab. (ingredient name: Tegoprazan), a new drug for Gastroesophageal acid reflux, to Luoxin, one of China's leading pharmaceutical companies with focus in digestive medicine. K-CAB Tab. was be launched in March 2019 in Korea and is regarded as a highly evaluated new drug both domestically and globally.



Silver JW Pharmaceutical



Address. 2477, Nambusunhwan-ro, Seocho-gu, Seoul, Korea
Tel. +82-2-840-6777
Website. www.jw-pharma.co.kr

Company or Product Information

JW Pharmaceutical
"Constant challenge and passion for global innovative new medicine development"
JW Pharmaceutical CORPORATION, who has been leading hospital market with its medical products, is strengthening its global competitiveness by getting the outstanding pipeline for original medicine and medical supplies and putting its passion to develop innovative new medicine through its global R&D network.
We will make commitment to making our society bright and healthy by producing and Supplying innovative technologies, products and services which will support for healthy life Of the people, and will pursue the satisfaction and happiness of customers, shareholders and the employees through our trustworthy activities.

Silver DAEWOONG Pharmaceutical



Address. 12 Bongeunsa-ro 114-gil, Gangnam-gu, Seoul, Korea
Tel. +82-2-550-8308
Website. www.daewoong.com

Company or Product Information

Daewoong Group is a global healthcare group established in 1945 under the vision to 'manufacture high quality pharmaceuticals to enhance people's health and create a healthy society'. As it is our vision to be a global healthcare group, Daewoong has established 3 manufacturing sites in Indonesia and China and 8 branch offices in China, Japan, Indonesia, Thailand, Vietnam, Philippines, India and USA. Through our global presence, we are actively striving to export our high value added portfolio to the world.
To achieve our mission to provide the most beneficial total solutions in pharmaceuticals and services that contribute to improving the quality of life of valued consumers, we have been reinforcing R&D capacities through the establishment of R&D centers globally in Korea, China, India and Indonesia and focusing on developing new chemical entities, biologics, incrementally modified drugs and high-value added APIs.

Silver Chong Kun Dang Pharm.



Address. 8, Chunjeong-ro, Seodaemun-gu, Seoul, Korea
Tel. +82-2-2194-0300
Website. www.ckdpharm.com

Company or Product Information

"Better Life through Better Medicine Contributing to improved quality of life and public welfare by developing quality medicines.
Dedicated to pharmaceuticals since its foundation, Chong Kun Dang has overcome many challenges, while continuing to grow and contribute to the advancement of Korea's pharmaceutical industry. In the days when Korea imported 100% of the raw materials required for medicines from abroad, we built Korea's largest plants for chemical synthesis and fermentation, making it possible to produce pharmaceutical ingredients locally using our own technology. From there, we had driven Korean Pharmaceutical Industry with this breakthrough on the path toward modernization. Furthermore, we became the first Korean pharmaceutical company to export products to the US market through the obtainment of the U.S. FDA approval. Now, on its 77th anniversary, we promise to put all efforts to lead continuous change and innovation, positioning Chong Kun Dang as a global pharmaceutical company with a competitive edge in the international market.

Bronze Dong-A ST



Address. 64, Cheonho-daero, Dongdaemun-gu, Seoul, Korea
Tel. +82-2-920-8114
Website. www.donga-st.com

Company or Product Information

Dong-A ST focuses on ethical drugs, such as domestically developed new drugs like Stillen, Zydena, and Motilitone, medical devices, diagnosis, and overseas businesses.
With its optimized research infrastructures such as its world-class, sophisticated research center completed in 2011, as well as its excellent researchers, Dong-A ST is furthering its efforts to develop global new drugs. Also, with the backing of these infrastructures, Dong-A ST vows to positively explore overseas markets, to expand its overseas exports, and to establish itself as a global pharmaceutical company, operating beyond the domestic market.

ACKNOWLEDGEMENT

Bronze PENTAX Medical KOREA



Address. 11F, 42, Olympic-ro 35 da-gil, Songpa-gu Seoul, Korea
Tel. +82-1544-9954
Website. www.pentaxmedical.co.kr

Company or Product Information

100 years of PENTAX Founded in November 1919, Asahi Optical Joint Stock Co. was the original manufacturer of PENTAX branded products. With a rich history of innovation, PENTAX first entered the endoscopy market in 1977 with the FB-17A – its first Broncho Fiberscope. Now a division of HOYA Group, PENTAX Medical continues to innovate, developing leading-edge optical technologies, working towards the next 100 years and beyond!

Our Mission Our mission is to improve the standard of patient care and quality of healthcare delivery by providing the best endoscopic products and services with a focus on QUALITY, CLINICALLY RELEVANT INNOVATION, and SIMPLICITY. Through leading edge R&D and manufacturing, PENTAX Medical provides endoscopic imaging devices and solutions to the global medical community.

Innovation with PENTAX PENTAX Medical is a globally diversified company with R&D innovation and manufacturing centers in Japan, Europe and the United States. Through leading-edge optical technologies, PENTAX Medical is providing the most advanced clinically relevant endo-imaging solutions and innovative endoscopy systems.

Bronze Il-Yang Pharm.



Address. 110, Hagal-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
Tel. +82-2-570-3891
Website. www.ilyang.co.kr

Company or Product Information

IL-YANG PHARM. CO., LTD., has been dedicated to develop and supply the OTC and ETC drugs with superior efficacy and safety to the worldwide patients since 1946.

On the basis of the most advanced medical practices and R&D capabilities, IL-YANG had developed 2 new chemical entities, NOLTEC (API: Ilaprazole) and SUPECT (API: Radotinib). IL-YANG is currently exporting a variety of pharmaceuticals products to approximately 30 countries in the world including USA and Europe.

NOLTEC (API: Ilaprazole) is a Proton Pump Inhibitor with indication of Duodenal Ulcer, Gastric Ulcer, EE/GERD, *Helicobacter pylori* eradication which marketed in Korea and China so far. Also had been License out to UAE, Turkey and Latin American countries.

We completed phase II trial for EE/GERD in U.S and Canada and Phase III trial for indication of NERD is on-going in Korea. Crystalline A form patent is available until 2027 in US, EU, Korea and AP countries.

Bronze Jeil Pharmaceutical Co., Ltd.



Address. 343, Sapyeong-daero, Seocho-gu, Seoul, Korea
Tel. +82-2-549-7451
Website. www.jeilpharm.co.kr

Company or Product Information

“We pursue happiness and health for people worldwide”
Founded in 1959, Jeil has developed and supplied superior pharmaceutical products to promote the happiness and health of mankind and has contributed to the growth and development of the pharmaceutical industry in Korea. Jeil, equipped with global-class research centers and production facilities, has been recognized for its outstanding value on the world market as well.

Harmonious GI Portfolio : Dexilant (Dexlansoprazole), Lanston (Lansoprazole), Nexilen (Artemisia Herb Isopropanol Soft Ext. (20→1), Albitri (Ranitidine, Sucralfate, Bismuth)



Bronze Hanmi Pharm. Co., Ltd.



Address. 14, Wiryeseong-daero, Songpa-gu, Seoul, Korea
Tel. +82-2-410-9114
Website. www.hanmi.co.kr

Company or Product Information

Creativity & Innovation

Hanmi jumps up to be a global leading pharmaceutical company with development of new biologics, new chemical entities, and innovative new drugs. The slogan of Hanmi is ‘creation and challenge’ as Hanmi tries to make new ways for the domestic pharmaceutical market. We have started a distribution revolution with RFID technology, the nation’s very first success of US expansion with IMD, and R&D collaboration with global companies.



Bronze Eisai Korea



Eisai Korea Inc.

Address. 10F Reveasant, 6, Bongeunsa-ro 86-gil, Gangnam-gu, Seoul, Korea
Tel. +82-2-3451-5500
Website. www.eisai.com

Company or Product Information

Eisai Korea

Eisai makes no mention of the word "pharmaceutical" in its company name.

This is because what we really want to create is the everyday fulfillment of the precious hopes of patients and their families, which goes beyond the provision of medicines.

"What are the patients' true needs?"

"What do families truly wish for?"

We want to get close to patients, see the situation from their perspectives and get a sense of their thoughts and feelings that cannot be expressed in words.

WE continue with our challenge to turn those thoughts and wishes into hopes for tomorrow.

Bronze Korea United Pharm. Inc.



For the Best Global Pharmaceutical Company

KOREA UNITED PHARM. INC.

Address. 22, Nonhyeon-ro 121-gil, Gangnam-gu, Seoul, Korea
Tel. +82-2-512-9981
Website. www.kup.co.kr

Company or Product Information

Established in 1987, Korea United Pharm. Inc. has continued to develop as a pharmaceutical company with its slogan of "Korean owned multinational pharmaceutical company."

We have continuously launched new pharmaceutical drugs such as Cilostan CR Tab, Gastiin CR Tab, Clanza CR Tab and etc., through prestigious R&D investment, abundant know-hows and top expert researchers and have been placed as a strong competitor in the pharmaceutical drug development industry. We were named one of Asia's 200 most promising companies by the US economy magazine Forbes.

From our first international exports to Vietnam in 1999, we have progressed into the global market with multiple international branches. We currently export in over 40 different countries and were nominated top exporter with over \$20 million in 2013. Since then, we have continuously pioneered into the global market.

Also, through our management philosophy "Like a giant tree," we are striving for management that is high in integrity, ethical, sustainable, and mutually beneficial. To uphold these values and become a responsible company, we promote fair and transparent sales and operations, anti-corruption policies, fair competition programs and various CSR activities. We at Korea United Pharm. Inc. will continue to work for the health of our people and the global world.

Bronze Daewon Pharmaceutical Corp.



Daewon Pharm. Co., Ltd.

Address. 386 Cheonhodaero, Seongdong-gu, Seoul, Korea
Tel. +82-2-2204-7000
Website. www.daewonpharm.com

Company or Product Information

In 1958, Daewon Pharm was established on the basis of founding idea: "the realization of human health." It has been our unchanging role and mission to protect the public health as a company specialized in therapeutic agents.

Daewon Pharm is ready to go beyond a-half-century long reputation of being a therapeutic agent specialist of the Republic of Korea.

Eswonamp Tab. 20mg, 40mg (Esomeprazole magnesium trihydrate) is the smallest tablet and has the longest duration of intragastric pH greater than 4.0 among esomeprazole drugs - Indication: Treatment of GERD, Risk reduction of NSAID-associated gastrointestinal symptoms, *Helicobacter pylori* eradication.

Bronze SK Chemicals



Life Science Biz.

Address. 310 Pangyo-ro, Bundang-gu, Seongnam-si, Korea
Tel. +82-2-2008-2008
Website. www.skchemicals.com

Company or Product Information

Happy Harmony of Humans and the Environment

First comes the advancement of human health and the protection of the Earth's environment through environmentally-friendly materials and provision of total healthcare solutions.

SK chemicals' new mission statement says, "We enhance human health and protect the Earth's environment" and we have reorganized our business structure to focus on the two large sectors of green chemicals and life sciences.

Our life sciences business, dominated by pharmaceuticals and bio, is anchored by the comprehensive healthcare solutions that cover patient care from diagnosis to treatment and prevention. The creation of new medicines is bolstering our global position.

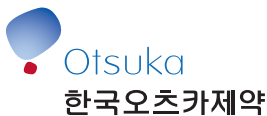
EXHIBITORS

FUJIFILM

Company Name. EVE MEDICAL CO., LTD.
Tel. +82-32-624-4800
Website. www.evemedical.com



Company Name. TAEWOONG MEDICAL
Tel. +82-31-904-6153
Website. www.stent.net



Company Name. Korea Otsuka Pharmaceutical Co., Ltd.
Tel. +82-2-3287-9000
Website. www.otsuka.co.kr



Company Name. SnC Publishing Inc.
Tel. +82-2-921-0653
Website. www.medbook.co.kr



Company Name. Bukwang Pharm. Co., Ltd.
Tel. +82-2-828-8114
Website. www.bukwang.co.kr

Boston Scientific

Advancing science for life™

Company Name. Boston Scientific Korea Co., Ltd.
Tel. +82-2-3476-2121
Website. www.bostonscientific.com



Company Name. SHENT Co., Ltd.
Tel. +82-2-3141-6605
Website. www.sonoscape.co.kr



Company Name. JIIN Commerce & Trading Co., LTD.
Tel. +82-2-453-1226
Website. www.jiincnt.com



Company Name. Ildong Pharmaceutical Co., Ltd.
Tel. +82-2-526-3114
Website. www.ildong.com



Company Name. Standard Sci•Tech Inc.
Tel. +82-2-922-3605
Website. www.standard4u.com



Medtronic

Further, Together

Company Name. Medtronic Korea
Tel. +82-2-3404-3600
Website. www.medtronic.com



Company Name. COOK MEDICAL
Tel. +82-2-6292-3500
Website. www.cookmedical.co.kr



Company Name. Endoaccess
Tel. +82-2-6959-9085
Website. www.endo-mall.com

Pharmbio Korea Inc.

Company Name. Pharmbio Korea inc.
Tel. +82-2-587-2551
Website. www.pharmbio.co.kr

M.I.Tech

Company Name. M.I.Tech Co., Ltd.
Tel. +82-31-662-5645
Website. www.mitech.co.kr



Company Name. YUHAN Corporation
Tel. +82-2-828-0181
Website. www.yuhan.co.kr



Company Name. SUNTEK MEDICAL SYSTEMS
Tel. +82-2-514-3214



SCIENTIFIC PROGRAM

IDEN 2019
International Digestive Endoscopy Network

SESSION DESCRIPTION

Upper GI

UGI 1 Exploring submucosal space

Endoscopic techniques are already moving into the third space beyond the mucosal layer. In this session, we will share the present and future of endoscopic technology for submucosal space.

UGI 2 Cutting edge of endoscopic stenting in upper GI tract

Using endoscopic stenting, we can treat postoperative complications, and relieve gastrointestinal obstruction in inoperable patients with malignancy. This session will introduce tips and techniques of upper gastrointestinal stenting from A to Z.

UGI 3 [KSGE-WEO] Up-to-date in image-enhanced endoscopy

Since endoscopy was developed, we have always wanted to see better and more accurately. We can better understand lesions through image-enhanced endoscopy including narrow-band imaging and magnifying endoscopy. In this session with WEO, we will learn the latest knowledge about image-enhanced endoscopy.

UGI 4 [KSGE-ESGE] Current management of superficial esophagogastric junction neoplasms

Despite advances in endoscopic devices and techniques, the diagnosis and treatment of esophagogastric junction neoplasms remain challenging. Through this session, Europe and Korea will share know-how on the diagnosis and treatment of superficial esophagogastric junction neoplasms.

UGI 5 [KSGE-JGES] Innovation in GI endoscopy: Emerging technologies in the upper GI tract

In the era of the fourth industrial revolution, new technologies including artificial intelligence and robotic endoscopy are being introduced in the field of gastrointestinal endoscopy. In this session, we will discuss how advanced technology is applied in endoscopic diagnosis and treatment.

UGI 6 Innovative therapeutic endoscopy: Tips for difficult endoscopic resection procedure

Have you ever had difficulty in performing endoscopic resection? In this session, experts will share their experiences and offer solutions, tips and know-how.



Lower GI

LGI 1 Real-time optical diagnosis for colorectal neoplasias

This session highlights real-time optical diagnosis for colorectal neoplasia including chromoendoscopy, image-enhanced endoscopy and confocal endomicroscopy and endocytoscopy. It also covers 2 clinically interesting case-based discussions which deal with the optimal use of these real-time optical diagnoses.

LGI 2 [Asian Network] Efforts for perfect colonoscopy in Asia

Colonoscopy quality management is very important in terms of prevention and management of colorectal cancer, which cannot be overemphasized. This session highlights how to achieve a high level of colonoscopy quality including optimal bowel preparation, high adenoma detection rates, and complete polyp resection.

LGI 3 [KSGE-ESGE] Managing colorectal polyps: The cutting-edge

This session highlights an optimal polyp removal method according to size, and guides management for complications and surveillance after polypectomy. In particular, this session is a joint session between ESGE and KSGE and will provide the latest advanced knowledge on polypectomy.

LGI 4 Special situations encountered in colonoscopy

This session highlights how and what we have to do in special situations during colonoscopy: detection, differentiation and management of serrated polyps; surveillance and management of multiple colon polyps; and differential diagnosis and management of subepithelial tumors with case-based discussion.

LGI 5 Updates on small bowel endoscopy

This session highlights updated knowledge on small bowel endoscopy including cutting-edge technology and applications of capsule endoscopy. It also covers therapeutic potential of double balloon enteroscopy and discusses when and how to optimally use small bowel endoscopy in real clinical practice in outstanding cases.

LGI 6 [KSGE-JGES] Endoscopic diagnosis and treatment of colorectal lesions: Advances and the future

This session highlights recent advances including endoscopic systems, devices, and techniques for diagnosis and treatment of colorectal lesions. This session is a KSGE-JSGE joint session. Both the KSGE and JSGE are leading the world in endoscopic treatment of colorectal luminal lesions, and will be a good chance to learn about a variety of interesting topics for the management of colorectal lesions.

SESSION DESCRIPTION

Pancreatobiliary

PB 1 Optimal management of AOV adenoma/carcinoma

Endoscopic advances in recent years have expanded the role of endoscopy in the therapeutic management of ampullary tumors. This session will allow us to formulate more reasonable therapeutic strategies with respect to appropriate treatment and surveillance for ampullary tumors.

PB 2 Advances in EUS-guided tissue acquisition for solid tumors

Endoscopic ultrasound (EUS)-guided fine needle biopsy (FNB) is increasingly used as a standard diagnostic tool for pancreatic disorders. This session provides a balanced perspective on the use of currently available EUS-FNB needles, highlighting the differences between them and potential niche applications of each to maximize diagnostic yield of EUS-FNB.

PB 3 Endoscopic management of combined duodenal and biliary obstruction

Combined obstruction of the bile duct and duodenum is not infrequent in periampullary malignancies. Nowadays, endoscopic palliation is preferred over surgical bypass due to similar efficacy, less morbidity, and shorter hospital stay. This session provides appropriate techniques for managing this situation endoscopically.

PB 4 [Asian Network] Breakthrough endoscopic technologies in pancreatobiliary malignancy

Recent years have seen the rise of newly developed diagnostic and therapeutic modalities to treat pancreatobiliary malignancies. This session deals with the following 4 new endoscopic diagnostic or therapeutic modalities: EUS guided ablation, confocal endomicroscopy, drug eluting metal stent, and radiofrequency ablation.

PB 5 [KSGE-JGES] Progress in pancreaticobiliary endoscopy: Two is better than one

Pancreatobiliary endoscopy remains an area of intense interest and is still under continual development. Endoscopic treatments in this realm such as LAMSs, interventional EUS, and direct peroral cholangioscopy techniques are becoming both more aggressive and more widely available. This session focuses on new endoscopic tools and techniques.

PB 6 What's your next choice for difficult or failed ERCP?

Selective bile duct cannulation is the prerequisite for all endoscopic biliary therapeutic interventions, but this cannot always be achieved easily. In this session, methods that can be used in difficult or failed initial ERCP will be discussed in order to provide practical advice, especially for those who are less experienced.

PB 7 Role of endoscopy in patients with LFT abnormalities due to benign disease

Abnormal liver function test results represent the most frequent and important pathophysiological consequences of biliary disease. In this session, various types of biliary diseases will be reviewed, and pertinent endoscopic diagnosis and treatment will be suggested by experts.



June 13 (Thu), 2019

DAILY PROGRAM

IDEN 2019
International Digestive Endoscopy Network

June 13 (Thu), 2019

Room B

13:00-13:10 Opening

13:00 AYEA Promotional Video

13:05 Welcome Remarks

Sang Yong Seol, President, International Digestive Endoscopy Network

13:10-14:00 Session 1 Recent Progress in Diagnostic and Therapeutic Endoscopy - Upper GI

Moderators: Hoon Jai Chun (Korea), Suleyman Gunay (Turkey), Rizwan Ahamed Zulfikar (India)

13:10 S1-1 Gastric Peroral Endoscopic Pyloromyotomy Versus Gastric Electrical Stimulator for Refractory Gastroparesis

Parit Mekaroonkamol, King Chulalongkorn Memorial Hospital, Chulalongkorn University, Thailand

13:20 S1-2 The Experience of Using the Vacuum-Aspiration System in Case of Esophageal Anastomosis Dehiscence

Kuralay Kunafina, Oncology Center, Kazakhstan

13:30 S1-3 Peroral Endoscopic Myotomy (POEM) for Achalasia Cardia: A Single Centre Experience Report

Stanley Khoo, University Malaya, Malaysia

13:40 S1-4 Early Gastrointestinal Cancer: Diagnosis and Treatment at Hue University Hospital

Tan Minh Le, Gastrointestinal Endoscopic Center, Hue University Hospital, Vietnam

13:50 S1-5 Correlation of Endoscopic and Intraoperative Findings of Caustic Material Ingestion at the Philippine General Hospital

Geraldine Obsequio Floro, Philippine General Hospital, Philippines

14:00-14:40 Session 2 Recent Progress in Diagnostic and Therapeutic Endoscopy - Lower GI

Moderators: Hyuk Soon Choi (Korea), Ray Anthony Igloria Bartolome (Philippines), Ngo Thi Hoai (Vietnam)

14:00 S2-1 The Prevalence of Sessile Serrated Polyp in Colorectum and Its Relationship to Synchronous Colorectal Advanced Neoplasia

Sz-luan Shiu, Taichung Veterans General Hospital, Taiwan

14:10 S2-2 Efficacy and Safety of Limited-Water-Exchange and Air Insufflations Colonoscopy in Minimal

Cherng Harnng Lim, Lukang Christian Hospital, Taiwan



14:20 **S2-3** **Efficacy and Safety of Viscous Solutions Versus Normal Saline Injection for Endoscopic Mucosal Resection: A Meta-Analysis**

Timothy Bren Phoa, VRP Medical Center, Philippines

14:30 **S2-4** **Endoscopic Images, Histologic Aspects of Colorectal Large Polyps and Polypectomy Result**

Duc Van Pham, 198 Hospital, Vietnam

14:40-15:00 Coffee Break

15:00-15:50 Session 3 Recent Progress in Diagnostic and Therapeutic Endoscopy - Pancreatobiliary

Moderators: Young Koog Cheon (Korea), Michelle Chu (Philippines), Su Chih Sheng (Taiwan)

15:00 **S3-1** **Is Lumen-Apposing Metal Stents More Effective Than Plastic Stents for Pancreatic Fluid Collections: A Meta-Analysis**

Xiaowei Tang, Affiliated Hospital of Southwest Medical University, China

15:10 **S3-2** **The Single-Center Experience of Endoscopic Treatment of Anastomotic Strictures after Live-Donor Liver Transplantation**

Nurken Abdiyev, National Scientific Center of Surgery Named after An Syzganov's, Kazakhstan

15:20 **S3-3** **Multimodality Drainage of Complicated Pseudocyst and Walled-Off Necrosis with Lumen-Apposing Metal Stent**

Thanawat Luangsukrerk, Chulalongkorn University, Thailand

15:30 **S3-4** **Endoscopic Treatment of Difficult Common Bile Duct Stones in Elderly Patients**

Andrei Mikhin, Pirogov Russian National Research Medical University, Russia

15:40 **S3-5** **EUS Guided Peripancreatic Cystic Fluid Drainage, Experience from Norvic International Hospital**

Sandeep Raj Kunwar, Norvic International Hospital, Nepal

DAILY PROGRAM

15:50-16:30 Poster Presentation 1

Moderators: Jun-Hyung Cho (Korea), Karlo Ivan Miguel Fontanilla (Philippines)

- 15:50 PP1-1 **Result of Oral Erythromycin Suspension for Acute Upper Gastrointestinal Bleeding**
Amarjargal Batdelger, Third State Central Hospital, Mongolia
- 15:57 PP1-2 **Diagnosis of Helicobacter Pylori Using the Rapid Urease Test: An Experience in Resunga Hospital (Rural Part of Nepal)**
Yam Bahadur Thapa Bhujel, Resunga Hospital, Nepal
- 16:04 PP1-3 **Endoscopic Patterns of Ingested Foreign Bodies of Esophagus in Children**
Doniyor Asadullaev, Republican Scientific Center of Emergency Medicine, Uzbekistan

15:50-16:30 Poster Presentation 2

Moderators: Tae Hoon Lee (Korea), Ariani Dewi Widodo (Indonesia)

- 15:50 PP2-1 **Post ERCP Cholangitis: Lessons Learnt from a Prospective Study in a Tertiary Care Center of Sri Lanka**
Rehan Tharanga Gamage, Colombo South Teaching Hospital, Sri Lanka
- 15:57 PP2-2 **Vigorous Hydration for Prevention of Post-ERCP Pancreatitis: A Meta-Analysis**
Adrian Manuel Fausto, Philippine General Hospital, Philippines
- 16:04 PP2-3 **Efficacy and Safety of EUS-Guided Biliary Drainage in Malignant Biliary Obstruction**
Roshan Agarwala, Post Graduate Institute of Medical Education & Research, India

15:50-16:30 Poster Exhibition

16:30-16:50 Closing & Awards Ceremony



June **14** (Fri), 2019

DAILY PROGRAM

IDEN 2019
International Digestive Endoscopy Network

DAILY PROGRAM

June 14 (Fri)

Upper GI

Room A

09:00-10:30 UGI 1 Exploring submucosal space

Moderators: Jong Sun Rew, Chonnam National University, Korea
Haruhiro Inoue, Showa University, Japan
Sang Woo Lee, Korea University, Korea

09:00 UGI 1-1 **Endoscopic resection for subepithelial tumors: When and how?**
Kyoung Oh Kim, Gachon University, Korea

09:20 UGI 1-2 **Endoscopic full thickness resection for GI tumors**
Khek-Yu Ho, National University Health System, Singapore

09:40 UGI 1-3 **Tips for being an expert in submucosal endoscopy**
Hwoon-Yong Jung, University of Ulsan, Korea

10:00 UGI 1-4 **NOTES: Present and future**
Haruhiro Inoue, Showa University, Japan

10:20 **Discussion**

10:30-11:00 Coffee Break

11:00-12:30 UGI 2 Cutting edge of endoscopic stenting in upper GI tract

Moderators: Myung-Gyu Choi, The Catholic University of Korea, Korea
Hyun Yong Jeong, Chungnam National University, Korea
Helmut Messmann, Klinikum Augsburg, Germany

11:00 UGI 2-1 **Palliative stenting for malignant esophagogastric junctional stricture**
Helmut Messmann, Klinikum Augsburg, Germany

11:20 UGI 2-2 **Stenting in post-gastrectomy complications**
Chul-Hyun Lim, The Catholic University of Korea, Korea

11:40 UGI 2-3 **EUS-guided stenting in malignant gastric outlet obstruction**
Shuntaro Mukai, Tokyo Medical University, Japan

12:00 UGI 2-4 **Case-based discussion**
Chan Gyoo Kim, National Cancer Center, Korea

12:15 UGI 2-5 **Case-based discussion**
Chan Hyuk Park, Hanyang University, Korea



12:30-13:30 Luncheon Symposium 1

Moderator: Sang Yong Seol, Inje University, Korea

- 12:30 LS 1 **Clinical impact of tegoprazan: New class of P-CAB**
Moon Kyung Joo, Korea University, Korea

13:30-15:00 UGI 3 [KSGE-WEO] Up-to-date in image-enhanced endoscopy

Moderators: Jean-Francis Rey, St. Laurent du Var, France
Soo Teik Lee, Chonbuk National University, Korea
Kwang Jae Lee, Ajou University, Korea

- 13:30 UGI 3-1 **Current status of image-enhanced endoscopy**
Jean-Francis Rey, St. Laurent du Var, France
- 13:50 UGI 3-2 **Effectiveness of BLI and LCI in the upper GI tract**
Fabian Emura, EmuraCenter LatinoAmerica & University of La Sabana, Colombia
- 14:10 UGI 3-3 **Magnifying endoscopy in upper GI tract**
Gwang Ha Kim, Pusan National University, Korea
- 14:30 UGI 3-4 **pCLE in upper GI tract**
Sang-Kil Lee, Yonsei University, Korea
- 14:50 **Discussion**

15:00-15:20 Coffee Break

15:20-16:50 UGI 4 [KSGE-ESGE] Current management of superficial esophagogastric junction neoplasms

Moderators: Hoon Jai Chun, Korea University, Korea
Mario Dinis-Ribeiro, Instituto Portugues de Oncologia Francisco Gentil, Portugal
Yong Woon Shin, Inha University, Korea

- 15:20 UGI 4-1 **Detection and pretreatment evaluation of EGJ neoplasms**
Jae Myung Park, The Catholic University of Korea, Korea
- 15:40 UGI 4-2 **Advanced imaging in EGJ neoplasms**
Helmut Messmann, Klinikum Augsburg, Germany
- 16:00 UGI 4-3 **Endoscopic submucosal dissection for EGJ neoplasms**
Do Hoon Kim, University of Ulsan, Korea
- 16:20 UGI 4-4 **Endoscopic therapy: Mucosectomy and radiofrequency ablation for EGJ neoplasms**
Mario Dinis-Ribeiro, Instituto Portugues de Oncologia Francisco Gentil, Portugal
- 16:40 **Discussion**

Lower GI

Room B

09:00-10:30 **LGI 1 Real-time optical diagnosis for colorectal neoplasias**

Moderators: Chang-Hun Yang, Dongguk University, Korea
Yuichi Mori, Showa University Northern Yokohama Hospital, Japan
Helmut Neumann, University Medical Center Mainz, Germany

- 09:00 **LGI 1-1 Chromoendoscopy for colorectal neoplasia: Still useful?**
Masau Sekiguchi, National Cancer Center Hospital, Japan
- 09:20 **LGI 1-2 Clinical application of image enhanced endoscopy**
Hyun Gun Kim, Soonchunhyang University, Korea
- 09:40 **LGI 1-3 Show me the cells: Confocal laser endomicroscopy and endocytoscopy**
Yuichi Mori, Showa University Northern Yokohama Hospital, Japan
- 10:00 **LGI 1-4 Case-based discussion**
Hyouon Woo Kang, Dongguk University, Korea
- 10:15 **LGI 1-5 Case-based discussion**
Seung-Joo Nam, Kangwon National University, Korea

10:30-11:00 Coffee Break

11:00-12:30 **LGI 2 [Asian Network] Efforts for perfect colonoscopy in Asia**

Moderators: Adiyasuren Battulga, UB Song-Do Hospital, Mongolia
Seun Ja Park, Kosin University, Korea
Yu-Min Lin, Shin Kong Wu Ho-Su Memorial Hospital, Taiwan

- 11:00 **LGI 2-1 Optimal bowel preparation, agent and protocol?**
Martin Chi Sang Wong, The Chinese University of Hong Kong, Hong Kong
- 11:15 **LGI 2-2 How to improve my adenoma detection rate?**
Yu-Min Lin, Shin Kong Wu Ho-Su Memorial Hospital, Taiwan
- 11:30 **LGI 2-3 How to reduce incomplete polyp resection?**
Masau Sekiguchi, National Cancer Center Hospital, Japan
- 11:45 **LGI 2-4 How can we train to make qualified colonoscopist?**
Jae Myung Cha, Kyung Hee University, Korea
- 12:00 **Discussion**



12:30-13:30 Luncheon Symposium 1

Moderator: Sang Yong Seol, Inje University, Korea

- 12:30 LS 1 **Clinical impact of tegoprazan: New class of P-CAB**
Moon Kyung Joo, Korea University, Korea

13:30-15:00 LGI 3 [KSGE-ESGE] Managing colorectal polyps: The cutting-edge

Moderators: Helmut Messmann, Klinikum Augsburg, Germany
Ji Won Kim, SMG-SNU Boramae Medical Center, Korea

- 13:30 LGI 3-1 **Diminutive polyp: Can we handle with confidence?**
Jun Lee, Chosun University, Korea
- 13:50 LGI 3-2 **Small polyps strategies – NICE, JNET and beyond**
Lars Aabakken, Oslo University Hospital-Rikshospitalet, Norway
- 14:10 LGI 3-3 **Large polyp: Manage complete, but safe**
Dong-Hoon Yang, University of Ulsan, Korea
- 14:30 LGI 3-4 **Postpolypectomy management: Complications and surveillance**
Cesare Hassan, Nuovo Regina Margherita Hospital, Italy
- 14:50 **Discussion**

15:00-15:20 Coffee Break

15:20-16:50 LGI 4 Special situations encountered in colonoscopy

Moderators: Kyu Chan Huh, Konyang University, Korea
Cesare Hassan, Nuovo Regina Margherita Hospital, Italy
Kee Myung Lee, Ajou University, Korea

- 15:20 LGI 4-1 **Serrated polyps: Detection, differentiation and management**
Cesare Hassan, Nuovo Regina Margherita Hospital, Italy
- 15:40 LGI 4-2 **Multiple colon polyps: Management and surveillance**
Eun Sun Kim, Korea University, Korea
- 16:00 LGI 4-3 **Subepithelial tumors: Differential diagnosis and management**
Hee Seok Moon, Chungnam National University, Korea
- 16:20 LGI 4-4 **Case-based discussion**
Soo-Kyung Park, Sungkyunkwan University, Korea
- 16:35 LGI 4-5 **Case-based discussion**
Jaeyoung Chun, Yonsei University, Korea

Pancreatobiliary

Room C

09:00-10:30 **PB 1 Optimal management of AOV adenoma/carcinoma**

Moderators: Gürhan Sisman, Acibadem University, Turkey
Woo Jin Lee, National Cancer Center, Korea
Dongki Lee, Yonsei University, Korea

09:00 **PB 1-1 Endoscopic diagnosis of ampullary adenoma and how to evaluate before endoscopic papillectomy**

Gürhan Sisman, Acibadem University, Turkey

09:20 **PB 1-2 Endoscopic management and technical tips to minimize complications**

Nonthalee Pausawasdi, Mahidol Univeristy, Thailand

09:40 **PB 1-3 How to manage (or handle) remnant or recurrent lesions**

Ichiro Yasuda, University of Toyama, Japan

10:00 **PB 1-4 How to manage incidental AOV cancer and perform surveillance after endoscopic papillectomy**

Sang Myung Woo, National Cancer Center, Korea

10:20 **Discussion**

10:30-11:00 Coffee Break

11:00-12:30 **PB 2 Advances in EUS-guided tissue acquisition for solid tumors**

Moderators: Lars Aabakken, Oslo University Hospital-Rikshospitalet, Norway
Dong Wan Seo, University of Ulsan, Korea
Seung Ok Lee, Chonbuk National University, Korea

11:00 **PB 2-1 The indication and future perspective of EUS-guided tissue biopsy**

Dong Wan Seo, University of Ulsan, Korea

11:20 **PB 2-2 Endoscopic ultrasound-guided fine needle aspiration biopsy and cytology: Adequacy and specimen processing**

Haeryoung Kim, Seoul National University, Korea

11:40 **PB 2-3 Which technique is better in EUS-guided tissue acquisition for pancreatic solid tumor: Convincing scientific evidence or personal preference?**

Se Woo Park, Hallym University, Korea

12:00 **PB 2-4 Which needle is better for pancreatic solid tumors? Standard aspiration needles or new designed biopsy needles?**

Marcin Polkowski, Medical Centre for Postgraduate Education, Poland

12:20 **Discussion**

**13:30-15:00 PB 3 Endoscopic management of combined duodenal and biliary obstruction**

Moderators: Marcin Polkowski, Medical Centre for Postgraduate Education, Poland
Yong-Tae Kim, Seoul National University, Korea
Seok Jeong, Inha University, Korea

- 13:30 PB 3-1 **Overview of combined duodenal and biliary obstruction**
Rungsun Rerknimitr, Chulalongkorn University, Thailand
- 13:50 PB 3-2 **Technical tips on double metallic stenting**
Jong Ho Moon, Soonchunhyang University, Korea
- 14:10 PB 3-3 **Technical tips on EUS-guided therapy**
Ryosuke Tonozuka, Tokyo Medical University, Japan
- 14:30 PB 3-4 **Case-based discussion**
Jae Hyuck Chang, The Catholic University of Korea, Korea
- 14:50 **Discussion**

15:00-15:20 Coffee Break

15:20-16:50 PB 4 [Asian Network] Breakthrough endoscopic technologies in pancreatobiliary malignancy

Moderators: Damien Meng Yew Tan, Singapore General Hospital, Singapore
Young Deok Cho, Soonchunhyang University, Korea
Seok-Ho Dong, Kyung Hee University, Korea

- 15:20 PB 4-1 **EUS-guided ablation**
Sundeep Lakhtakia, Asian Institute of Gastroenterology, India
- 15:40 PB 4-2 **Confocal endomicroscopy in pancreatic cystic tumor**
Damien Meng Yew Tan, Singapore General Hospital, Singapore
- 16:00 PB 4-3 **Drug eluting and bioabsorbable stent**
Sung Ill Jang, Yonsei University, Korea
- 16:20 PB 4-4 **Endoscopic radiofrequency ablation**
Jae Hee Cho, Gachon University, Korea
- 16:40 **Discussion**



June **15** (Sat), 2019

DAILY PROGRAM

IDEN 2019
International Digestive Endoscopy Network

June **15** (Sat)

Breakfast with Experts

08:00-08:40

Moderator: Jae J. Kim, Sungkyunkwan University, Korea

Board

BE 1

ESD for early gastric cancer: Eastern vs. Western

Fabian Emura, EmuraCenter LatinoAmerica & University of La Sabana, Colombia

Moderator: Hyung Kil Kim, Inha University, Korea

White Heron

BE 2

The history of flexible robot assisted endoscopic interventions

Kazuki Sumiyama, The Jikei University, Japan

Moderator: Geun Am Song, Pusan National University, Korea

Swan

BE 3

ESD technical tips & tricks

Yoshikazu Hayashi, Jichi Medical University, Japan

Moderator: Bong Min Ko, Soonchunhyang University, Korea

Flamingo

BE 4

Image enhanced endoscopy-based prediction of histology of colorectal neoplasia: Pearl and pitfall

Helmut Messmann, Klinikum Augsburg, Germany

Moderator: Jong Kyun Lee, Sungkyunkwan University, Korea

Crane

BE 5

EUS in the diagnosis and treatment of pancreatic cystic tumors

Marcin Polkowski, Medical Centre for Postgraduate Education, Poland

Moderator: Sang-Heum Park, Soonchunhyang University, Korea

Skylark

BE 6

Endoscopic transmural necrosectomy: Timing, indications, and methods

Rungsun Rerknimitr, Chulalongkorn University, Thailand



Live Demonstration

Room A & B

09:00-10:30 Live Demonstration 1

Moderators: Adiyasuren Battulga, UB Song-Do Hospital, Mongolia
Jong Ho Moon, Soonchunhyang University, Korea
Eun Young Kim, Daegu Catholic University, Korea
Soo-Heon Park, The Catholic University of Korea, Korea

- 09:00 LD 1-1 In Kyung Yoo, CHA University, Korea
09:30 LD 1-2 Bora Keum, Korea University, Korea
10:00 LD 1-3 Hsiu-Po Wang, National Taiwan University, Taiwan

10:30-11:00 Coffee Break

11:00-12:30 Live Demonstration 2

Moderators: Rungsun Rerknimitr, Chulalongkorn University, Thailand
Ichiro Yasuda, University of Toyama, Japan
Sang-Woo Cha, Soonchunhyang University, Korea
Inseok Lee, The Catholic University of Korea, Korea

- 11:00 LD 2-1 Philip WY Chiu, The Chinese University of Hong Kong, Hong Kong
11:30 LD 2-2 Jaihwan Kim, Seoul National University, Korea
12:00 LD 2-3 Kongkam Pradermchai, Chulalongkorn University, Thailand

Upper GI

Room A

12:40-13:00 **IDEN General Assembly**

13:00-14:00 Luncheon Symposium 2

Moderator: Yong-Tae Kim, Seoul National University, Korea

13:00 LS2 **How SnareMaster Plus changes polypectomy?**
Takeuchi Yoji, Osaka International Cancer Institute, Japan

14:00-15:30 **UGI 5 [KSGE-JGES] Innovation in GI endoscopy: Emerging technologies in the upper GI tract**

Moderators: Hisao Tajiri, Jikei University, Japan
Joo Young Cho, CHA University, Korea
Sei Jin Youn, Chungbuk University, Korea

14:00 UGI 5-1 **Advanced endoscopic imaging technologies: Perspective of engineering**
Kazuhiro Gono, Olympus Medical Systems, Japan

14:20 UGI 5-2 **Novel tools for successful hemostasis: New materials in clinical practice**
Jun Chul Park, Yonsei University, Korea

14:40 UGI 5-3 **Application of artificial intelligence in GI endoscopy**
Kazuki Sumiyama, The Jikei University, Japan

15:00 UGI 5-4 **Future high technologies for GI endoscopy: Frontiers of robotic endoscopy**
Hyuk Soon Choi, Korea University, Korea

15:20 **Discussion**

15:30-15:50 Coffee Break

15:50-17:20 **UGI 6 Innovative therapeutic endoscopy: Tips for difficult endoscopic resection procedure**

Moderators: Sang Yong Seol, Inje University, Korea
Jae Gyu Kim, Chung-Ang University, Korea
Naomi Kakushima, Shizuoka Cancer Center, Japan

15:50 UGI 6-1 **Circumferential resection for esophageal epithelial tumors**
Mario Dinis-Ribeiro, Instituto Portugues de Oncologia Francisco Gentil, Portugal

16:10 UGI 6-2 **ESD for huge sized gastric epithelial tumors**
Toru Ito, Kanazawa Medical University, Japan

16:30 UGI 6-3 **ESD for non-ampullary duodenal epithelial tumors**
Naomi Kakushima, Shizuoka Cancer Center, Japan

16:50 UGI 6-4 **Case-based discussion**
Ji Hyun Kim, Inje University, Korea

17:05 UGI 6-5 **Case-based discussion**
Sung Woo Jung, Korea University, Korea



Lower GI

Room B

12:40-13:00 **IDEN General Assembly**

13:00-14:00 Luncheon Symposium 2

Moderator: Yong-Tae Kim, Seoul National University, Korea

13:00 LS 2 **How SnareMaster Plus changes polypectomy?**
Takeuchi Yoji, Osaka International Cancer Institute, Japan

14:00-15:30 LGI 5 Updates on small bowel endoscopy

Moderators: Ja Seol Koo, Korea University, Korea
Tomonori Yano, Jichi Medical University, Japan
Yunjeong Lim, Dongguk University, Korea

14:00 LGI 5-1 **New small bowel capsule endoscopy: Techniques and applications**
Bora Keum, Korea University, Korea

14:20 LGI 5-2 **Therapeutic use of double balloon enteroscopy**
Tomonori Yano, Jichi Medical University, Japan

14:40 LGI 5-3 **When and How can we use small bowel endoscopy?**
Seong-Eun Kim, Ewha Womans University, Korea

15:00 LGI 5-4 **Case-based discussion**
Donghoon Baek, Pusan National University, Korea

15:15 LGI 5-5 **Case-based discussion**
Jung Min Lee, Wonkwang University, Korea

15:30-15:50 Coffee Break

15:50-17:20 LGI 6 [KSGE-JGES] Endoscopic diagnosis and treatment of colorectal lesions: Advances and the future

Moderators: Dong Kyung Chang, Sungkyunkwan University, Korea
Bo In Lee, The Catholic University of Korea, Korea
Yoshikazu Hayashi, Jichi Medical University, Japan

15:50 LGI 6-1 **Computer-aided therapeutic decision for diminutive polyps: Resect and discard or leave it?**
Yuichi Mori, Showa University Northern Yokohama Hospital, Japan

16:10 LGI 6-2 **Advanced endoscopy for diagnosis of colorectal lesions**
Bo-In Lee, The Catholic University of Korea, Korea

16:30 LGI 6-3 **Endoscopic submucosal dissection: How to do the pocket-creation method**
Yoshikazu Hayashi, Jichi Medical University, Japan

16:50 LGI 6-4 **New methods for therapeutic colonoscopy**
Yunho Jung, Soonchunhyang University, Korea

17:10 **Discussion**

Pancreatobiliary

Room C

**09:00-10:30 PB 5 [KSGE-JGES] Progress in pancreaticobiliary endoscopy:
Two is better than one**

Moderators: Takeshi Ogura, Osaka Medical College, Japan
Myung-Hwan Kim, University of Ulsan, Korea
Seung Woo Park, Yonsei University, Korea

**09:00 PB 5-1 Endoscopic or EUS-guided drainage for acute peripancreatic fluid collections:
Timing, indications, and methods**

Tae Jun Song, University of Ulsan, Korea

**09:20 PB 5-2 Novel Endoscopic or EUS-guidetherapeutic approach for postoperative bilio-
pancreatic duct stricture**

Takeshi Ogura, Osaka Medical College, Japan

09:40 PB 5-3 Therapeutic and diagnostic application of peroral cholangioscopy in biliary disease

Chang-Hwan Park, Chonnam National University, Korea

10:00 PB 5-4 Prospects of newly developed peroral direct cholangioscopy

Ryosuke Tono-zuka, Tokyo Medical University, Japan

10:20 Discussion

14:00-15:30 PB 6 What's your next choice for difficult or failed ERCP?

Moderators: Sundeep Lakhtakia, Asian Institute of Gastroenterology, India
Jinhong Kim, Ajou University, Korea
Jin Kim, Korea Cancer Center Hospital, Korea

14:00 PB 6-1 Endoscopic techniques for overcoming difficult cannulation

Sundeep Lakhtakia, Asian Institute of Gastroenterology, India

14:20 PB 6-2 Emerging role of EUS guided approach

Takeshi Ogura, Osaka Medical College, Japan

14:40 PB 6-3 Conventional role of percutaneous approach

Gi-Young Ko, University of Ulsan, Korea

15:00 PB 6-4 Case-based discussion

Min Jae Yang, Ajou University, Korea

15:20 Discussion

15:30-15:50 Coffee Break



15:50-17:20 PB 7 Role of endoscopy in patients with LFT abnormalities due to benign disease

Moderators: Nonthalee Pausawasdi, Mahidol University, Thailand
Ho Gak Kim, Daegu Catholic University, Korea
Tae Nyeun Kim, Yeungnam University Medical Center, Korea

- 15:50 **PB 7-1 IgG4-related disease**
Damien Meng Yew Tan, Singapore General Hospital, Singapore
- 16:10 **PB 7-2 Primary sclerosing cholangitis**
Lars Aabakken, Oslo University Hospital-Rikshospitalet, Norway
- 16:30 **PB 7-3 Parasite infestation**
Nonthalee Pausawasdi, Mahidol University, Thailand
- 16:50 **PB 7-4 Portal hypertension and ischemic choangiopathy**
Jong Jin Hyun, Korea University, Korea
- 17:10 **Discussion**

Nurse Session (Korean)

Swan

14:00-15:30 Gastrointestinal endoscope reprocessing: From basics to advanced application

Moderators: Byung-Wook Kim, The Catholic University of Korea, Korea
Hee-Hyuk Im, Soonchunhyang University, Korea

- 14:00 **NS 1-1 Revised gastrointestinal endoscope reprocessing process in a nutshell**
Yong Kang Lee, National Health Insurance Ilsan Hospital, Korea
- 14:20 **NS 1-2 Appropriate selection and use of high-level disinfectants in Korea**
Soo-Jeong Cho, Seoul National University, Korea
- 14:40 **NS 1-3 New paradigm: Endoscopic reprocessing system**
Young Seon Kim, Soonchunhyang University, Korea
- 15:00 **NS 1-4 How to overcome infections associated with reprocessed duodenoscopes**
Hyung-Keun Kim, The Catholic University of Korea, Korea
- 15:20 **Discussion**



June 16 (Sun), 2019

DAILY PROGRAM

IDEN 2019
International Digestive Endoscopy Network

June 16 (Sun)

Hands-on Course (Invitation Only)

Olympus Korea Medical Training
& Education Center (K-TEC)

09:00-13:00 **[Hands-on] ESD**

Opening

[Hands-on] ESD

Hyunjoo Jang, Hallym University, Korea
Bong Min Ko, Soonchunhyang University, Korea
Eun Ran Kim, Sungkyunkwan University, Korea
Jung Won Jeon, Kyung Hee University, Korea

[Hands-on] EUS

Normal radial EUS anatomy in the biliopancreas

Se Woo Park, Hallym University, Korea

Normal linear EUS anatomy in the biliopancreas

Jun Ho Choi, Dankook University, Korea

EUS-FNA

Eunae Cho, Chonnam National University, Korea

[Hands-on] Radial EUS

Eun Kwang Choi, Jeju National University, Korea
Jung-Wan Choe, Korea University, Korea
Ki-Hyun Ryu, Konyang University, Korea

[Hands-on] Linear EUS

Tae Hyeon Kim, Wonkwang University, Korea
Tae Hoon Lee, Soonchunhyang University, Korea
Woo Hyun Paik, Seoul National University, Korea
Seong-Hun Kim, Chonbuk National University, Korea

[Hands-on] EUS-FNA

Jong Jin Hyun, Korea University, Korea
Min Jae Yang, Ajou University, Korea
Sang Hyub Lee, Seoul National University, Korea
Jaemin Lee, Korea University, Korea

[Hands-on] Endoscopy Instrument & Stent

Perforation closure with hemoclips (or endoloop)

Yunho Jung, Soonchunhyang University, Korea
Jae Kook Yang, Soonchunhyang University, Korea

EMR-C and EMR-L

Jun-Hyung Cho, Soonchunhyang University, Korea
Hyun Lim, Hallym University, Korea

EMR-P

Jung-Wook Kim, Kyung Hee University, Korea
Han Hee Lee, The Catholic University of Korea, Korea



POSTERS

IDEN 2019
International Digestive Endoscopy Network

Upper GI



Best
Poster



Distinguished
Poster



Travel
Grant

PUG-01 Clinical Outcomes of Over-The-Scope-Clip for Acute Upper Non-Variceal Gastrointestinal Bleeding: A Systematic Review

Xiaowei Tang (China)



PUG-02 Role of Cd34, Itgb4, Usp22 and Myc in Patients with *Helicobacter Pylori* Related Chronic Gastritis and Gastric Cancer

Taweesak Tongtawee, Theeraya Simawaranon, Wareeporn Wattanawongdon (Thailand)



PUG-03 Cd24 Expression Predicts a Poor Prognosis in Patients with Gastric Cancer

Tanyalak Rakchat, Taweesak Tongtawee (Thailand)



PUG-04 *Helicobacter Pylori* Pathogenicity Factors Related to Gastric Cancer in Thailand

Titaya Wichaisaeng, Taweesak Tongtawee (Thailand)

PUG-05 Acquired Hemophilia a with Gastrointestinal Bleeding

Narae Park, Jinseok Jang (Korea)



PUG-06 Clinical Outcomes and Post-Procedural Complications of ESD of Gastric Neoplasia Involving the Pyloric Channel

Ah Young Yoo, Jong-Jae Park, Moon Kyung Joo, Boem Jae Lee, Hoon Jae Chun, Sang Woo Lee, Chang-Hun Yang, Eun Young Kim (Korea)



PUG-07 Feasibility and Long-Term Efficacy of Endoscopic Treatment of Gastrointestinal Stromal Tumors in Upper GI Tract

Jong Jae Park, Jin Sung Koh, Moon Kyung Joo, Boem Jae Lee, Hoon Jae Chun, Sang Woo Lee, Chang-Hun Yang, Eun Young Kim, Kyung Eun Lim (Korea)

PUG-08 Result of Oral Erythromycin Suspension for Acute Upper Gastrointestinal Bleeding

Amarjargal Batdelger, Badamsuren Dorjgotov, Khishgee Duinkherjav, Tseweendari Otgon, Enkh-Ulzii Mendbayar, Yanjiv Otgonbayar (Mongolia)

PUG-09 Risk Factors of Rebleeding among Patients with Nonvariceal Upper Gastrointestinal Bleeding with Anticoagulant Therapy

Won Shik Kim, Moon Kyung Joo, Beom Jae Lee, Jong-Jae Park (Korea)



PUG-10 Gastric Ulcer – Risk Factor for Rebleeding

Khishgee Duinkherjav, Nyamsuren Munkhbat, Enkh-Ulzii Mendbayar, Tseveendari Otgon (Mongolia)



PUG-11 Gastric Peroral Endoscopic Pyloromyotomy Versus Gastric Electrical Stimulator for Refractory Gastroparesis

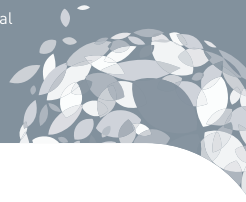
Parit Mekaroonkamol (Thailand), Shanshan Shen, Hui Luo, Cicily Vachaparambil, Guifang Xu, Huimin Chen, Liang Xia, Steven Keilin, Field F. Willingham, Jennifer A. Christie, Qiang Cai (USA), Edward Lin (China)

PUG-12 Histologic Discrepancy between Endoscopic Biopsy and Endoscopic Resection Specimen in Esophageal Squamous Neoplasms

Moon Won Lee, Gwang Ha Kim, Bong Eun Lee, Jun Woo Park, Eun Young Park (Korea)

PUG-13 Correlation of Endoscopic and Intraoperative Findings of Caustic Material Ingestion at the Philippine General Hospital

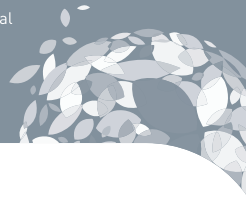
Geraldine Obsequio Floro, Mark Anthony De Lusong, Angel Paolo Amante (Philippines)



- PUG-14** **Submucosal Tunneling Endoscopic Resection for Esophageal Subepithelial Tumors: An Experience in a Single Center**
Hyun Kwon Ju, Byung Sun Kim, Jin Woong Cho, Mi Rim Choi, Nayun Kang, Jihyun Han (Korea)
- PUG-15** **Accuracy Comparison Study of Endoscopy Testing for *Helicobacter pylori* Compared with Non-Invasive Breath Testing in Patients**
Amarzaya Chagnaadorj, Bolormaa Munkhjav (Mongolia)
- PUG-16** **Efficacy of Liver Stiffness Measurement and Platelet Count in Screening for High Grade Varices in Patients with Cirrhosis**
Ashish Agarwal, Gyanranjan Rout, Sudheer Kumar Vuyyuru, Deepak Gunjan, Saurabh Kedia, Baibaswata Nayak, Shalimar (India)
- PUG-17** **Early Gastrointestinal Cancer: Diagnosis and Treatment at Hue University Hospital**
Trung Quang Tran, Tan Minh Le, Huy Van Tran, Thuan Dang Cong (Vietnam), Goto Hidemi, Shuji Shimizu (Japan)
- PUG-18** **Long-Term Outcome of Early Gastric Cancer with Lateral Margin Positive after Endoscopic Resection**
Byung Wook Yoon, Dong-Hyuk Yang, Young-Woon Shin, Weonjin Ko, Hyungkil Kim (Korea)
- PUG-19** **The 4th Space Surgery: Early Experience of Endoscopic Subserosal Dissection for Gastric Tumors in a Single Center**
Jihyun Han, Jin Woong Cho, So Hee Yun, Byung Sun Kim, Min A Yang, Mi-Rim Choi, Na Yun Kang, Hyun Kwon Ju (Korea)
- PUG-20** **Interleukin-6 in Patients with Acute Variceal Bleeding**
Rizwan Ahamed Zulfikar, Cyriac Abby Philips, Philip Augustine (India)
- PUG-21** **The Diagnostic Efficacy of Contrast Enhanced-Endoscopic US in Differential Diagnosis of Gastric GIST and Non-GIST**
Jaewoong Yoon, Hyunil Jang, Byungwook Bang, Kyesook Kwon, Yongwoon Shin, Weonjin Ko, Hyungkil Kim (Korea)
- PUG-22** **Platelet Count to Spleen Diameter Ratio as a Predictor of Esophageal Varices in Patients of Liver Cirrhosis due to Hepatitis C and B Viruses**
Dagiisuren Bavuu, Bayarmaa Nyamaa, Ariunaa Mishig-Ish (Mongolia)
- PUG-23** **Abdominal Obesity Increases Risk for Esophageal Cancer: A Nationwide Population-Based Cohort Study of South Korea**
Jae Ho Cho, Cheol Min Shin, Kyung Do Han, Hyuk Yoon, Young Soo Park, Nayoung Kim, Dong Ho Lee (Korea)
- PUG-24** **Inhibitory Effects of β -Caryophyllene on *Helicobacter Pylori* Infection: A Randomized Double-Blind, Placebo-Controlled Study**
Hyun Ik Shim, Jae Ho Cho, Cheol Min Shin, Hyuk Yoon, Young Soo Park, Nayoung Kim, Dong Ho Lee (Korea)
-  **PUG-25** **Metabolic Syndrome is Associated with Increased Risk of Esophageal Cancer: A Nationwide Cohort Study of South Korea**
Hyun Ik Shim, Dong Ho Lee, Dong Jin Song, Cheol Min Shin, Kyungdo Han, Jae Ho Cho, Hyuk Yoon, Young Soo Park, Nayoung Kim (Korea)
- PUG-26** **Comparison Study of the Performance of Aqueous Chitosan as a Submucosal Injection Solution Using a 3-Dimensional Sensor**
Han Jo Jeon, Yoon Tae Jeon, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim, Seung Jeong, Seong Nam Kim (Korea)
-  **PUG-27** **Comparison Study of Refractory GERD Treatment: ARES Vs Stretta Procedure**
Yik Joon Jang, In Kyoung Yoo, Joo Young Cho (Korea)

POSTERS

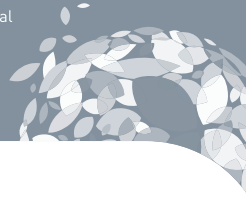
- PUG-28** The Experience of Using the Vacuum-Aspiration System in Case of Esophageal Anastomosis Dehiscence
Kuralay Kunafina, Aleksey Zelenyi, Kanat Batyrbekov (Kazakhstan)
- PUG-29** Efficacy of Percutaneous Endoscopic Gastrostomy in Viet Tiep Hospital
Duong Dang, Hoan Vu (Vietnam)
- PUG-30** Accuracy of Diagnosis of Chronic Gastritis and Hp Infection through Microvascular Pattern
Weonjin Ko, Jung-Wook Kim, Young Woon Chang, Joo Young Cho, Ki Baik Hahm, Gwangil Kim (Korea)
- PUG-31** Efficacy and Safety of Ilaprazole Compared with Omeprazole in Nonerosive Reflux Disease (NERD) Patients: A Pilot Study
Ji Hyun Kim, Seung-Joo Nam, Sang Hoon Lee, Tae Suk Kim, Min Jong Lee, Jin Myung Park, Dae Hee Choi, Sung Chul Park, Chang Don Kang, Sung Joon Lee (Korea)
- PUG-32** Diagnosis of *Helicobacter Pylori* Using the Rapid Urease Test: An Experience in Resunga Hospital (Rural Part of Nepal)
Yam Bahadur Thapa Bhujel (Nepal)
- PUG-33** Diagnostic Utility of 13C-Urea Breath Test in Rapid Urease Test Negative Dyspeptic Patients who are on Long Term PPI
Sukanta Chandra Das, Naymul Hasan, Birendra Nath Saha, Chanchal Kumar Ghosh, Abdul Rahim Miah, (Bangladesh)
- PUG-34** Gastric Outlet Obstruction from Gastroduodenal Crohn's Disease Conservatively Managed with Infliximab
Gizelle Mica Silla (Philippines)
- PUG-35** Caustic Material Ingestion: A 5-Year Experience in a Tertiary Toxicology Referral Center
Gizelle Mica Silla (Philippines)
- PUG-36** Prevalence of Gastric Ulcers and Duodenal Ulcers in a Tertiary Care Setting
Karlo Ivan Miguel Fontanilla, Ma Lourdes Daez (Philippines)
- PUG-37** Forrest 2a Ulcer at the Gastric Cardia Managed with Rubber Band Ligation - Alternative Endoscopic Management
Karlo Ivan Miguel Fontanilla, Hashamiya Babaran, Ma Lourdes Daez (Philippines)
- PUG-38** *Helicobacter Pylori* Infection in Patients with Liver Cirrhosis: Prevalence with Portal Hypertensive Gastropathy
Anuudari Sharaa, Nyam Biziya, Bayarmaa Nyamaa, Shinebayar Narantuya (Mongolia)
- PUG-39** Efficacy of Mucosal Incision and Forceps Biopsy for Subepithelial Tumors
Yun Jae Shin, Si Hyeong Lee, Dong Hoon Lee, You Sun Kim, Tae Young Park, Soo Hyung Ryu, Jeong Seop Moon (Korea)
- PUG-40** Endoscopic Histoacryl Injection is Safe and Effective Modality for Hemostasis of Non-Variceal Bleeding
Si Hyeong Lee, Yun Jae Shin, Dong Hoon Lee, You Sun Kim, Soo Hyung Ryu, Tae Young Park, Jeong Seop Moon (Korea)
- PUG-41** Short-Term Results of Gastric Peroral Endoscopic Myotomy in Antrum and Pylorus
Mi-Rim Choi, Min A Yang, Jihyun Han, Na Yun Kang, Hyun Kwon Ju, Byung Sun Kim, So Hee Yun, Jin Woong Cho (Korea)
- PUG-42** Peroral Endoscopic Myotomy (POEM) for Achalasia Cardia: A Single Centre Experience Report
Stanley Khoo, Shiao Hooi Ho, Peng Choong Lau, Wei Jin Wong, Sook Hui Chaw, Pui San Loh, Sanjiv Mahadeva (Malaysia)



- PUG-43** Prognosis of Endoscopic Resection in Patient with Early Gastric Cancer with Undifferentiated Type Histology
Ha Won Hwang, Yong Woon Shin, Sung-Wook Park, Byoung Wook Bang, Kye Sook Kwon, Weonjin Ko, Hyungkil Kim (Korea)
- PUG-44** Our Series of POEM Cases
Suleyman Gunay (Turkey)
- PUG-45** Variety of Gastric Mucosa Pathological Changes in Patients with Liver Cirrhosis and Portal Hypertension
Alina Khikhlova, Elena Olevskaya (Russia)
- PUG-46** Primary Gastric Mantle Cell Lymphoma
Hyun Ho Choi, Youngki Kim, Hyung-Keun Kim, Sang Woo Kim, Hiun Suk Chae, Sung Soo Kim (Korea)
- PUG-47** Epiphrenic Diverticulum: A Case Report and Review of Literature
Dennis Martin Castro, Gian Carlo Carpio, Riz Cabalfin, Frederick Dy (Philippines)
-  **PUG-48** Efficacy of Vonoprazan in Preventing NSAID-Associated Ulcer Recurrence: A Meta-Analysis of Randomized Controlled Trials
Dennis Martin Castro, Clarel Camille Ng, Timothy Bren Phoa (Philippines)
- PUG-49** Lack of Association between *Helicobacter Pylori* Infection and Diabetes: A Cohort Study
Jeung Hui Pyo, Hyuk Lee, Sung Chul Choi, Yoon-Ho Choi, Yang Won Min, Byung-Hoon Min, Jun Haeng Lee, Kyunga Kim, Jae J. Kim (Korea)
- PUG-50** Safety and Efficacy of Endoscopic Submucosal Dissection on Patients with End Stage Renal Disease: Multicenter Study
In Kyung Yoo, Younkyung Oh, Young Ju Suh, Gwang Ho Baik, Sun Moon Kim, Young Dae Kim, Chul-Hyun Lim, Jung Won Jeon, Su Jin Hong, Byoung Wook Bang, Joon Sung Kim, Jun-Won Chung, Chan Gyo Kim (Korea)
-  **PUG-51** Clinical Significance of Regional Lymph Node Enlargement in Patients with EGC within the Expanded Criteria for ESD
Woojin Jeong, Jong Kyu Park, Dong Seok Lee, Sang Jin Lee (Korea)
- PUG-52** A Case of Intramural Esophageal Dissection Combined with Extensive Pneumomediastinum after Endoscopy
Young Ki Kim, Hyung-Keun Kim, Hyun Ho Choi, Hiun Suk Chae, Sung Soo Kim, Sang Woo Kim, Sung Chul Cho, Woo-Jung Kim, Seon-Bin Yoon (Korea)
- PUG-53** Clinical Outcomes of Metachronous Gastric Cancer after Endoscopic Resection for Early Gastric Cancer
Jue Lie Kim, Sang Gyun Kim, Jung Kim, Jae Yong Park, Hyo-Joon Yang, Hyun Ju Kim, Hyunsoo Chung (Korea)
-  **PUG-54** Risk Factors of Non-Curative Resection with Early Gastric Cancer after Endoscopic Resection: ESD Research Group
Si Hyung Lee, Seung Woo Jeon, Kang Nyeong Lee, Jong Jae Park, Su Jin Hong (Korea)
- PUG-55** Facial Hemiparesis and Oropharyngeal Dysphagia Developed after Endoscopic Hemostasis: A Case Report
Heung up Kim, Soo-Young Na, Sun-Jin Boo, Hyun Joo Song (Korea)
- PUG-56** Comparison of Endoscopic Submucosal Dissection and Surgery for Early-Stage Esophageal Squamous Cell Carcinoma
Hyun Deok Lee, Hyunsoo Chung, Sang Gyun Kim, Soo-Jeong Cho, Ayoung Lee, Jue Lie Kim, Jinju Choi (Korea)
- PUG-57** Gastric Neuroendocrine Tumor of Rindi Type 3 has a Higher Incidence and a Benign Prognosis in Korea
Sunah Suk, Soo Yeon Choi, Dae Young Cheung, Jin Il Kim, Soo-Heon Park, Yunjung Park (Korea)

POSTERS

- PUG-58** Five-Year Progress of Gastric Mucosa-Associated Lymphoid Tissue Lymphoma Presenting as Gastric Outlet Obstruction
Soo Yeon Choi, Dae Young Cheung, Yun Jung Park, Sun Ah Suk, Jin Il Kim, Soo Heon Park (Korea)
- PUG-59** The Clinical Outcomes of Endoscopic Full Thickness Resection Assisted Laparoscopic Surgery for Neuroendocrine Neoplasms
Sunah Suk, Dae Young Cheung, Yunjung Park, Jae Young Cho, Dong Jin Kim, Jin Il Kim, Soo-Heon Park, Wook Kim (Korea)
- PUG-60** Accuracy of Endoscopic Ultrasound for Superficial Esophageal Cancer Prior to Endoscopic Submucosal Dissection
Jinju Choi, Hyunsoo Chung, Ayoung Lee, Jue Lie Kim, Hyun Deok Lee, Soo-Jeong Cho, Sang Gyun Kim (Korea)
- PUG-61** Endoscopic Submucosal Dissection for Undifferentiated-Type Early Gastric Cancer : A Meta-Analysis
Ayoung Lee, Hyunsoo Chung, Jue Lie Kim, Jinju Choi, Hyun Deok Lee, Soo-Jeong Cho, Sang Gyun Kim (Korea)
- PUG-62** Clinical Outcomes of Endoscopic Resection for Low-Grade Dysplasia & High-Grade Dysplasia on Gastric Pretreatment Biopsy
Jung Won Jeon, Sun Moon Kim, Cheol Hyun Lim, Gwang Ho Baik (Korea)
- PUG-63** Role of Interstitial Cells of Cajal on Gastric Slow Wave Patterns during Gastric Electrical Stimulation
Han Jo Jeon, Hoon Jai Chun, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Chang Duck Kim (Korea)
- PUG-64** Waist Circumferences Is the Independent Risk Factor of the Esophagitis Diagnosed by National Cancer Screening Program
Yong Kang Lee, Jeong Hun Seo, Byung Kyu Park, Yong Seok Cho, Sang Yun Shin, Jung Hwa Hong (Korea)
- PUG-65** Efficacy of Da-5204 for Gastroesophageal Reflux Disease: A Randomized, Double-Blind, Placebo-Controlled Pilot Study
Jae Ho Cho, Hyun Ik Shim, Hyuk Yoon, Cheol Min Shin, Young Soo Park, Nayoung Kim, Dong Ho Lee (Korea)
- PUG-66** Endoscopic Submucosal Tunnel Dissection for Esophagogastric Subepithelial Tumors: Flap Necrosis or Flap Detachments
Sang Youn Lim, Jong-Jae Park, Beom Jae Lee, Moon Kyung Joo, Jae Seon Kim, Hyo Jung Kim (Korea)
- PUG-67** Stenting of Cicatricial Stenosis of Esophagus in Children
Nodir Arifdjanov, Makhmud Aliev, Uktam Tilavov, Gulnora Adilova, Bakhodir Karimov (Uzbekistan)
- PUG-68** Endoscopic Patterns of Ingested Foreign Bodies of Esophagus in Children
Khabibulla Akilov, Doniyor Asadullaev, Shoilkhom Shakhaydarov (Uzbekistan)
- PUG-69** Endoscopic Pneumatic Dilation for Pediatric Achalasia: Six-Year Experience from a Tertiary Endoscopy Center
Ariani Dewi Widodo, Ido Narpati Bramantyo, Cathline Freya Adhiwidjaja, Budi Purnomo, Eva Jeumpa Soelaeman (Indonesia)
- PUG-70** Diagnostic Utility of Endoscopic Ultrasonography-Elastography in Gastric Submucosal Tumors: A Pilot Study
Joo Young Cho, In Kyung Yoo, Sung Pyo Hong (Korea)



Lower GI

PLG-01 The Prevalence of Sessile Serrated Polyp in Colorectum and Its Relationship to Synchronous Colorectal Advanced Neoplasia

Sz-luan Shiu, Hung-Chin Ho, Kashida Hiroshi (Taiwan)



PLG-02 Optical Biopsy of Colon Adenoma Using Deep Learning Algorithm

Seong Ji Choi, Youngjae Kim, Eun Sun Kim, Kihwan Choi, Sehyun Jang, Han Jo Jeon, Sang Hoon Kim, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Bora Keum, Yoon Tae Jeen, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)

PLG-03 Dyslipidemia is an Independent Risk Factor for Advanced or Any Colorectal Neoplasia: An Observational Cohort Study

Seung Bum Lee, Jae Ho Park, Seok Won Jung, Minsu Ock, Moon-Chan Kim (Korea)



PLG-04 Feasibility of Enteral Stents with a New Method for Malignant Obstruction in Rt Side Colon

Chang Beom Ryu, Jun Yong Bae, Moon Sung Lee (Korea)

PLG-05 Efficacy and Safety of Limited-Water-Exchange and Air Insufflations Colonoscopy in Minimal

Cherng Harnng Lim (Taiwan)

PLG-06 Efficacy and Safety of Viscous Solutions Versus Normal Saline Injection for Endoscopic Mucosal Resection: A Metaanalysis

Timothy Bren Phoa, Dennis Martin Castro, Clarel Camille Ng (Philippines)

PLG-07 Status of Radiation Proctitis in Yangon General Hospital

Nang Khinphonetint, Thein Myint, Moe Myintaung, Tin Moewai, Swe Monmya (Myanmar)

PLG-08 A Stomach Tumor Incidentally Observed

Bo Hye Song, Kye Sook Kwon, Won Jin Ko, Hyung Gil Kim, Yong Woon Shin (Korea)

PLG-09 Compare Endoscopic Finding with Histopathological Features in Colorectal Polyp

Ngo Thi Hoai, Vu Van Khien, Mai Hong Bang (Vietnam)

PLG-10 Picosulfate/Magnesium Citrate Solution for Bowel Preparation Compared to PEG Solution: A Randomized, Prospective Study

Sang Hoon Kim, Yoon Tae Jeen, Han Jo Jeon, Se Hyun Jang, Kang Won Lee, Sanghyun Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)

PLG-11 Clinical Outcomes after Colonoscopic Submucosal Dissection for Lesions with Ulcer or Scar

Na Yun Kang, So Hee Yun, Jin Woong Cho, Yong Keun Cho, Ji Woong Kim, Gum Mo Jung, Young Jae Lee, Min A Yang, Byung Sun Kim, Jae Sun Song, Hyun Kwon Ju, Mi-Rim Choi, Jihyun Han (Korea)

PLG-12 Risk Factor of Lymph Node Metastasis in Endoscopically Resected T1 Colorectal Cancer

Eunyoung Park, Donghoon Baek, Joonwoo Park, Geunam Song, Bongeun Lee, Moonwon Lee (Korea)

PLG-13 Clinical Characteristics and Prognosis of Elderly Patients with Colorectal Cancer Undergoing Surgical Resection

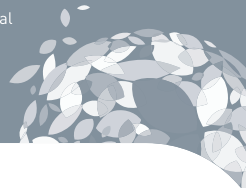
Soothan Kim, Jae Seung Soh, Sang-Woo Lim, Hyun Lim, Ho Suk Kang, Jong Hyeok Kim (Korea)

PLG-14 Ectopic Appendix Detected during Colonoscopy: A Report of Two Cases

Tuan Kieu Van, Lien Thikim Lien, Viet Tuan Tran, Huong Thilan Ha, Ngoc Thivan Pham, Long Duc Vu, Nhung Thi Vu, Dung Van Nguyen, Hieu Ngoc Ngo (Vietnam)

POSTERS

- PLG-15** **Feasibility and Accuracy of Innovative 3 Dimensional Colonoscope Image using Fiber Brag Grating Sensor**
Han Jo Jeon, Bora Keum, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim, Kyu Min Kang, Jun Sik Kim, Min Su Jang, Jin Seok Kim (Korea)
- PLG-16** **Spontaneous Self-Extraction of Rectal Foreign Body: Case Report**
Yongseok Lee, Daejin Kim, Jihun Jang, Sangmyoung Yeo, Hyunsoo Kim, Hanjun Ryu, Yunjin Chung, Jaekwon Jeong, Changkeun Park, Jaekwang Lee (Korea)
- PLG-17** **Clinical Features and Prognostic Factors of Stercoral Ulcer**
Min Cheol Kim, Kyeong Ok Kim, Byung Ik Jang (Korea)
- PLG-18** **Treatment of Hemorrhagic Shock owing to Massive Rectal Bleeding Following Prostate Biopsy by Endoclipping**
Donghoon Baek, Geunam Song, Eunyoung Park, Joonwoo Park, Moonwon Lee (Korea)
- PLG-19** **A Retrospective Analysis of Clinical Profile of Patients Who Underwent Colonoscopy at Rural Hospital in Nepal**
Samir Thapa Chhetri (Nepal)
- PLG-20** **Diverticular Disease of the Colon: Analysis of the Clinical Characteristics and Risk Factors in Adult Filipino Patients**
Clarel Camille Ng (Philippines)
- PLG-21** **Endoscopic Images, Histologic Aspects of Colorectal Large Polyps and Polypectomy Result**
Duc Van Pham (Vietnam)
- PLG-22** **Association of Colonic Diverticulosis and Colonic Adenoma: A Cross-Sectional Study in Philippine General Hospital**
Ray Anthony Bartolome (Philippines)
- PLG-23** **Focal Myositis after Endoscopic Mucosal Resection of Colon LST**
Ju-Il Yang, Hakeung Jeon (Korea)
- PLG-24** **Clinical Outcomes of Nonsurgical Management of Perforation in Patients Undergoing Colorectal Submucosal Dissection**
Yu Sik Myung, Phill Hoon Yoon, Myong Ki Baeg, Seok-Hoo Jeong, Hong Suk Park, Gwang-Mo Kim, Jaeouk Shin (Korea)
- PLG-25** **Case Report: Small Bowel Obstruction Secondary to Incarcerated Femoral Hernia**
Johaniya Dimaporo, Virgilio Banez (Philippines)
- PLG-26** **The Study of Colonoscopic Biopsy in the Diagnosis of IBD**
Javkhan Tsengenbayar, Enkh-Amar Ayush, Ankhzaya Bayanzul, Bayarmaa Bold (Mongolia)
- PLG-27** **Adenoma Miss Rate and the Location of the Adenoma**
Dongwoo Kim, Ja Seol Koo, Jae Won Lee, Jeong Hun Park, Young Eun Ahn, Byung Hun Lim, Min Koo Kim, Jung Wan Choe, Seung Young Kim, Jong Jin Hyun, Sung Woo Jung, Hyung Joon Yim, Sang Woo Lee (Korea)
-  **PLG-28** **Efficacy of Repeat Forward-View Examination of the Right Side Colon during Colonoscopy**
Su Young Kim, Jun-Won Chung, Sang Jin Lee, Kwang An Kwon, Kyoung Oh Kim, Yoon Jae Kim, Jung Ho Kim, Dong Kyun Park (Korea)
- PLG-29** **Simple Endoscopic Scoring of Patients with Rectal Cancer after Concurrent Chemoradiotherapy**
Jae Hyun Kim, Ji Hun Choi, Do Hyeong Lee, Sanghwan Byun, Kyoungwon Jung, Sung Eun Kim, Won Moon, Moo In Park, Seun Ja Park (Korea)



- PLG-30** **Differences in Degree of Intestinal Mucosal Damage According to the Polypectomy Technique**
Sang Hyun Kim, Hoon Jai Chun, Kang Won Lee, Han Jo Jeon, Se Hyun Jang, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Chang Duck Kim (Korea)
- PLG-31** **Acute Appendicitis Initiated after Bowel Preparation: A Case Report**
Soo in Choi (Korea)
- PLG-32** **The Use of a Second Endoscope for the Removal of a Trapped Endoloop**
Sujata May Mansukhani, Rafael Chan, Veronica Nica Carrasco (Philippines)
- PLG-33** **Endoscopic Features for Selection of Colorectal Cancer Amenable to Endoscopic Resection**
Young Min Kim, Jae Jun Park, Da Hyun Jung, Jie-Hyun Kim, Young Hoon Youn, Hyojin Park (Korea)
- PLG-34** **Intestinal Anisakiasis, Should It be Operated?**
In Seon Lee, Sae Kyung Joo, Ji Won Kim (Korea)
- PLG-35** **Sigmoidoscopy is Good Tool for Evaluating Endoscopic Severity of Ulcerative Colitis Patients**
Jun Hyung Lee, Jun Lee, Subum Park, Yoo Jin Lee, Dong Hoon Baek, Geom Seog Seo, Sang Wook Kim, Eun Soo Kim, Tae Oh Kim (Korea)
- PLG-36** **Small Bowel Malignant Tumors of Small Bowel Diagnosed by Balloon-Assisted Enteroscopy: A Single Center Experience**
Ah Young Yoo, Beom Jae Lee, Kyung Eun Lim, Won Sik Kim, Sang Yoon Lim, Yeon Ho Lee, Sung Min Kim, Moon Kyung Joo, Jong-Jae Park (Korea)
- PLG-37** **Co-Infection of TB Colitis with CMV Colitis in Immunocompetent Patient**
Jinsun Yang, Jiwon Kim (Korea)
- PLG-38** **A Case of Ischemic Colitis Induced by Polyethylene Glycol (PEG) Solution with Ascorbic Acid**
Jeongmin Choi (Korea)
- PLG-39** **Mantle Cell Lymphoma Involving Colon: Rare Entity**
Amna Subhan Butt, Fatima Sharrif (Pakistan)
- PLG-40** **Increase of Tuberculosis Due to Combination Therapy in Inflammatory Bowel Disease: A Population-Based Study in Korea**
Seong Ji Choi, Eun Sun Kim, Sanghyun Kim, Kang Won Lee, Han Jo Jeon, Sehyun Jang, Sang Hoon Kim, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)
- PLG-41** **Reduction of Butyrate-Producing Microbiota in Korean Ulcerative Colitis Patients**
Seong Ji Choi, Hyuk Soon Choi, Jae Ryang Choo, Mi Kyung Sung, Seung Han Kim, Jae Min Lee, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)
- PLG-42** **Characterization of Contractile Properties of Smooth Muscle in Porcine Intestine Model**
Sang Hyun Kim, Yoon Tae Jeon, Kang Won Lee, Han Jo Jeon, Se Hyun Jang, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)
- PLG-43** **The Risk of Delayed Bleeding after Colorectal Endoscopic Mucosal Resection without Prophylactic Clipping**
Hyeonjin Kim, Jae Hyun Kim, Youn Jung Choi, Hye Jung Kwon, Sung Eun Kim, Won Moon, Moo in Park, Seun Ja Park (Korea)
- PLG-44** **Cost Comparison between Endoscopic Submucosal Dissection and Endoscopic Piecemeal Mucosal Resection in the Colorectum**
Nam Seok Ham, Jeongseok Kim, Eun Hye Oh, Sung Wook Hwang, Sang Hyoung Park, Dong-Hoon Yang, Byong Duk Ye, Seung-Jae Myung, Suk-Kyun Yang, Jeong-Sik Byeon (Korea)

Pancreatobiliary

PPB-01 Clinical Outcomes of Lumen-Apposing Metal Stent for Treating Benign Gastrointestinal Strictures: A Systematic Review

Xiaowei Tang (China)

PPB-02 Is Lumen-Apposing Metal Stents More Effective Than Plastic Stents for Pancreatic Fluid Collections: A Meta-Analysis

Xiaowei Tang (China)

PPB-03 Imaging Characteristics and Clinical Factors Associated with Difficult Selective Cannulation in ERCP


Jae Min Lee, Hong Sik Lee, Sehyun Jang, Han Jo Jeon, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hoon Jai Chun, Chang Duck Kim, Na Yeon Han (Korea)

PPB-04 Severe Acute Pancreatitis Following Endoscopic Resection, Misunderstanding Accessory Papilla by Neoplasm


Tuan Minh Tran (Vietnam), Joung-Ho Han (Korea)

 **PPB-05** Long Term Follow-Up of Transmural Stents in Patients with Walled Off Necrosis and Disconnected Pancreatic Duct Syndrome

Surinder Rana, Jimil Shah, Ravi Sharma, Rajesh Gupta (India)

 **PPB-06** Optimal Biliary Drainage for Biliary Anastomotic Strictures after Right-Lobe Living Donor Liver Transplantation

Min Su You, Woo Hyun Paik, Young Hoon Choi, Bang-Sup Shin, Sang Hyub Lee, Ji Kon Ryu, Yong-Tae Kim, Kyung-Suk Suh, Kwang-Woong Lee, Nam Joon Yi, Suk Kyun Hong (Korea)

 **PPB-07** Endoscopic Ultrasound-Guided Biliary Drainage Using Novel Fine Gauge Diathermic Dilator: A Pilot Study

Masanori Yamada, Takeshi Ogura, Atsushi Okuda, Kazuhide Higuchi (Japan)

PPB-08 Multimodality Drainage of Complicated Pseudocyst and Walled-Off Necrosis with Lumen-Apposing Metal Stent

Thanawat Luangsukrer, Pradermchai Kongkam (Thailand)

PPB-09 Initial Results of Modified ERCP for Treatment of CBD Stricture in Patients with Gastroenterostomy

Nguyen Thi Huyen Trang, Tran Anh Tuyet, Trinh Xuan Hung, Nguyen Lam Tung (Vietnam)

PPB-10 Utility of Double Guidewire Technique in Difficult Biliary Cannulation: Experience from a Single Tertiary Hospital

Marjorie Antonette Cardenas Fragante, Jonathan Crisostomo, Katrina Jewel Cham, Evan Ong (Philippines)

PPB-11 Efficacy and Safety of Simultaneous Side-By-Side Bilateral Placement of Braided-Type Metal Stents for Klatskin Tumor

Boram Cha, Seok Jeong, Jin-Seok Park, Jae Hee Cho (Korea)

PPB-12 Endoscopic Retrograde Cholangio-Pancreatography Related Complications- Analysis at Tertiary Care Center in Central India

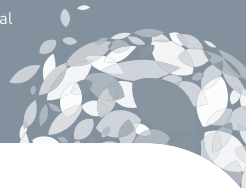
Swapnil Kankare, Deepesh Sharma, Aashish Patil, Shrikant Mukewar (India)

PPB-13 Endoscopic Minor Duodenal Papillotomy by Rendezvous Method - 2 Cases

Jihun Jang, Hyunsoo Kim, Hanjun Ryu, Sangmyung Yeo, Daejin Kim, Jaekwang Lee, Jaekwon Jung, Changkeun Park, Yunjin Chung, Yongseok Lee (Korea)

PPB-14 Endoscopic Removal of an Inwardly Migrated Lumen-Apposing Metal Stent after Cysto-Gastrostomy for Pancreatic Pseudocyst

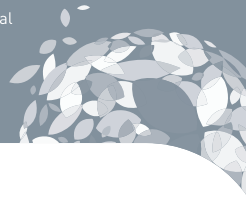
Gunn Huh, Sang Hyub Lee, Jung Won Chun, Min Su You, Woo Hyun Paik, Ji Kon Ryu, Yong-Tae Kim (Korea)



- PPB-15** **Intraductal Placement of Non-Flared Fully Covered Metallic Stent for Refractory Anastomotic Biliary Strictures after Living Donor Liver Transplantation: Long-Term Results of Prospective Multicenter Trial**
Jae Keun Park, Jeong-Ju Yoo, Jong Ho Moon, Yun Nah Lee, Seokjung Jo, Jong-Kyun Lee, Kyu Taek Lee, Kwang Hyuck Lee, Woo Jin Lee, Sang Myung Woo, Tae Hoon Lee, Sang-Heum Park (Korea)
- PPB-16** **The Usefulness of Non-Flared Short FCSEMS for Refractory Benign Pancreatic Strictures in Advanced Chronic Pancreatitis**
Seokjung Jo, Jong Ho Moon, Yun Nah Lee, Jae Keun Park, Tae Hoon Lee, Sang-Woo Cha, Young Deok Cho, Sang Heum Park (Korea)
- PPB-17** **Feasibility of Per-Oral Cholecystoscopy after EUS-Guided Gallbladder Drainage with a Lumen-Apposing Metal Stent for Acute Cholecystitis in Patients with Malignant Biliary Strictures**
Yun Nah Lee, Jong Ho Moon, Jae Keun Park, Seokjung Jo, Tae Hoon Lee, Moon Han Choi, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-18** **A Case of Early Diagnosis of Primary Sclerosing Cholangitis in a Patient with Ulcerative Colitis**
Nam Yeol Cho (Korea)
- PPB-19** **Effective Chemotherapy Prolongs Stent Patency in Patients with Malignant Biliary Obstruction due to Pancreatic Cancer**
Jung Won Chun, Sang Hyub Lee, Jinwoo Kang, Gunn Huh, Min Su You, Woo Hyun Paik, Dong-Won Ahn, Ji Bong Jeong, Ji Kon Ryu, Yong-Tae Kim (Korea)
- PPB-20** **Post ERCP Cholangitis; Lessons Learnt from a Prospective Study in a Tertiary Care Center of Sri Lanka**
Rehan T Gamage, T G Amal Priyantha (Sri Lanka)
- PPB-21** **Endoscopic Treatment of Difficult Common Bile Duct Stones in Elderly Patients**
Andrei Mikhin, Stanislav Orlov, Konstantin Vasilenko, Aleksandr Sazhin (Russia)
- PPB-22** **Efficacy of Stent Placement to Reduce the Stone Recurrence after the Endoscopic Removal of Common Bile Duct Stones**
Jung Hye Choi, Young Koog Cheon (Korea)
- PPB-23** **Valentino's Syndrome - Post ERCP Duodenal Perforation Presenting as Acute Appendicitis**
Karlo Ivan Miguel Fontanilla, Ruter Maralit (Philippines)
- PPB-24** **Endoscopic Transpapillary Gallbladder Drainage for Patient with Acute Cholecystitis and Unfit for Urgent Surgery**
Hyung Ku Chon, Dong Eun Park, Tae Hyeon Kim (Korea)
- PPB-25** **Case Report: A Case Hemobilia Caused by Hepatic Artery Pseudoaneurysm**
James Crisfil Fructuoso Montesa, Jerica Cristel Esguerra, Virgilio Banez, Johaniya Dimaporo (Philippines)
- PPB-26** **Application of In-Stent Radiofrequency Ablation for the Reopening of Occluded Biliary Metal Stents**
Eui Joo Kim, Yeon Suk Kim, Jae Hee Cho (Korea)
- PPB-27** **An Unusual Late Complication after Endoscopic Papillectomy**
Chih-Sheng Su, Ming Hui Lin (Taiwan)
- PPB-28** **The Clinical Case of Primary Pancreatic Lymphoma**
Valeriya Vereshchak, Ilya Iurichev, Olga Malikhova (Russia)
- PPB-29** **A Case of Untreated Autoimmune Pancreatitis Developing Adenocarcinoma of the Pancreatobiliary Origin during Follow-Up**
Kyu Won Lee, Jae Hyuck Chang, Tae Ho Kim, Chang Whan Kim, Sok Won Han (Korea)

POSTERS

- PPB-30** **Vigorous Hydration for Prevention of Post-ERCP Pancreatitis: A Meta-Analysis**
Adrian Manuel Fausto, Mariel Dianne Velasco, Geraldine Claire Floro, Jenis Emmanuel Camenforte, Therese Macatula (Philippines)
- PPB-31** **A Rare Case of Hemosuccus Pancreaticus in Children: Successful Diagnosis Using Endoscopy**
Ariani Dewi Widodo, Adianto Nugroho, Ido Narpati Bramantyo, Asri Dwi Rahmawati, Eva Jeumpa Soelaeman, Budi Purnomo (Indonesia)
- PPB-32** **Clinical Profile and Predictors of Choledocholithiasis among Patients Who Underwent ERCP in a Tertiary Referral Centre**
Michelle Chu, Don Edward Rosello, Charlie Avila, Bernadette Moscoso, Eden Gabriel (Philippines)
- PPB-33** **Guidewire-Assisted Drainage Removal under Fluoroscopy is Feasible and Safety Method Than Conventional Blind Method**
Jae Hyuck Jun, Huapyeong Kang, Young Seok Doh, Ji Woong Jang, Sae Hee Kim, Il Hyun Baek, Sung Hee Jung (Korea)
- PPB-34** **Retrograde Endoscopic Management of Obstructive Jaundice in Atyrau Regional Hospital**
Arman Aliyev, Shanayev Dauren (Kazakhstan)
- PPB-35** **Therapeutic Diagnosis of Pancreatic Tuberculosis Mimicking Malignancy with EUS-FNA and Biopsy: A Case Report**
Sangmyung Yeo, Jaekwon Jung, Hyunsoo Kim, Jaekwang Lee, Hanjun Ryu, Daejin Kim, Changkeun Park, Yunjin Chung, Jihun Jang, Yongseok Lee (Korea)
- PPB-36** **Percutaneous Treatment of Common Bile Duct Stones in Cases with Difficult Endoscopic Retrograde Cholangiopancreatography**
Woojin Jeong, Young Don Kim, Gab Jin Cheon, Jong Kyu Park, Young Jong Cho (Korea)
- PPB-37** **Pancreas Volume and Elastase-1 as Prognostic Marker for Pancreatic Exocrine Insufficiency Following Pancreatic Resection**
Young Wook Cho, Min Kyu Jung, Chang Min Cho, Jun Heo (Korea)
- PPB-38** **Successful Treatment of Ampullary Tumor with Intraductal Extension by Endoscopic Snare Papillectomy Followed by Argon Plasma Coagulation Using Percutaneous Transhepatic Cholangioscopy**
Woojin Jeong, Sang Soo Lee (Korea)
- PPB-39** **A Case of Multi-Organ Failure Caused by Dka Triggered by Post-ERCP Acute Pancreatitis without Hypertriglyceridemia**
Sung Chul Cho, Hyung-Keun Kim, Young-Ki Kim, Woo-Jung Kim, Seon-Bin Yoon, Hyun-Ho Choi, Sang-Woo Kim, Sung-Soo Kim, Hiun-Suk Chae (Korea)
- PPB-40** **The Diagnostic and Therapeutic Efficacy of Spyglass DS System for Biliary Tract Lesions – Single Centre Experience**
Bhavik Shah, Mahesh Kumar Goenka, Rachit Agarwal, Usha Goenka (India)
- PPB-41** **The Single-Center Experience of Endoscopic Treatment of Anastomotic Strictures after Live-Donor Liver Transplantation.**
Nurken Abdiyev, Yerlan Abdirashev, Maksat Doskhanov, Zhasulan Baimakhanov (Kazakhstan)
- PPB-42** **Trapped in a Tunnel: An Unusual Cause of Obstructive Jaundice**
Amna Subhan Butt (Pakistan)
- PPB-43** **Risk Factors for Duodenal Perforation Caused by Biliary Plastic Stent Migration**
Jin Ho Choi, Ji Kon Ryu, Gunn Huh, Jung Won Chun, Min Su You, Woo Hyun Paik, Sang Hyub Lee, Yong-Tae Kim (Korea)



Others

- POT-01** **Efficacy and Safety of EUS-Guided Biliary Drainage in Malignant Biliary Obstruction**
Roshan Agarwala, Surinder Rana, Ravi Sharma, Lovneet Dhalaria, Rajesh Gupta (India)
- POT-02** **Risk Factors for Adverse Events Associated with Bile Leak during Endoscopic Ultrasound-Guided Hepaticogastrostomy**
Atsushi Okuda, Takeshi Ogura, Masanori Yamada, Kazuhide Higuchi (Japan)
- POT-03** **EUS Guided Peripancreatic Cystic Fluid Drainage, Experience from Norvic International Hospital**
Sandeep Raj Kunwar, Vijay Kiran Dahal, Barun Kumar Shah, Madhu Ghimire (Nepal)
- POT-04** **EUS Guided Pancreaticogastrostomy for Relief of Pain in Patients of Chronic Pancreatitis**
 Surinder Rana, Jimil Shah, Ravi Sharma, Rajesh Gupta (India)
- POT-05** **Mini Probe EUS in Submucosal Tumor Evaluation: Experience in a Regional Hospital**
Ming Hui Lin (Taiwan)
- POT-06** **Digital Image Analysis of Endoscopic Ultrasonography is Helpful in Diagnosing Gastric Mesenchymal Tumors**
Moon Won Lee, Gwang Ha Kim, Jun Woo Park, Eun Young Park, Bong Eun Lee (Korea)
- POT-07** **First Review of Esophageal Lesions by Endoscopic Ultrasonography at E Hospital**
Hai Hoang Van (Vietnam)
- POT-08** **EUS FNA of Various Abdominal Lymph Nodes– 3 Month Experience at Digestive Disease Centre, Norvic International Hospital**
Sandeep Raj Kunwar (Nepal)
- POT-09** **Removal of Intrahepatic Bile Duct Stones by Endoscopic Ultrasound-Guided Choledochoduodenostomy after Failed ERCP**
Seung Goun Hong (Korea)
-  **POT-10** **Clinical Utility of Directional Eflow for the Differential Diagnosis of Pancreatic and Peripancreatic Solid Masses**
Jun Seong Hwang, Dong Wan Seo, Sung Woo Ko, Hoonsub So, Dong Wook Oh, Tae Jun Song, Do Hyun Park, Sang Soo Lee, Sung Koo Lee, Myung-Hwan Kim (Korea)
- POT-11** **Bow-Like, Displaced Splenic Artery Due to Pancreatic Pseudocyst**
Woojin Jeong, Young Don Kim, Jong Kyu Park, Sang Jin Lee, Goon Hee Han (Korea)
- POT-12** **Comparison of EUS Insertion Method: Standard Vs. Balloon-Inflated**
Jinwoo Kang, Sang Hyub Lee, Woo Hyun Paik, Ji Kon Ryu, Yong-Tae Kim (Korea)
- POT-13** **Evaluation of Specimen Adequacy and Diagnostic Performances Using a Novel Needle in EUS-TS for Pancreatic Solid Lesions**
Chang Min Cho, Seong Jae Yeo, An Na Seo, Han Ik Bae (Korea)
- POT-14** **The Diagnostic Performance of New Torque Technique for EUS-Guided Tissue Acquisition in Solid Pancreatic Lesions**
Gyeong Guk Kim, Se Woo Park (Korea)

POSTERS

POT-15 **Feasibility and Safety of Endoscopic Ultrasound-Guided Fine Needle Biopsy of Solid Liver Lesions**
Yu-Ting Kuo, Shih-Jhe Chen, Ming-Lun Han, Chieh-Chang Chen, Tsu-Yao Cheng, Wei-Chih Liao, Hsiu-Po Wang (Taiwan)

POT-16 **Comparative Efficacy of Stents in Endoscopic Ultrasonography-Guided Peripancreatic Fluid Collection Drainage**
Se Young Choi, Se Woo Park (Korea)


POT-17 **Lumen-Apposing Metal Stent and Antimigrating Tubular Self-Expandable Metal Stent for EUS-Guided Gallbladder Drainage**
Sung Hyun Cho, Dongwook Oh, Tae Jun Song, Do Hyun Park, Dong-Wan Seo, Sung Koo Lee, Myung-Hwan Kim, Yun Nah Lee, Jong Ho Moon, Sang Soo Lee (Korea)

POT-18 **Comparison of the Diagnostic Ability of Eus and Apct in the Diagnosis of Gastric Subepithelial Tumors**
Sang Yoon Kim, Ki-Nam Shim, Ji Young Lim, Tae Oh Kim, A Reum Choe, Chung Hyun Tae, Hye-Kyung Jung, Chang Mo Moon, Seong-Eun Kim, Sung-Ae Jung (Korea)

POT-19 **Eus-Guided Gallbladder Drainage for Acute Cholecystitis after Metal Stent Placement in Malignant Biliary Strictures**
Hyung-Ku Jeon, Tae-Hyeon Kim (Korea)


POT-20 **How Effective and Safe to Evaluate Esophageal and Gastric Cardia Mass Lesions by the Condom Method Eus Is!**
Yun Jae Shin, Dong Hoon Lee, Si Hyeong Lee, Tae Young Park, Soo Hyung Ryu, You Sun Kim, Jeong Seop Moon (Korea)

POT-21 **Diagnostic Utility of Endoscopic Ultrasonography-Elastography in Gastric Submucosal Tumors: a Pilot Study**
Eun Ji Kim, In Kyung Yoo, Sung Pyo Hong, Joo Young Cho (Korea)

 **POT-22** **Endoscopic Submucosal Dissection Using an Detachable Robotic Device in a Live Porcine Model**
Se Hyun Jang, Hyuk Soon Choi, Kang Won Lee, Sang Hyun Kim, Han Jo Jeon, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)

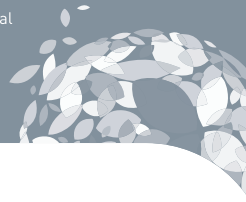
POT-23 **Clinical Characteristics and Outcomes of Poem in Achalasia with Normal Irp Patients**
Jongwoo Kim, Joo Young Cho, In Kyung Yoo (Korea)

POT-24 **Peroral Endoscopic Myotomy Versus Pneumatic Balloon Dilation for Achalasia Treatment: A Multicenter Comparative Study**
Weonjin Ko, Jin Seok Jang, Joo Young Cho, Hyung Gil Kim, In Kyung Yoo, Seong Hwan Kim, Young Kwan Jo, Hee Seok Moon, Sung Eun Kim, Su Jin Kim (Korea)

 **POT-25** **Safety Profile of Sedative Endoscopy Including Minimal Hepatic Encephalopathy in Liver Cirrhosis**
Jeong-Ju Yoo, Hyeon Jeong Goong, Ji Eun Moon, Sun A Moon, Song Ah Jeong, A Ri Song, Sang Gyune Kim, Young Seok Kim (Korea)

POT-26 **Clinical Practice and Guidelines for Management of Antithrombotics before and after Endoscopy: A National Survey Study**
Seong Woo Jeon, Su Jin Hong, Soo Teik Lee, Hyungkil Kim, Hoon Jai Chun (Korea)

POT-27 **Benefits of Capnographic Monitoring during ESD Procedures**
Sang Hoon Kim, Bora Keum, Kang Won Lee, Sanghyun Kim, Han Jo Jeon, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Hong Sik Lee, Yoon Tae Jeon, Hoon Jai Chun, Chang Duck Kim (Korea)



POT-28 **Balanced Propofol Sedation with Midazolam during Endoscopy Could Worsen Hepatic Encephalopathy in Cirrhotic Patients**

Joon Ho Jeong, Kwang Il Seo, Byung Cheol Yun, Sang Uk Lee, Byung Hoon Han, Eun Taek Park, Jin Wook Lee (Korea)



POT-29 **Prediction of Hypoxemia during Endoscopic Retrograde Cholangiopancreatography with Anesthesiologist-Assisted Sedation**

Huapyong Kang, Minju Lee, Eun Hwa Kim, Kwang Jun Kim, Hee Seung Lee, Jeong Youp Park, Seungmin Bang, Seung Woo Park, Si Young Song, Bora Lee, Moon Jae Chung (Korea)

POT-30 **Safety of Carbon Dioxide Insufflations during Endoscopic Submucosal Dissection for Gastric Epithelial Neoplasm**

Shinhee Kim, Sujin Hong (Korea)

POT-31 **Endoscopic Management of Iatrogenic Gastrointestinal Defects with the Over-The-Scope Clip System: A Systematic Review**

Xiaowei Tang (China)



POT-32 **Comparative Study of Peroral Endoscopic Shorter Versus Longer Myotomy for the Treatment of Achalasia**

Xiaowei Tang (China)



POT-33 **A Study on CLE in Comparison with Histopathology in Polypoidal Lesions of GI Tract: A Prospective Single Centre Study**

Parvez Ahmed Shah, Bhavik Shah, Vijay Rai, Enam Khan, Mahesh Kumar Goenka (India)

POT-34 **Outcome of Kumc Intra gastric Balloon Placement**

Se Hyun Jang, Hoon Jai Chun, Sang Hyun Kim, Kang Won Lee, Han Jo Jeon, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeen, Hong Sik Lee, Chang Duck Kim (Korea)

POT-35 **Feasibility and Effectiveness of Irreversible Electroporation Applied by Endoscopic Catheters on Gastrointestinal Tract**

Han Jo Jeon, Hyuk Soon Choi, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Choi Seong Ji, Seung Han Kim, Jae Min Lee, Eun Sun Kim, Bora Keum, Yoon Tae Jeen, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)

POT-36 **Early Experience of Endoscopic Intra gastric Balloon Treatment for Obesity**

Tungalag Byambadorj (Mongolia)

POT-37 **An Endoscopic Mapping Device for Gastrointestinal Slow Wave Propagation Patterns**

Seung Han Kim, Hoon Jai Chun, Sanghyun Kim, Kang Won Lee, Sanghoon Kim, Han Jo Jeon, Sehyun Jang, Seong Ji Choi, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeen, Hong Sik Lee, Chang Duck Kim (Korea)

POT-38 **Durability Test of Endoscopic Successive Suturing Device: In Vitro Experiments**

Kang Won Lee, Hoon Jai Chun, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Chang Duck Kim (Korea)

POT-39 **Preoperative Magnetic Marking Clip Makes Intraoperative Localization of Gastrointestinal Tumors Easier**

Sang Hoon Kim, Yoon Tae Jeen, Kang Won Lee, Sanghyun Kim, Han Jo Jeon, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim (Korea)

POSTERS

- POT-40** A Comparison of Endoluminal Bariatric Gastroplasty Method for Effective Weight Loss Using New Endoscopic Suture Device
Kang WonLee, Bora Keum, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun, Chang Duck Kim, Yoonjin Kim, Byunggon Kim, Kyungnam Kim, Youngnam Song, Daehie Hong (Korea)
- POT-41** Intraprocedure Quality Indicators of Colonoscopy Performed by Fellows in Training in a Tertiary Hospital
Angela Salvana, Janus Ong, Jenis Emmanuel Camenforte (Philippines)
- POT-42** DIY Non-Biologic ERCP Model
Marjorie Antonette Cardenas Fragante, Evan Ong (Philippines)
- POT-43** Upper Gastrointestinal Tract Involvement in Pediatric Crohn's Disease: A Single-Center Experience
Hyun Jin Kim, Kyung Mo Kim (Korea)
- POT-44** The Features of Upper Gastrointestinal Tract in Children with Choledochal Malformation
Makhmud Aliev, Rustam Yuldashev, Gulnora Adilova, Akmaljon Akhmadjonov, Shoilkhom Shakhaydarov, Dilnoza Tursunova (Uzbekistan)
- POT-45** Portal Hypertensive Bile Reflux Gastroesophagopathy in Children with Extrahepatic Portal Vein Obstruction
Makhmud Aliev, Rustam Yuldashev, Emin Musaev, Shoilkhom Shakhaydarov (Uzbekistan)
- POT-46** Non-Invasive Assessment of Gastresophageal Varices in Children with Prehepatic Portal Hypertension
Rustam Yuldashev, Makhmud Aliev, Fozil Yuldosh Ogli Yuldosh, Shoilkhom Shakhaydarov, Dilnoza Tursunova (Uzbekistan)
- POT-47** Endoscopic Management of Colorectal Polyps in Children
Avaz Dekhkonboev, Temur Sultanov, Shoilkhom Shakhaydarov (Uzbekistan)
- POT-48** A Case Report: Endoscopic Removal of a Large Trichobezoar in a Pediatric Patient
Woo-Jung Kim, Young-Ki Kim, Hyun-Ho Choi, Hyung-Keun Kim, Sang-Woo Kim, Sung-Soo Kim, Hiun-Suk Chae (Korea)
- POT-49** Can Endogenous Gastric Acid and Bile Facilitate Chemical Debridement of Walled Off Necrosis?
Surinder S Rana, Atul Rana, Ravi Sharma, Rajesh Gupta (India)
- POT-50** Comparison of N-Terminal Pro Brain Natriuretic Peptide in Patients with Child Pugh Class A, B and C
Muhammad Adnan Shahzad (Pakistan)
- POT-51** A Case of Primary Omental Infarction in an Adult Female Presenting as Right Upper Quadrant Pain
Sujata May Mansukhani, Virgilio Banez (Philippines)
- POT-52** Evaluation of the Effect of Intraperitoneal Ghrelin Treatment in Acute Experimental Distal Colitis Model
Erdem Kocak, Fatma Kilic (Turkey)
- POT-53** Determination Result of Colonic Lactobacillus on the *Helicobacter Pylori* Infection
Bayarsaikhan Ochirchuulgan, Amarjargal Batdelger (Mongolia)
- POT-54** A Quantitative Method to Justify the Quality of Current Reprocessing Guidance based on Test Strips for Endoscopy Suites
Hsin-Yu Lin, Hsien-Chung Yu, Wei-Ling Chen, Li-Chun Jang, Da-Yuan Guo, Yuan-Chung Lin, Yi-Song Fong (Taiwan)
- POT-55** Safety of Endoscopic Procedures in Neutropenic Patients with Hematologic Diseases
Ga-Young Shin, Jae Myung Park, You-Jin Kim, Kyung Han Song, Yu Kyung Cho, Dong-Wook Kim, Myung-Gyu Choi (Korea)



ABSTRACTS

LECTURE

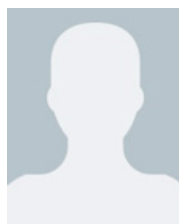
IDEN 2019
International Digestive Endoscopy Network

IDEN International
2019 Digestive
Endoscopy
Network
2019

June 14 (Fri), 2019

Upper GI





UGI 1-1

Endoscopic Resection for Subepithelial Tumors: When and How?

Kyoung Oh Kim

Gachon University, Korea

No Contents



UGI 1-2

Endoscopic Full Thickness Resection for Gi Tumors

Khek Yu Ho

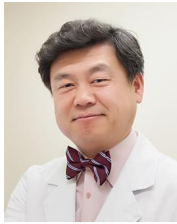
Department of Medicine, National University Health System, Singapore

One of the important next targets in the evolution of endoscopic surgery is endoscopic full-thickness resection (EFTR) for the treatment of gastrointestinal tumor. EFTR is mainly indicated for submucosal tumor excision. The steps for EFTR include tissue retraction, cutting the GI wall, and closure of the defect. A key challenge in doing all of these 3 steps is the limited manoeuvrability of today's endoscopes. The reliance on conventional ESD instruments also make tissue retraction very difficult. Current prototypes of endoscopic closure devices, including endoscopic clips, stents, vacuum-assisted closure, gap filling and suturing devices, are also not totally satisfactory in term of closure of the defect.

In order to eliminate the laparoscopic assistance and perform EFTR as a pure NOTES procedure, the introduction of robotics-enhanced endoscopic systems with better dexterity in instrumental control, and triangulation has been suggested. In this aspect, intuitively-steered novel endosurgical systems such as the master-slave flexible robotic system (MASTER) could fit in the application. From our preclinical and clinical studies, the MASTER endoscopic platform has a great advantage with respect to retraction and dissection in that it uses two robotic arms mounted on a double-channel endoscope. The MASTER has been evaluated and shown effective for EFTR, and natural orifice transluminal endoscopic surgery in animal trials. Indeed, EFTR was made easier by using the two robotic arms for retraction and dissection. Grasping the full-thickness tissue using one of the arms also avoided diathermy injuries to the adjacent organs during resection.

Robust suturing in flexible endoscopy has been a challenge due to the confined space of the orifice and lumen, high dexterity and force demands of suturing tasks, and critical size and strength requirements of wound closure. We have recently developed a novel robotic suturing device for flexible endoscopy, and shown the feasibility of this device in closing a rectal wall perforation in an animal model. As the suturing method is similar to that of laparoscopic and robotic suturing, closure using the endoscopic robotic suturing method is expected to be as strong as a surgical through-and-through closure.

Keywords: Endoscopic, Resection, Tumors



UGI 1-3

Tips for Being an Expert in Submucosal Endoscopy

Hwoon-Yong Jung

University of Ulsan, Korea

Curriculum Vitae

Educational Background

- Mar. 1982 - Feb. 1988 Seoul National University, School of Medicine
- Mar. 1996 - Feb. 1998 University of Ulsan, School of Postgraduate, M.S
- Mar. 2002 – Feb. 2005 Ph.D. in Microbiology, Hanyang University

Professional Experiences

- Mar. 1988 - Feb. 1989 Internship; Seoul National University Hospital
- Mar. 1989 - Feb. 1992 Residency in Internal medicine; Seoul National University Hospital
- Mar. 1992 - Apr. 1995 Military Service
- May. 1995 - Feb. 1997 Clinical Fellowship in Gastroenterology, Asan Medical Center (AMC)
- Mar. 1997 - Feb. 1998 Clinical Instructor in Gastroenterology, AMC
- Mar. 1998 - Apr. 2000 Instructor, Gastroenterology, University of Ulsan, AMC
- Mar. 2000 - Apr. 2004 Assistant Professor, Gastroenterology, University of Ulsan, AMC
- Sep. 2002 - Aug. 2004 Visiting Scholar, UC San Diego, USA
- Mar. 2004 - Apr. 2010 Associate Professor, Gastroenterology, University of Ulsan, AMC
- Mar. 2010 - Now Professor, Gastroenterology, University of Ulsan, AMC

Main Scientific Publications

Research Interests : Gastrointestinal Motility Disorders Therapeutic Endoscopy

1. Jung HK, Lee KJ, Choi MG, et al. Efficacy of DA-0801(Motilitone) in functional dyspepsia compared to pantoprazole: a multicenter, randomized, double-blind, non-inferiority study. *J Neurogastro Motil* 2016;22(2):254-263.
2. Na HK, Jung HY, Seo DW, et al. Erythromycin infusion prior to endoscopy for acute nonvariceal upper gastrointestinal bleeding: a pilot randomized controlled trial. *Korean J Int Med* 2017;32(6):1002-1009.
3. Lee S, Choi KD, Han M, et al. Long-term outcomes of endoscopic submucosal dissection versus surgery in early gastric cancer meeting expanded indication including undifferentiated-type tumors: a criteria-based analysis. *Gsatric Cancer* 2018;21(3):490-499.
4. Lee HJ, Jung KW, Chung SJ, et al. Relation of enteric a-synuclein to gastrointestinal dysfunction in patients with Parkinson's disease and in neurologically intact subjects. *J Neurogastroenterol Motil* 2018;24(3):469-478
5. Kim GH, Jung KW, Jung HY, et al. Diagnostic trends and clinical characteristics of eosinophilic esophagitis: a Korean, single-center database study. *J Neurogastroenterol Motil* 2018;24(2):248-254.



UGI 1-4

NOTES: Present and Future

Haruhiro Inoue

Showa University, Japan

No Contents



UGI 2-1

Palliative Stenting for Malignant Esophagogastric Junctional Stricture

Helmut Messmann

III Med, University Hospital Augsburg, Augsburg, Germany

About 400.000 patients are diagnosed yearly with esophageal cancer worldwide, more than 350.000 die from this disease and the prognosis of esophageal cancer is with a 5-year survival rate of 10–15% poor. Moreover, more than 50% of patients with esophageal cancer are inoperable/metastatic disease at presentation.

Most of these patients suffer from dysphagia and malnutrition as well as chronic cough due to aspiration or fistula and need therefore palliative treatment.

So far several therapeutic options are helpful in a palliative setting: Stent, radiotherapy (external/internal), tube feeding, nutritional support, PEG-catheter, dilation or tumor ablation with argon plasma coagulation or laser.

In the last decades stent placement of self-expanding metal stent (SEMS) has become one of the most used therapeutic options for treatment of dysphagia. There is almost no contraindication expect poor performance status and an expected survival time of less than 4 weeks. The stent insertion is quick, safe and effective which means that dysphagia disappears within a few days.

Although there are different stent types available, there exist no standard stent. Even stents with antireflux systems were not superior to standard stents regarding reflux symptoms in patients with malignant strictures at the esophagogastric junction. Stent migration and stent obstruction due to tumor in- or overgrowth are common complications. Patients with good performance status and a longer life expectancy radiotherapy either by brachytherapy or external radiotherapy is more effective with regard to dysphagia after 3 months. A combination of brachytherapy and SEMS is an effective approach in the longterm run. However, SEMS before or after RT or CRT is still discussed controversial and there is low quality evidence. Recent data have shown that chemoradiotherapy prior to stenting is associated with severe complications and therefore preferably, no SEMS after CRT or RT is recommended.

ESGE has recently published guidelines for the palliative stenting in esophageal cancer:

1. ESGE recommends placement of partially or fully covered self-expandable metal stents (SEMSs) for palliative treatment of malignant dysphagia over laser therapy, photodynamic therapy, and esophageal bypass (strong recommendation, high quality evidence).

2. For patients with longer life expectancy, ESGE recommends brachytherapy as a valid alternative or in addition to stenting in esophageal cancer patients with malignant dysphagia. Brachytherapy may provide a survival advantage and possibly a better quality of life compared to SEMS placement alone.

(Strong recommendation, high quality evidence.)

3. ESGE recommends esophageal SEMS placement as the preferred treatment for sealing malignant tracheoesophageal or bronchoesophageal fistula (strong recommendation, lowquality evidence).

4. ESGE does not recommend the use of concurrent external radiotherapy and esophageal stent treatment. SEMS placement is also not recommended as a bridge to surgery or prior to preoperative chemoradiotherapy. It is associated with a high incidence of adverse events and alternative satisfactory options such as placement of a feeding tube are available. (Strong recommendation, lowquality evidence.)

Keywords: Palliative stenting



UGI 2-2

Stenting in Post-Gastrectomy Complications

Chul-Hyun Lim

Internal Medicine, The Catholic University of Korea, Seoul, Korea

Self-expandable metallic stent (SEMS) insertion has been used for the palliative treatment of malignant obstruction, and post-operative leakage and stricture of gastrointestinal tract. The gastrectomy is one of treatment modalities for cure of gastric cancer. Although post-gastrectomy complications including anastomotic stricture, leakage, and obstruction are rare, they can result to increase postoperative morbidity and mortality. Reoperation is often required for treatment of post-gastrectomy complications and increases the risk of condition deterioration. It also increases psychological and social economic burden on patients. SEMS insertion has been reported to be a feasible and effective modality for treatment for post-gastrectomy complications. Anastomotic leaks after gastrectomy has been reported in 0.2-7.4% with 25-75% range of mortality rate after operative treatment. Successful management of anastomotic leaks after gastrectomy with SEMS insertion has been reported with high technical and clinical success rates. SEMS insertion with a silk thread (Shim technique) has been reported to prevent stent migration. Anastomotic stenosis after gastrectomy has been reported in 1.0-17.0%. Membranous and cicatricial stenosis require balloon dilation or re-operation. Endoscopic balloon dilation still carries risk of re-stenosis and perforation. SEMS insertion has been reported to be a feasible and effective modality for management of anastomotic stenosis after gastrectomy with avoiding re-operation. Efferent and afferent loop syndrome after gastrectomy are characterized by a mechanical obstruction at the site of a gastrojejunostomy and result in obstruction of gastric emptying. There have been several reports documenting significant benefits to the use of SEMS insertion for loop syndromes. Stent migration has been reported as a frequent complication after SEMS insertion in post gastrectomy complications. Endoscopic retrieval or surgical removal may be required in stent migrations. SEMS placement is an effective and safe treatment for post-gastrectomy complication and can decrease the risk of reoperation related mortality and modalities. Further studies for standardization of the procedure according to the indication of post-gastrectomy complications and strategies for reduction of stent related complication are required.

Keywords: Stent, Gastrectomy, Complication



UGI 2-3

Eus-Guided Stenting in Malignant Gastric Outlet Obstruction

Shuntaro Mukai

Department of Gastroenterology and Hepatology, Tokyo Medical University, Tokyo, Japan

Malignant gastric outlet obstruction (GOO) due to the invasion of malignant cancer markedly impairs quality of life of patients because of anorexia and vomiting. Traditionally open or laparoscopic surgery has been the primary treatment for malignant GOO. Surgical treatment, however, provides definitive palliation of symptoms but have more invasiveness. Endoscopic self-expanding metal stents, mainly duodenal stent, placement has been carried out for the treatment of malignant GOO in recent years. Duodenal stenting is minimum invasive but often have recurrences of symptoms because of stent obstruction due to tumor ingrowth and overgrowth.

As a new approach, EUS-guided stenting between stomach and jejunum by using a lumen-apposing metal stent, so-called endoscopic ultrasonography-guided gastrojejunostomy (EUS-GJ), which utilizes these advantages, has emerged in clinical setting¹⁻⁵. However, EUS-GJ is not always successful because of invisible jejunum under EUS due to air or collapse of the jejunum, leading to mispuncture to the large intestine and misdeployment of stent. To overcome these problems, we developed EUS-guided double-balloon-occluded gastrojejunostomy bypass (EPASS)¹. A special double-balloon enteric tube which can store the saline in the jejunum only between two inflated balloons, enabling successful puncture and advancement of stent. EUS-GJ is expected to have long-term patency because a stent does not interfere with stenosis, namely "short-cut". It is considered to be the preferred palliative treatment for cancer patients with markedly reduced quality of life associated with GOO. In this lecture, I show EPASS technique for the malignant GOO with procedure videos.

EUS-GJ has the potential to become one of the standard treatments for GOO. To confirm the efficacy of EUS-GJ by EPSS technique, clinical prospective trials with comparison to luminal enteral stents and surgical gastrojejunostomy are warranted.

References

1. Itoi T, Ishii K, Ikeuchi N, et al. Prospective evaluation of endoscopic ultrasonography-guided double-balloon-occluded gastrojejunostomy bypass (EPASS) for malignant gastric outlet obstruction. *Gut* 2016;65:193-195.
2. Itoi T, Baron TH, Khashab MA, et al. Technical review of endoscopic ultrasonography-guided gastroenterostomy in 2017. *Dig Endosc*. 2017;29:495-502.
3. Chen YI, Kunda R, Storm AC, et al. EUS-guided gastroenterostomy: a multicenter study comparing the direct and balloon-assisted techniques. *Gastrointest Endosc*. 2018;87:1215-1221.
4. Perez-Miranda M, Tyberg A, Poletto D, et al. EUS-guided Gastrojejunostomy Versus Laparoscopic Gastrojejunostomy: An International Collaborative Study. *J Clin Gastroenterol*. 2017;51:896-899.

5. Chen YI, Kunda R, Storm AC, et al. EUS-guided gastroenterostomy: a multicenter study comparing the direct and balloon-assisted techniques. *Gastrointest Endosc.* 2018;87:1215-1221.

Keywords: Eus-guided gastrojejunostomy, Malignant gastric outlet obstruction, Lumen-apposing metal stent, Duodenal stent, Eus-guided double-balloon-occluded gastrojejunostomy bypass



UGI 2-4

Case-Based Discussion

Chan Gyo Kim

National Cancer Center, Korea

Curriculum Vitae

Educational Background

- 1987-1993. Medical Doctor, Seoul National University, Korea
- 1993-1994. Internship, Seoul National University Hospital, Korea
- 1994-1998. Residency, Department of Internal Medicine, Seoul National University Hospital, Korea
- 2001-2003. Clinical and Research Fellowship, Division of Gastroenterology, Department of Internal Medicine, Seoul National University Hospital, Korea

Professional Experiences

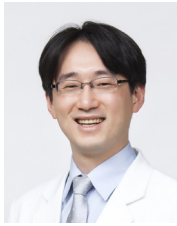
- 2003–present. Staff Physician, Center for Gastric Cancer, Research Institute and Hospital, National Cancer Center, Korea
- 2015-2019.1. Head of Endoscopy Center, National Cancer Center, Korea
- 2018-present. Head of Center for Gastric Cancer, National Cancer Center, Korea
- 2018-present. Adjunct Professor, Department of Cancer Biomedical Science, National Cancer Center Graduate School of Cancer Science and Policy, Korea
- 2019-present. Chair, Department of Internal medicine, National Cancer Center

Professional Organizations

- 1993 Medical Doctor License, Korea
- 1998 Board Certification of Internal Medicine, Korea
- 2002 Board of Gastrointestinal Endoscopy, Korea
- 2003 Specialty Board of Gastroenterology, Korea

Main Scientific Publications related with Symposium

1. Kim CG, Choi IJ, Lee JY, et al. Outcomes of second self-expandable metallic stent insertion for malignant gastric outlet obstruction. *Surg Endosc* 2013.
2. Kim CG, Park SR, Choi IJ, et al. Effect of chemotherapy on the outcome of self-expandable metallic stents in gastric cancer patients with malignant outlet obstruction. *Endoscopy* 2012;44:807-12.
3. Kim J, Choi IJ, Kim CG, et al. Self-expandable metallic stent placement for malignant obstruction in patients with locally recurrent gastric cancer. *Surg Endosc* 2010.
4. Kim CG, Choi IJ, Lee JY, et al. Covered versus uncovered self-expandable metallic stents for palliation of malignant pyloric obstruction in gastric cancer patients: a randomized, prospective study. *Gastrointest Endosc* 2010;72:25-32.



UGI 2-5

Self-Expandable Metallic Stent for Anastomosis Site Leakage after Gastrectomy

Chan Hyuk Park

Department of Internal Medicine, Hanyang University Guri Hospital, Guri, Korea

Age and Gender: 72/M**Chief Complaints:** Abdominal pain and fever

Present Illness: A 72-year-old male patient complained of abdominal pain and fever. Two days ago, he had undergone laparoscopic proximal gastrectomy for early gastric cancer located in the cardia. Abdominal CT scan showed suspicious leakage at the anastomosis site with free air and ascites.

Past History: Hypertension**Family History:** none**Physical Examination and Laboratory Findings:**

- Physical Examination: epigastric tenderness (both direct and rebound)
- Laboratory Findings:
 - ① WBC 5,470/ μ L (seg 88.3%), Hemoglobin 11.7 g/dL, Platelet 143,000 / μ L
 - ② BUN/Cr 26.6/0.97 mg/dL, Total Protein/Albumin 5.2/2.8 g/dL
 - ③ AST/ALT 28/23 IU/L, Total bilirubin 1.4 mg/dL

Endoscopic Findings:

- Proximal gastrectomy status
- Fistulous opening at just over anastomosis site (hole size, 1 mm)

Hospital Progress: Fully covered self-expandable metallic stent (SEMS) was placed at the anastomosis site. After 3 days, the stent was removed due to proximal migration of the. When observing leakage site, the hole was rather larger. The second fully covered SEMS was placed at the anastomosis site. After 4 weeks, the stent was removed and complete healing of anastomosis site leakage was identified.

Keywords: Stent, Anastomosis, Leakage



UGI 3-1

Update on Imaging Enhanced Endoscopy

Jean-Francois Rey

Gi Unit, Institut Arnault Tzanck, Saint Laurent Du Var, France

Imaging enhanced endoscopy (IEE) has been a major breakthrough linked with high definition endoscopy in digestive endoscopy. For detection the most important factor relies on high resolution endoscopy but with last generation endoscope IEE could improve detection of colonic polyp.

After some confusing technologies (FICE, I-Scan) it is now easier to understand the clinical outcome of IEE as all manufacturers develop a similar optical technique called NBI (Olympus) BLI (Fujifilm) OE (Pentax) or VAST (Sonoscape).

Most of papers have initially been based on NBI. All these techniques allow characterization of digestive lesions in order to assess the clinical outcome: leave as non-neoplastic, remove as benign or superficial cancer (polypectomy, EMR, ESD) or send to surgery. The best example is the NICE and JNET classifications for colonic polyp. But definition of depth of invasion is also carried out for superficial gastric or esophageal carcinomas.

As outside Asia NBI technology with magnification is not commonly used in daily practice we could expect soon improvement linked with computer-aid endoscopy.

Keywords: Imaging, Classifications, Characterisation



UGI 3-2

Effectiveness of BLI and LCI in the Upper GI Tract

Fabian Emura

EmuraCenter LatinoAmerica & University of La Sabana, Colombia

Curriculum Vitae**Educational Background**

- 4/2003-3/2005 Clinical Fellow. Interventional Endoscopy and Gastrointestinal Surgery.
National Cancer Center. Tokyo. Japan.
- 10/1999-3/2003 Ph.D. Gastrointestinal Tumors.
University of Tsukuba, Tsukuba. Japan.
- 4/1994-3/1998 Clinical Fellow in General Surgery.
National University, Bogotá. Colombia.
- 5/1985-10/1991 Physician and Surgeon.
Universidad del Valle. Cali. Colombia.

Professional Experiences***University Position:***

- 04/2012~ Associate Professor of Medicine. Gastroenterology Division.
Universidad de La Sabana. Bogotá, Colombia.
- 07/2008~2012 Auxiliary Professor of Medicine.
Universidad de La Sabana. Bogotá, Colombia.
- 04/2006~12/2007 Director. Cancer Research Unit.
Assistant Professor of Gastroenterology El Bosque University. Bogotá. Colombia.
- 8/2005~ 8/2007 Visiting Professor of Medicine.
Valle University. Cali. Colombia.

Clinical Appointments:

- 09/2008~ Director. World Endoscopy Training Center in ESD, NBI, BLI, LCI and systematic
alphanumeric coded endoscopy (SACE).
- 8/2006~ Gastroenterologist. Organización Sanitas International.
Clínica Colombia. Bogotá, Colombia.
- 4/2006~ Medical Director. Advanced Digestive Endoscopy.
EmuraCenter LatinoAmerica. Bogotá, Colombia.
- 4/2005~3/2006 Clinical Scientist. Gastrointestinal Endoscopy Division.
National Cancer Center. Tokyo. Japan.
- 4/2003~3/2005 Clinical Fellow. Endoscopy Division and Gastrointestinal Surgery Division.
National Cancer Center, Tokyo, Japan.
- 10/1997~2/1999 Chief Emergency Room, Marly Clinic, Bogotá.
- 4/1998-6/1999 General Surgeon, Bosa State Hospital, Bogotá.



UGI 3-3

Magnifying Endoscopy in Upper GI Tract

Gwang Ha Kim

Department of Internal Medicine, Pusan National University School of Medicine, and Biomedical Research Institute, Pusan National University Hospital, Busan, Korea

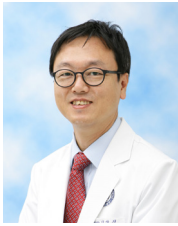
Narrow-band imaging (NBI) system utilizes two narrow-band illuminations of 415 nm and 540 nm by the NBI filter, corresponding to peak absorption of hemoglobin.¹ Therefore, thin blood vessels in the mucosal layer can be seen more distinctly than in conventional endoscopy. On NBI, most early esophageal squamous cell carcinomas (SCCs) are seen as brownish areas.² Especially, magnifying endoscopy with NBI (ME-NBI) is a powerful tool to characterize the lesion.³ With magnification, regularity of the intraepithelial papillary capillary loops (IPCLs) can be evaluated. IPCLs which can be observed during ME-NBI work as an indicator of tissue atypia in the squamous epithelium.⁴ To date, two different ME classifications, established by Inoue and Arima, have been reported to be useful for predicting depth of invasion of SESCC.^{3,4} However, both classifications are difficult to apply because of their complicated criteria. Recently, the Japan Esophageal Society (JES) proposed a new ME classification based on these two classifications.⁵ Type B suggesting SCC is classified into three subtypes. Type B1 consists of abnormal microvessels with four characteristic findings and a conserved loop-like formation, corresponding to m1 or m2. Type B2 consists of stretched and markedly elongated transformations without a loop-like formation, corresponding to m3 or sm1. Type B3 consists of highly dilated irregular vessels with a caliber that appears to be more than three times that of type B2 vessels, corresponding to sm2 or deeper. This new ME classification is simple and useful for estimating depth of invasion of SESCC, and interobserver agreement is reliable.³ However, its accuracy decreases for type B2 tumors. Therefore, establishment of a revised classification including modification of the definition of type B2 will be considered, and prospective multi-center studies are needed to validate these results.

ME-NBI also enables evaluation of detailed visualization of microstructures and microvessels within the superficial layer of the gastric mucosa.⁶ For example, my recent study reported that the appearance of a light blue crest and a white turbid band in the mucosa is a distinctive endoscopic finding that suggests an increased probability of intestinal metaplasia.⁷ Yao et al. first reported unique ME-NBI findings based mainly on the subepithelial microvascular (MV) and microsurface (MS) architecture characteristics of differentiated-type early gastric cancers (EGCs).⁸ ME-NBI is also capable of predicting the histological characteristics of EGCs; a fine network or intralobular pattern suggests differentiated-type carcinomas and a corkscrew pattern suggests undifferentiated-type carcinomas.^{9,10} Clinically ME-NBI is useful for the differential diagnosis of focal gastritis and small depressed cancer and for determining the horizontal extent of early gastric cancer for successful endoscopic resection.⁶ Advantages of ME-NBI over conventional endoscopic imaging techniques with white light include accurate diagnosis and cost effectiveness.

References

1. Muto M. Endoscopic diagnostic strategy of superficial esophageal squamous cell carcinoma. *Dig Endosc* 2013;25 Suppl 1:1-6.
2. Muto M, Horimatsu T, Ezoe Y, Morita S, Miyamoto S. Improving visualization techniques by narrow band imaging and magnification endoscopy. *J Gastroenterol Hepatol* 2009;24:1333-1346.
3. Kim SJ, Kim GH, Lee MW, et al. New magnifying endoscopic classification for superficial esophageal squamous cell carcinoma. *World J Gastroenterol* 2017;23:4416-4421.
4. Inoue H, Kaga M, Ikeda H, et al. Magnification endoscopy in esophageal squamous cell carcinoma: a review of the intrapapillary capillary loop classification. *Ann Gastroenterol* 2015;28:41-48.
5. Oyama T, Inoue H, Arima M, et al. Prediction of the invasion depth of superficial squamous cell carcinoma based on microvessel morphology: magnifying endoscopic classification of the Japan Esophageal Society. *Esophagus* 2017;14:105-112.
6. Yao K. Clinical Application of Magnifying Endoscopy with Narrow-Band Imaging in the Stomach. *Clin Endosc* 2015;48:481-490.
7. An JK, Song GA, Kim GH, et al. Marginal turbid band and light blue crest, signs observed in magnifying narrow-band imaging endoscopy, are indicative of gastric intestinal metaplasia. *BMC Gastroenterol* 2012;12:169.
8. Yao K, Oishi T, Matsui T, Yao T, Iwashita A. Novel magnified endoscopic findings of microvascular architecture in intramucosal gastric cancer. *Gastrointest Endosc* 2002;56:279-284.
9. Nakayoshi T, Tajiri H, Matsuda K, Kaise M, Ikegami M, Sasaki H. Magnifying endoscopy combined with narrow band imaging system for early gastric cancer: correlation of vascular pattern with histopathology (including video). *Endoscopy* 2004;36:1080-1084.
10. Ok KS, Kim GH, Park do Y, et al. Magnifying Endoscopy with Narrow Band Imaging of Early Gastric Cancer: Correlation with Histopathology and Mucin Phenotype. *Gut Liver* 2016;10:532-541.

Keywords: Magnifying endoscopy, Esophagus, Stomach, Squamous cell carcinoma, Gastric cancer



UGI 3-4

PCLE in Upper GI Tract

Sang Kil Lee

Internal Medicine, Yonsei University College of Medicine, Seoul, Korea

Introduction

Endoscopy is the essential procedure for the diagnosis of gastrointestinal (GI) disease. Subsequential biopsy and histologic diagnosis was the gold standard for final diagnosis. However, detection of dysplasia in the inflamed stomach and intestine, detection of malignancies and discrimination of inflammatory disease from neoplasia remain was not easy to get.

Confocal laser endomicroscopy (CLE) is a technology that allows the user to get microscopic views of the mucosa in real time during endoscopy. The technology can be used through a single endoscope-based system (CLE) (OptiScan, Notting Hill, Australia) or through a probe-based system known as probe-based confocal laser endomicroscopy (PCLE) (Cellvizio; Mauna Kea Technologies, Paris, France).(1) CLE is one of the newest advancements in diagnostic endoscopy and is a highly promising technique for investigating the mucosal surface together with its immediate subsurface areas. Cell structures and tissue morphological characteristics can be visualized to a maximum depth of 250 μm .(2) Recently, there are efforts to use CLE not only for the means for replacing the biopsy, but also for monitoring and prediction the progression of GI disease. In this review, we will touch the indications of CLE in GI disorders.

Barrett's Esophagus (BE) and adenocarcinoma of esophagus

The first trial of CLE with eCLE to predict BE and associated neoplasia was done at 2006 Kiesslich R, et al.(3) In this study included 63 patients with BE found that CLE predicted BE and associated neoplasia with a sensitivity of 98.1% and 92.9% and a specificity of 94.1% and 98.4%, respectively. Recently Canto et al. did randomized controlled trial that included 192 study patients with BE compared high-definition WLE alone with random biopsy and high-definition WLE with CLE and targeted biopsy.(4) Adding CLE to high-definition WLE increased the rate of sensitivity from 40% to 96% without significantly compromising the rate of specificity (92%). Generally speaking, pCLE showed improved efficacy compared to WLE or high definition endoscopy. However there is debate that pCLE can replace the standard practice for the diagnosis of BE-associated neoplasia due to its low positive predictive value and sensitivity.

Stomach

CLE was tried to characterize dysplasia or cancer and to find the risk factors of gastric cancer such as intestinal metaplasia and existence of *Helicobacter pylori* in vivo. In Asian country including Korea

and Japan, the most of EGC are detected by white light endoscopy, however, identification of EGC is difficult because some lesions are very little to recognize and metaplasia on background make endoscopist difficult to find. In the largest published study on the use of CLE for the detection of gastric superficial cancerous lesions, 182 patients were enrolled in phase I to establish morphologic criteria for gastric superficial cancerous lesions and 1,786 patients were enrolled in phase II for prospective validation.(4) CLE criteria for cancer/high-grade intraepithelial neoplastic lesions were irregularity in glandular size and shape, disorganized or destroyed pits and glands, irregular cells with disordered appearance, severe stratification, loss of cell polarity, and irregular shape and caliber of vessels. Using these criteria, eCLE had higher sensitivity (88.9%), specificity (99.3%), and accuracy (98.8%) for the diagnosis of gastric superficial cancer/high-grade intraepithelial neoplastic lesions than WLE (sensitivity, 72.2%; specificity, 95.1%; and accuracy, 94.1%).(4) Furthermore, there were trials to figure out and grade intestinal metaplasia and atrophic gastritis which were confirmed pre-cancerous lesion of gastric cancer by CLE. CLE showed distinct features of intestinal metaplasia, and CLE with targeted biopsies is superior to WLE with standard biopsies for the detection and surveillance of GIM.(5) Recently, Liu et al. reported a new application of pCLE as grading of atrophic gastritis.(6) In this study pCLE had a higher sensitivity, specificity, and accuracy compared with NBI and CE, which were equivalent for diagnosis of atrophic gastritis.

However, there is also some drawbacks of application of CLE in stomach. The performance and interpretation of pCLE for gastric lesions also depends on examiner and reviewer.

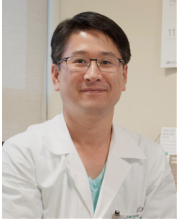
Conclusions

Confocal laser endomicroscopy (CLE) is an endoscopic-assisted technique developed to obtain histopathological diagnoses of upper gastrointestinal in real time. Recent research about CLE have shown clinical application and efficiency in gastrointestinal disease, however there are still limitations to use CLE as standard tool as diagnosis and monitor GI disease.

References

1. Committee AT. Confocal laser endomicroscopy. *Gastrointest Endosc.* 2014;80(6):928-38.
2. Choi KS, Jung HY. Confocal laser endomicroscopy and molecular imaging in Barrett esophagus and stomach. *Clin Endosc.* 2014;47(1):23-30.
3. Kiesslich R, Gossner L, Goetz M, Dahlmann A, Vieth M, Stolte M, et al. In vivo histology of Barrett's esophagus and associated neoplasia by confocal laser endomicroscopy. *Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association.* 2006;4(8):979-87.
4. Li WB, Zuo XL, Li CQ, Zuo F, Gu XM, Yu T, et al. Diagnostic value of confocal laser endomicroscopy for gastric superficial cancerous lesions. *Gut.* 2011;60(3):299-306.
5. Li Z, Zuo XL, Yu T, Gu XM, Zhou CJ, Li CQ, et al. Confocal laser endomicroscopy for in vivo detection of gastric intestinal metaplasia: a randomized controlled trial. *Endoscopy.* 2014;46(4):282-90.
6. Liu T, Zheng H, Gong W, Chen C, Jiang B. The accuracy of confocal laser endomicroscopy, narrow band imaging, and chromoendoscopy for the detection of atrophic gastritis. *Journal of clinical gastroenterology.* 2015;49(5):379-86.

Keywords: Confocal laser endomicroscopy, Barrett's esophagus, Stomach



UGI 4-1

Detection and Pretreatment Evaluation of Esophagogastric Junctional Neoplasms

Jae Myung Park

Internal Medicine, The Catholic University of Korea, Seoul, Korea

The past decade has also seen changes in the epidemiology of esophageal and gastric cancer. The incidence of lower third and esophagogastric junctional (EGJ) adenocarcinomas has increased further, and these tumors form the most common EGJ tumor, probably reflecting the effect of chronic gastro-esophageal reflux disease (GERD) and the epidemic of obesity. The management of esophageal cancer remains clinically challenging, not only in terms of identifying patients at high risk, but also because of the overall poor prognosis of the disease.

The EGJ zone is a short segment which is identified as a transitional zone by multiple indicators. EGJ zone has a different histological structure and mucus secretion function from proper esophagus and stomach, such as columnar epithelium, cardiac mucosa, squamous cell mucosa and esophageal gland. Several studies have shown the possibility of distinct pathways in carcinogenesis of the EGJ adenocarcinoma, suggesting a different pathway from gastric corpus cancer. Two different pathways, i.e. intestinal metaplasia related and unrelated, with high and low gastric acid secretion, and with and without gastric atrophy have been observed. Therefore, several types of cancer having different origins are speculated to be located in the EGJ area. It is widely accepted that intestinal metaplasia in both the gastric mucosa and columnar-lined esophagus is the probable common precursor of adenocarcinoma.

Serological markers of gastric mucosal phenotype (*Helicobacter pylori*, pepsinogen I, II and gastrin) and presence versus absence of GERD symptoms suggest two distinct etiologies of cardia adenocarcinoma with some resembling *Helicobacter pylori*-induced gastric adenocarcinoma arising against a background of this infection and atrophic gastritis and others acid reflux-induced esophageal adenocarcinoma arising against a background of *pylori*-negative healthy acid secreting stomach and reflux symptoms.

EGJ area is not easily observed because of the anatomical and histological transitional nature. Therefore, Endoscopists should perform the diagnostic evaluation with the most appropriate methods to look at the distal end of esophagus and upper end of gastric folds. To clearly identify the upper end of gastric folds by endoscopy, the air must be properly deflated. Excessive air inflation or deflation sometimes changes the position of the upper end of the gastric folds. The distal end of palisade vessels is considered to be the endoscopic landmark of the EGJ. The palisade vessels, however, can be difficult to identify endoscopically particularly in Barrett esophagus where inflammation or mucosal dysplastic change may obscure them. Insufficient air inflation can also render them difficult to visualize. In clinical practice, air must be properly deflated when observing the gastric folds by endoscopy. Excessive air deflation changes the position of the upper end of the gastric folds. In addition,

respiratory movement, pulsation of heart, and contraction of the lower esophageal sphincter further complicate accurate identification of the GEJ. Image-enhanced endoscopy (IEE) with or without magnification is likely to improve diagnostic yields of adenocarcinoma arising in the EGJ area, but there are no clear differences in diagnostic yields between chromoendoscopy and equipment-based IEE, from the evidence obtained by Barrett's adenocarcinoma and gastric adenocarcinoma.

Keywords: Esophagogastric junction, Neoplasms, Endoscopy



UGI 4-2

Advanced Imaging in EGJ Neoplasms

Helmut Messmann

III Med, University Hospital Augsburg, Augsburg, Germany

Advanced imaging in EGJ neoplasms is faced with the problem of detection, delineation and differentiation. In Barrett's esophagus the Seattle biopsy protocol is still the standard and the pathologist has the difficult task to differentiate the various types of neoplasia in Barrett's esophagus including second opinion.

To overcome this problem various techniques have been investigated or are still under investigation.

A new technique (WATS (Wide Area Transepithelial Sampling) of tissue sampling with a special brush generates more than normal cytology. With this special brush a wide area (WA) of Barrett's mucosa is brushed and the brushes samples tissues which is transepithelial (TS) and will be analyzed with a special computer software, which generates a kind of 3 dimensional tissues samples. First results are promising and have the potential to substitute the Seattle-biopsy protocol.

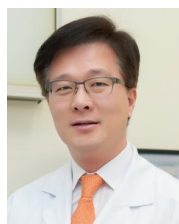
Similar to classifications of neoplasia in the colon a new classification system for Barrett's esophagus has been developed (BING). By using the NBI technology characteristic appearance of the mucosal and vascular structure of Barrett neoplasia has been described very simple as abnormal for HGD/Ca and normal for Barrett without dysplasia. This simple classification has a high NPV and should be helpful to reduce the number of biopsies to detect and differentiate HGS/Ca from normal mucosa.

Similar results have meanwhile produced for BLI and i-scan. BLI showed advantages in detection and delineation of Barrett neoplasia in expert hands. I-scan showed advantage in sensitivity, specificity, and accuracy in detection of dysplasia, independent of the experience of the endoscopist (trainee and experts).

Among chromoendoscopy acetic acid has meanwhile become the most attractive substance. In the ABBA trial it could be shown, that compared to the Seattle Biopsy Protocol less biopsies are necessary to detect neoplasia and is therefore cost effective.

A recent publication from our group showed, that artificial intelligence by using deep learning is able to differentiate regular Barrett mucosa from neoplastic mucosa by using still images. In this study the computer was superior to endoscopist in the differentiation of Barrett tissue. Further research is necessary to use this technique for real life endoscopy.

Keywords: Egj



UGI 4-3

Endoscopic Submucosal Dissection for EGJ Neoplasms

Do Hoon Kim

Departments of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea

Adenocarcinoma of the esophagogastric junction (EGJ) has shown an increasing incidence over the last few decades in Western countries, whilst the incidence of non-cardia cancer has decreased. However, it is unclear whether similar changes are occurring in Asia, with inconsistent study data and lack of population-based studies. Because of its later presentation and higher incidence of lymph node metastasis, adenocarcinoma of the EGJ has been known to have poorer prognosis than cancers involving other parts of the stomach. The location itself has therefore been revealed to be an independent prognostic factor in previous studies. Early detection and complete resection of tumors with lymph node dissection is important, and the treatment strategy for EGJ cancer should consider its anatomic location, which requires total gastrectomy with transhiatal resection of distal esophagus in surgically indicated cases.

Endoscopic submucosal dissection (ESD) has been accepted as the standard treatment for early gastric cancer (EGC) due to its minimal invasiveness and favorable outcomes in suitable indications. With effective endoscopic surveillance, gastric cancers are increasingly diagnosed at an early stage and may be amenable to endoscopic treatment. The proportion of early stage EGJ cancer cases has also shown an increasing trend over time. However, ESD of EGJ cancer is technically difficult. EGJ is an anatomic location where the narrow and curved space of the tubular esophagus flares to become the sac-like stomach. Dynamic peristaltic activity of the distal esophagus and contractions of the lower esophageal sphincter render endoscopic procedures difficult in this area. In addition, to access the tumors in the gastric cardia, retroflexion and sophisticated manipulation of the scope is often needed. These technical difficulties to resect tumors in this complex region may contribute to the relatively low complete resection and curative resection rates compared to resections in other parts of the stomach. Therefore, efforts should be made to overcome these technical difficulties and to improve the curative resection rate.

ESD for EGJ cancer shows a relatively low rate of curative resection compared to resection of other parts of the stomach but may be an effective and safe treatment strategy on the basis of favorable long-term outcomes. For tumors that meet the absolute or expanded criteria for endoscopic resection, ESD is an acceptable alternative to surgery and favorable outcomes can be expected.

Keywords: Endoscopic submucosal dissection, Esophagogastric junction neoplasm



UGI 4-4

Endoscopic Therapy: Mucosectomy and Radiofrequency Ablation for EGJ Neoplasms

Mario Dinis Ribeiro

Gastroenterology, Instituto Portugues De Oncologia Francisco Gentil, Leasbon, Portugal

Superficial management of gastro-esophageal junction lesions may be considered a challenge. Regarding the approach to a superficial lesion and according to current guidelines, the presence of Barrett's esophagus should be assessed. Thereafter, the management varies as piecemeal mucosectomy (and radiofrequency ablation) is the standard for a Barrett's superficial lesion; whereas enbloc ESD is considered the standard for cardiac (gastric) lesions. Moreover, from training and patients' perspective these lesions must also be considered as those where learning is more demanding and non-curative resections are not infrequent. We will present a structured approach to GEJ superficial lesions and a personal perspective to the management of these patients.

Keywords: Egj neoplasms

IDEN International
2019 Digestive
Endoscopy
Network
2019

June 14 (Fri), 2019

Lower GI





LGI 1-1

Chromoendoscopy for Colorectal Neoplasia: Still Useful?

Masau Sekiguchi^{1,2,3}

¹Cancer Screening Center, National Cancer Center Hospital, Tokyo, ²Endoscopy Division, National Cancer Center Hospital, Tokyo, ³Division of Screening Technology, Center for Public Health Sciences, National Cancer Center, Tokyo, Japan

Colonoscopy plays important roles in detection, diagnosis, and treatment of colorectal neoplasia. Magnifying image-enhanced endoscopy (IEE) has been established as useful for both qualitative and quantitative diagnosis of colorectal neoplasia. IEE is sub-divided into digital, optical-digital and chromoendoscopy methods, and several modalities are available for each of these [1]. Narrow band imaging (NBI) is in the category of the optical-digital method and can reportedly achieve detailed evaluation of colorectal neoplasia without requiring time-consuming chromoendoscopy. Thus, the question arises: is chromoendoscopy still required for diagnosis of colorectal neoplasia?

The extremely high accuracy with which magnifying chromoendoscopy differentiates neoplastic from non-neoplastic lesions has long been well established [2-4]. Magnifying NBI reportedly has a comparably high accuracy and, when performed by experts, has been accepted as a useful real-time endoscopic assessment tool for qualitative diagnosis [5-8]. Thus, it can be postulated that NBI could replace chromoendoscopy for making qualitative diagnoses in most cases. However, magnifying chromoendoscopy is still sometimes required when an optical histological diagnosis cannot be made with high confidence using NBI.

Additionally, magnifying chromoendoscopy can play many roles in the quantitative diagnosis of deep submucosal invasive cancer. Although the diagnostic accuracy of magnifying NBI is reportedly high, it is still not comparable to that of magnifying chromoendoscopy; several recent studies have shown that magnifying chromoendoscopy is more accurate and reliable than magnifying NBI in the quantitative (depth) diagnosis of colorectal neoplasia [9, 10]. Thus, when and how is use of magnifying chromoendoscopy indicated for making quantitative diagnoses? This question can be answered as follows: magnifying chromoendoscopy is required when magnifying NBI is unable to exclude deep submucosal invasive cancer. Specifically, when the use of magnifying NBI results in a diagnosis of JNET type 2B, it is recommended that magnifying chromoendoscopy with crystal violet staining be performed to evaluate the pit pattern. The JNET classification has recently been developed in Japan as a universal NBI magnifying endoscopic classification of colorectal neoplasia [11]. The category of JNET type 2B is characterized by the endoscopic findings of variable caliber and irregular distribution of vessels and irregular or obscure surface pattern, indicating high grade intramucosal neoplasia or submucosal invasive cancer (the possibility of deep submucosal invasive cancer cannot be excluded). The finding of "invasive pattern" by evaluation using magnifying chromoendoscopy can be helpful in achieving a diagnosis of deep submucosal invasive cancer [12].

In this presentation, the above-mentioned issues will be discussed and several clinical cases that illustrate the usefulness of magnifying NBI and chromoendoscopy will be shown.

References

1. Tajiri H and Niwa H. A new classification and precise definitions of endoscopic imaging. *Gastrointestinal Endoscopy*. 2009; 51: 1677-82. [In Japanese]
2. Kudo S, Tamura S, Nakajima T, et al. Diagnosis of colorectal tumorous lesions by magnifying endoscopy. *Gastrointest Endosc*. 1996; 44: 8-14.
3. Fu KI, Sano Y, Kato S, et al. Chromoendoscopy using indigo carmine dye spraying with magnifying observation is the most reliable method for differential diagnosis between non-neoplastic and neoplastic colorectal lesions: a prospective study. *Endoscopy*. 2004; 36: 1089-93.
4. Li M, Ali SM, Umm-a-OmarahGilani S, et al. Kudo's pit pattern classification for colorectal neoplasms: a meta-analysis. *World J Gastroenterol*. 2014; 20: 12649-56.
5. Sano Y, Ikematsu H, Fu KI, et al. Meshed capillary vessels by use of narrow-band imaging for differential diagnosis of small colorectal polyps. *Gastrointest Endosc*. 2009; 69: 278-83.
6. McGill SK, Evangelou E, Ioannidis JP, et al. Narrow band imaging to differentiate neoplastic and non-neoplastic colorectal polyps in real time: a meta-analysis of diagnostic operating characteristics. *Gut*. 2013; 62: 1704-13.
7. ASGE Technology Committee, Abu Dayyeh BK, Thosani N, Konda V, et al. ASGE Technology Committee systematic review and meta-analysis assessing the ASGE PIVI thresholds for adopting real-time endoscopic assessment of the histology of diminutive colorectal polyps. *Gastrointest Endosc*. 2015; 81: 502.e1-502.e16.
8. Guo TJ, Chen W, Chen Y, et al. Diagnostic performance of magnifying endoscopy with narrow-band imaging in differentiating neoplastic colorectal polyps from non-neoplastic colorectal polyps: a meta-analysis. *J Gastroenterol*. 2018; 53: 701-11.
9. Zhang QW, Teng LM, Zhang XT, et al. Narrow-band imaging in the diagnosis of deep submucosal colorectal cancers: a systematic review and meta-analysis. *Endoscopy*. 2017; 49: 564-80.
10. Sakamoto T, Nakajima T, Matsuda T, et al. Comparison of the diagnostic performance between magnifying chromoendoscopy and magnifying narrow-band imaging for superficial colorectal neoplasms: an online survey. *Gastrointest Endosc*. 2018; 87: 1318-23.
11. Sano Y, Tanaka S, Kudo SE, et al. Narrow-band imaging (NBI) magnifying endoscopic classification of colorectal tumors proposed by the Japan NBI Expert Team. *Dig Endosc*. 2016; 28: 526-33.
12. Matsuda T, Fujii T, Saito Y, et al. Efficacy of the invasive/non-invasive pattern by magnifying chromoendoscopy to estimate the depth of invasion of early colorectal neoplasms. *Am J Gastroenterol*. 2008; 103: 2700-6.

Keywords: Chromoendoscopy



LGI 1-2

Clinical Application of Image-Enhanced Endoscopy for Colorectal Neoplasia

Hyun Gun Kim

Internal Medicine, Soonchunhyang University College of Medicine, Seoul, Korea

Equipment assisted image-enhanced endoscopy (IEE) has been used for over a decade for the diagnosis of colorectal tumors. IEE systems, such as next generation narrow-band imaging (NBI), Fuji intelligent color enhancement (FICE), i-scan with optical enhancement (OE) systems, and blue laser imaging (BLI) are easily controllable and enable visualization of the capillary pattern of a lesion.

Colorectal tumors induce similar structural changes and irregularities in the capillary pattern and pit pattern of the colorectal mucosa. A dense capillary pattern detected by IEE is considered diagnostic of colorectal tumors, and the capillary pattern becomes more irregular and dense as the invasiveness and malignancy of the lesion increase.

IEE is applied clinically for the assessment of polyp histology. IEE has advantages over white light endoscopy (WLE) for optical characterization of colorectal polyps, and has higher adenoma and polyp detection rates. Although sparse, the available evidence suggests that the various IEE systems have similar performance for the optical diagnosis of colorectal polyps.

IEE is also used for prediction of deep submucosal (SM) invasion by colorectal neoplasia. Several NBI based classifications for diagnosis of colorectal tumors have been proposed, most of which were developed in Japan. The NBI international colorectal endoscopic classification (NICE) and the Japanese NBI Expert Team (JNET) classifications have been recently provided and practically used, but still have some limitation to exact prediction between superficial invasion and deep invasive lesions. In that case, magnifying chromoendoscopy (MCE) can be used together to predict deep SM invasion. NBI and MCE show similar ability for optical diagnosis of T1 cancer and deep-invasive T1 cancer. Unfortunately, the evidence of the ability of other IEE systems to predict deep SM invasion is insufficient to draw firm conclusions.

IEE systems can facilitate the differential diagnosis of flat lesions, particularly sessile serrated adenoma and polyp (SSA/P). Several NBI findings—including varicose microvascular vessels, dilated and branching vessels, and a dark spot (indicating a type II-O pit pattern)—are used when assessing the histology of SSA/P. The Workgroup Serrated Polyp and Polyposis classification is based on the findings of IEE and WLE (including a clouded surface and indistinct border) and shows moderate accuracy for the diagnosis of SSA/P. Finally, linked color imaging is superior to WLE and BLI in terms of visualizing SSA/P.

IEEs have several advantages for the optical diagnosis of colorectal adenoma and SSA/P, and for prediction of deep SM invasion. However, the operator must traverse a steep learning curve and the inter observer agreement of IEE systems must be improved.

Keywords: Colon adenoma, Colon cancer, Image enhanced endoscopy, Sessile serrated adenoma



LGI 1-3

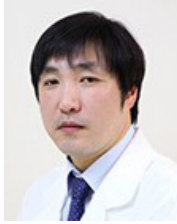
Show Me the Cells: Confocal Laser Endomicroscopy and Endocytoscopy

Yuichi Mori

Digestive Disease Center, Showa University Northern Yokohama Hospital, Yokohama, Japan

Recently, two types of ultra-magnifying endoscope are being applied to clinical practice which enables in vivo cellular observation; Endocytoscopy (EC; CF-H290ECI, Olympus, Tokyo) and Confocal laser endomicroscopy (CLE; Cellvizio, Mauna Kea Corp. Paris). EC is an endoscope, on the tip of which a microscopic lens is attached, allows visualization of cellular lumens, nuclei, and vessels with 520 fold magnification. On the other hand, CLE is a probe-based laser endoscope which analyzes the excitation light emitted by fluorescein flown in the mucosa, allowing visualization of cellular lumens and vessels with 1000 fold magnification. Both EC and CLE provide higher diagnostic performance in pathological prediction of colorectal polyps in comparison with the previously developed endoscopes. In addition to these strengths, these endoscopes are expected to realize the “future medicine”, namely EC is being applied for the automated diagnostic system powered by artificial intelligence, while CLE can be used for the endoscopic molecular imaging.

Keywords: Endomicroscopy



LGI 1-4

Case-Based Discussion

Hyoun Woo Kang

Internal Medicine, Dongguk University Ilsan Hospital, Goyang, Korea

Age and Gender: M/63

Chief complains: For screening colonoscopy

Present Illness: A-63-old male patient visited outpatient clinic for screening colonoscopy. The previous colonoscopy 7 years ago was negative.

Past History: He had a history of hypertension and was taking calcium channel blocker.

Family History: None

Physical examination and Laboratory Findings: The abdomen was soft and flat without any abnormal sign.

WBC: 6,700/uL- Hemoglobin 13.5 g/dL-Platelet 198,000/uL
AST/ALT 18/20 IU, Total bilirubin 0.6 mg/dL, BUN/Cr 10.2/0.8 mg/dL

Endoscopic and Radiologic Findings: Colonoscopy showed 40x10 mm sized laterally spreading tumor in sigmoid colon. Chromendoscopic findings using indigocarmine shows Vi pit pattern and using crystal violet shows Vi pit pattern.

Hospital Progress: After he underwent ESD, he discharged without complication. 1 year Follow-up colonoscopy showed no recurrence.

Keywords: Colonoscopy, Laterally spreading tumor, Pit pattern



LGI 1-5

Treatment of Synchronous Colorectal Cancer

Seung-Joo Nam

Internal Medicine, Kangwon National University School of Medicine, Chuncheon, Korea

Age and Gender: 70/Female

Chief Complaint: For the management of colon polyps

Present Illness: A 70-year-old woman was referred to our hospital for the management of multiple colon polyps discovered by screening colonoscopy one month ago.

Past History: Hypertension on angiotensin II receptor antagonist

Family history: none

Physical Examination and Laboratory Findings:

- Physical Examination: Unremarkable
- Laboratory Finding:
 - WBC 7,700 / μ L – Hemoglobin 13.2 g/dL – Platelet 386,000 / μ L
 - BUN/Cr 12.2/0.6 mg/dL
 - Prothrombin time 0.96 INR, activated partial thromboplastin time 28.2 sec
 - CEA 4.2 ng/mL

Endoscopic and Radiologic Finding: Colonoscopy showed a lateral spreading tumor in ascending colon and diffuse circumferential nodular mucosa involving the whole rectum from rectosigmoid junction to anus.

Hospital progress: The patient underwent endoscopic submucosal dissection for the lateral spreading tumor in ascending colon, and ultrashort anterior resection for the rectal lesion. The histopathologic examination revealed well-differentiated adenocarcinoma arising in tubulovillous adenoma with 1000 μ m submucosal invasion for ascending colon lesion, and well-differentiated intramucosal adenocarcinoma with regional lymph node metastasis for the rectal lesion. After the operation, she was scheduled for concurrent chemoradiation therapy for the rectal lesion.

Keywords: Colonoscopy, Lateral spreading tumor, Intramucosal cancer



LGI 2-1

Optimal Bowel Preparation for Colonoscopy

Chi Sang Wong

Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong, Sha Tin, Hong Kong

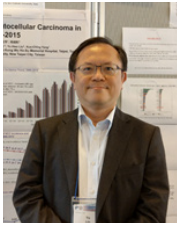
Colorectal cancer (CRC) is one of the most common malignancies worldwide. Colonoscopy could reduce its mortality, yet the effectiveness of colonoscopy is dependent on the quality of bowel preparation. Suboptimal bowel preparation will also increase the risk for procedure rescheduling and induce high costs. Previous studies reported a high rate of inadequate bowel preparation, ranging from 18-35%.

It has been shown that effective education could significantly improve the quality of bowel preparation. There has been evidence showing that split dosing could provide a higher-quality colonoscopy examination. Bowel preparation regimens typically incorporate dietary modifications along with oral cathartics. It is also important for preparation quality to be properly documented in colonoscopy reports.

We have conducted the first large-scale study in the Asia Pacific region which addressed the association between bowel preparation and adenoma detection rate (ADR) among asymptomatic screening CRC participants. It was found that the level of poor or fair bowel preparation was 34.6%. Older age, male sex, and smoking were associated with poorer bowel cleansing, which was associated with lower ADR for any neoplasia or neoplasia with diameter ≥ 5 mm. Poor preparation may obscure the colonoscopy field, thus rendering identification of colonic lesions more difficult.

Subjects at higher risk for inadequate cleansing should have more intensive preparation protocols. They are also individuals where steps to improve patient understanding of and compliance with bowel preparation are warranted. The low ADR among those with poor bowel cleansing found in this study alerts the need for emphasizing strategies to improve it in continuous quality improvement programs. Future studies should evaluate the reasons underlying poor bowel preparation, and devise targeted interventions to enhance the cleansing procedure.

Keywords: Bowel preparation, Colonoscopy Protocol, Agents



LGI 2-2

How to Improve My Adenoma Detection Rate?

Yu-Min Lin^{1,2}

¹Gastroenterology, Shin Kong Wu Ho-Su Memorial Hospital, Taipei, ²College of Medicine, Fu Jen Catholic University, New Taipei, Taiwan

Colonoscopy is the most powerful method for colorectal cancer (CRC) screening for its ability to perform both diagnostic and therapeutic procedures at the same time. Ensuring high quality colonoscopies is essential. Many international CRC screening guidelines define key indicators and recommend minimal benchmarks for assuring the quality of colonoscopy. For example, to view the entire colon and to avoid missing lesions, more than 95% of the colonoscopies should reach cecum with photo documentations; the withdrawal time from cecum to anus should not be shorter than 6 minutes; the adenoma detection rate (ADR) in the screening colonoscopies should be at least 30% of men and 20% of women.

The ADR is defined as the proportion of screening colonoscopies where at least one adenoma is found. It is a surrogate marker for missed lesions of colonoscopies and is practically auditable. Several key screening outcomes such as the incidence and mortality of interval cancer are closely linked to ADR. Based upon the strong supporting evidence, ADR is considered as the central component of quality indicators for colonoscopy.

To improve ADR, several key concepts should be emphasized. A high quality of bowel preparation and a careful inspection of the entire colon are critical for a better detection of colorectal adenomas. Accordingly, endoscopists should deliver effective agents, suggest proper timing for bowel cleaning and apply image enhanced endoscopy for diagnostic accuracy. A regular audit on quality metrics could help individuals and institutes to identify the limitations of each setting. Development of a reporting system with automatic data upload, transformation and feedback is expected. All these efforts may improve the adenoma detection rate.

Despite its importance, the ADR is not a perfect metric. Current ADR targets are stratified only by gender; further adjustments might be necessary that are based on the specific characteristics of the screened population. ADR is potentially corruptible and can miss in total adenoma detection. A qualified ADR does not guarantee a competent ability to remove polyps. These concerns underscore the fact that the standard ADR can overlook significant differences in colonoscopy quality. Other quality metrics should be developed for colonoscopy.

Keywords: Colonoscopy, Adenoma detection rate, Quality



LGI 2-3

How to Reduce Incomplete Polyp Resection?

Masau Sekiguchi^{1,2,3}

¹Cancer Screening Center, National Cancer Center Hospital, Tokyo, ²Endoscopy Division, National Cancer Center Hospital, Tokyo, ³Division of Screening Technology, Center for Public Health Sciences, National Cancer Center Hospital, Tokyo, Japan

Endoscopic resection is currently a major means of treating colorectal neoplasia, and it is performed to achieve curative and complete retrieval of colorectal neoplasia. Incomplete resection, such as when the vertical cut margin is positive, should be avoided. The following points must be understood to minimize incomplete resection.

First, the indications for endoscopic resection of colorectal neoplasia should be correctly understood. For instance, without this understanding an inappropriate attempt at endoscopic resection of invasive colorectal cancer, which requires surgery, may result in incomplete resection (e.g., a positive vertical margin), leading to unfavorable clinical outcomes. Because endoscopic resection is a local treatment, it is indicated only for lesions with a negligible risk of metastasis. The following factors are known risk factors for lymph node metastasis from colorectal neoplasia: invasion depth (deep submucosal [$\geq 1000 \mu\text{m}$] invasive cancer), histological type (poorly differentiated adenocarcinoma, signet-ring cell carcinoma, and mucinous carcinoma), lymphovascular invasion, and Grade 2/3 budding at the site of deepest invasion [1]. Of these factors, invasion depth can be predicted endoscopically before initiating treatment. Thus, the indications for endoscopic resection are as follows: intramucosal benign neoplastic tumors (including adenomatous and serrated lesions), and intramucosal and superficial submucosal cancers.

Second, appropriate selection of endoscopic treatment is essential. Currently, several techniques for endoscopic resection are available, including cold polypectomy, hot polypectomy, conventional endoscopic mucosal resection (EMR), and endoscopic submucosal dissection (ESD). Recently, cold polypectomy has attracted much attention because of its technical ease and low risk of adverse events; however, inappropriate use of this technique can lead to incomplete resection and recurrence [2]. Considering that cold polypectomy is performed without electrocautery, it should be indicated only for <10 mm non-pedunculated lesions with no endoscopic findings suggestive of advanced histology. Lesions with endoscopic findings suggestive of advanced histology or ≥ 10 mm in size usually require other resection techniques such as EMR. ESD is indicated for lesions for which en bloc resection is required (e.g., because of possible invasion of the submucosa) but would be difficult to achieve with conventional EMR. Thus, ≥ 20 mm laterally spreading tumors of non-granular type (LST-NG) and ≥ 30 mm LST granular type (LST-G) with a nodular or depressed component are good indications for ESD [3]. ESD also should be utilized for intramucosal or superficially submucosal neoplastic lesions that show non-lifting after submucosal injection, for example because of fibrosis caused by previous biopsies, and lesions with residual or local recurrence because those are technically difficult to treat with conventional EMR.

Third, technical strategies for each type of endoscopic procedure should be mastered. In any procedure, the first requirement is to ensure that the endoscope can be moved freely, which requires mastering the appropriate colonoscopy insertion technique. Next, in EMR for instance, it is mandatory to learn techniques for submucosal injection and snaring to achieve complete resection. Here, the importance of training for assistant nurses also requires emphasis: successful endoscopic resection can best be achieved through a good relationship with well-trained assistants.

Appropriate post-endoscopic resection management is also important, including detailed pathological evaluation and consideration of the necessity for additional treatment and surveillance. If metastatic risk factors are identified by pathological evaluation of the endoscopically resected specimen, surgery (colectomy with lymphadenectomy) should be considered [1,3].

As discussed above, complete endoscopic resection is the key to successful management of colorectal neoplasia. However, Japanese guidelines allow that diminutive polyps (≤ 5 mm), even adenomatous ones, can be followed-up without endoscopic resection, provided endoscopic examination with magnifying image-enhanced endoscopy identifies no evidence of advanced histology [4]. A recent study reported favorable clinical outcomes in individuals with untreated diminutive colorectal adenomas, without intensive surveillance [5]. The issue of appropriate management of diminutive colorectal polyps, including the option of the “do-not-resect” strategy, requires further discussion, as does the issue of means of minimizing incomplete polyp resection.

References

1. Watanabe T, Muro K, Ajioka Y, et al; Japanese Society for Cancer of the Colon and Rectum. Japanese Society for Cancer of the Colon and Rectum (JSCCR) guidelines 2016 for the treatment of colorectal cancer. *Int J Clin Oncol*. 2018; 23: 1-34.
2. Horiuchi A, Ikuse T, Tanaka N. Cold snare polypectomy: Indications, devices, techniques, outcomes and future. *Dig Endosc*. 2018 Dec 14. [Epub ahead of print]
3. Tanaka S, Kashida H, Saito Y, et al. JGES guidelines for colorectal endoscopic submucosal dissection/endoscopic mucosal resection. *Dig Endosc*. 2015; 27: 417-34.
4. Tanaka S, Saitoh Y, Matsuda T, et al; Japanese Society of Gastroenterology. Evidence-based clinical practice guidelines for management of colorectal polyps. *J Gastroenterol*. 2015; 50: 252-60.
5. Sekiguchi M, Otake Y, Matsumoto M, et al. Incidence of Advanced Colorectal Neoplasia in Individuals with Untreated Diminutive Colorectal Adenomas Diagnosed by Magnifying Image-Enhanced Endoscopy. *Am J Gastroenterol*. 2019.

Keywords: Polyp resection



LGI 2-4

How Can We Train to Make Qualified Colonoscopists?

Jae Myung Cha

Kyung Hee University School of Medicine, Seoul, Korea

Introduction

There is a chasm between endoscopists for the detection rate of neoplastic lesion, as well as complete resection rate of neoplastic lesion. Furthermore, PCCRC rate was increased in recent 5 years in Korea, which may be reflected by suboptimal quality of colonoscopy. We should recognize that there is a significant quality gap of colonoscopy, which means that there is a significant room for quality improvement by education and training.

Main body

Qualified colonoscopist may be educated by supervised education program, training to measure quality indicators, and training to document optimal endoscopic findings.

1. Supervised education program

Ireland university hospital reviewed colonoscopies done by seven gastroenterology trainees and six surgical trainees. In this study, adjusted completion rate, polyp detection rate as well as adenoma detection rate (ADR) was significantly better in gastroenterology trainee group than surgical trainee group.¹ In a cohort of Ontario residents, there was no association between colonoscopy volume and colorectal cancer (CRC).² However, performance of colonoscopy by a non-gastroenterologist was associated with the higher risk of CRC. Therefore, endoscopist's specialty is an important determinant of qualified colonoscopy. On the other study from Ontario, independent risk factor of interval cancer was also a performance of colonoscopy by an internist or family physician. In a Manitoba Cancer Registry, independent risk factors associated with early or missed CRCs were a performance of index colonoscopy by family physicians.³ These studies highlight the importance of endoscopist's specialty. Berlin Colonoscopy Project analyzed the potential factors that may influence ADR.⁴ In this study, number of continuing medical education meeting attended correlated with the ADR. Unexpectedly, annual volume of screening colonoscopy did not correlated with the ADR. This study showed the importance of education for qualified colonoscopy. In a Korean study, the minimum number of colonoscopies to reach technical competence was more than 200 cases. It is based on only number of colonoscopy, however, colonoscopic competency should be measured by objective tools such as a Mayo Colonoscopy Skills Assessment Tool and Gastrointestinal Endoscopy Competency Assessment Tool.

2. Measuring quality indicators

ADR is very variable between endoscopists and their training. In a study from University of Amsterdam, variable ADR was already noticed during the endoscopy training of GI fellows.⁵ Most of fellows do not improve their ADR after completion of their training. These findings suggest that feedback and benchmarking of ADR should be implemented early during gastrointestinal (GI) fellow training. Even though many techniques were suggested to exposure more mucosa or to detect flat lesions, a cap-assisted colonoscopy was recommended as an effective and practical method to improve ADR during colonoscopy. In a meta-analysis of randomized controlled trials, cap-assisted colonoscopy had higher polyp detection rate than standard colonoscopy.⁶ In a Korean study, cap-assisted colonoscopy increased cecal intubation rate and shortened cecal intubation time for GI fellows. Some centers used video recording, withdrawal time more than 6 minutes, as well as withdrawal time more than 11 minutes to improved ADR or polyp detection rate, but all failed. Therefore, it is not easy to improve ADR or polyp detection rate by simple interventions. In this regard, Endoscopy Quality Improvement Program of Mayo Clinic is exciting. This program included two 1-2 hours didactic sessions with video clips for the importance of ADR, techniques and methods to increase ADR, NBI learning modules, two rests before and after training.⁷ After measurement of baseline ADR, monthly ADR feedback and education was provided for intervention group. The baseline ADR was similar between intervention and non-intervention groups. ADR was not changed in a non-intervention group, however, ADR was significantly increased in intervention group. This study indicated that ADR can be improved significantly by education. Previous study was followed up for 5 months to check stability of increased ADR at colonoscopy. High ADR was sustained for 5 months in the intervention group, but, low ADR was not increased for 5 months in non-intervention group. ADR improvement by training may persist for at least 5 months after completion of the program. In a recent review, more withdrawal time was significantly associated with higher ADR. In a Switzerland multicenter study, ADR was significantly higher among endoscopists aware of being monitored than endoscopists unaware of being monitored.⁸ Furthermore, the endoscopists knowing that they were being monitored was the strongest factor associated with ADR in multivariate analysis. Rockford Gastroenterology Associates combined segmental withdrawal time with a digital stopwatch and education about inspection technique, for example, the use of adequate insufflation, examination of flexures and proximal sides of haustral folds, suctioning of residual liquid, and adequate time for instrument withdrawal.⁹ Endoscopists with mean withdrawal time of 8 minutes or longer had higher ADR. This study showed us withdrawal time should be combined with careful inspection technique to improved ADR.

3. Optimal documentation

As published in Endoscopy 2016, the colonoscopy report is central to colonoscopy practice and facilitates the exchange of information about findings, therapy, clinical recommendations, adverse events, and performance in relation to colonoscopy.¹⁰ European Society of Gastrointestinal Endoscopy (ESGE) presented the first guideline for standard colonoscopy images in 2001. Photo-documentation was included as an integral part of endoscopic quality control in 2008. ESGE guideline was revised in 2012 and included retroflexed view of rectum as a 9th image. ASGE guideline was revised in 2015 and included two images of cecal landmarks and one retroflexed view of rectum. The ESGE proposed a list

of performance measures of colonoscopy,¹¹ which includes reporting about rate of adequate bowel preparation, indication for colonoscopy, cecal intubation, adequate description of polyp morphology and complication rate. ACG guideline recommends the quality of bowel preparation should be documented in more than 98% of screening colonoscopy, and the adequate preparation should be more than 85% of outpatient examinations. Preparation quality may be documented regardless of the scoring system used, but Boston scale is the most objective one. ACG guideline also recommends that visualization of the cecum by notation of landmarks and photo-documentation of landmarks should be documented in every procedure. Performance target of cecal intubation with photography is more than 95% in screening colonoscopy and 90% in all colonoscopies. ACG guideline also recommends that withdrawal time should be documented in more than 98% of colonoscopies and average withdrawal time should be more than 6 minutes. Withdrawal time documentation is an essential part of a colonoscopy report in my endoscopy unit. There is no widely accepted standard colonoscopy report form, as it may be different in each country. However, standard colonoscopy report may be mandatory in GI fellowship training.

Conclusion

As there is no secrets of the Master, keeping basic may be the secrets of the Master. The basic, such as supervised education program, measuring quality indicators, and documentation of optimal endoscopic findings may be the essential training of qualified colonoscopists.

References

1. Leyden JE, Doherty GA, Hanley A, et al. Quality of colonoscopy performance among gastroenterology and surgical trainees: a need for common training standards for all trainees? *Endoscopy* 2011;43:935-940.
2. Rabeneck L, Paszat LF, Saskin R. Endoscopist specialty is associated with incident colorectal cancer after a negative colonoscopy. *Clin Gastroenterol Hepatol* 2010;8:275-279.
3. Singh H, Negent Z, Demers AA, Bernstein CN. Rate and predictors of early/missed colorectal cancers after colonoscopy in Manitoba: a population-based study. *Am J Gastroenterol* 2010;105:2588-2596.
4. Adler A, Wegscheider K, Lieberman D, et al. Factors determining the quality of screening colonoscopy: a prospective study on adenoma detection rates, from 12,134 examinations (Berlin colonoscopy projects 3, BECOP-3). *Gut* 2013;62:236-241.
5. van Doorn SC, Klanderman RB, Hazewinkel Y, Fockens P, Dekker E. Adenoma detection rate varies greatly during colonoscopy training. *Gastrointest Endosc* 2015;82:122-129.
6. Ng SC, Tsoi KK, Hirai HW, et al. The efficacy of cap-assisted colonoscopy in polyp detection rate and cecal intubation: a meta-analysis of randomized controlled trials. *Am J Gastroenterol* 2012;107:1165-1173.
7. Coe SG, Crook JE, Diehl NN, Wallace MB. An endoscopic quality improvement program improves detection of colorectal adenomas. *Am J Gastroenterol* 2013;108:219-226.
8. Vavricka SR, Sulz MC, Degen L, et al. Monitoring colonoscopy withdrawal time significantly improves the adenoma detection rate and the performance of endoscopists. *Endoscopy* 2016;48:256-262.
9. Barclay RL, Vicari JJ, Greenlaw RL. Effect of a time-dependent colonoscopic withdrawal protocol on adenoma detection during screening colonoscopy. *Clin Gastroenterol Hepatol* 2008;6:1091-1098.

10. Bretthauer M, Aabakken L, Dekker E, et al. Requirements and standards facilitating quality improvement for reporting systems in gastrointestinal endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement. *Endoscopy* 2016;48:291-294.
11. Kaminski MF, Thomas-Gibson S, Bugajski M, et al. Performance measures for lower gastrointestinal endoscopy: a European Society of Gastrointestinal Endoscopy (ESGE) Quality Improvement Initiative. *Endoscopy* 2017;49:378-397.



LGI 3-1

Diminutive Polyp: Can We Handle with Confidence?

Jun Lee

Department of Internal Medicine, Chosun University, Gwangju, Korea

Introduction

The majority of colorectal polyps discovered on diagnostic colonoscopy is diminutive polyp. Although diminutive polyps demonstrate a lower frequency of any advanced histological features compared small or large polyps, all neoplastic polyp should be completely removed because of the risk of malignancy. However, there is no consensus on a method to remove diminutive polyps, and various techniques have been adopted based on physician preferences. In this lecture, we will investigate various treatment methods of diminutive polyp and find out optimal treatment methods.

Polypectomy techniques for diminutive polyps

1. Cold forceps polypectomy (CFP)

The CFP technique is performed as follows: a biopsy forceps is passed through the working channel of the endoscope. The jaws of the forceps are placed over the polyp tissue, and the polyp is captured and removed with mechanical pressure. The advantages of CFP are the following: easy, simple technique to apply; short procedure time; relatively low cost; easy tissue retrieval; and low rate of complications, such as bleeding or perforation. Unfortunately, this procedure is associated with significant rates of incomplete polyp resection.¹ The endoscopist should meticulously inspect the resection site and remove any remaining tissue to confirm that complete resection has been achieved. Notably, previous trials revealed a marked incomplete resection rate following what was considered complete removal of a polyp (29–38%).^{2,4} The reason for this rather high incomplete resection rate might be that minor bleeding after the initial bite can obstruct the visual field of a polypectomy site. To increase the complete resection rate, proposed alternatives to conventional CFP include the use of jumbo biopsy forceps (Radial Jaw™ 4 Single-Use Jumbo Biopsy Forceps, Boston Scientific Corp., Marlborough, MA, USA)⁵ or narrow-band imaging (NBI) evaluation of remnant tissue following CFP.

2. Hot forceps polypectomy (HFP)

HFP is analogous to CFP except it involves applying an electric current to the forceps. The technique for HFP involves the following: A biopsy forceps is passed through the working channel of an endoscope. The tip of the polyp should be captured and tented away from the colonic wall to prevent perforation. The colonic lumen should be slightly deflated, and electrocautery is then applied. Application of

electrical current by a coagulation wave removes the polyp and burns the surrounding tissue. The disadvantages of this method are a 17–34% risk of residual polyp; increased risk of coagulation syndrome, perforation and delayed bleeding; and impaired histological evaluation of the biopsy specimen.⁶⁻⁸ For these reasons, the Korean guidelines for colonoscopic polypectomy do not routinely recommend HFP for the removal of diminutive polyps.

3. Cold snare polypectomy (CSP)

The technique of CSP is performed as follows: First, the lesion should be placed at the 5 o'clock position. The snare opens and encircles the polyp without air aspiration. Then, the snare slowly captures the polyp with at least 1-2 mm of surrounding normal tissue. The polyp is guillotined and should not be lifted or tented until complete closure is achieved. The polyp can then be suctioned through the working channel into the trap.⁹ The advantages of CSP are a short procedure time, high complete resection rate, and low complication rate. In a recent prospective, randomized trial, CSP with a snare exclusively designed as a cold snare (Exacto[®] cold snare; US Endoscopy, Mentor, OH, USA) resulted in complete polyp removal more often than did CSP with a traditional snare. Snares exclusively designed as cold snares (with features such as thinner wires or a different shield shape) may be more efficient for resection and easier to use for cutting than traditional snares.

4. Hot snare polypectomy

HSP is a polyp removal method in which a polyp is grasped by a snare and then removed by electrocautery. Electrocautery can cause damage to the proper muscle layer and then lead to coagulation syndrome or perforation. Therefore, HSP should be used with some caution in comparison to CSP. First, to avoid grasping excess normal tissue, a polyp with minimal normal tissue should be captured by the snare. Second, the ensnared polyp should be tented away from the colonic wall and the lumen should be deflated prior to the application of electrocautery to minimize the risk of transmural injury. The following are three types of electric currents used in HSP: pure cut, coagulation, and blended. There is currently no consensus regarding the optimal type of current that should be used. Generally, a blended or coagulation current, rather than a pure cut current, is recommended for polypectomy because of the bleeding risk.

What is the best technique for the removal of diminutive polyps

An optimal technique for the removal of diminutive polyps must satisfy many conditions that include high complete resection rate, low complication rate, easy available technique, and short procedure time. A systematic review and meta-analysis showed that CSP or jumbo biopsy polypectomy decrease the risk of incomplete diminutive polyp removal by 60%, without increasing the total procedure time or complication rates.¹⁰ In a subgroup analysis of this study, three randomized trials showed that CSP reduces the risk of incomplete removal by 79%, and two randomized trials showed that jumbo biopsy polypectomy reduces the risk of incomplete removal by 52%.⁵ In recently prospective randomized controlled trial, Jumbo biopsy forceps polypectomy reported complete resection rate (92.0% vs 92.2% P=0.947) similar to CSP. CSP and jumbo biopsy polypectomy are useful technique for removing of diminutive polyp.¹¹

Several studies of HFP and CFP for the removal of diminutive and small polyps have shown that there is not a statistically significant difference in the complete resection rate between the two methods. HFP is associated with a higher rate of complications, such as bleeding and perforation. In addition, a recently reported comparative study between jumbo forceps polypectomy and HFP showed that jumbo forceps polypectomy is superior to HFP in terms of histological quality (96% vs. 80%) and complete resection rate (87.5% vs. 76.1%).¹² For these reasons, HFP is not recommended as the first-line treatment for diminutive and small polyp removal in Korea.

Several studies have compared CSP and HSP for the removal of diminutive and small polyps. CSP was found to be superior to HSP in terms of procedure time.¹³ In HFP, complications, such as bleeding, required additional intervention, and post-procedural abdominal symptoms were similar to CFP or developed more frequently.¹³ A prospective randomized controlled study has shown that immediate bleeding (5.7% vs. 23%) and delayed bleeding (0% vs. 14%) were more common with conventional polypectomy compared with CSP.¹⁴ This study demonstrated that CSP is preferred for the removal of small colorectal polyps in patients taking anticoagulants without stopping the medication.

Conclusion

Currently, there is no consensus regarding the optimal method to remove diminutive polyps. Recent studies have shown that CSP and jumbo biopsy polypectomy is a safer and more effective method. Therefore, CSP and jumbo biopsy polypectomy should be considered first for the removal of diminutive polyps.

Reference

1. Jung YS, Park JH, Kim HJ, et al. Complete biopsy resection of diminutive polyps. *Endoscopy* 2013;45:1024-9.
2. Efthymiou M, Taylor AC, Desmond PV, et al. Biopsy forceps is inadequate for the resection of diminutive polyps. *Endoscopy* 2011;43:312-6.
3. Woods A, Sanowski RA, Wadas DD, et al. Eradication of diminutive polyps: a prospective evaluation of bipolar coagulation versus conventional biopsy removal. *Gastrointest Endosc* 1989;35:536-40.
4. Liu S, Ho SB, Krinsky ML. Quality of polyp resection during colonoscopy: are we achieving polyp clearance? *Dig Dis Sci* 2012;57:1786-91.
5. Draganov PV, Chang MN, Alkhasawneh A, et al. Randomized, controlled trial of standard, large-capacity versus jumbo biopsy forceps for polypectomy of small, sessile, colorectal polyps. *Gastrointest Endosc* 2012;75:118-26.
6. Vanagunas A, Jacob P, Vakil N. Adequacy of "hot biopsy" for the treatment of diminutive polyps: a prospective randomized trial. *Am J Gastroenterol* 1989;84:383-5.
7. Peluso F, Goldner F. Follow-up of hot biopsy forceps treatment of diminutive colonic polyps. *Gastrointest Endosc* 1991;37:604-6.
8. Tsai CJ, Lu DK. Small colorectal polyps: histopathology and clinical significance. *Am J Gastroenterol* 1995;90:988-94.
9. Hewett DG. Cold snare polypectomy: optimizing technique and technology (with videos). *Gastrointest Endosc* 2015;82:693-6.
10. Raad D, Tripathi P, Cooper G, et al. Role of the cold biopsy technique in diminutive and small colonic pol-

yp removal: a systematic review and meta-analysis. *Gastrointest Endosc* 2016;83:508-15.

11. Huh CW, Kim JS, Choi HH et al. Jumbo biopsy forceps versus cold snares for removing diminutive colorectal polyps: a prospective randomized controlled trial. *Gastrointest Endosc*. 2019 Jan 23 [Epub ahead of print]
12. Yasar B, Kayadibi H, Abut E, et al. The histological quality and adequacy of diminutive colorectal polyps resected using jumbo versus hot biopsy forceps. *Dig Dis Sci* 2015;60:217-25.
13. Aslan F, Camci M, Alper E, et al. Cold snare polypectomy versus hot snare polypectomy in endoscopic treatment of small polyps. *Turk J Gastroenterol* 2014;25:279-83.
14. Horiuchi A, Nakayama Y, Kajiyama M, et al. Removal of small colorectal polyps in anticoagulated patients: a prospective randomized comparison of cold snare and conventional polypectomy. *Gastrointest Endosc* 2014;79:417-23.

Keywords: Polyps, Colorectal, Resection, Technique



LGI 3-2

Small Polyps–NICE, JNET and Beyond

Lars Aabakken

Medical Gastroenterology, Rikshospitalet University Hospital, Oslo, Norway

The improving image quality of endoscopes allows for increasingly accurate assessment of polyps by optical means only, in particular with the added utility of electronic chromoendoscopy (NBI and others). If the endoscopist could make a reliable differentiation between hyperplastic and adenomatous polyps, resection of small and diminutive polyps could be performed without histological assessment, and possibly even disregard diminutive hyperplastic lesions. Initial data from UK assessing the use of NICE classification of polyps indicated this strategy might indeed be viable, satisfying PIVI requirements of performance. However, subsequent studies showed that in standard endoscopy units the quality of optical diagnosis still is not sufficiently good.

The NICE classification has been the main standard world wide for some years, differentiating hyperplastic, adenomatous and cancerous lesions. However, this lacks the necessary subclassification of type II lesions to decide on mode of resection. Thus, the JNET classification was introduced, with type IIa and IIb differentiation to indicate presence of high grade dysplasia/early submucosal invasion. New algorithms have been developed based on this classification, but more data are needed from centers outside Japan. Also, the necessity of magnifying endoscopes needs to be further assessed.

Finally, extensive efforts are currently made to train Artificial Intelligence systems to help detect, as well as characterize polyps. It remains to be seen whether this in time will obviate the need for NBI.

Keywords: Nice, Jnet



LGI 3-3

Large Polyp: Manage Complete, but Safe

Dong-Hoon Yang

Gastroenterology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Large polyps of the colon and rectum carry a higher risk of advanced histology such as high-grade dysplasia and adenocarcinoma compared with the small polyps. Incomplete resection of colorectal neoplasia (CRN) is considered as one of the main reasons for interval colorectal cancers (CRCs) while undergoing surveillance colonoscopies. Therefore, complete endoscopic resection of large polyps is essential for effective CRC prevention. Comparing with en bloc resection, piecemeal resection exposes a higher local recurrence rate up to 50% for large polyps. In the viewpoint of achieving complete en bloc resection, endoscopic submucosal dissection (ESD) would be the most appropriate technique for removing large CRNs. However, ESD carries a higher risk of perforation and hemorrhage and requires a long training period for the endoscopists to be skillful enough. Moreover, as histology of the CRNs can be estimated based on the morphology of the lesions and surface/vascular characteristics using image enhanced endoscopies, not all large CRNs require ESD in daily practice. Therefore, ESD is often reserved for the large (>20 mm, in general) or malignant lesions, which are less likely to be removed in en bloc manner by conventional endoscopic mucosal resection (EMR) technique. However, even if a certain lesion is not indicated for ESD or endoscopists expertise in ESD are lacking, CRNs should be removed completely to minimize the chance for local recurrence and consequently prevent interval CRCs. Here we will discuss about technical tips for complete endoscopic resection of large polyps using conventional endoscopic mucosal resection (EMR) and other modified EMR techniques, such as EMR after circumferential mucosal incision (in other words, precut EMR), ESD with snaring (in other words, hybrid ESD), and anchored snare tip EMR. The safety of each technique will be also discussed.

Keywords: Polyp



LGI 3-4

Postpolypectomy Management: Complications and Surveillance

Cesare Hassan

Hepato-gastroenterology Service, Nuovo Regina Margherita Hospital, Rome, Italy

Bleeding represents the main risk of polypectomy /EMR, and it may be broadly divided in intra-procedural and delayed. These two events have different predictive factors and clinical relevance. The role of clipping in preventing delayed bleeding will be discussed.

While perforation has represented the most catastrophic adverse event related with operative colonoscopy, most perforations are now treated with clipping or suturing devices, marginalizing the relevance of such complication. A new semeiology for deep wall injury has been validated and it will be discussed.

Guidelines by European Society of Gastrointestinal Endoscopy on Polypectomy and EMR as well as on anticoagulants and antithrombotic will be discussed.

Postpolypectomy surveillance depends on number, size and histology of removed polyps, as well as on patient- and technical-related factors. Official recommendations by European Society of Gastrointestinal Endoscopy will be discussed.

Keywords: Postpolypectomy



LGI 4-1

Serrated Polyps: Detection, Differentiation and Management

Cesare Hassan

Hepato-gastroenterology Service, Nuovo Regina Margherita Hospital, Rome, Italy

A 'serrated pathway' has been proposed as alternative of the adenoma-carcinoma sequence, and considered partially responsible of the risk of interval CRC, especially in the proximal colon [5,6]. Thus, the detection of serrated lesions may result in an additional reduction of CRC incidence, as compared with the simple detection of adenomas. Moreover, patients with serrated lesions considered to be at higher risk of CRC – such as large sessile serrated polyps (SSP) or those with dysplasia – are usually included in post-polypectomy surveillance programs, in order to further reduce the CRC risk.

Detection, differentiation and management of these lesions have been dealt with in official guidelines by the European Society of Gastrointestinal Endoscopy on advanced imaging applied to colonoscopy and polypectomy/EMR.

Keywords: Polyps



LGI 4-2

Multiple Colon Polyps: Management and Surveillance

Eun Sun Kim

Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Numbers of adenomas at colonoscopy and cumulatively over a lifetime is the most consistent risk factor for metachronous colorectal cancer. Studies suggest that patients with a limited number (one or two) of small, tubular, adenomatous polyps removed do not have an increased risk of advanced neoplasia. In contrast, the presence of one or more advanced adenomas predicts a higher rate of both any and advanced metachronous adenomas. In a pooled analysis of eight prospective studies, the absolute risks of metachronous advanced adenomas, colorectal cancer, and their combination (advanced colorectal neoplasia) within three to five years was higher (24 percent) in patients with >4 adenomas at baseline. The risk for metachronous advanced adenomas increased with the number of adenomas at baseline and was 9, 13, 15, 20, and 24 percent for 1, 2, 3, 4, or ≥ 5 adenomas at baseline, respectively. The risk of metachronous colon cancer also increases with the number of advanced adenomas.

Patients with one or more adenomas ≥ 10 mm have an increased risk of advanced neoplasia during surveillance as compared with those with no neoplasia or small adenomas. The risk of advanced neoplasia increases with adenoma size. As compared with patients with adenomas <5 mm, those with baseline adenomas(s) 10 to 19 mm and ≥ 20 mm have a significantly higher risk of advanced neoplasia (8, 16 and 19 percent, respectively). In another study that included 1287 individuals, those with large adenomas (>1 cm) and proximally located adenomas at baseline colonoscopy were significantly more likely to have recurrent high-risk adenomas during a mean follow-up period of 37 months (odds ratio [OR] 2.69; 95% CI, 1.3-5.4 and OR 1.7; 95% CI, 1.0-2.7, respectively).

Approximately 5 to 10 percent of colorectal cancers are attributable to a hereditary cancer predisposition syndrome. A hereditary cancer predisposition syndrome should be considered in patients who present with early age at onset of polyps or cancer or unusual numbers or histologies of cancers or premalignant conditions. As an example, in patients with 10 or more cumulative colorectal adenomas or any number of adenomas in combination with duodenal/ampullary adenomas, desmoid tumors, papillary thyroid cancer, epidermal cysts, or osteomas, should raise the possibility of familial adenomatous polyposis (FAP).

Keywords: Colon polyps, Management, Surveillance



LGI 4-3

Subepithelial Tumors: Differential Diagnosis and Management

Hee Seok Moon

Division of Gastroenterology, Department of Internal Medicine, Chungnam National University Hospital, Daejeon, Korea

INTRODUCTION

Subepithelial lesions (SELs) of the gastrointestinal tract were previously known as submucosal tumors. However, they originate not only in the submucosa but also between the serosa layers in the deep mucosa. Most SELs are incidentally discovered during endoscopic screening, appearing as small or large bulging lesions covered with normal mucosa and detected in one of 300 colonoscopy procedures.¹ The type of treatment and prognosis vary depending on the type of tumor, and an accurate differential diagnosis is crucial. Colorectal SELs are mostly found in the appendix and rectum, but some lesions may occur throughout the entire colon.

Differential diagnosis using colonoscopy

Subepithelial lesions in the large intestine and rectum can be distinguished from subepithelial lesions in other digestive tract sites on the basis of the location of the lesion and the endoscopic findings. As extrinsic compression can be caused by both normal and abnormal anatomical structures, changes in the lesion should be observed through control of patient position and air volume. In addition, detailed observation of the lesion size, shape, color, location, and presence or absence of pulsatility accompanying mucosal abnormalities and of rolling or pillow signs when the lesion is pushed with biopsy forceps are important. Most of the mucous covering the subepithelial tumor (SET) is normal; however, it may sometimes show erosion, redness, and ulceration. If erosion is present, a neuroendocrine tumor (NET) is possible. Large-sized NETs may accompany a central depression. When the lymphangioma is closely observed, a shallow linear depression formed by dividing the inside of the lesion by the septum of the fibrous connective tissue can be found. The color of most SETs is the same as that of the surrounding mucous membranes. However, lipomas and carcinoids have a yellow color. Vascular lesions have a light or dark blue color, and may have a similar color as varices or arterio-venous malformations. Lymphangiomas are smooth, pale, transparent, and often grayish. They are evaluated by pressing the SET using biopsy forceps to confirm the firmness. Lipomas or cysts are positive for the pillow or cushion sign. Cysts appear transparent and soft when pressed. If the lesion is pushed to the left or right by a biopsy forceps (positive rolling sign), it is likely to be at least a tumor that develops below the muscularis mucosa. In contrast, if the lesion is circular or elliptical, fixed on the wall (negative rolling sign), and is solid, a differential diagnosis of gastrointestinal stromal tumors (GISTs), leiomyomas, and schwannomas originating from the muscularis propria should be considered.

Use of endoscopic ultrasonography in differentiating SET lesions

Since the introduction of ultrasonography for detecting colorectal SETs, extrinsic compressions can now be identified, as well as the size of intramural tumors, their internal characteristics, contours, and primary layers, which in turn include whether they have malignant potential or not. Endoscopic ultrasonography (EUS) also provides additional information to endoscopic findings to further enhance diagnostic accuracy. This is highly important for the evaluation of indications for endoscopic resection, determination of the need for operation, follow-up, and post treatment evaluation. However, concordance between pathological and differential diagnoses with EUS is not as good as 43–79%.^{2,3} Histological differential diagnosis has become possible with the use of EUS-guided fine-needle aspiration (FNA) and core biopsy. However, the use of linear EUS in the lower gastrointestinal (GI) tract has been limited to the rectum and distal sigmoid colon because of the oblique viewing optics. A catheter-based mini-probe EUS device has a shallow depth of acoustic penetration, and FNA under EUS guidance cannot be performed.^{4,5} Thus, front-view forward-array EUS is known to be useful and to overcome the aforementioned limitations of conventional EUS.⁶ Recently, the use of intravenous contrast agents has been a major development in the practice of ultrasonography, enabling better characterization of lesions based on their vascular enhancement. In practice, leiomyomas and GISTs, which originate from the same layer, can be difficult to differentiate on the basis of EUS features alone. A recent study reported distinct patterns on contrast-enhanced EUS, with GISTs showing hyper-enhancement as opposed to leiomyomas, which were hypoenhanced.^{7,8} EUS elastography displays the differences in tissue hardness by adding a color overlay coding for different elasticity values to the conventional gray scale images. The role of elastography in the diagnosis of submucosal tumors should also be examined to investigate the associated patterns of tissue hardness, which might be useful for differentiating between benign lesions and malignant lesions.⁸

Extraluminal compression

Normal anatomical structures such as the cervix or prostate, an expanded intestine, and pulsatile compression by serpentine vascular structures can appear as subepithelial lesions. To differentiate intramural lesions from extramural compression during an endoscopic examination, the changes of the lesions must be observed by controlling the position of the patient or adjusting the air volume. If the shape of the lesion is changed by these measures, an extrinsic compression from normal anatomical structures is highly possible. In addition, the use of an endoscopic forceps and the absence of lesion movement suggest the possibility of extrinsic compression. Extrinsic compression lesions are likely to have normal anatomical structures, but they may be pathological in some cases. If the lesion is to be confirmed clinically, performing additional radiological imaging such as abdominal computed tomography (CT) and ultrasonography is considered.

Characteristic findings of SETs

(1) Neuroendocrine tumor (NET)

NETs of the gastrointestinal tract occur in the order of the small intestine, appendix, and rectum.

Rectal endocrine tumors account for 13% of all NETs. NETs are mostly grossly yellow or white on endoscopy and may be accompanied by a central depression and hemorrhage. Ultrasonoscopy revealed a lesion in the second or third layer that was relatively peripherally clear and well defined, and uniformly hypoechoic, mostly <2 cm in size. NETs originate from the deep mucosal epithelium and grow in the lower layer. They could be diagnosed using endoscopic biopsy. The diagnostic rate by biopsy forceps was reported to be 83%.⁹ Their malignant potential is related to their size, and surface scarring, bleeding, and ulceration may be signs of advanced tumor invasion with a higher rate of lymph node metastases. If the lesions are <1 cm in size and localized only to the third layer without lymphadenopathy or distant metastasis, endoscopic resection is considered. Selective endoscopic or surgical resection is considered for lesions 1-2 cm in size and surgical resection is considered for lesions >2 cm.¹⁰ Endoscopic excisional NET lesions require careful histological evaluation, and further surgical resection is considered by assessing for complete resection, malignancy, and risk of lymph node metastasis. For endoscopic resection of rectal carcinoid tumors, several methods can be used. Although conventional endoscopic mucosal resection (EMR) may be useful for smaller rectal NETs (<5 mm in size), however, many studies have reported that the modified EMR (cap-assisted EMR, EMR with ligation, and EMR performed using the strip method) or ESD has shown superiority over the conventional EMR method with respect to histologically complete resection rate.¹¹ If high-risk features, such as larger primary tumor size, tumor grade ≥ 2 , lymphovascular invasion, and margin involvement are present, ESD, transanal endoscopic microsurgery, or a more aggressive surgery should be considered.¹²

(2) Gastrointestinal stromal tumor (GIST)

GISTs are rarely found in the rectum or colon (5-10%). The rate of malignant transformation of GISTs is relatively high. The risk of malignancy of GISTs is determined by size and mitotic index. EUS findings are similar to those of other mesenchymal tumors, and hypoechoic lesions originating from the muscularis propria may be found. GISTs may sometimes also appear as multifocal lesions. If the margins of the lesion are irregular, include anechoic and hyperechogenic areas, and have a size of ≥ 3 cm, the possibility of malignancy is high.

(3) Endometriosis

Endometriosis is a gynecologic disorder defined as the presence of endometrial glands and stroma outside the endometrial cavity and uterine musculature.¹³ When endometriosis invades the intestine, it manifests mainly as SELs in the rectosigmoid colon, appendix, and terminal ileum. GI endometriosis is asymptomatic and incidentally diagnosed. Symptoms are thought to be caused by the swelling of endometriotic implants in the intestinal wall, and abdominal pain, hematochezia, tenesmus, dyschezia, diarrhea, and constipation occur. EUS findings are usually hypoechoic lesions in the muscularis propria of the fourth layer, with cystic echogenicity in the interior and involvement of the third layer in approximately 40%.¹³⁻¹⁵

(4) Mucocele

Appendiceal mucocele is a lesion in the lumen of the appendix that appears to be filled with abnor-

mal mucous substances in the lumen of the appendix. The location of the lesion is useful for differential diagnosis and may be malignant; therefore, surgical resection is necessary. Mucocele is observed as a hypoechoic extramural tumor compressing the appendix and has micro hyperechogenic dots internally on EUS.¹⁶ and abdominal CT is also considered to be performed prior surgery.

(5) Lymphangioma

Lymphangioma is a benign lesion caused by local dilatation of the lymphatic system. It is mainly found in the right colon. It is soft and shows a cushion sign and rather pale mucosal changes. The internal septum may cause a linear depression on the surface of the tumor. Unroofing the mucosa with a biopsy forceps may cause the tumor to shrink as clear lymph fluid flows. Ultrasonoscopic findings are also found in the third layer of anechoic cysts, often with an internal septum.

(6) Leiomyoma

Gastrointestinal leiomyomas, which are subepithelial benign smooth muscle tumors, are most commonly found in the esophagus. Colonic leiomyomas are rare, constituting only 3% of leiomyomas, and are usually located in the rectosigmoid area.¹⁷ Leiomyomas are mostly small, hard, and commonly found in the rectum. They may have a similar color to the surrounding mucosa or somewhat whiter. However, some cases are difficult to distinguish from NETs, and most of the leiomyomas of the large intestine originate from the muscularis mucosa. On EUS, leiomyomas are often observed as a hypoechoic mass originating from a deep mucosal layer. As they are derived from the muscularis mucosa, infusion of hypertonic saline for the endoscopic resection tends to float, making endoscopic resection relatively easy.

(7) Lipoma

Lipomas usually occur in the right colon, near the ileocecal valve, and take a yellow color. As they are not hard but soft, they can be pressed easily using a biopsy forceps. They show the pillow or cushion sign. Bite-on-bite biopsy would reveal yellow fat, called the naked fat sign, by exposing the mucosal and submucosal layers. On EUS, a high echogenic mass originating in the submucosal layer could be observed. Almost none of the cases is malignant; therefore, treatment is not necessary unless the tumor is very large, causes symptoms such as intussusception, or lead to differentiation from malignant tumors.

Colonoscopic full-thickness resection using an over-the-scope device

Endoscopic full-thickness resection (EFTR) using a clip-assisted non-exposure technique is a novel treatment for colorectal lesions not suitable for conventional endoscopic resection. Conventional techniques such as EMR and endoscopic submucosal dissection (ESD) have limitations for resection of SETs. lesions involving the muscularis propria layer are generally referred for surgical resection, as the ability to achieve complete endoscopic resection may be difficult without causing perforation through the serosal layer of the GI tract wall. The full-thickness resection device (FTRD; Ovesco Endoscopy, Tuebingen, Germany) is an over-the-scope system that allows single-step EFTR after placement

of a modified over-the-scope clip. thus, endoscopic full-thickness resection (EFTR) for colonic SETs have been reported. Among 20 patients with colonic SETs, an R0 resection was achieved in 87.0% of the patients in a German prospective multicenter trial.¹⁸ In an Italian multicenter trial, 10 patients with subepithelial lesions underwent EFTR procedures, and deep and lateral R0 resections were achieved in 85.7% and 100% of the patients, respectively.¹⁹

Follow-up

When the lesion is <1 cm and no finding is suggestive of a malignant potential such as GIST, NET, and mucocele, histological diagnosis is difficult owing to the risk of complications. if the risk of malignancy is rare, regular follow-up endoscopy can be considered without immediate surgery. However, the appropriate follow-up interval is yet to be established, and planning requires an individualized approach that takes into account factors such as patient age and overall health, and the malignant potential of the lesions. Experts recommend performing EUS at 1-year intervals and extending the interval to 2 years if no change is observed in the first 2 years.¹⁶

CONCLUSIONS

The endoscopic features of subepithelial lesions must be well understood, and the lesions must be differentiated by endoscopy or EUS. In addition, if necessary, histological diagnosis or radiological evaluation such as CT and MRI can be applied in the actual clinical examination. recently, endoscopic treatments such as EFTR have been introduced and some colonic SET lesions can be treated. symptomatic lesion and histologically proven-malignant SET should undergo resection. there is no established guideline for follow-up of colonic SETs with less than 1cm or without high risk features and future investigations in this field are needed.

REFERENCES

1. Landi B, Palazzo L. The role of endosonography in submucosal tumours. *Best practice & research Clinical gastroenterology* 2009;23:679-701.
2. Hwang JH, Saunders MD, Rulyak SJ, Shaw S, Nietsch H, Kimmey MB. A prospective study comparing endoscopy and EUS in the evaluation of GI subepithelial masses. *Gastrointestinal endoscopy* 2005;62:202-8.
3. Kwon JG, Kim EY, Kim YS, et al. [Accuracy of endoscopic ultrasonographic impression compared with pathologic diagnosis in gastrointestinal submucosal tumors]. *The Korean journal of gastroenterology = Taehan Sohwagi Hakhoe chi* 2005;45:88-96.
4. Bhutani MS. Recent developments in the role of endoscopic ultrasonography in diseases of the colon and rectum. *Current opinion in gastroenterology* 2007;23:67-73.
5. Bhutani MS, Nadella P. Utility of an upper echoendoscope for endoscopic ultrasonography of malignant and benign conditions of the sigmoid/left colon and the rectum. *The American journal of gastroenterology* 2001;96:3318-22.
6. Nguyen-Tang T, Shah JN, Sanchez-Yague A, Binmoeller KF. Use of the front-view forward-array echoendoscope to evaluate right colonic subepithelial lesions. *Gastrointestinal endoscopy* 2010;72:606-10.
7. Kannengiesser K, Mahlke R, Petersen F, et al. Contrast-enhanced harmonic endoscopic ultrasound is

- able to discriminate benign submucosal lesions from gastrointestinal stromal tumors. *Scandinavian journal of gastroenterology* 2012;47:1515-20.
8. Cartana ET, Gheonea DI, Saftoiu A. Advances in endoscopic ultrasound imaging of colorectal diseases. *World journal of gastroenterology* 2016;22:1756-66.
 9. Shim KN, Yang SK, Myung SJ, et al. Atypical endoscopic features of rectal carcinoids. *Endoscopy* 2004;36:313-6.
 10. Mandair D, Caplin ME. Colonic and rectal NET's. *Best practice & research Clinical gastroenterology* 2012;26:775-89.
 11. Lee HJ, Kim SB, Shin CM, et al. A comparison of endoscopic treatments in rectal carcinoid tumors. *Surgical endoscopy* 2016;30:3491-8.
 12. Chablaney S, Zator ZA, Kumta NA. Diagnosis and Management of Rectal Neuroendocrine Tumors. *Clinical endoscopy* 2017;50:530-6.
 13. Pishvaian AC, Ahlawat SK, Garvin D, Haddad NG. Role of EUS and EUS-guided FNA in the diagnosis of symptomatic rectosigmoid endometriosis. *Gastrointestinal endoscopy* 2006;63:331-5.
 14. Roseau G, Dumontier I, Palazzo L, et al. Rectosigmoid endometriosis: endoscopic ultrasound features and clinical implications. *Endoscopy* 2000;32:525-30.
 15. Nickl N. Endoscopic approach to gastrointestinal stromal tumors. *Gastrointestinal endoscopy clinics of North America* 2005;15:455-66, viii.
 16. Kim TO. Colorectal Subepithelial Lesions. *Clinical endoscopy* 2015;48:302-7.
 17. Naem M, Stanich PP, El-Dika S. Incidental subepithelial sigmoid colon lesion. *Clinical gastroenterology and hepatology : the official clinical practice journal of the American Gastroenterological Association* 2015;13:A32.
 18. Schmidt A, Beyna T, Schumacher B, et al. Colonoscopic full-thickness resection using an over-the-scope device: a prospective multicentre study in various indications. *Gut* 2018;67:1280-9.
 19. Andrisani G, Soriani P, Manno M, et al. Colo-rectal endoscopic full-thickness resection (EFTR) with the over-the-scope device (FTRD((R))): A multicenter Italian experience. *Digestive and liver disease : official journal of the Italian Society of Gastroenterology and the Italian Association for the Study of the Liver* 2019;51:375-81.

Keywords: Subepithelial tumors, Diagnosis



LGI 4-4

Case Base Discussion

Soo-Kyung Park

Gastroenterology, Kangbuk Samsung Hospital, Seoul, Korea

CASE-BASE DISCUSSION

Age and Gender: 66/male

Chief Complaints: For management of a colon polyp

Present Illness: In January 2016, 45-year-old man was referred for endoscopic resection of colon polyp. He underwent a screening colonoscopy which showed a 1 cm-sized polyp in the ascending colon.

Past History: None

Family History: None

Physical Examination and Laboratory Findings: The abdomen was soft and flat without any abnormal sign.

WBC 6,700 /uL – Hemoglobin 12.7 g/dL – Platelet 198,000 /uL

Prothrombin time 1.01 INR - Activated partial thromboplastin time 30.3 sec

Serum chemistry: within normal limits

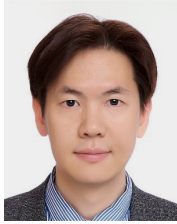
Endoscopic and Radiologic Findings: Colonoscopy showed two polyps, 1 cm-sized polyp and 1.5 cm sized polyp in the ascending colon

Hospital Progress: The polyp was resected endoscopically by using EMR method. The polyp was completely removed macroscopically.

Histologic results were as follows: 1.5 cm sized sessile serrated polyp, 1.0 cm sized hyperplastic polyp.

Endoscopic were performed at 3-year intervals after endoscopic resection and there was 5 mm sized hyperplastic polyp in the ascending colon.

Keywords: Serrated polyp, Serrated adenoma



LGI 4-5

Management of Multiple Colorectal Polyps

Jaeyoung Chun

Internal Medicine, Gangnam Severance Hospital, Yonsei University College Of Medicine, Seoul, Korea

Age and Gender: M/62

Chief Complaints: For management of multiple colorectal polyps

Present Illness: A 62-year-old man was referred for management of multiple colorectal polyps. He underwent a colonoscopy because of positive fecal immunochemical test for colorectal cancer screening, which showed numerous polyps less than 2 cm in the whole colon and rectum.

Past History: He denied any past history of chronic or severe medical illness, and did not take any medications at hospitalization.

Family History: He denied a family history of colorectal cancer. His father had been diagnosed with stomach cancer.

Social History: He was an ex-smoker who quit smoking 10 years ago (30 pack years), and a social alcohol drinker.

Physical Examination and Laboratory Findings:

The abdomen was soft and flat without any abnormal sign.

WBC 6,360 /uL – Hemoglobin 16.8 g/dL – Platelet 202,000 /uL

AST/ALT 33/44 IU/L, Total cholesterol 191 mg/dL, BUN/Creatinine 12/1.03 mg/dL

Prothrombin time 0.91 INR - Activated partial thromboplastin time 31.4 sec

CEA <0.5 ng/mL

Endoscopic Findings: Colonoscopy showed approximately 100 polyps less than 2 cm from the cecum to the rectum.

Hospital Progress: He underwent endoscopic polypectomy for the numerous colorectal polyps in several days without any procedure-related complications. On the pathologic reports, there were colorectal adenomatous polyps including two villous adenomas, two high grade dysplasias, and three intramucosal adenocarcinomas with clear resection margins and negative lymphovascular and perineural invasion. On the follow-up colonoscopic exams, any recurrence of advanced colorectal adenoma did not occur within next 2 years after the endoscopic resection.

Keywords: Colorectal polyps

IDEN International
Digestive
Endoscopy
Network
2019 2019

June 14 (Fri), 2019

Pancreatobiliary





PB 1-1

Endoscopic diagnosis of ampullary adenoma and how to evaluate before endoscopic papillectomy

Gürhan Sisman

Gastroenterology, Acibadem University, Istanbul, Turkey

Curriculum Vitae

Educational Background

- Internal Medicine Residency: Istanbul Training and Research Hospital, Internal Medicine Department. Istanbul/ Turkey (2003-2009)
- Gastroenterology Residency: Fellowship at Istanbul University Cerrahpaşa Medical School, Gastroenterology Department, (2009-2012)
- University: Karadeniz Technical University Medical School Trabzon/ Turkey (1997-2003)

Professional Experiences

- Gastroenterology Specialist at Van Education Hospital Van / Turkey(2012-2014)
- Gastroenterology Specialist at İstanbul Education Hospital Istanbul / Turkey (2015-2016)
- Associate Professor at Acibadem University School of Medicine Istanbul / Turkey(2016- till nov)

Professional Organizations

- TGD (Turkish Gastroenterology Organization)
- EASL (European Association for the Study of the Liver)
- TKAD (Turkish Liver Organization)
- ECCO (European Crohn and Colitis Organization)

Main Scientific Publications

1. Sisman G, Karaaslan L, Tözün N. Diagnosis of peritoneal tuberculosis by endosonography-assisted through the needle forceps biopsy of the peritoneum: First case in the literature. Dig Endoscopy 2017.
2. Sisman G, Koroglu E, Erzin Y, et al. Demographic characteristics of chronic pancreatitis patients in the era of endosonography: Experience of a single tertiaryreferral center in Turkey. Turk J Gastroenterol 2016.
3. Sisman G, Baran B. Placement of a Self-Expanding Metal Stent to Treat Esophagogastric Benign Anastomotic Stricture via Retroflexed Ultrathin Endoscopy: A Case Report with a Video. Clin Endosc. 2015 Sep;48(5):428-30.
4. Boga S, Koksall AR, Alkim H, Yilmaz Ozguven MB, Bayram M, Ergun M, Sisman G, Tekin Neijmann S, Alkim C. Plasma Pentraxin 3 Differentiates Nonalcoholic Steatohepatitis (NASH) from Non-NASH. Metab Syndr Relat Disord. 2015 Nov;13(9):393-9.
5. Altun R, Şahintürk H, Şişman G, Baran B. Hepatitis B surface antigen seroconversion in HBeAg negative chronic hepatitis B patient during entecavir treatment. Turk J Gastroenterol. 2014 Dec;25 Suppl 1:272-3.



PB 1-2

Endoscopic Management and Technical Tips to Minimize Complications

Nonthalee Pausawasdi

Internal Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Introduction

Ampullary neoplasm is uncommon. Adenoma and adenocarcinoma account for more than 95% of ampullary tumor. When the tumor is non-invasive and confined within the mucosa, endoscopic papillectomy (EP) is considered the mainstay therapy as it offers acceptable results with less complications compared to surgical approach. Nonetheless, there has not been a consensus guideline for pre-procedural assessment, resection techniques, and post papillectomy surveillance and thus the practice may be variable.

Clinical features

The incidence of ampullary cancer is less than 1 in 100,000 and reported to be 0.04-0.12% in autopsy series. Ampullary adenoma can be sporadic or Familial Adenomatous Polyposis (FAP) - associated. Patients with FAP has a 300-fold increase in developing ampullary adenoma compared to normal population. The sporadic type has higher chance of malignant transformation whereas the FAP-associated adenoma is more static with slow progression. Clinical manifestations include obstructive jaundice, weight loss, abdominal pain, occult gastrointestinal blood loss, and less commonly acute pancreatitis. Associated gallstones can be seen in one-third of cases.

Management

The management is dictated by tumor staging. Many systems have been proposed to stage ampullary neoplasm including the American Joint Committee on Cancer TNM classification, Vienna classification which is based on histologic grading and Spigelman classification which is based on scoring and staging system, specifically in FAP patients as shown in Table 1.

The diagnosis and staging are needed prior to the treatment decision is made. In general, surgical management is mandatory for invasive carcinoma given the possibility of nodal involvement whilst endoscopic papillectomy (EP) is preferable for noninvasive lesions. However, pre-procedural assessment, resection techniques, and surveillance protocol have not been standardized. Criteria for EP almost depends on endoscopist's comfort level.

Assessment prior to endoscopic resection

Mucosal biopsy can be performed to exclude cancer with diagnostic accuracy of 62-83%. Some ad-

Table 1. Classifications of ampullary neoplasm¹

Classification system	Description
TNM ²	Based on depth of invasion
	T0: No evidence of primary tumor
	Tis: Carcinoma In situ
	T1: Tumor echo limited to the major papilla
	T2: Invasion of the duodenal muscularis propria
	T3: Invasion of the pancreatic parenchyma
	T4: Invasion of peripancreatic soft tissue or adjacent organs or structures
	N0: No regional lymph node invasion
	N1: Regional lymph node invasion
	M0: No evidence of distant metastasis
M1: Evidence of distant metastasis	
Vienna ³	Based on histologic grade
	Category 1: Negative for neoplasia/dysplasia
	Category 2: Indefinite for neoplasia/dysplasia
	Category 3: Noninvasive low-grade neoplasia/dysplasia
	Category 4: Noninvasive high-grade neoplasia/dysplasia
	• High grade adenoma/dysplasia
	• Noninvasive carcinoma (carcinoma in situ)
	• Suspicion of invasive carcinoma
	Category 5: Invasive neoplasia
• Intramucosal carcinoma	
• Submucosal carcinoma or beyond	
Spigelman ⁴	Based on scoring and staging system
	Scoring (1-3 for each variable)
	• Number of polyps (1-4; 5-20; >20)
	• Size (1-4; 5-10; >10)
	• Histologic type (tubular, tubulovillous, villous)
	• Degree of dysplasia (mild, moderate, severe)
	Staging
	• Stage I: score 1-4
	• Stage II: score 5-6
	• Stage III: score 7-8
• Stage IV: score 9-12	

vocate endoscopic sphincterotomy (EST) first followed by biopsy but this is debatable. Some argue that EST may cause cautery artifact. To improve the diagnostic yield, multiple methods have been proposed such as the use of indigocarmine and methylene blue to differentiate tumor from normal tissue and application of NBI in prediction of histology. Endoscopic ultrasound (EUS) and intraductal ultrasound (IDUS) have been shown to increase diagnostic accuracy. EUS is superior to CT scan, MRI in T staging. IDUS has slightly better accuracy than EUS but higher risk of infection. ERCP is helpful for assessment of bile duct and pancreatic duct involvement. Generally, EUS should be performed prior to endoscopic resection when the lesion is >3 cm, concerning endoscopic features noted, and presence of high grade dysplasia (HGD) or Cis/T1 in patients unfit for surgery.

Criteria for EP⁵

Conventional criteria

- Benign histology from biopsy
- Size <5 cm
- No malignant/concerning endoscopic features
- Absence of intraductal involvement

Expanded criteria

- Larger lesions (without lateral extension of >50% and discernible duodenal infiltration)
- Intraductal extension of <1 cm
- HGD or early ampullary cancer

Important issues to be addressed regarding papillectomy techniques

- Endoscopic inspection of the lesion: Firmness, bleeding, ulceration, and induration
- Cannulation of biliary and pancreatic duct
- Sphincterotomy: Is it needed?
- Submucosal injection: Is it needed? Which agent?
- Resection:
 - Is there an optimal snare type?
 - What is the optimal electrosurgical setting?
- Tissue retrieval
- Ablation of residual tissue
- Stenting
 - PD stent for prevention of pancreatitis is recommended.
 - Biliary stent is needed only if poor biliary drainage.

Complications of EP

The overall complication rate is approximately 15%. Complications include acute pancreatitis (0-25%), bleeding (0-25%), perforation (0-5%), cholangitis (0-2%) and papillary stenosis (0-8%). Mortality post procedure is rare but has been reported in 0.3%.⁶

Surveillance

Surveillance post papillectomy is required but interval can be variable depending on histology, margin of the resected lesion, age, history of FAP, and comorbidities due to no standardized guidelines. After resection, follow-up duodenoscopy should be performed in 3-6 months to assess for recurrence and assure completion of resection. If residual adenoma is observed, the tissue must be removed. Surveillance endoscopy every 6-12 months can be performed for 2-5 years. FAP patients should undergo surveillance every 3 years.⁷

References

1. El Hajj II, Coté GA. Endoscopic Diagnosis and Management of Ampullary Lesions. *Gastrointest Endoscopy Clin N Am* 2013; 23:95-109.

2. AJCC Cancer Staging Manual. Exocrine pancreas. American Joint Committee on Cancer Manual. 5th edition. Philadelphia: Lippincott-Raven; 1997. p. 121-6.
3. Schlemper RJ, Riddell RH, Kato Y, et al. The Vienna classification of gastrointestinal epithelial neoplasia. *Gut* 2000; 47:251-5.
4. Spigelman AD, Williams CB, Talbot IC, et al. Upper gastrointestinal cancer in patients with familial adenomatous polyposis. *Lancet* 1989; 2:783-5.
5. De Palma GD. Endoscopic papillectomy: Indications, techniques, and results. *World J Gastroenterol* 2014; 20: 1537-43.
6. Espinel J, Pinedo E, Ojeda V, Guerra-del-Río M. Endoscopic ampullectomy: a technical review. *Rev Esp Enferm Dig (Madrid)* 2016; 108: 271-8.
7. Patel R, Varadarajulu S, Wilcox M. Endoscopic ampullectomy techniques and outcomes. *J Clin Gastroenterol* 2012;46:8-15.

Keywords: Ampulla of vator, Ampullary adenoma, Ampullary carcinoma, Endoscopic management, Ampullectomy/papillectomy



PB 1-3

How to Manage (or Handle) Remnant or Recurrent Lesions

Ichiro Yasuda

Third Department of Internal Medicine, University of Toyama, Toyama, Japan

Introduction

Ampulla of Vater (AOV) tumors are being increasingly detected because of the wide spread use of EGD as a screening tool for gastric cancer and other GI disorders. Most of the AOV tumors are adenomas. However, careful observation or complete resection is recommended because of their malignant potential and difficulty of discrimination from early carcinoma. Focal carcinoma can be missed by endoscopic biopsy sampling and is found only in resected specimens in 6% to 26% of adenomas undergoing papillectomy.¹ Recently, endoscopic papillectomy (EP) is becoming a popular therapeutic option for the management of AOV adenomas. Endoscopic treatment of AOV adenomas achieves cure rates ranging from 76% to 90% in patients without intraductal extension.¹ The recurrence rates have been reported as high as 33%.²

Remnant and recurrent AOV adenomas

If the lesion can be ensnared completely, en bloc complete resection would be performed. However, larger lesions are more likely to be incompletely excised at the initial endoscopic procedure. Piecemeal or repeated resection is often performed for lesions >2 cm or for cases in which visible neoplastic tissue remains after attempted en bloc resection. Many sessions may be required to completely remove all lesions. In cases of a visible remnant tumor after the initial snare cutting, repeated snaring would be generally carried out until all visible remnant tumors are resected. Otherwise, endoscopic ablative therapies are selectively administered at the discretion of the endoscopist for control of immediate bleeding, prevention, of post-procedural bleeding, or ablation of the suspected tiny remnant tumor. Such ablation therapies can also be attempted for the recurrent lesions after EP, although repeated EP is performed more preferably than such ablation therapies.

Ablative therapies

Endoscopic ablative therapies such as electrocoagulation, argon plasma coagulation (APC), laser therapy, photodynamic therapy (PDT), and radiofrequency ablation (RFA) can be used to destroy residual or recurrent superficial adenomas that could not be removed during previous attempted snare resection. APC is a type of non-contact thermal ablation in which a high-frequency current is applied to the target lesion. It is widely used for the treatment of endoscopic hemostasis or as additional treatment after endoscopic resection. APC is also the most frequently used modality for residual or recur-

rent lesions after EP, given its widespread availability and superficial depth of tissue destruction. Nam et al.³ compared short- and long-term outcomes between the EP with additional APC group and the EP alone group using propensity score matching. Additional APC was selectively used at the discretion of the endoscopist for control of immediate bleeding, prevention, of post-procedural bleeding, or ablation of suspected microscopic remnant tumor. As a result, the bleeding rate was significantly lower in the EP+APC group than in the EP alone group, without an increase in the risk of other early adverse effects such as pancreatitis, cholangitis, and perforation. The recurrence rates were also comparable. Moreover, APC has also been reported to be useful for recurrent ampullary tumors that arise after EP.⁴ On the other hand, there is no consensus regarding settings or power levels for APC. Pancreatic duct stents are usually placed before ablating tissue around the pancreatic orifice.² However, the pathological evaluation is not available after such ablation therapies.

Treatments of intraductal lesions

Intraductal extension of ampullary adenomas into the common bile duct or pancreatic duct is challenging to treat endoscopically and is generally considered a contraindication to endoscopic therapy. However, it is sometimes difficult to recognize the lesion before papillectomy even by using ERCP, EUS, and IDUS. Intraductal remnant lesions are sometimes revealed after papillectomy. In addition, some endoscopists try to expand the indication for endoscopic therapy to AOV adenomas with intraductal extension. However, the limited visualization and inability to accurately target lesions make the endoscopic treatments difficult.

To overcome such problems, use of a balloon-tipped catheter has been attempted to expose intraductal adenomas and permit complete endoscopic resection. Kim JH et al.⁵ reported their experience of endoscopic papillectomy with an extraction balloon catheter for an unexposed ampullary adenoma. In this report, they successfully exposed the ampullary mass to the duodenal side by extracting the lesion using an extraction balloon catheter. Snare papillectomy was then performed on the exposed ampullary mass and APC was additionally performed at the resected area to ablate any possible remnant adenomatous tissue. On the other hand, Dzeletovic et al.⁶ used a dilation balloon catheter to visualize the intraductal lesion and to guide endoscopic therapy. After the visualization of the intraductal lesion, it was then snare resected and/or treated with a variety of thermal therapies, including a heater probe, APC, PDT, and RFA.

Intraductal biliary RFA is an ablative therapy that has been used to treat malignant biliary strictures and tumor ingrowth into biliary self-expandable metal stents. Valente et al.⁷ reported the initial 3 cases with ampullary adenoma that were treated with RFA: 1 had intraductal recurrence after endoscopic papillectomy and the other 2 had intraductal adenoma. Mehendirata et al.⁸ also reported a case where RFA was successful in eradicating residual ampullary adenoma at the biliary orifice after endoscopic papillectomy in the same year.

Rustagi et al.¹ reported clinical outcomes of the case series in which complete intraductal adenoma eradication could be achieved in 12 of 13 assessable patients (92%) by using endoscopic RFA. Adverse events occurred in 6 of 14 patients (43%), which included symptomatic or asymptomatic biliary stricture and retroduodenal abscess. However, all cases were successfully treated endoscopically. Most recently, Camus et al.⁹ evaluated the efficacy and safety of intraductal RFA for the treatment of

adenomatous intraductal residue after EP in a prospective multicenter study. Twenty patients with histologically proven endobiliary adenoma remnant were included in this study. The rates of residual neoplasia were 15% and 30% at 6 and 12 months, respectively. Two patients (10%) were referred for surgery. Eight patients (40%) experienced at least 1 adverse event between the RFA and follow-up at 12 months, which included mild pancreatitis, melena, cholangitis, and biliary strictures. However, no major adverse event occurred.

Thus, intraductal RFA of residual intraductal lesions after EP can be offered as an alternative to surgery, especially in patients who are unfit for surgery or refused surgery.

References

1. Rustagi T, Irani S, Reddy DN, et al. Radiofrequency ablation for intraductal extension of ampullary neoplasms. *Gastrointest Endosc* 2017;86:170-176.
2. Chathadi KV, Khashab MA, Acosta RD, et al. The role of endoscopy in ampullary and duodenal adenomas. *Gastrointest Endosc* 2015;82:773-81.
3. Nam K, Song TJ, Kim RE, et al. Usefulness of argon plasma coagulation ablation subsequent to endoscopic snare papillectomy for ampullary adenoma. *Dig Endosc* 2018;30:485-492.
4. Sakai A, Tsujimae M, Masuda A, et al. Clinical outcomes of ampullary neoplasms in resected margin positive or uncertain cases after endoscopic papillectomy. *World J Gastroenterol* 2019;25:1387-1397.
5. Kim JH, Moon JH, Choi HJ, et al. Endoscopic snare papillectomy by using a balloon catheter for an unexposed ampullary adenoma with intraductal extension (with videos). *Gastrointest Endosc* 2009;69:1404-6.
6. Dzeletovic I, Topazian MD, Baron TH. Endoscopic balloon dilation to facilitate treatment of intraductal extension of ampullary adenomas (with video). *Gastrointest Endosc* 2012;76:1266-9.
7. Valente R, Urban O, Del Chiaro M, et al. ERCP-directed radiofrequency ablation of ampullary adenomas: a knife-sparing alternative in patients unfit for surgery. *Endoscopy* 2015;47 Suppl 1 UCTN:E515-6.
8. Mehendiratta V, Desilets DJ. Use of radiofrequency ablation probe for eradication of residual adenoma after ampullectomy. *Gastrointest Endosc* 2015;81:1055-6.
9. Camus M, Napoleon B, Vienne A, et al. Efficacy and safety of endobiliary radiofrequency ablation for the eradication of residual neoplasia after endoscopic papillectomy: a multicenter prospective study. *Gastrointest Endosc* 2018;88:511-518.

Keywords: Ampullary tumor, Endoscopic papillectomy, Ablation, Ampullary adenoma, Intraductal



PB 1-4

How to Manage Incidental Aov Cancer and Perform Surveillance after Endoscopic Papillectomy

Sang Myung Woo

Center for Liver and Pancreatobiliary Cancer, National Cancer Center, Goyang, Korea

Ampullary adenocarcinoma is considered to have a better prognosis than either pancreatic or bile duct carcinoma.¹ Although pancreaticoduodenectomy (PD) is the mainstay of surgical treatment for ampullary malignancies, PD is associated with significant mortality and morbidity. Many patients with ampullary cancer are elderly and have significant comorbidities. This has generated interest in less aggressive treatment options, such as local resection for selected patients. Given the success of endoscopic resection in the treatment of benign ampullary adenoma, attention has turned to the role of endoscopic papillectomy (EP) in early stage ampullary adenocarcinoma. Some recent publications have advocated the use of EP for the treatment of early stage ampullary adenocarcinoma.

For EP to be curative, accurate tumour staging is essential and the risk for lymph node metastasis must be considered.^{2,3} Accurate pretreatment staging of an ampullary malignancy is important, especially given the suggestion that adenocarcinoma confined to the mucosa can be treated endoscopically. Computed tomography more frequently understages than overstages ampullary tumours; however, its use in staging should be routine given its ability to detect distant metastatic disease.⁴ Although EUS are suggested to be superior to CT and conventional US for T- and N-staging, success in differentiating between T1 and T2 tumours is variable.⁵ It is difficult to estimate duodenal involvement by EUS because the muscularis propria of the duodenal wall was not clearly visualized in some cases. In addition, the sphincter of Oddi is difficult to depict even with EUS and intraductal US, probably due to the low density of its muscle fibers.

The roles of local resection such as EP are controversial. EP of ampullary cancers limited to the mucosa without ductal infiltration into the pancreatic and bile duct can be justified as radical treatment.⁵ The attention has primarily focused on T1 disease, in which the risk for lymph node metastasis is lowest. Although ampullary cancer are usually reported as single institutional experiences with relatively small sample sizes, and only a few have examined survival beyond 5 years, it is worth noting that approximately 15.8% of patients undergoing PD for T1 cancer display lymph node metastases. The risk for lymph node metastasis significantly increases with tumour size, tumour depth, and degree of differentiation.⁶ Given the risk for lymph node metastasis, local resection should be considered as an alternative to PD, provided strict criteria are met.^{7,8} The subsequent PD appear to be of no benefit for those with well differentiated focal tumours less than 2 cm in size which displayed no angiolymphatic invasion. Therefore, when EP is carried out for an ampullary neoplasm, careful histological evaluation of the resected specimen is essential for evaluation of its appropriateness.

The use of EP to treat T1 adenocarcinoma was published as case reports and series, that show that T1 adenocarcinoma has a very low recurrence rate when treated with EP. However, these studies

are limited by small numbers of patients in each report and short-term follow-up. Data on further long-term follow up are awaited.

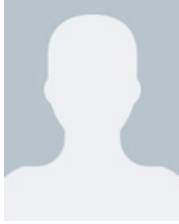
After examination of the endoscopic resected specimen, an additional PD was proposed for T1 adenocarcinomas in duct ingrowth, R1 resection or lymphovascular invasion. There is no consistent evidence about the management of ampullary tumors that exhibit R1 or uncertain margins after being resected via EP. Resected margin positive or uncertain, and even recurrent cases after EP could be managed by endoscopic treatment including argon plasma coagulation.⁹

Posttreatment surveillance to detect recurrent or persistent disease is performed at regular intervals, although the optimal surveillance strategy is undefined. National Comprehensive Cancer Network (NCCN) guidelines are not available. The first follow-up session can be scheduled for 12 weeks after EP, after which a reasonable approach is to follow patients every six months for five years and yearly thereafter. Follow-up visits usually include a clinical examination, duodenoscopy with biopsies, CT and/or EUS.¹⁰ Complementary ERCP can be performed if doubt remained about a possible intraductal recurrence after EUS. Nodal status should be determined by CT, MRI, or EUS during follow-up.

References

1. Woo SM, Ryu JK, Lee SH, et al. Recurrence and prognostic factors of ampullary carcinoma after radical resection: comparison with distal extrahepatic cholangiocarcinoma. *Ann Surg Oncol* 2007;14:3195-201.
2. Song J, Liu H, Li Z, et al. Long-term prognosis of surgical treatment for early ampullary cancers and implications for local ampullectomy. *BMC Surg* 2015;15:32.
3. Kim H, Kwon W, Kim JR, et al. Recurrence patterns after pancreaticoduodenectomy for ampullary cancer. *J Hepatobiliary Pancreat Sci* 2019;26:179-186.
4. Artifon EL, Couto D, Jr., Sakai P, et al. Prospective evaluation of EUS versus CT scan for staging of ampullary cancer. *Gastrointest Endosc* 2009;70:290-6.
5. Ito K, Fujita N, Noda Y. Endoscopic diagnosis and treatment of ampullary neoplasm (with video). *Dig Endosc* 2011;23:113-7.
6. Askew J, Connor S. Review of the investigation and surgical management of resectable ampullary adenocarcinoma. *HPB (Oxford)* 2013;15:829-38.
7. Woo SM, Ryu JK, Lee SH, et al. Feasibility of endoscopic papillectomy in early stage ampulla of Vater cancer. *J Gastroenterol Hepatol* 2009;24:120-4.
8. Yoon SM, Kim MH, Kim MJ, et al. Focal early stage cancer in ampullary adenoma: surgery or endoscopic papillectomy? *Gastrointest Endosc* 2007;66:701-7.
9. Sakai A, Tsujimae M, Masuda A, et al. Clinical outcomes of ampullary neoplasms in resected margin positive or uncertain cases after endoscopic papillectomy. *World J Gastroenterol* 2019;25:1387-1397.
10. Alvarez-Sanchez MV, Oria I, Luna OB, et al. Can endoscopic papillectomy be curative for early ampullary adenocarcinoma of the ampulla of Vater? *Surg Endosc* 2017;31:1564-1572.

Keywords: Ampullary neoplasms, Endoscopic papillectomy



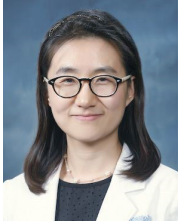
PB 2-1

The indication and future perspective of EUS-guided tissue biopsy

Dong Wan Seo

Internal Medicine, University of Ulsan, Seoul, Korea

No Contents



PB 2-2

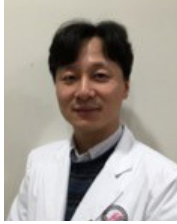
Endoscopic Ultrasound-Guided Fine Needle Aspiration Biopsy and Cytology: Adequacy and Specimen Processing

Haeryoung Kim

Pathology, Seoul National University Hospital, Seoul, Korea

Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is currently the procedure of choice for diagnosing pancreatic neoplasms, and high sensitivity and specificity have been reported for pancreatic ductal adenocarcinomas. For pathologists, the important issues in EUS-FNA material interpretation include specimen adequacy, recognizing contaminants, and discriminating between well-differentiated adenocarcinomas – which may appear deceptively bland-looking on cytology – and reactive atypia. As the aspirated material is often scanty in amount, pathologists need to lower the threshold for a cytological diagnosis of malignancy, compared to when interpreting relatively more cellular aspirates obtained from superficial locations (e.g. thyroid). In addition, clinicoradiological correlation is important, as the cellularity and cell composition would be affected by the nature of the lesion in question; for example, cystic lesions are more likely to be paucicellular and mostly composed of macrophages. Gastroenterologists who perform smears of EUS-FNA material should be careful to avoid dry artifact and crushing artifact, both of which result in the distortion of the cytological features. In addition, thick and bloody smears should be avoided as the cellular details cannot be appreciated in these cases. In this talk, the different preparation methods of EUS-FNA specimens will be discussed, together with a brief overview of the general cytopathological features of pancreatic neoplasms.

Keywords: Endoscopic ultrasound, Fine needle aspiration, Cytology, Biopsy



PB 2-3

Which Technique Is Better in Eus-Guided Tissue Acquisition for Pancreatic Solid Tumorr: Convincing Scientific Evidence or Personal Preference?

Se Woo Park

Department of Internal Medicine, Hallym University Dongtan Sacred Heart Hospital, Hallym University College of Medicine, Gyeonggi-do, Korea

Introduction

EUS (endoscopic ultrasound) is well established for differentiation of pancreaticobiliary malignancies and benign diseases and for diagnostic tissue acquisition, which can be achieved by EUS-guided fine needle aspiration (FNA) or by EUS-guided fine needle biopsy (FNB) using dedicated biopsy needles.¹ EUS-guided tissue acquisition (TA) is a multistep procedure that involves assessment of proper clinical indication, correct selection of FNA needles, and adoption of evidence-based techniques for tissue sampling. EUS FNA is done by needles that are available in different sizes, mainly 19, 22, and 25-gauge needle.² The need of rapid onsite evaluation, dependence on histology/core biopsy occasionally to get a diagnosis, and inability to reliably assess for molecular markers are important limitations of EUS-TA. EUS-guided fine needle biopsy (FNB) that samples the core of tissue is an exciting new development in the field of diagnostic EUS. FNB needles are expensive than FNA needles, and although the initial results are encouraging, more studies with robust evidence proving their superiority beyond any doubt are needed before they can be widely used.³ This manuscript focuses on recent developments in procedural techniques and needle technologies for EUS-guided TA in pancreatic solid tumor.

Various techniques of EUS-TA for pancreatic solid tumor

Suction or No suction

In technique using suction, while performing EUS-guided TA, negative suction is applied using suction syringe (usually supplied with the needle by the manufacturer) over a three-way stop-cock during the puncturing of lesion, and this theoretically would increase the yield of tissue. Various studies have shown that it indeed increases the diagnostic yield but at the risk of bloody sample.⁴⁻⁶ In a recent randomized trial comparing 22-G and 25-G needles with or without suction, authors found that that use of suction with 22-G needles was inferior to no use of suction, and they concluded that the use of suction must be avoided in centers utilizing rapid onsite evaluation (ROSE) as it increases specimen bloodiness and number of passes needed to achieve diagnostic adequacy, particularly with 22-G needles.⁷ However, suction has been shown to improve the diagnostic yield in fibrotic lesions such as pancreatic

cancer.⁵ Thus, ASGE technical review has recommended the use of suction during EUS-guided TA of pancreatic masses and against the use of suction during EUS-guided TA of lymph nodes because it increases the bloodiness of specimens obtained and has no impact on the overall diagnostic yield.⁸ In conclusion, the available evidence suggests that sampling a hyper-vascular lesion such as lymph nodes, a non-suction technique may result in better quality, whereas aspirating hypo-vascular fibrotic malignant lesion of pancreas or in setting of chronic pancreatitis suction may provide a superior sample.

Slow pull back technique

To avoid unnecessary strong suction of suction technique and thus decrease the bloodiness of the sample, an alternative low negative pressure method of slow pull back technique has been introduced. Also known as capillary technique, the stylet is slowly withdrawn along during to-and-fro motion of the needle by assistant nurse, thereby creating a slow negative suction that enables increased aspiration of tissue. In a recent comparative study for solid pancreatic mass compared with standard suction and slow-pull back technique, authors demonstrated that slow-pull back technique was found to be having significantly superior diagnostic accuracy (88% vs 71%) with significantly less blood contamination.⁹

Role of stylet

The stylet in the needle was designed to maintain stiffness to the needle device as well as to prevent the clogging by digestive wall tissue within needle path during puncturing, and thus prevent the contamination of the sample by cells that do not originate from the intended target pancreatic lesion. However, studies have shown that the use of a stylet does not guarantee any advantage during EUS-guided tissue sampling. One meta-analysis¹⁰ regarding stylet have shown that the routine use of stylet for these purposes did not yield better result and there was no difference in cellularity, contamination, bloodiness score, diagnostic ability, and diagnostic accuracy when EUS-guided TA was performed with or without stylet. In addition, the use of stylet at every passage is technically labor intensive, time consuming, and prone for needle stick injury. Thus, ASGE technical review has recommended against the use of a stylet during EUS-guided TA in order to improve the diagnostic yield of and specimen quality.⁸

Standard or fanning techniques

In standard technique, during a pass, the needle tip is positioned at one location within the mass and then moved back and forth multiple times. For subsequent passes, a different margin of mass is targeted, with needle movement being confined to the same area. In contrary to this, the needle is positioned at different areas within the mass and then moved to and fro multiple times in each area by the fanning technique. The needle path can be altered using either the “up/down” endoscope dial or the elevator.¹¹ In a recent randomized controlled trial which compared the standard technique versus fanning technique, authors found no difference in diagnostic accuracy, technical failure, or complication rates.¹¹ However, fanning technique required lesser number of passes to establish the diag-

nosis with a higher percentage of patients achieving diagnosis on pass one (57.7% vs. 85.7%; $P = 0.02$).

Conclusions

The multiple techniques required to accomplish successful results include not only the needle puncture itself, but also appropriate lesion identification, correct puncture sequence, collaboration with the cyto-pathologist onsite or remotely, proper handling of the specimens, choosing one or more of cytology, cell-block, and/or tissue core preparation and, last, deciding the special staining such as immunohistochemistry panels and ancillary tests which may be needed for the current case. Some mistakes in any steps may lead to incomplete or inconclusive information from the procedure, even if the aspirate is 'adequate.' Thus, the operators must individualize the tissue-acquisition process and handling of the aspirated specimen for each patient, as per the presumptive diagnosis. Based on these premises, we need to change our way of thinking and search for the right technique or the right needle that will give enough tissue to perform all studies to reach the diagnosis and to allow for personalized treatment of individual patients. We firmly believe that a close collaboration between endosonographers and cyto-pathologists is of paramount importance to succeed in this balanced effort to develop the right EUS-TA technique and should be strongly encouraged.

References

1. Roy A, Kim M, Hawes R, Varadarajulu S. Changing trends in tissue acquisition in malignant pancreatic neoplasms. *J Gastroenterol Hepatol.* 2016; 31: 501-5.
2. Affolter KE, Schmidt RL, Matynia AP, Adler DG, Factor RE. Needle Size Has Only a Limited Effect on Outcomes in EUS-Guided Fine Needle Aspiration: A Systematic Review and Meta-Analysis. *Digest Dis Sci.* 2013; 58: 1026-34.
3. Rong L, Kida M, Yamauchi H, et al. Factors affecting the diagnostic accuracy of endoscopic ultrasonography-guided fine-needle aspiration (EUS-FNA) for upper gastrointestinal submucosal or extraluminal solid mass lesions. *Dig Endosc.* 2012; 24: 358-63.
4. Lee JK, Choi JH, Lee KH, et al. A prospective, comparative trial to optimize sampling techniques in EUS-guided FNA of solid pancreatic masses. *Gastrointest Endosc.* 2013; 77: 745-51.
5. Puri R, Vilmann P, Saftoiu A, et al. Randomized controlled trial of endoscopic ultrasound-guided fine-needle sampling with or without suction for better cytological diagnosis. *Scand J Gastroenterol.* 2009; 44: 499-504.
6. Wallace MB, Kennedy T, Durkalski V, et al. Randomized controlled trial of EUS-guided fine needle aspiration techniques for the detection of malignant lymphadenopathy. *Gastrointest Endosc.* 2001; 54: 441-7.
7. Bang JY, Hebert-Magee S, Trevino J, Ramesh J, Varadarajulu S. Randomized trial comparing the 22-gauge aspiration and 22-gauge biopsy needles for EUS-guided sampling of solid pancreatic mass lesions. *Gastrointest Endosc.* 2012; 76: 321-7.
8. Wani S, Muthusamy VR, Komanduri S. EUS-guided tissue acquisition: an evidence-based approach (with videos). *Gastrointest Endosc.* 2014; 80: 939-59 e7.
9. Lee JM, Lee HS, Hyun JJ, et al. Slow-Pull Using a Fanning Technique Is More Useful Than the Standard Suction Technique in EUS-Guided Fine Needle Aspiration in Pancreatic Masses. *Gut Liver.* 2018; 12:

360-6.

10. Kim JH, Park SW, Kim MK, et al. Meta-Analysis for Cyto-Pathological Outcomes in Endoscopic Ultrasonography-Guided Fine-Needle Aspiration With and Without the Stylet. *Dig Dis Sci*. 2016; 61: 2175-84.
11. Bang JY, Magee SH, Ramesh J, Trevino JM, Varadarajulu S. Randomized trial comparing fanning with standard technique for endoscopic ultrasound-guided fine-needle aspiration of solid pancreatic mass lesions. *Endoscopy*. 2013; 45: 445-50.

Keywords: Endoscopic ultrasound, Tissue acquisition, Pancreatic solid tumor, Technique, Diagnostic yield



PB 2-4

Which Needle Is Better for Pancreatic Solid Tumors? Standard Aspiration Needles or Newly Designed Biopsy Needles

Marcin Polkowski^{1,2}

¹Department of Gastroenterological Oncology, M Sklodowska-Curie Memorial Cancer Center, Warsaw, ²Department of Gastroenterology, Hepatology and Clinical Oncology, Center of Postgraduate Medical Education, Warsaw, Poland

Needles for endoscopic ultrasonography (EUS)-guided sampling can be broadly categorized into fine-needle aspiration (FNA) and fine-needle biopsy (FNB) needles. FNB needles feature special modification of the distal portion/tip designed to cut out tissue and procure core tissue specimens. This group can be further divided into reverse bevel ProCore needles introduced nine years ago and the newly introduced, "second generation" FNB needles such as Acquire, SharkCore and the antegrade bevel Procore needle.

The reverse bevel ProCore needle was extensively evaluated in 15 randomized controlled trials (RCTs) and four meta-analyses [1]. These studies consistently showed that when compared with FNA needle of the same size fewer needle passes with reverse bevel ProCore needle were required to obtain a diagnostic/adequate specimen. The evidence that samples obtained with reverse bevel needle are of better histologic quality is less consistent. Effect on diagnostic accuracy or sensitivity for malignancy, which are the most important outcomes, was documented in only one of four meta-analyses and in one RCTs.

The second generation FNB needs have been introduced only recently and the evidence on their performance is emerging. Robust evidence from a RCT that carefully compared the quantity and quality of specimens obtained with 22G Acquire FNB needle and 22G FNA needle, showed that former provided specimens that were larger, contained more tumor tissue, more desmoplastic stroma, and were of higher quality. Most FNB specimens had retained tissue architecture (vs only 20% of FNA samples), were more often suitable for immunohistochemistry and more often diagnostic [2]. Another RCT showed that the SharkCore and Acquire FNB needles provided specimens of comparable size and quality [3]. Comparisons of the antegrade 20G ProCore needle with Acquire or SharkCore needle are missing.

A large multicentric parallel-group RCT in 608 patients (51% with pancreatic masses) showed that FNB with the 20G antegrade ProCore needle has higher diagnostic accuracy than FNA with 25G needle [4]. There was no difference in adverse events rate and very small difference in technical failure rate. 20G Procore provided more often samples suitable for histologic evaluation. Patients with pancreatic masses were not analyzed separately; however, the results were robust when corrected for indication and lesion size.

A safety profile of the new FNB needles seems comparable to that of FNA needles; however, available studies were not adequately powered to evaluate adverse event rates.

In summary, there is emerging evidence that the new FNB needles offer advantages over FNA needles: they provide samples that are larger, more often diagnostic and of better histologic quality. In addition, a lower number of FNB needle passes is required to obtain a diagnostic sample. Using FNB needles probably improve diagnostic accuracy for malignancy, although the evidence for this is still limited.

References

1. Polkowski M, Jenssen C, Kaye P et al. Technical aspects of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Guideline - March 2017. *Endoscopy* 2017; 49: 989-1006
2. Bang JY, Hebert-Magee S, Navaneethan U et al. EUS-guided fine needle biopsy of pancreatic masses can yield true histology. *Gut* 2018; 67: 2081-2084
3. Bang JY, Hebert-Magee S, Navaneethan U et al. Randomized trial comparing the Franseen and Fork-tip needles for EUS-guided fine-needle biopsy sampling of solid pancreatic mass lesions. *Gastrointest Endosc* 2018; 87: 1432-1438
4. van Riet PA, Larghi A, Attili F et al. A multicenter randomized trial comparing a 25-gauge EUS fine-needle aspiration device with a 20-gauge EUS fine-needle biopsy device. *Gastrointest Endosc* 2019; 89: 329-339

Keywords: Pancreatic cancer, Pancreatic tumors, Endoscopic ultrasonography, Fine-needle aspiration, Fine-needle biopsy



PB 3-1

Endoscopic Management of Combined Duodenal and Biliary Obstruction

Rungsun Rerknimitr

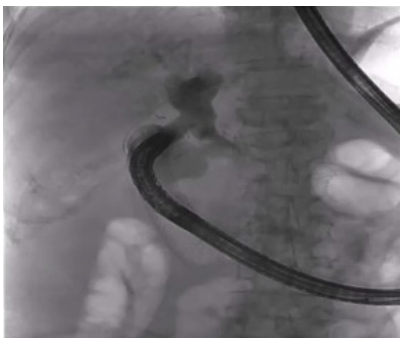
Medicine, Chulalongkorn University, Bangkok, Thailand

Majority of cause that resulted to combined duodenal and biliary obstruction is pancreatic head cancer. Other less common caused care cholangiocarcinoma, gastric cancer, gallbladder cancer, and metastatic tumor. The common presentation of patients are gastric outlet obstruction and obstructive jaundice.

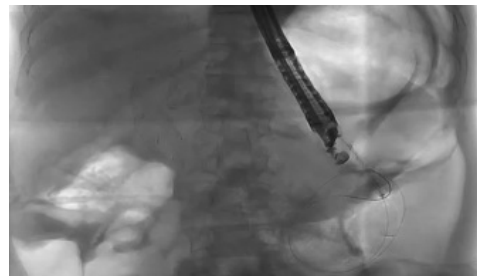
Traditionally surgery played as the main role as double bypass. Over the last decade, double endoscopic stenting with metallic stents, one in the bile duct and the other to open duodenal block has become more popular with comparable result in the first few months. However, the results are still in favor of surgery in those with predicted longer survival over 6 months. The main causes of stents obstruction are tumor ingrowth, tissue hyperplasia and food debris blockage.

Recently EUS guided choledochoduodenal drainage and gastro-jejunal bypass by EUS are being performed and the results appeared to be superior over the transluminal stenting but the analysis of the two EUS techniques have been done separately. Technically, the transluminal and EUS guided drainage can be combined by selecting one from the two. However, the results of these combinations have been reported as cases series only. Therefore, it is warranted to have a prospective trial of EUS guided double bypass vs. transluminal stenting in this setting of patients.

Keywords: Duodenum, Biliary, Obstruction, Endoscopy, Therapy



Combination of EUS guided choledochoduodenostomy and duodenal stenting



EUS guided gastrojejunostomy in a patient with advanced gastric cancer whose duodenal stent became occluded.



PB 3-2

Technical Tips on Double Metallic Stenting

Jong Ho Moon

 SoonChunHyang University School of Medicine, Korea

Curriculum Vitae

Educational Background

- 1983.3 - 1985.2 Premedical Course
 SoonChunHyang University of School of Medicine, Korea
- 1985.3 - 1989.2 School of Medicine
 SoonChunHyang University of School of Medicine, Korea
 Degree : M.D.
- 1992.3 - 1994.2 Graduate School
 SoonChunHyang University of School of Medicine, Korea
 Degree : M.M.S.
- 1994.3 - 1998.2 Graduate School, Ph.D. Course
 SoonChunHyang University of School of Medicine, Korea
 Degree : Ph.D.

Professional Experiences

- 2005. 3 - 2005. 8 Visiting Assistant Professor
 Division of Gastroenterology, Department of Medicine,
 University of Washington School of Medicine, Seattle, USA
- 2010. 9 - Professor
 Division of Gastroenterology, Department of Medicine
 SoonChunHyang University of School of Medicine, Korea

Main Scientific Publications

International; 180
Domestic; over 220

Representative;

Moon JH, et al. Endoscopic retrograde cholangiopancreatography. *Gastrointest Endosc* 2014;80(3):388-391.

Moon JH, et al. Peroral cholangioscopy: Diagnostic and therapeutic applications. *Gastroenterology* 2013;144(2):276-82.



PB 3-3

Technical Tips on Double Metallic Stenting

Ryosuke Tonozuka

Gastroenterology and Hepatology, Tokyo Medical University, Tokyo, Japan

In non-resectable pancreatic cancer cases found to have duodenal stenosis, 13–20% are in the terminal stage when obstruction occurs. The survival period is a mean of 12 weeks. Considering the systemic condition and limited prognosis, it is better to apply minimally invasive treatment whenever possible. Recently, endoscopic duodenal stenting (DuS), which is also minimally invasive, is being increasingly used. In addition, it is referred to as double stenting, combining biliary stenting (BS) and DuS, and it has also been reported. However, when endoscope passage is a challenge due to malignant stenosis, or when Vater's ampulla is invaded by cancer, biliary drainage by the normal endoscopic retrograde cholangiopancreatography (ERCP) procedure (ERCP-BD) can become complicated. Recently, the usefulness of endoscopic ultrasonography-guided biliary drainage (EUS-BD) as a biliary drainage procedure for cases where the approach from Vater's ampulla is a challenge was reported. There have been some reports on double stenting by EUS-BD. They carried out safely with no significant differences in the success rate and the complication rate from those of the ERCP-BD patients. In addition, in EUSBD, the biliary stent and the duodenal stent are placed far apart, and this is likely the reason why they hardly affect each other. Furthermore, We developed EUS-guided gastrojejunostomy (EUS-GJ) as new therapeutic method for gastric outlet obstruction, and now we perform double stenting by EUS-BD and EUS-GJ.

Keywords: Gastric outlet obstruction, Biliary stricture, Duodenal stent, Biliary stent, Double stenting



PB 3-4

Endoscopic Management of Combined Duodenal and Biliary Obstruction: Case-Based Discussion

Jae Hyuck Chang

Department of Internal Medicine, Bucheon St. Mary's Hospital, The Catholic University of Korea, Bucheon, Korea

Case 1

Age and Gender: 86-year-old female

Chief Complaints: Left upper quadrant and left flank pain for 20 days

Present Illness: A 86-year-old female visited the ER due to left upper quadrant and left flank pain for 20 days.

Past and Familial History: Non-specific

Family History: Non-specific

Laboratory Findings: WBC $8.730 \times 10^9/L$, Hb 12.6 g/dL, platelet $357 \times 10^9/L$, AST/ALT 101/93 U/L, total/direct bilirubin 2.1/1.1 mg/dL, alkaline phosphatase 529 U/L, γ -GT 1101 u/L, CA 19-9 651.2 U/mL

Radiologic Findings: Concentric wall thickening and enhancement at the distal common bile duct, diffuse dilatation of bile duct and pancreatic duct with the distended gallbladder, slightly prominent pancreatic head with heterogeneous density and infiltration to surroundings, and mild edematous change of duodenal 2nd loop

Hospital Progress: Insertion of duodenoscope was difficult. A duodenal metal stent was placed. One week later, a biliary stent was placed through the duodenal sent.

Case 2

Age and Gender: 76-year-old male

Chief Complaints: abnormal liver function test and diarrhea

Present Illness: A 76-year-old female with locally advanced pancreatic head cancer was admitted to oncologic department for abnormal liver function. The patient previously underwent duodenal stent placement in another hospital.

Past History: Hypertension

Laboratory Findings: WBC $4.500 \times 10^9/L$, Hb 9.2 g/dL, platelet $282 \times 10^9/L$, AST/ALT 92/83 U/L, total/direct bilirubin 2.09/1.51 mg/dL, alkaline phosphatase 860 U/L, γ -GT 793 u/L

Radiologic and Endoscopic Findings: Large pancreatic head mass with a duodenal metal stent, diffuse dilatation of bile duct and distended gallbladder, and a non-covered metal stent from the ampulla of Vater to the 3rd portion of the duodenum

Hospital Progress: ERCP via the major papilla was failed due to the duodenal metal stent. EUS-guided choledochoduodenostomy with biliary metal stent was performed.

Keywords: Duodenal obstruction, Biliary obstruction



PB 4-1

Eus Guided Ablation

Sundeep Lakhtakia

Gastroenterology, Asian Institute of Gastroenterology, Hyderabad, Telangana, India

Feasibility and safety to accurately position needle, devices and deliver agents under real-time EUS imaging have expanded the use of EUS to ablate tumor or periluminal anatomical structures. EUS-guided antitumor therapy of solid or cystic pancreatic neoplasms can be broadly classified, based on mechanism of action as direct (local ablation) or indirect. "Direct ablation" includes ethanol injection, radiofrequency ablation, photodynamic therapy, laser ablation, and brachytherapy. In "indirect methods", a second process later achieves the antitumor effect e.g. image-guided stereotactic radiation (after fiducial placement), stimulation of immune system to target the tumor (after antitumor vaccines) or locally acting chemotherapeutic agents.

EUS provides better anatomic access for local guided therapy. Minimally invasive EUS guided antitumor therapy has been reportedly used for pancreatic cancer (dismal prognosis even with the best management) and pancreatic cyst neoplasm (having unacceptable high morbidity with surgery). Other targets for EUS-guided tumor ablation are pancreatic neuroendocrine tumors which are less aggressive and curable by surgical resection. However, patient non-eligible for surgery may be considered for EUS-guided ablation.

EUS guided Pancreatic Cystic Lesion (PCL) ablation: PCLs are increasingly being detected due to the widespread use of high-resolution cross-sectional imaging. The current management of malignant or pre-malignant PCL is surgical resection, often associated with high postoperative adverse events. Hence, minimally invasive EUS-guided therapies like intra-cystic lavage or instillation of chemical agents alone or in combination are being accepted e.g. ethanol, saline or paclitaxel. Randomized trials show reported impressive safety and efficacy of various EUS guided cyst ablation techniques. However, widespread acceptance of the ideal biochemical agent needs more validation and multicentre studies.

EUS guided ethanol ablation: include case reports of liver metastases, GI stromal tumor, and adrenal metastasis from lung cancer. Recent small series of pancreatic NET show safety & efficacy. Technical variables (needle type, volume, number of sessions needed) and methods to prevent potential risk of complications need standardization.

EUS guided RFA: RFA produces coagulative necrosis in the tissue from high-frequency alternating current. RFA is minimally invasive, safe and well tolerated. Depending on the delivery mechanism, EUS RFA probes can be broadly classified as "through-the-needle" device and "EUS FNA needle type" device. They are either mono- or bipolar. Some have sophisticated internal cooling methods and generators. Reported clinical use of RFA includes pancreatic cancer, neuroendocrine tumor, and pancreatic cyst neoplasm. Unresolved issues include power setting, duration & number of sessions according to tumor type and size.

Keywords: Eus, Ablation, Rfa, Alcohol, Tumor



PB 4-2

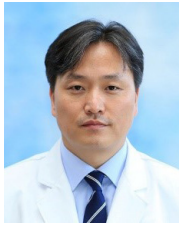
Confocal Endomicroscopy in Pancreatic Cystic Lesions

Damien Tan

Gastroenterology and Hepatology General Hospital, Singapore

Pancreatic cystic lesions (PCLs) are usually found incidentally. The prevalence of PCLs is approximately 2%. With the increased use of cross-sectional imaging PCLs are being diagnosed more frequently. Characterization of PCLs is determined by a patient's symptoms, imaging findings (EUS/computed tomography), and cyst fluid studies (viscosity, tumour markers, and pancreatic enzyme levels). EUS-FNA is used to obtain fluid for analysis. However, cyst fluid cytology has a pooled sensitivity of 63% and specificity of 88% due to the poor aspiration of epithelial cells. The use of tumour markers such as carcinoembryonic antigen (CEA) (with a cut-off level of >192 ng/mL) has poor accuracy. Confocal laser endomicroscopy (CLE) is a new endoscopic modality which provides real-time, very high magnification images of the GI mucosal epithelium during endoscopy. CLE is novel in that it enables the acquisition of in vivo "optical biopsy" without taking any tissue sample. For pancreatic cyst wall imaging the CLE probe can be inserted through a 19-gauge FNA needle (nCLE) and visualization of the cyst wall can be characterized after fluorescein administration. A recent study (CONTACT 2) has shown nCLE was conclusive in 91% of PCLs. The sensitivities and specificities of nCLE for the diagnosis of serous cystadenoma, mucinous PCL, and premalignant PCL were all ≥ 0.95 (with 95% confidence interval from 0.85 to 1.0). The use of nCLE probe renders visualization of the cyst wall during EUS-FNA possible and has the potential to change the current diagnostic algorithm of PCLs.

Keywords: Confocal endomicroscopy, Eus, Pancreas cyst



PB 4-3

Drug Eluting and Bioabsorbable Stent

Sung Ill Jang

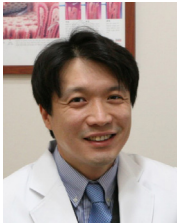
Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Biliary stents have undergone various modifications to improve the management of both malignant biliary obstruction and benign stenosis. New stent materials include plastic stents and self-expanding metal stents (SEMS). Moreover, various functional stents have been developed to serve multiple purposes, including antimigratory stents, easily removable or shape-modifying stents, antihyperplasia stents, drug-eluting stents (DES), radioactive stents, and bioabsorbable stents (BAS). This section discusses DES, which prevent tumor ingrowth into the stent, and BAS, which disappear gradually.

SEMS can become obstructed by tumor ingrowth through the stent mesh, tumor overgrowth at the proximal or distal end of the stent, the compaction of biliary sludge or food, or mucosal hyperplasia due to stent-induced chronic inflammation. The use of covered SEMS cannot prevent tumor ingrowth completely, although these stents were designed to suppress such ingrowth. Tumor ingrowth occurs because the membrane used in the covered SEMS is biodegraded in vivo by hydrolysis, oxidation, and continuous contact with bile flow. Degraded membranes form microcracks, and holes in the stent can result in tumor ingrowth and stent occlusion. There have been efforts to coat similar stents with antitumor drugs to prevent tumor invasion into the membrane and to prolong stent patency. The several animal and human studies of DES are performed. Although the safety of DES in human is proven, the efficacy of DES for preventing ingrowth is not sufficiently proven. However, the possibility of local therapy of DES in bile duct cancer is suggested. Therefore, a paradigm shift is required for the purpose of DES. The aim of future DES in malignant biliary obstruction should be to reduce tumor volume through local antitumor effect rather than to increase stent patency by inhibition of tumor ingrowth.

BAS has the main advantage of avoidance of repeated endoscopic retrograde cholangiography (ERCP) for stent removal. BAS can reduce the associated burden on the patient and the health care system. Data and experience in animal and human studies on BAS have until recently been limited and the commercial development of endoscopic implantation devices for BAS use in ERCP has been challenging. However, the advance and modification of endoscopic use of BAS in patients are increasingly relevant after various novel prototypes of BAS for endoscopic implantation has become available, and the initial experiences of clinical use in ERCP reported. Although the previous studies for BAS suggest the evidence of good biocompatibility, convincing feasibility, and mid-term results in percutaneous and endoscopic use, BAS may become a viable alternative method in only highly selected cases until now. Therefore further studies are needed to confirm the widespread clinical endoscopic use of BAS.

Keywords: Drug eluting stent, Bioabsorbable stent



PB 4-4

Endoscopic Radiofrequency Ablation for Malignant Biliary Tract Obstruction

Jae Hee Cho

Internal Medicine, Gachon University College of Medicine, Incheon, Korea

Introduction

Intraductal radiofrequency ablation (ID-RFA) is an endoscopic local treatment modality in patients with malignant biliary tract obstruction (MBTO). Because it may provide improvement of stent patency and patient survival, ID-RFA technique is increasingly performed in many countries for palliation of an MBTO. A temperature-controlled RFA catheter (ELRA[®] RF catheter, STARmed, Goyang, Korea) has an internal temperature sensor for monitoring tissue temperature, and the ablation can be terminated if the tissue temperature exceeds the preset target temperature, which could be helpful to control ablation depth and volume, and eventually avoid overheating and perforation. However, there is only limited evidence for temperature-controlled ID-RFA. In this article, we will discuss previously reported data describing clinical safety and efficacy of temperature-controlled ID-RFA.

ID-RFA for malignant distal biliary tract obstruction

In a retrospective multicenter study, 43 patients underwent temperature controlled ID-RFA (7-10 W, target temperature 80°C, 120 seconds). All patients had unresectable distal MBTOs including 28 CBD cancer, 11 pancreatic cancer and 4 GB cancer. After ID-RFA, biliary drainage was maintained by placing a covered/uncovered self-expanding metallic stent (SEMS) or plastic stent. Temperature controlled ID-RFA was safely performed in all patients without technical difficulties. The median length of MBTO was 22 mm (range: 12-50), and ID-RFA was followed by placement of biliary stents; 15 uncovered SEMS, 26 covered SEMS and two plastic stents. There were 18 (41.9%) patients who required re-intervention during follow-up period. The median durations of stent patency were 173 days for uncovered SEMS group and 203 days for covered SEMS group ($P=0.119$). The median overall survival was estimated to be 449 days. The median overall survivals were 630 days and 191 days for biliary tract cancer and for pancreatic cancer, respectively ($P<0.001$). Although this study was a retrospective single arm study, the total incidence of adverse events after procedure was 18.6% (8/43; 5 pancreatitis, 1 cholangitis with cholecystitis and 2 cholecystitis) which was comparable to previous studies which analyzed conventional palliative treatments and there was no major complication such as perforation and hemobilia. The authors concluded that ID-RFA is a safe and effective adjunctive local therapy in patients with distal MBTO. Distal MBTO caused by biliary tract cancer including GB cancer and CBD cancer might be an adequate indication for ID-RFA in terms of stent patency and overall survival.

Although ID-RFA is increasingly performed, there is only limited evidence of actual ablation volume

or depth following ID-RFA. The authors analyzed pathologic ablation depth and volume of ID-RFA in patients with resectable distal extrahepatic cholangiocarcinoma. Seven surgical specimens were evaluated after preoperative ID-RFA (7–10 W, 80°C, 120 sec, overlapping ablation was permitted as needed). The median fluoroscopic improvement of diameters at the biliary stricture site were 1.3 (range: 0.7–1.7) mm. No evidence of perforation, hemobilia, cholangitis, cholecystitis, or death related to ID-RFA was detected in any patient. The histology revealed that median maximal ablation depth was 4.0 mm (range, 1–6) and median effective ablation length (histological ablation length/fluoroscopic ablation length) was 72.0% (range, 42.1–95.3). Based on these results, ablating the target lesion longer than the estimated ablation length by fluoroscopy may improve the efficacy of ID-RFA.

ID-RFA for malignant perihilar biliary tract obstruction

The safety of ID-RFA in perihilar area has yet to be clearly demonstrated. In our unpublished data, ID-RFA at the hilar area using different probe lengths (11, 18, and 22 mm) and settings (7 or 10 W for 60–120 s) was performed in six mini-pigs. In addition, patients with malignant hilar obstruction who underwent palliative ID-RFA were retrospectively evaluated. In the animal study using different ID-RFA settings, post-ID-RFA fluoroscopic radiocontrast leakage and microscopic bile duct perforation with hepatic abscess were observed in four of the six mini-pigs. Only two of the them, in which an 11-mm ID-RFA probe at a target temperature of 80°C, power of 7 W, and duration of 60 s was used, underwent successful ID-RFA without any immediate adverse events. Clinically, ID-RFA was performed using the 11-mm probe with the setting of 80°C, 7 W, and 60–120 s for malignant hilar obstruction, and total of 11 patients underwent successful ID-RFA without adverse events. Our study suggests that ID-RFA performed using a short-length probe with settings of 80°C, 7 W and 60–120 s is a safe and feasible palliative treatment for malignant hilar obstruction.

Conclusions

Recently developed ID-RFA is still in debate for the clinical efficacy on the stent patency or survival. However, based on previously reported studies, ID-RFA with a temperature-controlled RFA catheter could result in coagulation necrosis of human cancer tissue. Because ID-RFA is a safe and effective adjunctive local therapy, further prospective randomized studies are warranted to confirm the survival benefit of ID-RFA.

References

1. Laquiere A, Boustiere C, Leblanc S, et al. Safety and feasibility of endoscopic biliary radiofrequency ablation treatment of extrahepatic cholangiocarcinoma. *Surg Endosc* 2016;30:1242-8.
2. Strand DS, Cosgrove ND, Patrie JT, et al. ERCP-directed radiofrequency ablation and photodynamic therapy are associated with comparable survival in the treatment of unresectable cholangiocarcinoma. *Gastrointest Endosc* 2014;80:794-804.
3. Sharaiha RZ, Sethi A, Weaver KR, et al. Impact of Radiofrequency Ablation on Malignant Biliary Strictures: Results of a Collaborative Registry. *Dig Dis Sci* 2015;60:2164-9.

4. Lee YN, Jeong S, Choi HJ, et al. The safety of newly developed automatic temperature-controlled endobiliary radiofrequency ablation system for malignant biliary strictures: A prospective multicenter study. *J Gastroenterol Hepatol* 2019.
5. Cho JH, Jeong S, Kim EJ, et al. Long-term results of temperature-controlled endobiliary radiofrequency ablation in a normal swine model. *Gastrointest Endosc* 2018;87:1147-1150.
6. Cho JH, Lee KH, Kim JM, et al. Safety and effectiveness of endobiliary radiofrequency ablation according to the different power and target temperature in a swine model. *J Gastroenterol Hepatol* 2017;32:521-526.
7. Kim EJ, Chung DH, Kim YJ, et al. Endobiliary radiofrequency ablation for distal extrahepatic cholangiocarcinoma: A clinicopathological study. *PLoS One* 2018;13:e0206694.

Keywords: Rfa, Endoscopy

IDEN International
Digestive
Endoscopy
Network
2019 2019

June 14 (Fri), 2019

Luncheon Symposium 1





LS 1

Clinical impact of tegoprazan: New class of P-CAB

Moon Kyung Joo

Gastroenterology & Hepatology, Korea University, Seoul, Korea

No Contents

IDEN International
Digestive
Endoscopy
Network
2019 2019

June 15 (Sat), 2019

Breakfast with Experts





BE 1

ESD for Early Gastric Cancer: Eastern vs. Western

Fabian Emura

EmuraCenter LatinoAmerica & University of La Sabana, Colombia

Curriculum Vitae

Educational Background

- 4/2003-3/2005 Clinical Fellow. Interventional Endoscopy and Gastrointestinal Surgery. National Cancer Center. Tokyo. Japan.
- 10/1999-3/2003 Ph.D. Gastrointestinal Tumors. University of Tsukuba, Tsukuba. Japan.
- 4/1994-3/1998 Clinical Fellow in General Surgery. National University, Bogotá. Colombia.
- 5/1985-10/1991 Physician and Surgeon. Universidad del Valle. Cali. Colombia.

Professional Experiences

University Position:

- 04/2012~ Associate Professor of Medicine. Gastroenterology Division. Universidad de La Sabana. Bogotá, Colombia.
- 07/2008~2012 Auxiliary Professor of Medicine. Universidad de La Sabana. Bogotá, Colombia.
- 04/2006~12/2007 Director. Cancer Research Unit. Assistant Professor of Gastroenterology El Bosque University. Bogotá. Colombia.
- 8/2005~ 8/2007 Visiting Professor of Medicine. Valle University. Cali. Colombia.

Clinical Appointments:

- 09/2008~ Director. World Endoscopy Training Center in ESD, NBI, BLI, LCI and systematic alphanumeric coded endoscopy (SACE).
- 8/2006~ Gastroenterologist. Organización Sanitas International. Clínica Colombia. Bogotá, Colombia.
- 4/2006~ Medical Director. Advanced Digestive Endoscopy. EmuraCenter LatinoAmerica. Bogotá, Colombia.
- 4/2005~3/2006 Clinical Scientist. Gastrointestinal Endoscopy Division. National Cancer Center. Tokyo. Japan.
- 4/2003~3/2005 Clinical Fellow. Endoscopy Division and Gastrointestinal Surgery Division. National Cancer Center, Tokyo, Japan.
- 10/1997~2/1999 Chief Emergency Room, Marly Clinic, Bogotá.
- 4/1998-6/1999 General Surgeon, Bosa State Hospital, Bogotá.



BE 2

The History of Flexible Robot Assisted Endoscopic Interventions

Kazuki Sumiyama

Department of Endoscopy, The Jikei University School of Medicine, Tokyo, Japan

Curriculum Vitae

Educational Background

- Mar. 1998 Graduated from The Jikei University School of Medicine
- May 1998 Passed the 92nd National Medical Practitioners Qualifying Examination
- May 1998 Began residency in the Department of Endoscopy as a junior resident at Jikei University Hospital
- Mar. 2000 Completed junior residency
- Apr. 2000 Entered the PhD Course in Medical Research, The Jikei University School of Medicine Graduate School
- Nov. 2003 Graduated from PhD course and awarded PhD degree (Doctor of Medicine)

Professional Experiences

- Dec. 2003 Research associate, Department of Endoscopy, The Jikei University School of Medicine Graduate School and Clinical Staff Member, Department of Endoscopy, Jikei University Hospital
- Apr. 2005 Postdoctoral Research Fellow and Advanced Endoscopy Fellow at the Division of Gastroenterology and Hepatology, Mayo Clinic College of Medicine Developmental Endoscopy Unit (US)
- Mar. 2007 Completed sabbatical research program
- Apr. 2007 Clinical Staff Member, Department of Endoscopy, Jikei University Aoto Hospital
- Apr. 2009 Clinical Staff Member, Department of Endoscopy, Jikei University Hospital
- Dec. 2012 Instructor, Endoscopy Course, The Jikei University School of Medicine
- Jan. 2013 Clinical chief, Division of Endoscopy, Jikei University Hospital
- Apr. 2015 Department of Endoscopy, Jikei University School of Medicine
Director, Division of Endoscopy, Jikei University Hospital Professor
- May. 2015 Professor, Department of Gastroenterological Endoscopy, The Jikei University School of Medicine Graduate School

Professional Organizations

- Apr. 2005 International Active Member of the American Society of Gastrointestinal Endoscopy
- Dec. 2008 Member of NOTES Research Association White Paper Working Group
- Jan. 2010 Organizer, Needlescopic surgery meeting
- Dec. 2010 Organizer, EMR/ESD Research Association

-
- Jan. 2012 Councilor, Japan Gastroenterological Endoscopy Society, Kanto Chapter
 - Apr. 2012 Councilor, Japanese Society of Gastroenterology, Kanto Chapter
 - Feb. 2013 Member of Editorial Board of Gastroenterological Endoscopy, Japan Gastroenterological Endoscopy Society
 - May. 2013 Councilor, Japan Gastroenterological Endoscopy Society
 - Aug. 2013 World Endoscopy Organization, Upper GI Cancer Committee
 - Jan. 2014 Organizer, Laparoscopy and Endoscopy Cooperative Surgery
 - Jan. 2014 Organizer, Japan Gastric Cancer Association ESD Research Association
 - May. 2015 Organizer, J-CASE Research Association
 - Oct. 2015 Councilor, Japan Society of Computer Aided Surgery
 - May. 2016 Organizer, Standardization of Peri-procedural Management Research for Endoscopic Diagnosis and Therapy, Japan Gastroenterological Endoscopy Society
 - Jul. 2016 Member of Optimal Usage of Japan Endoscopy Database (JED) Project Committee, Japan Gastroenterological Endoscopy Society
 - Jul. 2016 Member of Medical Terminology Committee, Japan Gastroenterological Endoscopy Society
 - Jun. 2017 Member of Academic Program Committee, Japan Society for Abdominal Emergency Medicine
 - Jul. 2017 Member of 100th Anniversary Magazine Committee, Japan Gastroenterological Endoscopy Society
 - Aug. 2017 Councilor, Japan Society of Smooth Muscle Research



BE 3

ESD Technical Tips and Tricks

Yoshikazu Hayashi

Gastroenterology, Jichi Medical University, Shimotsuke, Tochigi, Japan

In order to achieve a cure when treating neoplastic lesion, both complete local excision of the tumor and complete control of metastases are required. Inability to control metastatic disease is a clear limitation of endoscopic treatment. Therefore, accurate assessment of the risk of lymph node metastases is required when we consider the indications for endoscopic resection of gastrointestinal (GI) tumors. Intramucosal GI tumors do not have any risk of lymph-node metastases. However, invasive cancers need consideration of lymph-node resection according to the risk of metastases. The risk of lymph-node metastases of submucosally invasive cancers can be estimated by examining risk factors such as the depth of submucosal invasion, presence of lymphovascular invasion and histopathological type based on examination of a high-quality pathological specimen obtained by endoscopic resection. En bloc resection, negative margins and a thick submucosa with minimum thermal damage are important factors to make an accurate histopathological evaluation. Therefore, a superficial tumor with a suspicion of submucosal invasive cancer must be resected en bloc with a thick submucosal layer to provide a high-quality pathological specimen. Ideally, even intramucosal tumors would be resected in an en-bloc fashion with negative-margins to avoid local recurrence after piecemeal resection.

It is technically difficult to resect a large superficial tumor with the conventional endoscopic mucosal resection (EMR) technique using a snare to obtain an en-bloc specimen with negative-margins when the tumor is greater than 2 cm in diameter or is accompanied by severe submucosal fibrosis even if the tumor is intramucosal. A considerable number of large superficial tumors or lesions in difficult locations are surgically resected even if they can be cured by complete local resection. However, endoscopic submucosal dissection (ESD), which is a more sophisticated technique than EMR, is now available to overcome the limitations of snare resection techniques and achieves an en-bloc resection regardless of tumor size, shape, location or degree of submucosal fibrosis. The use of ESD is more widespread in recent years because of an increased desire for less invasive curative treatment of superficial GI tumors. However, it is believed by many that ESD is much more technically demanding than EMR and requires intensive training and experience to gain sufficient facility.

I will present many technical tips and tricks to perform safe ESD and to obtain the high-quality pathological specimen with a focus on colorectal tumors from our experiences. The tips and tricks range from basic techniques of ESD to tricky ones for overcoming difficult colorectal situations.

Keywords: Endoscopic submucosal dissection, ESD, Tips, Tricks, Difficult situation



BE 4

Image Enhanced Endoscopy-Based Prediction of Histology of Colorectal Neoplasia: Pearl and Pitfall

Helmut Messmann

III Med, University Hospital Augsburg, Augsburg, Germany

Curriculum Vitae

Educational Background

- 1981 – 1983 University Regensburg
- 1983 – 1987 University Erlangen-Nuremberg

Professional Experiences

Clinical Occupation:

- 12/1987 - 5/1988 Institute of Clinical Pharmacology, University Regensburg (Professor Dr. H. Grobecker)
- 6/1988 - 3/1992 Hospital of the Barmherzigen Brüder, Regensburg
- 4/1992 -12/2001 Clinic und Policlinic of Internal Medicine I, University Regensburg (Professor Dr. J. Schölmerich)
- 1995 Specialist for Internal Medicine and Internal Radiology
- 4/1998 Assistant Medical Director of the Clinic and Policlinic of Internal Medicine I: Chief medical consultant of the department of endoscopy and department of GI-oncology
- 5/2000 Executive senior physician
- 6/2000 Recognition of the specialization "Gastroenterology"
- since 1/2002 Director of the Medical Clinic III, University Clinic Augsburg (gastroenterology/hepatology, infectiology, rheumatism, internal intensive medicine)

Research:

- 1993 Ludwig-Demling-Research Scholarship
- 1994 Research stay at the National Medical Laser Centre (Photodynamic therapy and fluorescence endoscopy)
- 1996 Promotion award of the Society of Gastroenterology in Bavaria e.V.
- 1997 Poster award of the European Pancreatic Club
- 1997 Approval of a research project through the Sander foundation
Establishment and evaluation of a new fluorescence supported endoscopic procedure to diagnose early neoplastic changes in the gastro-intestinal tract
- 1999 First poster prize of the German Society of endoscopy and imaging diagnostics
- 1999 Approval of the renewal proposal through the Wilhelm-Sander foundation
- Since 2002 Consultant activity and scientific cooperation with diverse companies (Olympus, Given-Imaging, Storz, Medwork, Cook, Boston, Invendo Medical)

- 2006 Research stay in Tokyo and Nagano (Prof. Dr. T. Oyama)

Professional Organizations

Medical Societies

- 2006 Chairmen of the Working Group for GI-Oncology of the DGVS
- 2006 Adviser and Board Member of the German Society of Digestive and Metabolic disease (DGVS)
- 2008 President of the German Society of Endoscopy
- Since 2008 Board member of the German Society of Endoscopy
- Since 2010 President and Board Member of German Society of Intensive Care Medicine (DGIIN)
- 2012 President and Board Member of the German Society for Endoscopy and Imaging (DGE-BV)
- 2014 President and Board Member of the Society of Gastroenterology in Bavaria e. V.
- 2016/2017 President and Board member of the Germany Society for Coloproctology
- 2016-2018 Vice secretary of the Section of Endoscopy of the DGVS
- 2015-2019 Treasurer of the ESGE
- 2018 Secretary of the Section of Endoscopy of the DGVS
- 2019 President Elect of the ESGE

Membership in scientific societies:

- American Gastroenterology Association (AGA)
- Arbeitsgemeinschaft Gastroenterologische Intensivmedizin
- Working Committee Gastroenterological Intensive Care (active member)
- Arbeitsgemeinschaft Internistische Onkologie (AGO)
- Working Committee Internal Oncology (active member)
- Arbeitsgemeinschaft leitender gastroenterologischer Krankenhausärzte (ALGK)
- Working Committee Executive Gastroenterological Hospital Doctors (active member)
- Deutsche Gesellschaft für Verdauungs- und Stoffwechselerkrankungen (DGVS)
- German Society of Digestive and Metabolic Disease (active member)
- Deutsche Gesellschaft für Endoskopie und bildgebende Verfahren (DGE BV)
- German Society for Endoscopy and Imaging Diagnostics (active member)
- Deutsche Gesellschaft für Innere Medizin (DGIM) (active member)
- German Society for Internal Medicine (active member)
- Deutsche Krebsgesellschaft (DKG)
- German Cancer Society (active member)
- European Society of Gastroenterologic Endoscopy (ESGE) (active member: ESGE research committee 2008-2010)
- Gesellschaft für Gastroenterologie in Bayern e. V.
- Society for Gastroenterology in Bavaria (active member)
- Deutsche Gesellschaft für Internistische Intensiv- und Notfallmedizin (DGIIN)
- German Society for Internal Intensive and Emergency Medicine (active member)
- Deutsche Gesellschaft für Koloproktologie (DKG)
- German Society for Colonproctology (active member)



BE 5

Endoscopic Ultrasonography in the Diagnosis and Treatment of Pancreatic Cystic Tumors

Marcin Polkowski^{1,2}

¹Department of Gastroenterological Oncology, M Skłodowska-Curie Memorial Cancer Center, Warsaw, ²Department of Gastroenterology, Hepatology and Clinical Oncology, Center of Postgraduate Medical Education, Warsaw, Poland

This Breakfast with Expert Session will discuss the following topics related to the use of endoscopic ultrasonography (EUS) in the management of pancreatic cystic tumors:

EUS fundamental B-mode image in the differential diagnosis of pancreatic cyst.

The potentials and limitations of contrast harmonic EUS.

Techniques and safety of EUS-guided sampling of pancreatic cyst.

Advantages and limitations of cyst fluid cytology, biochemical and molecular markers.

Through-the-needle diagnostic devices (micro forceps, confocal laser endomicroscopy, fiberoptic probe).

Current status of EUS-guided infusion therapy and EUS-guided radiofrequency ablation.

The role of EUS in surveillance of patients with pancreatic cyst.

Place of EUS in guideline-recommended management of pancreatic cysts.

Keywords: Pancreatic cystic lesions, Endoscopic ultrasonography, Eus, Eus-fna, Diagnosis, Treatment



BE 6

Endoscopic Transmural Necrosectomy: Timing, Indications, and Methods

Rungsun Rerknimitr

Medicine, Chulalongkorn University, Bangkok, Thailand

There are many points to consider before performing necrosectomy in a patient with walled-off necrosis (WON) that developed after an episode of acute pancreatitis. According to the revised Atlanta classification, the maturity of WON has to be at least 4 week-old otherwise there is a chance that the necrotic areas are in the form of “acute necrosis collection” and premature drainage of this collection may cause more harm to the patient in term of leakage and infection. However, a case with confirmed infected collection with significant clinical deterioration may require an earlier drainage. The second consideration is the location of WON. Endoscopic drainage of WON should be considered when WON locates in the vicinity of central approach form the stomach or duodenum. In a case that WON locates in the periphery of abdomen such as WON near paracolic gutter, a percutaneous drainage should be more preferred. On the other hand, the video assisted retroperitoneum debridement (VARD) has more advantage in a case of WON located deeply near the flank.

Previously, endoscopic drainage may be achieved by a visual assessment of the bulging stomach, however EUS guided drainage has become more popular because of its safety on avoid puncturing the interposed vessels and a higher success rate in non-bulging WON. After stomach or duodenal puncture, the ostomy can be kept patent by one or two plastic stents. Recently, a lumen-approximated stent (LAMS) has become more popular because it allows a larger diameter of ostomy to be patent and perhaps it provides a more convenient access to WON debridement. Generally, the ultimate goal for debridement is to clear almost all necrotic tissue and debris until the pink granulation tissue of retroperitoneum can be seen endoscopically. The additional technique for a faster completion of debridement is multi-gateway drainage and this can be achieved either by multiple plastic stents or LAMSs.

In conclusion, age and location of WON are the most important points when considering endoscopic debridement. The choice of stent is depended on the availability of stent, perhaps if LAMS is available it is more preferred. Lastly, multi-gateway drainage may help to reduce the number of session of debridement.

Keywords: Won, Debridement, When, Method, Indication



The first Lumen approximate stent (LAMS) can be seen through the gastric stoma created by the second LAMS

IDEN International
2019 Digestive
Endoscopy
Network
2019

June 15 (Sat), 2019

Upper GI





UGI 5-1

Advanced Endoscopic Imaging Technologies: Perspective of Engineering

Kazuhiro Gono

Technology Innovation Office, Olympus, Tokyo, Japan

NBI (Narrow Band Imaging) opens door of IEE (Image Enhanced Endoscopy). It is based on knowledge of bio-optics, and a optical based technology. NBI has been improved in its image quality as an incremental innovation process. Recently, DRI (dual-red imaging) has been developed for looking at vessels in deeper layer. And AI technology is enhancing its capability of IEE. In the presentation, IEE; NBI and DR are mentioned and also the future potential of AI is discussed.

Keywords: Nbi, Ai, Iee



UGI 5-2

Novel Tools for Successful Hemostasis: New Materials in Clinical Practice

Jun Chul Park

Department of Internal Medicine, Gastroenterology, Seoul, Korea

Acute upper gastrointestinal bleeding (UGIB) is a common condition worldwide, with an estimated annual incidence of 40–150 cases per 100 000 individuals; UGIB frequently leads to hospital admission and is associated with significant mortality rates, which have been reported to range between 6% and 15%.¹⁻⁶ Currently, endoscopic hemostasis is accepted as a first-line treatment modality in the management of UGIB and has been demonstrated to be effective in reducing the rate of rebleeding, the need for surgical intervention, and mortality. Conventionally, hemostasis can be achieved by using injection therapy, hemoclips, or thermocoagulation methods (argon plasma coagulation or heater probe).

However, these current methods have some limitations in terms of effectiveness, required expertise, rate of adverse events (e.g. perforation and worsening of bleeding because of secondary injury by instrumental contact), and applicability (e.g. may be difficult to use in patients with large, friable bleeding surfaces such as gastrointestinal tumors).⁷ In addition, some patients with unsuccessful complete hemostasis may require angiography with embolization or surgical resection. Efforts in this direction have led to the development of topical hemostatic agents. The use of topical hemostatic agents is attractive because it represents a non-traumatic method of hemostasis and because it can be applied to diffuse, multifocal bleeding. Moreover, topical hemostatic agents are easy to use without the need for specialized endoscopic techniques.

The polysaccharide hemostatic powder (PHP) is a new, noncontact endoscopic device that delivers hemostatic powder for the treatment of UGIB. The PHP can be administered as a primary hemostatic agent or as an adjunct alongside other modalities. Its hemostatic properties are attributed to absorbable modified polysaccharides derived from plant starches, free of components of animal or human origin.

There are several advantages to using the PHP in acute UGIB. First, this device is easy to use and does not require trained assistants. Moreover, the associated learning curve may be shorter than that of other hemostatic devices. In addition, using the PHP may be more helpful when the bleeding site is difficult to determine because of the large amount of blood clots, when there are multifocal bleeding lesions, or when visibility is poor. On the other hand, using hemoclips or coagulation therapy requires precise knowledge of the bleeding site. Additionally, patients with lesions difficult to reach because of the anatomical position may also benefit from the use of hemostatic powder, which could be simply applied in the form of spray; the polysaccharide would then combined with the gastric fluid to form a mucosal barrier to the bleeding.

However, topical hemostatic agents, such as PHP, have developed recently, not many well-de-

signed prospective studies yet exist to show definitive effectiveness. Large-scale, well-designed, prospective, and randomized controlled studies are warranted to confirm the effectiveness of topical hemostatic agents.

References

1. Abougergi MS, Travis AC, Saltzman JR. The in-hospital mortality rate for upper GI hemorrhage has decreased over 2 decades in the United States: a nationwide analysis. *Gastrointest. Endosc.* 2015; 81: 882–8 e1.
2. Terdiman JP. Update on upper gastrointestinal bleeding. Basing treatment decisions on patients' risk level. *Postgrad. Med.* 1998; 103: 43–7 51–2, 8–9 passim.
3. van Leerdam ME, Vreeburg EM, Rauws EA et al. Acute upper GI bleeding: did anything change? Time trend analysis of incidence and outcome of acute upper GI bleeding between 1993/1994 and 2000. *Am. J. Gastroenterol.* 2003; 98: 1494–9.
4. Loperfido S, Baldo V, Piovesana E et al. Changing trends in acute upper-GI bleeding: a population-based study. *Gastrointest. Endosc.* 2009; 70: 212–24.
5. Laine L, Yang H, Chang SC, Datto C. Trends for incidence of hospitalization and death due to GI complications in the United States from 2001 to 2009. *Am. J. Gastroenterol.* 2012; 107: 1190–5 quiz.
6. Beg S, Al-Bakir I, Bhuvu M, Patel J, Fullard M, Leahy A. Early clinical experience of the safety and efficacy of EndoClot in the management of non-variceal upper gastrointestinal bleeding. *Endosc. Int. Open.* 2015; 3: E605–9.
7. Barkun AN, Adam V, Lu Y, Chen YI, Martel M. Using hemospray improves the cost-effectiveness ratio in the management of upper gastrointestinal nonvariceal bleeding. *J. Clin. Gastroenterol.* 2018; 52: 36–44.

Keywords: Hemostasis



UGI 5-3

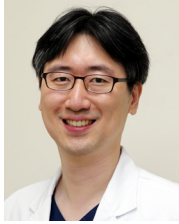
Emerging Technologies in the Upper GI Tract Application of Artificial Intelligence in Gi Endoscopy

Kazuki Sumiyama

Department of Endoscopy, The Jikei University School of Medicine, Tokyo, Japan

An array of computer aided diagnosis (CAD) technologies have been explored in the field of GI endoscopy for many years. However, none of them has so far succeeded to greatly contribute to daily clinical practice. A machine needs to study to get smarter to support someone else just as human does. In traditional machine learning, learning subjects for CAD for endoscopy were verbally described specific features of each clinical category identified and defined by humans. Therefore, lesions without typical or representative findings can be frequently overlooked and misdiagnosed. Meanwhile, one of most common artificial intelligence (AI) technologies, deep learning model autonomously extracts features to learn from data source to analyze. The advent of deep learning model boosted researches of AI in the myriad of applications in medical field. Image recognition is considered as a strong area for deep learning, and deep learning is now broadly examined for endoscopic image analysis regardless of target organ. Although colon applications for polyp detection and characterization have been dominantly examined, the number of publications for upper GI application are steadily increasing. A series of retrospective studies echoed the advantage of AI demonstrated in preceding colonoscopy studies. In the esophagus, Ghatwary and his colleagues reported that Single-Shot Multibox Detector (SSD) model could detect esophageal adenocarcinoma with the sensitivity of 96%, which was higher than the sensitivity achieved with other deep learning models such as R-CNN, Fast R-CNN and Faster R-CNN. Horie and his colleagues developed SSD model for squamous cell cancers and reported 98% of sensitivity of lesion detectability. Hirasawa and his colleague also established SSD based model for gastric cancer detection with 92% of sensitivity in the first publication in 2018. However, all these studies were evaluated in a retrospective fashion using static images of high quality stored in clinical record, the study design greatly varied and high false positive rate were reported. In order to prove the efficacy of the model in clinical setting, prospective clinical trials with adequate study designs. In addition, the prediction of cancer invasion depth could be an application of the AI analysis and the accuracy of the AI prediction has already caught up with or even outperformed that of experienced endoscopists in experimental trials. Most of deep learning model evaluated in the endoscopy field so far required learning an abundant volume of dataset of endoscopic images annotated by endoscopists to teach localization and characterization of target lesions (supervised learning). Wu and his colleague developed a deep learning model, WISENSE to reduce blind spots during routine esophagogastroduodenoscopy (EGD) which actively feedback the quality of the observation in real-time by applying reinforcement learning. Reinforcement learning is an unsupervised learning methodology, in which machine autonomically explores an suitable action model to maximize the cumulative reward and known as the technology enable a computer to win the game of Go the grand master. WISENSE was clinically evaluated in a randomized trial and significantly reduced blind spots during routine EGD.

Keywords: Artificial intelligence, Deep learning, Upper GI



UGI 5-4

Future High Technologies for Gastrointestinal Endoscopy: Frontiers of Robotic Endoscopy

Hyuk Soon Choi

Internal Medicine, Institute of Gastrointestinal Medical Instrument Research, Korea University College Of Medicine, Seoul, Korea

The gastrointestinal endoscope is a medical device developed for the medical need to visualize organs inside the body. Previous gastrointestinal endoscopes were used only for diagnoses in the gastrointestinal tract, but they have also become a major part of therapeutics. The development of a variety of therapeutic endoscopes has made a major contribution to medical care. Patients who had to undergo open surgery for internal bleeding can now be treated using endoscopy. In addition, patients with early gastric cancer had to undergo resection of a large part of the stomach, but in recent years, endoscopic resections have been performed, which preserve the stomach and do not cause major complications. However, as accurate diagnostics and minimally invasive endoscopic therapy have progressed, doctors need more sophisticated and high-precision endoscopic instruments and have thus become increasingly interested in the application of robots.

The development of medical robots started a long time ago and has recently seen remarkable progress. For about 10 years, medical robots have been actively applied in clinical practice. The number of robotic surgeries has increased exponentially over a short period of time. Although the superiority of robotic surgery has been limited, depending on the surgical field, the use of medical robotic surgery is gradually expanding. In the medical robot market, rigid endoscopes, such as the da Vinci surgical system, have been developed to alter the paradigm of clinical operations.

Attempts in the field of soft endoscopic robots have not yet shown successful clinical results. Flexible endoscopic robots have the limitations of technology rather than that of rigidity. However, clinical trials of various devices that can be applied in hospitals are on the rise. After the development of various flexible endoscopic devices for the field of natural orifice transluminal endoscopic surgery, minimally invasive robotic surgery was attempted for various diseases and showed good results.

Flexible robotic endoscopy for the diagnosis and treatment of gastrointestinal diseases is developing. Owing to the rapid development of artificial intelligence (AI) in recent years, many subsystems have been developed to assist in diagnostics, which rely on professionals. Various AI systems are on the verge of endoscopic clinical application. In the endoscopic field, the role and area of robotics, which are the core of the 4th industrial revolution, are expanding. Robots, which have replaced the roles that human resources cannot perform in the industrial field, are now being used as medical tools, leading to the medical age of information technology. In the future, robots in the field of gastrointestinal endoscopy are expected to elicit a great change and influence on the health care system.

Keywords: Gastrointestinal endoscopy



UGI 6-1

Circumferential Resection for Esophageal Epithelial Tumors

Mario Dinis Ribeiro

Gastroenterology, Instituto Portugues De Oncologia Francisco Gentil, Leasbon, Portugal

The approach towards a patient where a circumferencial resection of a esophageal superficial lesion is foreseen will be described. We will starting by stressing the need for endoscopic management (vs other alternatives, eg, RT) and en-bloc resection (vs piecemeal, namely in Barrett's esophagus), followed by the technical description of the steps and tips for an enbloc circumferencial resection namely by performe single and double tunneling. Moreover, the required prevention and management of stenosis will be noted.

Keywords: Circumferential resection



UGI 6-2

ESD for Huge Sized Gastric Epithelial Tumors

Toru Ito

Kanazawa Medical University, Japan

Curriculum Vitae

Educational Background

Mar 1982 Kanazawa Medical University
 Mar 1986 Kanazawa Medical University Graduate School of Medicine

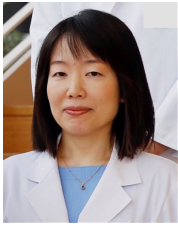
Fields of specialization: Gastroenterological Endoscopy

Professional Experiences

Apr 1986 Kanazawa University Cancer Research Hospital
 Jan 1990 National Hospital Structure Ishikawa Hospital Surgical
 Apr 1992 Kanazawa University Cancer Research Hospital Surgical
 Apr 1994 Kanazawa Medical University, Department of Gastroenterology Assistant Professor
 Apr 1995 a" Senior Assistant Professor Kanazawa Medical University Endoscope Center Sub Chief
 Jul 1997 Kanazawa Medical University, Department of General Medicine Senior Assistant Professor
 Aug 1997 u" Associate Professor
 Apr 2007 Kanazawa Medical University, Department of Endoscope Assistant Professor
 Apr 2008 Kanazawa Medical University Endoscope Center Chief
 Oct 2008 Kanazawa Medical University, Department of Endoscope Professor
 Dec 2012 Kanazawa Medical University, Department of Gastroenterological Endoscope Professor
 Jun 2013 Kanazawa Medical University, Department of Gastroenterological Endoscope Professor and Chair
 Apr 2017 Vice Director of Kanazawa Medical University Hospital

Professional Organizations

- Japan Gastroenterological Endoscopy Society(Medical Specialist) Auditors
- The Japan Society of Gastroenterology (Medical Specialist) Japan Surgical Society (Certified Physician)
- The Japanese society of Gastroenterological Surgery (Certified Physician)
- The Japanese society of Internal medicine (Certified Physician)
- Kampo Medicine
- Japanese Gastric Cancer Association



UGI 6-3

ESD for Non-ampullary Duodenal Epithelial Tumors

Naomi Kakushima

Division of Endoscopy, Shizuoka Cancer Center, Shizuoka, Japan

Diagnosis and treatment of non-ampullary duodenal epithelial tumors (NADET) including adenoma and adenocarcinoma have gradually increased lately. Endoscopic diagnoses of neoplastic lesions in the duodenum are sometimes difficult due to the rarity of NADET and the occurrence of various benign lesions. Many duodenal adenomas may follow the adenoma-carcinoma sequence. Therefore, it is reasonable to endoscopically resect NADETs before they progress to have a higher malignant potential. For proper management of NADETs, it is important to endoscopically diagnose low-grade adenoma (Vienna category 3, C3) or high-grade adenoma (category 4, C4) or carcinoma (category 5, C5).

For endoscopic diagnoses of superficial NADETs, it is useful to perform white-light endoscopy (WLI) and narrow-band imaging (NBI) to differentiate between C3 and C4/5 lesions. Using WLI, a simple scoring system using findings of size/macroscopic type/presence of depression/color/loss of lobulation is useful to differentiate between C3 and C4/5 lesions. Diagnosis of C4/5 by using the criteria of 2 or more NBI patterns or presence of disappeared pattern is also useful for differentiation. Diagnostic performance using WLI or NBI are reported to be better than biopsy-based diagnosis for NADETs.

Considering the risk of bleeding and perforation related to procedures of endoscopic resection (ER) in the duodenum, the selection of ER including cold snare polypectomy (CSP), endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) should be based on the malignant potential of the lesion and technical aspects. Less invasive ER procedures such as cold forceps polypectomy or CSP are rapid and convenient, however complete removal of the muscularis mucosa is often insufficient. Therefore small (10 mm or less) C3 lesions are possible candidates for CSP. Tumors that occupy the whole layer or invade beyond the mucosa such as C4/5 lesions should be treated by EMR/ESD or surgery. EMR procedures including underwater EMR are widely performed for C4/5 lesions up to 20 mm with no apparent findings of submucosal invasion. EMR sometimes require multiple sessions to achieve complete remission because of the rather low en bloc resection rate. ESD provides an excellent complete resection rate, however it remains a challenging method, considering the high risk of intraoperative or delayed perforation. Shielding or closing of the ulcer after EMR/ESD has been reported to be effective to decrease the risk of delayed bleeding and perforation. Minimally invasive surgery such as wedge resection and pancreas-sparing duodenectomy are beneficial for C4/5 lesions that are technically difficult to remove by ER. Pancreaticoduodenectomy remains a standard treatment for C5 lesions with a possibility of submucosal invasion. Patients with NADETs could benefit from a multidisciplinary approach to stratify the optimal treatment based on endoscopic diagnoses.

Keywords: Duodenum, ESD, Wli, Nbi, Nadet



UGI 6-4

Case-Based Discussion

Ji Hyun Kim

Gastroenterology, Inje University Busan Paik Hospital, Busan, Korea

Age and Gender: M/70

Chief complains: For screening colonoscopy

Present Illness: A-63-old male patient visited outpatient clinic for management of incidentally found esophageal lesion. The previous colonoscopy 2 years ago was negative.

Past History: None

Family History: None

Endoscopic and Radiologic Findings: EGDS showed 50 mm sized lugol-unstained mucosal granularity at mid esophagus (26-33 cm from incisor). Magnifying endoscopy with narrow-band imaging showed type B1 with focal B2 component.

Hospital Progress: After he underwent ESD, he discharged without complication.

Keywords: Case



UGI 6-5

Endoscopic Resection of Early Gastric Cancer in Remnant Stomach after Distal Gastrectomy

Sung Woo Jung

Division of Gastroenterology Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Age and Gender: 74/Male

Chief Complaints: For management of recurrent early gastric cancer after distal gastrectomy

Present Illness: A 73-year-old man underwent follow-up gastroscopy after treatment of gastric and esophageal cancer at outside hospital. During the exam, two depressed lesions were detected on the upper and mid body lesser curvature. The lesions were located at the suture line of the remnant stomach. The upper body lesion was confirmed to be adenocarcinoma and he was referred to our clinic for endoscopic resection.

Past History:

- Subtotal gastrectomy (Billroth II) for gastric cancer (14 years ago)
- Concurrent chemoradiation therapy for esophageal cancer (2 years ago)

Family History: None

Physical Examination and Laboratory Findings:

- No specific findings on physical examination, except for surgical scars on abdomen.
- Levels of leukocytes, hemoglobin, platelets, liver enzymes, and bilirubin were normal.

Endoscopic and Radiologic Findings: Endoscopic finding: About 8 mm sized open ulcer with irregular margin on the lesser curvature side of mid body and hyperemic nodular lesion with shallow ulcer on the lesser curvature anterior side of upper body were noted.

Abdomen CT: Focal wall thickening in stomach high body greater curvature. No definite focal abnormal lesion in other organs.

Hospital Progress: The two lesions were resected by endoscopic submucosal resection. On the histologic examination, there was no tumor in the upper body specimen, but a 1 cm sized adenocarcinoma which invaded the submucosa (invasion depth; 756 μ m) was detected in the mid body specimen. Surgical resection was recommended, but he refused to undergo surgery. He has received endoscopy every 6 months for 2 years, and there was no evidence of local recurrence until last follow-up.

Keywords: Early gastric cancer, Remnant stomach, Endoscopic submucosal dissection

IDEN International
2019 Digestive
Endoscopy
Network
2019

June 15 (Sat), 2019

Lower GI





LGI 5-1

New Small Bowel Capsule Endoscopy: Techniques and Applications

Bora Keum and Sehyun Jang

Gastroenterology, Korea University, Seoul, Korea

Introduction

Since small bowel capsule endoscopy was introduced by Iddan et al in 2000, CE is used widely in various small bowel diseases. CE is non-invasive, safe and has high diagnostic yield. With tremendous advances in devices and regimens of the SBCE, SBCE is the best method for examining the full mucosa of the small-intestine and optimal for diagnosis of small-intestinal abnormalities. Here we review the current techniques and applications and future prospects of CE.

Currently available capsule endoscopy

Currently there are five commercially-available platforms. The PillCam[®] (Medtronic, Yokneam, Israel) was first released and 3rd generation capsule (PillCam[®] SB3) is now available. And Endocapsule[®] (Olympus Corporation, Tokyo, Japan), MiroCam[®] capsule (IntroMedic, Seoul, Korea), OMOM system[®] (Jianshan Science and Technology Group Co., Ltd, Chongqing, China), CapsoCam Plus[®] (CapsoVision Inc, Saratoga, CA, USA) system are released. Each system has unique features. PillCam has an adaptive frame rate (AFR) of 2 to 6 frames per second. AFR system automatically adjusts the frame rate according to capsule movement due to peristalsis. MiroCam uses an electric-field propagation using the human body as a conductive medium to transmit data whereas other CE systems use radiofrequency as a method of transmission. Recently CapsoCam Plus was introduced to market. It has four side cameras with 90° view each and enables full 360° lateral view. CapsoCam Plus stores image inside the capsule itself so doesn't need outside portable data recorder. But it needs additional capsule collection. And the efficacy of lateral-viewing capsule endoscopy for diagnosis has not been shown. There are many progress in each CE trying to improve battery life, field of view, and image resolution.

Indications

The major indications of SBCE are obscure gastrointestinal bleeding (OGIB), Chron's disease, small bowel polyps and tumor, NSAIDs-induced enteropathy, celiac disease, etc. OGIB is the main indication for SBCE.

OGIB

OGIB is defined as GI bleeding of undetermined etiology despite evaluation of esophagogastroduodenoscopy, colonoscopy or radiological evaluation. It is subclassified into "overt" (positive signs of

bleeding such as hematochezia or melena) and “occult” (positive fecal occult blood test or iron deficiency anemia) The American College of Gastroenterology (ACG) proposed the former term referred to as OGIB be reclassified as small bowel bleeding. The term OGIB would then be reserved for patients in whom a source of bleeding cannot be identified anywhere in the GI tract. This is because OGIB originates in the small bowel more than 80% of cases and can be detected in most cases with the complementary use of both CE and balloon-assisted enteroscopy (BAE). Many medical society published guidelines for OGIB. Most guidelines recommended that SBCE is an effective first-line diagnostic modality and perform SBCE as soon as possible after bleeding events. The Japan Gastroenterological Endoscopy Society (JGES) recommended that CT should be initial diagnostic method and then if abnormalities are found on CT, BAE through the closest route should be followed.

Crohn’s disease

Crohn’s disease can affect the entire GI tract. Approximately 10-30% of CD involved solitary small bowel. SBCE has role of early diagnosis of small bowel CD, assessment of extent, activity, mucosal healing, recurrence in CD patient. Several Western guidelines recommended that in patient with suspected Crohn’s disease undiagnosed initial ileocolonoscopy and imaging study, SBCE should be followed in the absence of obstructive symptoms or known stenosis. In the presence of obstructive symptoms or known stenosis, small bowel cross-sectional imaging modalities such as magnetic resonance enterography/enteroclysis or CT enterography/enteroclysis should be used first. But SBCE is not recommended in patients with non-specific symptoms and no evidence of biomarkers associated with Crohn’s disease. Capsule retention risk in patient with established CD is approximately 13%. Therefore, SBCE should be applied carefully after adequate medical history. Precedence of patency capsule examination or SB cross-sectional imaging methods can be effective to avoid capsule retention.

Preparation

Various interventions have been tried for quality improvement. During SBCE, cecal completion rate (CR), small bowel visualization quality (SBVQ) and diagnostic yield (DY) are evaluated as quality indicators. Polyethylene glycol (PEG) bowel preparation enhances the SBVQ, but not affect the DY or CR. The effect of 2-L PEG solution preparation was similar to that of a 4-L PEG solution in DY, SBVQ and CR. Bowel preparation using PEGcombine with simethicone enhances SBVQ, but not affect CR. The use of prokinetics does not enhance the SBVQ, CR or DY, except the use of metoclopramide improved the CR. The optimal timing of bowel preparation for small bowel CE is not established. Future study is needed to offer adequate guidelines.

Future perspectives

The role of CE in diagnosis of small bowel disease can not be replace. But there are still challenges in CE such as poor image quality, difficulty in localization or time-consuming reading process. Recently, deep learning techniques and convolutional neural networks have tried for analysis and recognition of capsule images. Several algorithms are also being tried to develop image reconstruction for enhancement of detection rate. There will be much advances including high-frame-rate-imaging, full

spherical imaging and high-resolution imaging. Recently various approaches based on artificial intelligence for computer-aided diagnosis is studied to reduce the review burden and expected to be applied in near future.

References

1. Alaskar H, Hussain A, Al-Aseem N, Liatsis P, Al-Jumeily D. Application of Convolutional Neural Networks for Automated Ulcer Detection in Wireless Capsule Endoscopy Images. *Sensors (Basel)*. 2019;19(6).
2. Barkin JA, Barkin JS. Video Capsule Endoscopy: Technology, Reading, and Troubleshooting. *Gastrointest Endosc Clin N Am*. 2017;27(1):15-27.
3. Chetcuti Zammit S, Ellul P, Sidhu R. The role of small bowel endoscopy for Crohn's disease. *Curr Opin Gastroenterol*. 2019;35(3):223-34.
4. Enns RA, Hookey L, Armstrong D, Bernstein CN, Heitman SJ, Teshima C, et al. Clinical Practice Guidelines for the Use of Video Capsule Endoscopy. *Gastroenterology*. 2017;152(3):497-514.
5. Gerson LB, Fidler JL, Cave DR, Leighton JA. ACG Clinical Guideline: Diagnosis and Management of Small Bowel Bleeding. *Am J Gastroenterol*. 2015;110(9):1265-87; quiz 88.
6. Hosoe N, Takabayashi K, Ogata H, Kanai T. Capsule endoscopy for small-intestinal disorders: Current status. *Dig Endosc*. 2019.
7. Hwang Y, Park J, Lim YJ, Chun HJ. Application of Artificial Intelligence in Capsule Endoscopy: Where Are We Now? *Clin Endosc*. 2018;51(6):547-51.
8. Pennazio M, Spada C, Eliakim R, Keuchel M, May A, Mulder CJ, et al. Small-bowel capsule endoscopy and device-assisted enteroscopy for diagnosis and treatment of small-bowel disorders: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy*. 2015;47(4):352-76.
9. Song HJ, Shim KN. Current status and future perspectives of capsule endoscopy. *Intest Res*. 2016;14(1):21-9.
10. Vasilakakis M, Koulaouzidis A, Yung DE, Plevris JN, Toth E, Iakovidis DK. Follow-up on: optimizing lesion detection in small bowel capsule endoscopy and beyond: from present problems to future solutions. *Expert Rev Gastroenterol Hepatol*. 2019;13(2):129-41.
11. Zwinger LL, Siegmund B, Stroux A, Adler A, Veltzke-Schlieker W, Wentrup R, et al. CapsoCam SV-1 Versus PillCam SB 3 in the Detection of Obscure Gastrointestinal Bleeding: Results of a Prospective Randomized Comparative Multicenter Study. *J Clin Gastroenterol*. 2019;53(3):e101-e6.

Keywords: Capsule endoscopy



LGI 5-2

Therapeutic Use of Double-Balloon Enteroscopy

Tomonori Yano

Department of Medicine, Division of Gastroenterology, Jichi Medical University, Shimotsuke, Japan

Background/aims: Anatomical characteristics of small intestine make it difficult to perform endoscopic diagnosis and treatment by using conventional enteroscopy. In balloon-assisted enteroscopy, the balloon on the tip of the over-tube grips the intestinal tube from the inside to prevent unwanted extension of the intestine and allows the maneuver to be transferred to the tip of the endoscope precisely. Equipped with an accessory channel, it can perform biopsy, endoscopic ultrasonography (EUS), marking, and perform various endo-therapies because the balloon endoscope maintains a good maneuverability even in deep small intestine. Double-balloon endoscopy (DBE) have a second balloon at the tip of the scope for gripping the intestine during advancement of the over-tube. Its second role is stabilization of the scope nearby the lesion. Its third role is assistance of water immersion endoscopy, gel immersion endoscopy and endoscopic enteroclysis.

Methods: From February 2000 until December 2018, we performed 5686 procedures including 802 balloon dilations, 552 polyp treatments, 351 hemostasis procedures. During this period, we have modified therapeutic techniques to improve the efficacy and safety of them.

Results: After technical modification, for strictures in Crohn's disease patients, we perform balloon dilations with calibrated small-caliber-tip transparent hood (CAST hood) using water immersion technique. For polyps in Peutz-Jeghers syndrome patients, we perform strangulation treatments with hemoclips and detachable snares using water immersion technique. Especially, crossed clip technique enables effective strangulation. For polyps in familial adenomatous polyposis patients, we perform cold snare polypectomy. For ongoing bleeding, we perform clip hemostasis using gel immersion technique in difficult situations. These technical modifications make it easy to perform therapeutic procedures and decrease procedure related adverse event.

Conclusions: CAST hood, strangulation treatments, cold snare polypectomy, water immersion technique and gel immersion technique are useful for therapeutic enteroscopy.

Keywords: Double-balloon enteroscopy, Cast hood, Crossed clip strangulation, Gel immersion endoscopy



LGI 5-3

When and How Can We Use Small Bowel Endoscopy?

Seong-Eun Kim

Department of Internal Medicine, Ewha Womans University College of Medicine, Seoul, Korea

Both capsule endoscopy (CE) and balloon-assisted enteroscopy (BAE) test has advantages and disadvantages. CE is a painless endoscopy for examining the entire small bowel, but it cannot obtain biopsy specimens and perform therapeutic intervention. BAE is a labor-intensive study but can obtain the tissue specimen and provides various therapeutic procedures such as polypectomy, balloon dilation, stenting, and foreign body removal. Usually BAE can't see the whole small bowel at one examination. An appropriate selection and proper decision on timing of CE and BAE can improve the diagnosis rate and treatment results of small bowel diseases. Additionally, it can allow a more cost-effective approach.

In this session, the use of CE and BAE will be reviewed in various small bowel diseases, focusing on suspected small bowel bleeding, Crohn's disease and small bowel tumor.

Suspected small bowel bleeding

As diagnostic modalities, CE, BAE and radiologic tests such as CT angiography/CT enterography (CTE) can be used. CE is recommended as the first-line study for exploring the source of bleeding without obstructive symptoms in most guidelines,^{1,3} and to be performing as soon as possible for improving the diagnostic yield. When small bowel tumors are suspected or capsule retention is possible, CTE/CT enteroclysis is recommended as the first-line modality to examine suspected small bowel bleeding. BAE may be preferred initially if CE is contraindicated or unavailable. Although BAE has shown high diagnostic yield and therapeutic success rates in suspected small bowel bleeding, it is a very invasive study which can cause some serious complications. To reduce the procedure burden, CE is useful to decide the approach route (oral vs. anal) prior to performing BAE.⁴ As CE, early intervention with DBE may also induce better outcomes.

Crohn's disease

It has been known that approximately 10-30% of Crohn's disease (CD) involved only small bowel, while involvement of SB and colon reported up to 67%.⁵ The usefulness of CE in CD include early diagnosis revealing the extent and activity, and mucosal healing after treatment as well as recurrence, especially for diagnosing CD after negative ileocolonoscopy and radiological tests in patients with CD symptoms.⁶⁻⁸ The overall diagnostic yield of CE was approximately 60%. However, CE should not be performed in CD patients with suspected stenosis before confirming patency using radiologic or patency capsule test to prevent capsule retention. The usefulness of DAE can suggested as a therapeutic

tic and biopsy sampling tool for differential diagnosis. Endoscopic small bowel dilation seems a safe (usually for short and non-inflammatory strictures) and may prevent potential short bowel problems from repeated resections.⁹

Small bowel tumors

Small bowel tumors are rare and are detected during work-up of unknown origin of bleeding. Although CE proved significantly superior in diagnostic accuracy over radiological tests for small tumors (< 1 cm), some studies revealed that CE can miss some significant tumors in proximal jejunum.^{10,11} When a suspected small bowel tumor in the radiologic study cannot be confirmed by CE, DAE should be required.

References

1. Shim KN, Moon JS, Chang DK, et al. Guideline for capsule endoscopy: obscure gastrointestinal bleeding. *Clin Endosc* 2013;46:45-53.
2. Gerson LB, Fidler JL, Cave DR, et al. ACG Clinical Guideline: Diagnosis and Management of Small Bowel Bleeding. *Am J Gastroenterol* 2015;110:1265-1287; quiz 1288.
3. Pennazio M, Spada C, Eliakim R, et al. Small-bowel capsule endoscopy and device-assisted enteroscopy for diagnosis and treatment of small-bowel disorders: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy* 2015;47:352-376.
4. Teshima CW, Kuipers EJ, van Zanten SV, et al. Double balloon enteroscopy and capsule endoscopy for obscure gastrointestinal bleeding: an updated meta-analysis. *J Gastroenterol Hepatol* 2011;26:796-801.
5. Yang SK, Yun S, Kim JH, et al. Epidemiology of inflammatory bowel disease in the Songpa-Kangdong district, Seoul, Korea, 1986-2005: a KASID study. *Inflamm Bowel Dis* 2008;14:542-549.
6. Park SK, Ye BD, Kim KO, et al. Guidelines for video capsule endoscopy: emphasis on Crohn's disease. *Clin Endosc* 2015;48:128-135.
7. Sidhu R, Sanders DS, Morris AJ, et al. Guidelines on small bowel enteroscopy and capsule endoscopy in adults. *Gut* 2008;57:125-136.
8. Enns RA, Hookey L, Armstrong D, et al. Clinical Practice Guidelines for the Use of Video Capsule Endoscopy. *Gastroenterology* 2017;152:497-514.
9. Sunada K, Yamamoto H, Yano T, et al. Advances in the diagnosis and treatment of small bowel lesions with Crohn's disease using double-balloon endoscopy. *Therap Adv Gastroenterol* 2009;2:357366.
10. Zagorowicz ES, Pietrzak AM, Wronska E, et al. Small bowel tumors detected and missed during capsule endoscopy: single center experience. *World J Gastroenterol* 2013;19:9043-9048.
11. Han JW, Hong SN, Jang HJ, et al. Clinical Efficacy of Various Diagnostic Tests for Small Bowel Tumors and Clinical Features of Tumors Missed by Capsule Endoscopy. *Gastroenterol Res Pract* 2015;2015:623208.

Keywords: Endoscopy



LGI 5-4

Recurrent Obscure Gastrointestinal Bleeding in a Patient with Radical Bile Duct Resection

Dong Hoon Baek

Department of Internal Medicine, Pusan National University School of Medicine, Busan, Korea

Age/Sex: 78 years/Female**Chief Complaints:** Recurrent melena

Present Illness: In February 2016, she underwent Roux-en-Y hepaticojejunostomy for bile duct resection of mid-common bile duct (CBD) cancer. She was diagnosed as having stage IVA CBD cancer (7th AJCC) and received concurrent chemoradiotherapy with a 5-fluorouracil/leucovorin regimen from May 2016 to August 2016.

In November 2017, she was admitted to our hospital because of melena that had persisted for 4 days. Esophagogastroduodenoscopy revealed no lesions; however, the hepaticojejunostomy anastomotic site was not intubated. Abdominal computed tomography (CT) findings were within their normal limits. After transfusion and supportive care, the bleeding slowly resolved, and she was discharged with a hemoglobin level of 10.1 gm/dL.

The patient was readmitted 3 months later for recurrent melena.

Social History: Nonsmoker and non-alcoholic**Past History:** Roux-en-Y hepaticojejunostomy for bile duct resection of CBD cancer**Physical Examination and Laboratory Findings:**

- Vital signs: Blood pressure of 135/80 mmHg and pulse rate of 110/min
- Physical examination on admission revealed stable vital signs, pallor, and normal abdominal examination findings. Rectal examination revealed melena.
- The results of the laboratory analysis were as follows: hemoglobin, 7.7 g/dL (baseline recent Hb, 10.1 g/dL); platelet count, 201,000/L; and blood urea nitrogen-to-creatinine (BUN/Cr) ratio, 36. The results of liver function tests and coagulation panel were within the normal limits as follows: AST/ALT 30/17 IU/L; GGT 10 IU/L; TP 6.2 g/dL; Albumin 3.3 g/dL; BUN/Cr 22/0.6 mg/dL; and international normalized ratio for PT/aPTT 1.09/36.1

Endoscopic and Radiological Findings:

- Esophagogastroduodenoscopy: Non-specific (The jejunojejunostomy site was confirmed on gastroscopy, but the hepaticojejunostomy anastomotic site could not be confirmed and intubated.)
- Colonoscopy: Non-specific

CT: No active contrast leakage

Single-balloon enteroscopy: Anterior single-balloon enteroscopy was performed at the hepaticojejunostomy anastomotic site and revealed multiple engorged blood vessels that were oozing blood.

Hospital Progress: After endoscopic treatment, no additional bleeding was observed. The patient has been doing well after discharge, with no further gastrointestinal bleeding.

Keywords: Recurrent obscure gi bleeding, Roux-en-y hepaticojejunostomy, Enteroscopy, Argon plasma coagulation



LGI 5-5

Small Bowel Surveillance In Familial Adenomatous Polyposis

Jung Min Lee

Department of Gastroenterology, Wonkwang University Sanbon Medical Center, Gunpo, Korea

Age and gender: 22/Female

Chief complaint: Familial history with colon cancer

Present illness: The patient's father had been diagnosed with colon cancer and around a hundred of colonic polyps. The patients had been evaluated for gastroscopy and colonoscopy and diagnosed with a familial adenomatous polyposis when she was 18 years old. The patient and his family refused total proctocolectomy because of young age and she has been taken surveillance every 6 months.

Past history: None

Familial history:

- Father - colon cancer and familial adenomatous polyposis syndrome
- Physical examination and laboratory findings
- Physical examination was unremarkable
- WBC 6850/mm³, Hb 12.5 g/dL, Platelet 203,000/mm³
- AST/ALT 12/9 IU/L, GGT 10 IU/L, ALP 35 IU/L, Total bilirubin 0.6 mg/Dl

Radiologic and endoscopic findings:

- Gastroscopy and colonoscopy were performed every 6 months for surveillance.
- About around 100 polyps were observed in the colon and we removed the large polyps around 20 by polypectomy every 6 months.
- Abdomen CT and capsule endoscopy were performed every 1 year.
- When the capsule endoscopy around the small bowel polyps, we removed even small bowel polyps by single-balloon enteroscopy.

Hospital progress: The patients continues to have surveillance every 6 month, including annual capsule endoscopy and abdominal CT.

Keywords: Case



LGI 6-1

Computer-Aided Therapeutic Decision for Diminutive Polyps: Resect and Discard or Leave It?

Yuichi Mori

Digestive Disease Center, Showa University Northern Yokohama Hospital, Yokohama, Japan

INTRODUCTION

Computer-aided detection and characterization of colorectal polyps is now attracting increased attention. The concept and use of the basic technology of computer-aided diagnosis (CAD) for colonoscopy has long been explored.¹ With emergence of deep learning algorithms and significant advancements in computer power, CAD assistance during colonoscopy is now being realized.²

The major roles of CAD for colonoscopy include automated polyp detection and characterization. By indicating the presence and location of polyps in real time during colonoscopy, CAD potentially draws the endoscopist's attention to polyps that are displayed on the monitor but could be overlooked visually, which in turn would result in a higher adenoma detection rate. In addition, by outputting the predicted pathology or endoscopic classification of the detected polyps, CAD accelerates accurate optical biopsy characterization of the colorectal polyps, which could lead to a significant reduction in the number of unnecessary polypectomies of non-neoplastic polyps. The CAD can be beneficial especially for characterization of tiny polyps (≤ 5 mm), because such diminutive polyps are allowed being discarded or left in situ based on the western guidelines if their histology can be correctly predicted using endoscopic diagnosis.^{3,4}

AUTOMATED POLYP DETECTION

Recently, three physician-initiated studies that addressed automated polyp detection using a deep-learning method were published. Misawa et al. developed a three-dimensional convolutional network model for automated polyp detection that worked nearly in real time.⁵ They confirmed a sensitivity of 90% and specificity 63% using 50 polyp videos and 85 non-polyp videos as test sets. Subsequently, Urban et al. developed a CAD model that had excellent diagnostic capability in an experimental setting: its area under the receiver operating characteristic curve for polyp recognition was 0.991, and its accuracy was 96%.⁶ They also assessed the efficacy of their algorithm by comparing assessments of nine videos with CAD vs. without CAD. Their results showed that the assessment with CAD identified nine more polyps than that without CAD (45 vs. 36, respectively). Most recently, Wang et al. reported a CAD model that provided $>90\%$ sensitivity but $<90\%$ specificity for video-based analysis.⁷ The strength of their study was that they evaluated their model using a large number of images, patients, video records, and polyps, which contributed to the reliability of the acquired data.

AUTOMATED POLYP CHARACTERIZATION

The application of CAD to magnifying narrow-band imaging (NBI) (Olympus Corp., Tokyo, Japan) has been the area most eagerly investigated in this field. The first application of CAD was reported by Tischendorf et al.²⁷ and Gross et al.,²⁸ who providing diagnostic accuracies of 85.3% and 93.1%, respectively. Following these studies, a research group at Hiroshima University in Japan played a significant role in the development of CAD models.⁸⁻¹⁴ Their achievement was notable because they realized real-time prediction of polyp pathology.

Recently, two research teams conducted retrospective studies on newly developed CAD systems based on a deep-learning algorithm. Byrne et al. assessed their model using 125 unaltered endoscopic videos containing diminutive polyps. For the 106 diminutive polyps, the sensitivity for identifying adenomas was 98%, specificity 83%.¹⁵ Similarly, Chen et al. assessed their model using 284 diminutive polyps. The model identified neoplastic or hyperplastic polyps with 96.3% sensitivity, 78.1% specificity.¹⁶

Endocytoscopy (H290ECI, Olympus Corp.) is a newly introduced in vivo contact microscopic imaging modalities. They allow endoscopists to obtain real-time cellular images with 500-fold magnification power, respectively, during colonoscopy.^{17,18} These devices are considered ideal for partnering with the CAD system because they always provide focused, fixed-size images, which contribute to easier robust image analysis using CAD. Our team recently conducted a larger-scale prospective study exploring the efficacy of an endocytoscopy-based CAD system.¹⁹ They included 791 patients and assessed 466 diminutive polyps using CAD. The NPV for diminutive rectosigmoid adenomas proved to be 93.7% in the worse-case scenario which reached the threshold in which leaving-in-situ strategy requires.

References

- Liedlgruber M, Uhl A. Computer-aided decision support systems for endoscopy in the gastrointestinal tract: a review. *IEEE Rev Biomed Eng* 2011;4:73-88.
- Mori Y, Kudo SE, Berzin TM, et al. Computer-aided diagnosis for colonoscopy. *Endoscopy* 2017;49:813-819.
- Rex DK, Kahi C, O'Brien M, et al. The American Society for Gastrointestinal Endoscopy PIVI (Preservation and Incorporation of Valuable Endoscopic Innovations) on real-time endoscopic assessment of the histology of diminutive colorectal polyps. *Gastrointest Endosc* 2011;73:419-22.
- Kaminski MF, Hassan C, Bisschops R, et al. Advanced imaging for detection and differentiation of colorectal neoplasia: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. *Endoscopy* 2014;46:435-49.
- Misawa M, Kudo SE, Mori Y, et al. Artificial Intelligence-Assisted Polyp Detection for Colonoscopy: Initial Experience. *Gastroenterology* 2018;154:2027-2029 e3.
- Urban G, Tripathi P, Alkayali T, et al. Deep Learning Localizes and Identifies Polyps in Real Time With 96% Accuracy in Screening Colonoscopy. *Gastroenterology* 2018;155:1069-1078 e8.
- Wang P, Xiao X, Glissen Brown JR, et al. Development and validation of a deep-learning algorithm for the detection of polyps during colonoscopy. *Nature Biomedical Engineering* 2018;2:741-748.
- Takemura Y, Yoshida S, Tanaka S, et al. Computer-aided system for predicting the histology of colorectal tumors by using narrow-band imaging magnifying colonoscopy (with video). *Gastrointest Endosc*

2012;75:179-85.

9. Tamaki T, Yoshimuta J, Kawakami M, et al. Computer-aided colorectal tumor classification in NBI endoscopy using local features. *Med Image Anal* 2013;17:78-100.
10. Hirakawa T, Tamaki T, Raytchev B, et al. SVM-MRF segmentation of colorectal NBI endoscopic images. *Conf Proc IEEE Eng Med Biol Soc* 2014:4739-42.
11. Hafner M, Tamaki T, Tanaka S, et al. Local fractal dimension based approaches for colonic polyp classification. *Med Image Anal* 2015;26:92-107.
12. Kominami Y, Yoshida S, Tanaka S, et al. Computer-aided diagnosis of colorectal polyp histology by using a real-time image recognition system and narrow-band imaging magnifying colonoscopy. *Gastrointest Endosc* 2016;83:643-9.
13. Wimmer G, Tamaki T, Tischendorf JJ, et al. Directional wavelet based features for colonic polyp classification. *Med Image Anal* 2016;31:16-36.
14. Okamoto T, Koide T, Sugi K, et al. Image segmentation of pyramid style identifier based on Support Vector Machine for colorectal endoscopic images. *Conf Proc IEEE Eng Med Biol Soc* 2015;2015:2997-3000.
15. Byrne MF, Chapados N, Soudan F, et al. Real-time differentiation of adenomatous and hyperplastic diminutive colorectal polyps during analysis of unaltered videos of standard colonoscopy using a deep learning model. *Gut* 2019;68:94-100.
16. Chen PJ, Lin MC, Lai MJ, et al. Accurate Classification of Diminutive Colorectal Polyps Using Computer-Aided Analysis. *Gastroenterology* 2018;154:568-575.
17. Kiesslich R, Burg J, Vieth M, et al. Confocal laser endoscopy for diagnosing intraepithelial neoplasias and colorectal cancer in vivo. *Gastroenterology* 2004;127:706-13.
18. Mori Y, Kudo S, Ikehara N, et al. Comprehensive diagnostic ability of endocytoscopy compared with biopsy for colorectal neoplasms: a prospective randomized noninferiority trial. *Endoscopy* 2013;45:98-105.
19. Mori Y, Kudo SE, Misawa M, et al. Real-Time Use of Artificial Intelligence in Identification of Diminutive Polyps During Colonoscopy: A Prospective Study. *Ann Intern Med* 2018;169:357-366.

Keywords: Artificial intelligence



LGI 6-2

Advanced Endoscopy for Diagnosis of Colorectal Lesions

Bo-In Lee

Internal Medicine, The Catholic University of Korea, Seoul, Korea

In recent years, various technological advances in colonoscopy have been made for improving detection (red-flag technique) and characterization (histologic prediction) of colorectal lesions. Techniques and devices for maximizing mucosal exposure include transparent cap, Endocuff, Endorings, balloon colonoscope. Extra-wide-angle view colonoscope and Full Spectrum Endoscopy are devices for increasing the field of view and minimizing blind areas. Capsule colonoscopy is a minimally invasive technique allowing direct visualization of the entire colonic mucosa without sedation. Prolonged and complicated preparation is a significant limitation of capsule colonoscopy. Linked Color Image may be helpful to decrease adenoma miss rate. Endocytoscopy is a promising high resolution microendoscopy technique for histologic predication and estimation of invasion depth. Artificial intelligence is being applied actively in automatic polyp detection and polyp characterization. Molecular imaging is another rapidly evolving field that enables detection of molecular changes which are specific for certain diseases.

Keywords: Colonoscopy, Image-enhanced endoscopy, Capsule colonoscopy, Artificial intelligence



LGI 6-3

Endoscopic Submucosal Dissection: How to Do the Pocket-Creation Method

Yoshikazu Hayashi

Gastroenterology, Jichi Medical University, Shimotsuke, Japan

The pocket-creation method (PCM) was originally introduced to overcome technical issues of endoscopic submucosal dissection (ESD) of large subpedunculated tumors. This innovative technique provides several advantages. PCM facilitates the dissection of a thick submucosal layer with minimal mucosal incision, preventing 'diffuse lift', and provides effective traction and counter-traction as the tip of the small-caliber-tip transparent (ST) hood elongates the submucosal tissue and assists dissection. This technique enhances recognition of the muscularis layer and thus a deep dissection is feasible ensuring a high-quality pathological specimen with an adequate margin. In challenging lesions located on a vertical wall or over a fold, the approach of the knife converts from vertical to tangential by endoscope-tip insertion into the pocket. In addition, the tip of the endoscope in the pocket provides stability counteracting any movement due to breathing or heartbeat. In our experience, ESD with PCM is a well-established, useful and safe technique that appears to be an effective alternative to standard ESD.

Keywords: Endoscopic submucosal dissection, ESD, Pocket-creation method, St hood



LGI 6-4

New Methods for Therapeutic Colonoscopy

Yunho Jung

Internal Medicine, Soonchunhyang University College of Medicine, Cheonan, Korea

Introduction

A variety of polyp removal techniques such as cold or hot forceps biopsy, cold or hot snare polypectomy, and endoscopic mucosal resection (EMR) have been performed in clinical practice. And various EMR techniques such as ligation-EMR, cap-EMR, strip-biopsy EMR and precut-EMR have been developed to remove lesions more safely and properly.¹ Endoscopic submucosal dissection (ESD) is a developing resection method for superficial GI neoplasms and is becoming the standard treatment in some Asian regions because, it has the advantage of a high en bloc and complete resection rate in comparison to conventional EMR, regardless of tumor size, which allows a more accurate histologic evaluation of the specimen.² Although various resection methods have currently used in clinical practice, efforts are being made to find easier, safer methods. In this chapter, I'd like to review the recent attempts and trends of therapeutic techniques in the field of colonoscopy.

New trend & methods of therapeutic colonoscopy

1. Cold snare polypectomy for large non pedunculated polyp (≥ 10 mm)

Cold snaring requires en bloc lesion capture and mechanical transection of tissue. Without electrocautery, tissue cutting is affected by closure of the snare wire only. CSP technique does not require an electrosurgical system and submucosal injection.³ ESGE recommends CSP as the preferred technique for removal of diminutive polyps (size ≤ 5 mm) and flat or sessile polyps 6-9 mm in size.⁴ The results of recent systematic review and pooled analysis for cold snare resection of colorectal polyps >10 mm was 99.3% (95% CI, 98.6%-100%) of complete resection rate and Intra- and postprocedural bleeding rates were 0.7% (95% CI, 0%-1.4%) and 0.5% (95% CI, .1%-1.2%), respectively.⁵

2. Colorectal ESD [conventional method (CM) vs pocket creation method (PCM)]

The pocket-creation method (PCM) is a new strategy for ESD of superficial colorectal tumors. The key feature of the PCM is creation of a large submucosal pocket using a small-caliber-tip transparent hood and needle-type knife. The PCM maintains a thick submucosal layer during the because a minimal incision prevents dispersion of injected fluid. The tip of the endoscope in the submucosal pocket facilitates tissue traction, resulting in keeping the direction parallel to the muscularis.⁶ A recent large retrospective data show that the PCM group achieved a significantly higher en bloc resection rate (PCM, 100%, vs CM, 96%; $P < .001$) and R0 resection rate (91% [255/280] vs 85% [224/263], respective-

ly; P Z .033) than the CM group. And the incidence of adverse events was similar.

3. Traction methods for endoscopic resection in colorectal neoplasm

Traction methods have been attempted to facilitate the procedure of colorectal ESD. The double scope method for colorectal tumors requires a second endoscopist to operate the thin endoscope for traction and is limited to the rectum and distal sigmoid colon. ESD for rectal cancers using external forceps was reported but, an external forceps was possible only for rectal tumors because of difficulty in inserting and controlling the forceps. Internal traction methods such as rubber strips, S-O clips, loop attached rubber bands, and latex bands are also promising for the treatment of colorectal tumors. Although control of the traction direction is difficult and a special device is required, internal traction can be advantageous for deep colon procedures.⁷ A FDA approved tissue retractor system (ORISE TRS; Boston Scientific Corp., Marlborough, Mass, USA) was recently demonstrated and an successful treatment case also reported.⁸

4. Full-thickness resection

Safe, reliable, and effective endoscopic full-thickness resection (EFTR) remains at the unconquered summit of endoscopic tissue resection. Within the colon, an emerging technique uses an over-the-scope clip (OTSC) with a modified all-in-one system marketed as the full-thickness resection device (FTRD).

Technical success of FTRD was achieved in 144 out of 156 (92.3%). Mean procedural time was 42 minutes. R0 resection was achieved in 112 of 156 (71.8%). Severe procedure-related adverse events were recorded in 3.9% of patients.⁹

5. Robotics for Advanced Therapeutic Colonoscopy

Numerous innovative endoscopic systems have been developed to support advanced therapeutic endoscopy. These technically enhanced and significantly improved novel systems include intuitively operated robotic endoscopic platforms/systems (MASTER system, ANUBIScope, ViaCath system, and Auris Robotic Endoscopy System), mechanically enhanced and/or robotics-assisted endoscopes (RAFE, invendoscope, and Endomina system), and autonomously driven endoscopic locomotion devices (Medrobotics Flex[®] Robotic System, NeoGuide Endoscopy System, magnetically driven robotic platform, and Endotics[®] System).¹⁰

Conclusions

Equipment and procedures for easier, safe and rapid removal of colorectal neoplasia are rapidly developing. I hope you will become familiar with the new trend and methods of therapeutic colonoscopy in this chapter so that you can apply new technologies that can be used in real clinical practice.

References

1. Committee AT, Hwang JH, Konda V, et al. Endoscopic mucosal resection. *Gastrointest Endosc* 2015;82:215-26.

2. Wang J, Zhang XH, Ge J, Yang CM, Liu JY, Zhao SL. Endoscopic submucosal dissection vs endoscopic mucosal resection for colorectal tumors: a meta-analysis. *World J Gastroenterol* 2014;20:8282-7.
3. Hewett DG. Cold snare polypectomy: optimizing technique and technology (with videos). *Gastrointest Endosc* 2015;82:693-6.
4. Ferlitsch M, Moss A, Hassan C, et al. Colorectal polypectomy and endoscopic mucosal resection (EMR): European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. *Endoscopy* 2017;49:270-97.
5. Thoguluva Chandrasekar V, Spadaccini M, Aziz M, et al. Cold snare endoscopic resection of nonpedunculated colorectal polyps larger than 10 mm: a systematic review and pooled-analysis. *Gastrointest Endosc* 2019;89:929-36 e3.
6. Shinozaki S, Hayashi Y, Lefor AK, Yamamoto H. What is the best therapeutic strategy for colonoscopy of colorectal neoplasia? Future perspectives from the East. *Dig Endosc* 2016;28:289-95.
7. Tsuji K, Yoshida N, Nakanishi H, Takemura K, Yamada S, Doyama H. Recent traction methods for endoscopic submucosal dissection. *World J Gastroenterol* 2016;22:5917-26.
8. Jawaid S, Yang D, Draganov PV. Tissue retractor system-assisted endoscopic submucosal dissection of a large rectal tumor with significant fibrosis from direct tattooing. *VideoGIE* 2019;4:84-6.
9. Kuellmer A, Mueller J, Caca K, et al. Endoscopic full-thickness resection for early colorectal cancer. *Gastrointest Endosc* 2019;89:1180-9 e1.
10. Wong JYY, Ho KY. Robotics for Advanced Therapeutic Colonoscopy. *Clin Endosc* 2018;51:552-7.

Keywords: Colonoscopy

IDEN International
Digestive
Endoscopy
Network
2019 2019

June 15 (Sat), 2019

Pancreatobiliary





PB 5-1

Endoscopic or Eus-Guided Drainage for Acute Peripancreatic Fluid Collections; Timing, Indications, and Methods

Hoonsub So and Taejun Song

Department of Internal Medicine, University of Ulsan, Asan Medical Center, Seoul, Korea

Introduction

The old concept of treating acute peripancreatic fluid and pseudocyst based on time and size has been abandoned by virtue of advance in understanding of the disease and development of minimally invasive treatments, such as percutaneous drainage and endoscopic ultrasound guided treatment. Pancreatic fluid collections are now classified into 4 categories based on the presence of pancreatic necrosis and time from the onset of pancreatitis, i.e., acute peripancreatic fluid collection (APFC), pancreatic pseudocyst, acute necrotic collection, walled-off necrosis.¹ APFC is an early complication associated with interstitial edematous pancreatitis, with no association with peripancreatic necrosis. It is applied only to areas of peripancreatic fluid seen within the first 4 weeks after onset of interstitial edematous pancreatitis, without features of pseudocyst. Mostly, they resolve, but some portion can develop to pseudocysts after 4 weeks, having well circumscribed, defined inflammatory wall.² Endoscopic ultrasound (EUS)-guided drainage is now taking over most of the drainage procedures of peripancreatic fluid in many centers. In this topic, we will discuss the optimal timing, indications and methods about the EUS-guided drainage of APFC.

1. Timing

Timing of EUS-guided drainage depends on maturity of wall of the fluid collection.³⁻⁵ As the majority of APFCs resolve spontaneously, it would be wise to manage the patient conservatively in initial phase of pancreatitis.² Even in cases of necrosis pancreatitis, it is recommended to delay the first intervention for infected necrosis if it can be tolerated by the patient.⁵ Studies about necrotizing pancreatitis revealed that early performance of intervention was associated with poorer outcomes.^{6,7} The concept is called "step-up approach".⁸ Peripancreatic fluid collection usually needs more than four weeks to be created from the onset of acute pancreatitis. If possible, procedure should be postponed until the wall matures. In occasion, conservative treatment before wall maturation fail. The most common reason for failure of conservative management in this early phase is refractory infection.³ In this clinically indicated situation, EUS can be used for evaluation of wall maturation, and if the wall is not mature enough, temporary percutaneous drainage can be utilized to allow cyst wall maturation and to avoid complications. Furthermore, delays in drainage will also allow the contents to liquify, simplifying subsequent drainage and/or necrosectomy.⁹

2. Indications

In the past, indications for the treatment of pancreatic pseudocysts were based on the size and the duration of pancreatic pseudocysts. For now, indications are based on the presence of persistent symptoms, ongoing obstruction of nearby organs (gastric outlet, bile duct, intestine), disconnected duct syndrome.¹⁰ Large size alone is not an indication before being symptomatic.⁴ Prophylactic treatment are suggested for some indications to prevent complications in asymptomatic patients as pseudocysts don't easily regress in these situation: 1) Pseudocyst larger than 5 cm without any regression after more than 6 weeks, 2) pseudocyst in the setting of chronic pancreatitis with advanced main p-duct changes or pancreaticolithiasis.¹¹

3. Methods

1. Endoscopic vs EUS-guided drainage

EUS-guided drainage is now first-line therapy for pancreatic pseudocyst.⁵ There are several advantages over conventional transmural drainage using duodenoscopy. EUS allows real-time intervention and give information about the size, location, wall thickness and contents of lesions at the same time. Patient with coagulopathy or collateral vessels can benefit from EUS guidance by avoiding intervening vessels.¹² EUS-guided technique can also be applied safely to non-bulging pseudocyst.¹³ In two prospective study comparing EUS and endoscopic approach, EUS-guided drainage shows higher technical success rate and similar clinical success rate.^{13,14} Even though statistically insignificant, there was tendency of lower procedure related complication.¹⁴

2. Metal vs Plastic stent

Conventionally, multiple double pigtail plastic stents have been used for the procedure. However, deploying one fully covered self-expandable metallic stents (FCSEMS) has been increasingly used recently.^{15,16} The reason for the popularity is that it can shorten procedure time. Furthermore, metal stent can secure larger lumen for drainage leading to rapid drainage without obstruction. However, metal stent has not shown better efficacy compared to plastic stent in treating pseudocysts.^{17,18} Dedicated double-flanged lumen apposing stents has been developed for the procedure.¹⁹ A new platform with electrocautery and deployment allows near simultaneous cyst puncture and stent deployment. Endoscopy can pass through the large-caliber lumen of the stent and perform necrosectomy. Recent study showed better efficacy of the metal stent in treating walled-off necrosis.²⁰

3. Nasocystic tube

Nasocystic tube can be inserted in parallel to deployed stent. The aim of inserting nasocystic tube is to irrigate the inside of fluid collection to prevent stent obstruction and facilitated faster drainage. In a large multicenter study, there was no significant difference in clinical success between groups with or without nasocystic tube placement (90.9% vs. 95.6%; $P = 0.59$).²¹ A study reported that, if viscous debris are inside, group with nasocystic tube with stent showed greater short-term success rate compared with those who only had stents.²² As nasocystic is safe, it could be inserted in selected patients with viscous debris.

Conclusions

The concept and treatment of APFC has evolved drastically over the last decade. Minimally invasive treatment is a mainstay, and EUS is playing a significant role in managing APFC. New devices and specialized techniques have helped endoscopists deal with APFC.

References

1. Banks PA, Bollen TL, Dervenis C, et al. Classification of acute pancreatitis–2012: revision of the Atlanta classification and definitions by international consensus. *Gut* 2013;62:102-11.
2. Lenhart DK, Balthazar EJ. MDCT of acute mild (necrotizing) pancreatitis: abdominal complications and fate of fluid collections. *AJR Am J Roentgenol* 2008;190:643-9.
3. Elmunzer BJ. Endoscopic Drainage of Pancreatic Fluid Collections. *Clin Gastroenterol Hepatol* 2018;16:1851-1863.e3.
4. Muthusamy VR, Chandrasekhara V, Acosta RD, et al. The role of endoscopy in the diagnosis and treatment of inflammatory pancreatic fluid collections. *Gastrointest Endosc* 2016;83:481-8.
5. Arvanitakis M, Dumonceau JM, Albert J, et al. Endoscopic management of acute necrotizing pancreatitis: European Society of Gastrointestinal Endoscopy (ESGE) evidence-based multidisciplinary guidelines. *Endoscopy* 2018;50:524-546.
6. Besselink MG, Verwer TJ, Schoenmaeckers EJ, et al. Timing of surgical intervention in necrotizing pancreatitis. *Arch Surg* 2007;142:1194-201.
7. van Santvoort HC, Bakker OJ, Bollen TL, et al. A conservative and minimally invasive approach to necrotizing pancreatitis improves outcome. *Gastroenterology* 2011;141:1254-63.
8. van Santvoort HC, Besselink MG, Bakker OJ, et al. A step-up approach or open necrosectomy for necrotizing pancreatitis. *N Engl J Med* 2010;362:1491-502.
9. Topazian M. Endoscopic Ultrasound-Guided Drainage of Pancreatic Fluid Collections (with Video). *Clin Endosc* 2012;45:337-40.
10. IAP/APA evidence-based guidelines for the management of acute pancreatitis. *Pancreatology* 2013;13:e1-15.
11. Lerch MM, Stier A, Wahnschaffe U, et al. Pancreatic pseudocysts: observation, endoscopic drainage, or resection? *Dtsch Arztebl Int* 2009;106:614-21.
12. Singhal S, Rotman SR, Gaidhane M, et al. Pancreatic fluid collection drainage by endoscopic ultrasound: an update. *Clin Endosc* 2013;46:506-14.
13. Park DH, Lee SS, Moon SH, et al. Endoscopic ultrasound-guided versus conventional transmural drainage for pancreatic pseudocysts: a prospective randomized trial. *Endoscopy* 2009;41:842-8.
14. Varadarajulu S, Christein JD, Tamhane A, et al. Prospective randomized trial comparing EUS and EGD for transmural drainage of pancreatic pseudocysts (with videos). *Gastrointest Endosc* 2008;68:1102-11.
15. Jang JW, Lee SS, Park DH, et al. Feasibility and safety of EUS-guided transgastric/transduodenal gallbladder drainage with single-step placement of a modified covered self-expandable metal stent in patients unsuitable for cholecystectomy. *Gastrointest Endosc* 2011;74:176-81.
16. Lee BU, Song TJ, Lee SS, et al. Newly designed, fully covered metal stents for endoscopic ultrasound (EUS)-guided transmural drainage of peripancreatic fluid collections: a prospective randomized study. *Endoscopy* 2014;46:1078-84.
17. Bang JY, Hawes R, Bartolucci A, et al. Efficacy of metal and plastic stents for transmural drainage of pancreatic fluid collections: a systematic review. *Dig Endosc* 2015;27:486-98.

18. Mukai S, Itoi T, Baron TH, et al. Endoscopic ultrasound-guided placement of plastic vs. biflanged metal stents for therapy of walled-off necrosis: a retrospective single-center series. *Endoscopy* 2015;47:47-55.
19. Gornals JB, De la Serna-Higuera C, Sanchez-Yague A, et al. Endosonography-guided drainage of pancreatic fluid collections with a novel lumen-apposing stent. *Surg Endosc* 2013;27:1428-34.
20. Siddiqui AA, Kowalski TE, Loren DE, et al. Fully covered self-expanding metal stents versus lumen-apposing fully covered self-expanding metal stent versus plastic stents for endoscopic drainage of pancreatic walled-off necrosis: clinical outcomes and success. *Gastrointest Endosc* 2017;85:758-765.
21. Siddiqui AA, Adler DG, Nieto J, et al. EUS-guided drainage of peripancreatic fluid collections and necrosis by using a novel lumen-apposing stent: a large retrospective, multicenter U.S. experience (with videos). *Gastrointest Endosc* 2016;83:699-707.
22. Siddiqui AA, Dewitt JM, Strongin A, et al. Outcomes of EUS-guided drainage of debris-containing pancreatic pseudocysts by using combined endoprosthesis and a nasocystic drain. *Gastrointest Endosc* 2013;78:589-95.

Keywords: Endoscopic ultrasound, Pseudocyst, Stent



PB 5-2

Novel Eus-Guided Therapeutic Approach for Postoperative Bile Duct Stricture

Takeshi Ogura

2nd Department of Internal Medicine, Osaka Medical College, Takatsukishi, Japan

Background and aim: Hepaticojejunum stricture (HJS) is commonly treated under percutaneous transhepatic or enteroscopic guidance. However, there are several disadvantages in these procedures such as prolong procedure time, low technical success rate, or self-tube removal. Recently, EUS-guided biliary drainage (EUS-BD) is indicated for malignant biliary obstruction. EUS-BD for benign biliary stricture has been reported, however, the evidence of EUS-BD for HJS is not sufficient. The aim of this study is to evaluate the feasibility and efficacy of interventional endoscopy under EUS guidance for HJS.

Patients and Method: Between January 2017 and May 2018, a total 29 HJS patients were enrolled. First, EUS-BD was performed using covered metal stent. After 1 week, cholangioscope inserted into the biliary tract through the HGS stent. Then, HJS was evaluated, and dilated using balloon catheter. Finally, HGS was performed using plastic stent. After 3 months, if HJS was still presence, antegrade metal stent deployment (M-Intraductal stent) was attempted.

The primary endpoint in this study is to evaluate the technical success rate, and adverse events were secondary evaluated.

Results: The 29 patients underwent EUS-BD. Indications for EUS-BD comprised obstructive jaundice (n=10) and frequent cholangitis (n=17). Among them, intrahepatic bile duct stones were complicated in 11 patients. Technical success of EUS-BD was obtained in 27 patients (93%). HJS dilation was attempted in 26 patients except one patient who was diagnosed as recurrence of cholangiocarcinoma at HJS site. HJS was resolved in 19 patients (median follow-up period 192 days). Antegrade metal stent deployment were attempted in 7 patients, and stent deployment was successfully performed in all patients. In addition, after 1 month, stent removal via HGS route could be successfully performed in all patients. Although follow up period is short (median 92 days), recurrence of HJS were not seen in any patients. Finally, severe adverse events were not seen in any patients.

Conclusion: EUS-BD may be one of option for patients complicated with HJS.

Keywords: Eus, Ercp, Eus-hgs, Eus-bd



PB 5-3

Therapeutic and Diagnostic Application of Peroral Cholangioscopy in Biliary Disease

Chang-Hwan Park

Internal Medicine, Chonnam National University Medical School, Gwangju, Korea

Abstract

Direct visualization of the bile ducts has become essential in a selected group of biliary disorders that represent a high diagnostic and therapeutic challenge not easily resolved by conventional techniques. In order to permit direct visualization of the bile ducts, smaller endoscopes for cholangioscopy have been developed. Nowadays, two kinds of direct peroral cholangioscopy (DPOC) have been used. One cholangioscope is passed through the working channel of a standard therapeutic duodenoscope during endoscopic retrograde cholangiopancreatography (ERCP). The SpyGlass Direct Visualization System (Boston Scientific Corp., Natick, MA, USA) is currently the most widely used and studied device. The other cholangioscope is directly inserted to the bile duct with or without using an anchoring balloon. One of the major encounters includes the evaluation of indeterminate biliary strictures, concerning malignancy potential. Despite available methods of indirect visualization of the biliary tract, such as endoscopic ultrasonography, computed tomography, magnetic resonance imaging, and ERCP using brush cytology and/or intraductal blind biopsy, up to 30% of biliary strictures remain indeterminate. DPOC with cholangioscopy-directed biopsies has a high specificity in differentiating intraductal malignancies from benign lesions. Cholangioscopy-directed biopsies should be strongly considered for biliary stricture evaluation. DPOC with intraductal lithotripsy has become an established modality in the treatment of difficult biliary lithiasis. DPOC-assisted electrohydropolypsectomy was effective and safe for difficult biliary stones in patients with and without surgically altered anatomy. Endoscopic treatment of Mirizzi syndrome using DPOC is a safe and effective alternative to surgery, especially in patients with the type II syndrome. A favorable long-term outcome depends on the absence of large residual gallbladder stones. Finally, DPOC immediately following difficult CBD stone removal was safe, feasible and accurate. In this setting, DPOC at the time of ERCP appears to be a very useful tool to achieve complete clearance of choledocholithiasis. Endoscopic transpapillary gallbladder drainage by using DPOC is also very useful for the patients with severe comorbidity. Complications specific to the performance of DPOC include cholangitis, which is related to intraductal fluid irrigation. In conclusion, DPOC allows endoscopists to treat patients with complicated diseases of the gallbladder and biliary tract better. In recent years, this technique was optimized to overcome prior limitations.

Keywords: Cholangioscopy, Choledocholithiasis, Endoscopic retrograde cholangiopancreatography, Indeterminate stenosis



PB 5-4

Prospects of Newly Developed Per-Oral Direct Cholangioscope

Ryosuke Tonozuka

Gastroenterology and Hepatology, Tokyo Medical University, Tokyo, Japan

Peroral cholangioscopy is useful for the diagnosis of indeterminate biliary strictures and filling defects which are often shown on cholangiography. Moreover, peroral cholangioscopy enables the treatment of difficult stones such as impacted stones, large stones, and hard stones using electric hydraulic lithotripsy. Theoretically, Direct peroral videocholangioscopy (D-PVCS) using conventional ultrathin GI endoscopy appears to be an ideal modality for the diagnosis and therapy of biliary tract diseases because it is performed by a single operator and the unit has a high-resolution video system with a large accessory channel enabling the use of large caliber diagnostic and therapeutic devices. D-PVCS using the free-hand technique has been limited because of inevitable obstacles as follows: (1) the scope looping in the fornix of the stomach owing to the small diameter of the endoscope axis precludes the straightening of the endoscope in the bile duct, (2) the direction of the bile duct is on the side opposite (acute angulation) to the running direction of the endoscope, leading to the difficulty of free-hand endoscope insertion into the proximal bile duct. Thus, D-PVCS requires assisting devices such as a guidewire, an overtube, and an anchoring balloon to overcome these obstacles. Therefore, we developed the 1st prototype cholangioscope for double-bending D-PVCS (DBD-PVCS) in which the cholangioscope has a large diameter insertion shaft and double-bending portions to easily advance the tip of the cholangioscope in the hilar bile duct. Subsequently, we developed the 2nd prototype cholangioscope, and then the 3rd prototype cholangioscope for DBD-PVCS. The latest our report on DBD-PVCS has shown that it is possible to conduct free-hand insertion at a high success rate. Nevertheless, most biliary endoscopists believe that D-PVCS can be performed only by a certain number of endoscopy experts. Thus, we developed an ex-vivo training model dedicated for DBD-PVCS. We found that this model using the 3rd prototype cholangioscope was very useful for training and gaining expertise in free-hand D-PVCS.

Keywords: Cholangioscopy, Ercp, Direct cholangioscope



PB 6-1

Endoscopic Techniques for Overcoming Difficult Cannulation

Sundeep Lakhtakia

Gastroenterology, Asian Institute of Gastroenterology, Hyderabad, Telangana, India

ERCP procedure is largely therapeutic in intent and its success crucially depends on cannulating the duct of choice. Smooth selective cannulation into the duct of choice makes the procedure efficient and safe. The accepted current norm is to limit the number of attempts at cannulation and changing to alternative endoscopic technique on failure.

Factors affecting selective biliary cannulation (SBC) include operator's experience, papilla morphology, altered anatomy, technique, and accessories.

The standard SBC techniques include limited attempts using either 'wire-guide' or 'contrast-guide' to enter the bile duct (CBD). With either technique, the dictum is to restrict guide-wire passages and forceful contrast injections.

Failure of standard cannulation methods, lead to the selection of following alternate techniques.

1. Pancreatic duct Access Techniques

A) Double guide-wire (DGW) technique: If guide-wire enters pancreatic duct (PD) while attempting for SBC, retain the guide-wire in the PD and pass a second guide-wire besides to cannulate the CBD. The first guide-wire not only blocks further entry into PD but also straightens the terminal common channel. DGW can also cause post ERCP pancreatitis (PEP) due to mechanical trauma to PD. Therefore, prophylactic short pancreatic duct stent (3 to 5 Fr) placement should be considered in high-risk cases to reduce the risk of PEP. The prophylactic PD stent may be considered either before or after passing the second guide-wire.

B) Burdick's technique: Occasionally guidewire creates false intramural passage when an expert endoscopist can use sphincterotome to make an intramural incision and unmask the bile duct opening.

2. Transmural access at papilla.

A) Needle knife sphincterotomy. NKS or precut sphincterotomy is considered when the standard techniques of biliary cannulation fail or when the DGW technique fails. NKS is generally performed using a needle knife (bare stiff wire) or its modifications (insulated/isolated tip - to avoid inadvertent deeper injury) and precut sphincterotome. NKS can be performed with or without prophylactic PD stent placement, however presence of pancreatic stent makes the NKS safer and easier.

The incision with needle knife starts from the superior lip of papillary orifice and extended in increments of 2-3 mm towards 12 O'clock to a maximum length of about 2/3rd of the papillary mound. The

deeper cut is continued in a layer-by-layer manner over the primary incision path. After each layer cut, the incised papilla is carefully inspected for whitish muscular bile duct sphincter. A small nick over the biliary sphincter followed by the gentle passage of the soft hydrophilic guide-wire in the path of CBD followed on fluoroscopy confirms the accurate position. Care should be taken to avoid blind aggressive attempts at cannulation after NKS. Early and timely NKS is safe and in fact, reduces the risk of PEP.

B) Needle knife fistulotomy. The papillary mound can be divided into three parts (upper third, middle third and lower third) by an imaginary line along the long axis. NKF involves incision at the middle portion papillary mound either below-upwards or above downwards, with the aim to expose sphincter choledochus. In either technique, the papillary orifice stays untouched, thereby explaining the reduced risk of PEP as compared to NKS. Early NKF (<5 min, <5 attempts, ≤1 PD cannulation) has been shown to be a safe and effective strategy for SBC.

In a select case where the ampulla is bulging due to an impacted calculus, the endoscopist may directly opt for NKS or NKF.

C) Trans-pancreatic septotomy or sphincterotomy. In this technique, after PD cannulation with a guidewire, sphincterotomy is performed in the direction of CBD. With TPS, the septum separating both the ducts is cut and the biliary duct orifice is often exposed. TPS is especially helpful when repeated attempts at biliary cannulation result in PD entrance and the papilla is small and unsuitable for NKS.

ERCP in special population

A) Intra-diverticular papilla. The papillary orifice is usually located along the inferior margin of the diverticulum (4-8 o'clock). SBC is often easier here as the acute angulation of bile duct is not present and extreme flexion of sphincterotome is usually not required. If the papilla is situated within the diverticulum, it can be exposed either using a pediatric biopsy forceps or applying an endoclip.

B) Altered surgical anatomy. In cases of surgically altered anatomy (Billroth II), there are two challenges – intubating the afferent limb which has an acute angulation and dealing with the papilla in an upside-down configuration with different relative positions of pancreatobiliary ducts. The biliary orifice is located at around 5 o'clock position in these cases and therefore, rotatable or sigmoid shaped sphincterotomes (cutting wire on the convex side) can be especially useful for SBC. Tips for identification of afferent loop include the presence of bile, fluoroscopy assistance (luminal air going towards liver hilum suggest afferent limb or scope dipping in pelvis suggests efferent loop), tattooing the efferent loop near the anastomotic site so that repeated deep intubation of the wrong limb is avoided. Besides the side view scope, forward-viewing endoscope, pediatric colonoscope or balloon enteroscope can also be utilized to reach the papillary site and gain biliary access. Alternatively, EUS can be used to access the obstructed biliary ducts, and even drain it either directly by transmural covered SEMS (in malignant biliary obstruction) or trans-papillary route by rendezvous procedure.

Keywords: ErCP, Selective biliary cannulation, Precut, Needle knife, Double guidewire technique



PB 6-2

Emerging Role of Eus-Guided Approach

Takeshi Ogura

2nd Department of Internal Medicine, Osaka Medical College, Takatsukishi, Japan

Endoscopic retrograde cholangiopancreatography (ERCP) is the gold standard technique for diagnostic and therapeutic procedure for pancreato-biliary disease. However, selective biliary cannulation is not always achieved. Reasons for failed ERCP may be based on failed selective biliary cannulation or inaccessible papilla. For such cases, EUS-guided approach is alternatively attempted.

The aim of this lecture is to present the strategy and technical tips for EUS-guided approach in case of failed ERCP in our hospital. In this presentation, technical tips for EUS-guided rendezvous (RV) technique, EUS-guided choledochoduodenostomy (with video), EUS-guided hepaticogastrostomy for benign biliary stricture (with video), and EUS-guided hepaticogastrostomy combined with antegrade stenting (with video) will be presented.

Keywords: Eus, Ercprcp, Eus-rv, Eus-cds, Eus-hgs



PB 6-3

Conventional Role of Percutaneous Approach

Gi-Young Ko

Department of Radiology, Asan Medical Center, Seoul, Korea

Bile drainage can be achieved via endoscopic, percutaneous transhepatic, and open surgical methods. Endoscopic drainage is preferred method whenever it is applicable, because of its low incidence of major complications and shorter duration of hospitalization. The introduction of different techniques such as the balloon-enteroscopy ERCP or endoscopic ultrasound-guided biliary drainage have led to a decreased in percutaneous transhepatic biliary drainage (PTBD) in recent years.

However, endoscopic cannulation may fail in some of the cases because of ampulla pathology (stones, stenosis, and tumor), periampullary diverticulum, variant anatomy, and malignant luminal occlusion. In these cases, PTBD has been a highly valuable therapy of choice over years. In addition, PTBD still plays a significant role, especially in the palliation of biliary malignancy or post-transplant biliary stricture which endoscopically inaccessible cases. Conventional indications of percutaneous transhepatic biliary drainage are follows; 1) decompress obstructed biliary tree, 2) dilate biliary strictures, 3) remove bile duct stones, 4) divert bile from and stent bile duct defect.

Although PTBD has been used as the standard treatment of biliary obstruction in the setting of failed ERCP, application of this procedure is gradually declining due to considerably high incidence of procedure-related complications, such as pain, sepsis, cholangitis, or arterial bleeding especially during the creation of the percutaneous transhepatic tract (9-61%). Patient discomfort and reduced quality of life ascribable to drain tube-related complications (20-77%) such as occlusion, bile leak, or dislocation of drain tube are also major long-term complication of PTBD. Therefore, there is a need for improvement in the PTBD complication rates. Repeat endoscopic manipulation following rescue PTBD with cannulation of the occlusion or a rendezvous technique combining PTBD and ERCP may be a valuable alternative in cases with initial ERCP failure.

Keywords: Ptbtd



PB 6-4

Cases of Inoperable Malignant Hilar Biliary Obstruction

Min Jae Yang

Department of Gastroenterology, Ajou University School of Medicine, Suwon, Korea

Case 1

Age and Gender: 41-year old man

Chief Complaints: jaundice and itching sensation (onset 1 week)

Present Illness: A 41-year old-man underwent radical surgery for sigmoid colon cancer and had undergone 8 cycles of palliative chemotherapy to treat multiple liver metastases. One year later, he presented with a 1-week history of jaundice and whole body itching.

Family History: none

Physical Examination and Laboratory Findings: His vital signs were within normal limits. He had scleral icterus. Liver function tests revealed elevated serum total bilirubin, alkaline phosphatase, aminotransferases, and γ -glutamyl-transpeptidase.

Radiologic Findings: Contrast-enhanced abdominal computed tomography (CT) revealed new dilation of intrahepatic bile ducts caused by an increase in the size of the metastatic tumor at the liver hilum.

Hospital Course: Endoscopic unilateral biliary drainage was performed in the right anterior intrahepatic bile duct (IHD). The patient was referred to interventional radiology for percutaneous transhepatic biliary drainage (PTBD) of the segment 3 IHD. Three days after PTBD, a new uncovered stent was percutaneously inserted to form a Y configuration. Six months later, the patient was readmitted to our hospital, complaining of recurrent jaundice. As in the initial procedure, endoscopic reintervention for the left IHD failed. PTBD of the segment 2 IHD was attempted, but failed due to a poor access window. Instead, PTBD of segment 6 was performed. The patient was a Spaniard and wanted to return to his home country without an external drainage tube. We attempted percutaneous anterograde biliary stenting via the B6 route. Even though the guidewire could traverse the indwelling stent mesh and hilar stricture, the dilating devices could not be passed through the stent mesh. The patient was then placed in a prone position for a percutaneous-endoscopic rendezvous procedure. However, the dilating devices could not be passed through the hilum as well. We finished the procedure after advancing the PTBD tube from the B6 to the B2. Finally we attempted EUS-guided hepaticogastrostomy. First, we inserted the percutaneous balloon catheter into B2 over the guidewire and filled the balloon with low concentrations of contrast for echoendoscopic and fluoroscopic localization of the targeted bile duct.

With the help of this device, we successfully performed EUS-guided hepaticogastrostomy and additional biliary stenting between B2 and B6.

Case 2

Age and Gender: 61-year old man

Chief Complaints: jaundice and febrile sensation (onset 5 days)

Present Illness: A 61-year old-man underwent laparoscopic cholecystectomy for gallbladder cancer 4 years ago. He had undergone palliative chemotherapy for recurred tumor at gallbladder bed and peritoneal seeding for recent 2 years. Six months ago, he received bilateral plastic stenting for hilar biliary obstruction caused by recurred tumor in other hospital. He presented to emergency department of our hospital after 5-days of progressive worsening of jaundice and febrile sensation.

Family History: none

Physical Examination and Laboratory Findings: On physical examination, his temperature was 38.5oC body and he had scleral icterus. Blood workup showed raised total leukocytes count with an elevated serum C-reactive protein level. Liver function tests were all abnormal.

Radiologic Findings: Contrast-enhanced abdominal computed tomography (CT) revealed dilation of intrahepatic bile duct (IHD) and a 5-cm infiltrative hypovascular mass lesion involving right liver, superior duodenal angle, and hepatic flexure of the colon.

Hospital Course: We performed ERCP and changed the plastic stents with new ones to address jaundice and cholangitis. Two months later, the patient presented with poor oral intake and progressive worsening of vomiting. We performed duodenal metal stenting in a prone position. One month later, he was readmitted with acute onset of abdominal clamping pain and constipation. We inserted a self-expandable uncovered metal stent, covering the stricture of hepatic flexure of the colon. One month later, the patient visited emergency department for fever and abdominal pain. Liver function tests revealed elevated serum total bilirubin, and alkaline phosphatase. ERCP was attempted, but selective cannulation of B2 or B3 IHD failed. Therefore, we finished the procedure after placing two metal stents to B4 and the right anterior side. Unfortunately jaundice did not improve with the stent-in-stent placement. We performed EUS-guided hepaticogastrostomy. Clinical success was achieved with this procedure. Two months later, the patient presented with recurrent jaundice. We reattempted ERCP. Fortunately selective cannulation of B2 and stenting was successfully performed. Two months later, the patient expired due to hepatic infarction following right hepatic artery obliteration by tumor invasion without external drainage tube.

Keywords: Failed ercp, Malignant hilar biliary obstruction, Eus guided hepaticogastrostomy



PB 7-1

Role of Endoscopy in the Management of IgG4 Related Disease of the Pancreas and Bile Ducts

Damien Tan

Gastroenterology and Hepatology General Hospital, Singapore

IgG4 related disease is a systemic inflammatory disease that affects multiple organs. Patients commonly present with jaundice or LFT abnormalities due to involvement of the pancreas and bile ducts. They may mimic pancreatic or bile duct cancers and it is important to differentiate IgG4 related disease from malignancy as management is different. IgG4 related disease is being diagnosed more frequently due to better awareness, better diagnostic capabilities and better understanding of the disease. Various diagnostic criteria have been proposed. Methods to diagnose AIP include histology, radiological imaging, serological, other organ involvement and response to therapy. Endoscopy plays an important role as it allows visualization of the pancreas and bile ducts as well as enables biopsies of the affected organs to make a diagnosis.

Keywords: Igg4 related disease, Autoimmune pancreatitis, Sclerosing cholangitis, Eus, Ercp



PB 7-2

Primary Sclerosing Cholangitis - Role of Endoscopy

Lars Aabakken

Medical Gastroenterology, Rikshospitalet University Hospital, Oslo, Norway

Primary sclerosing cholangitis (PSC) is an autoimmune disease characterized by inflammation and fibrosis of bile ducts with multiple strictures and dilations, with subsequent parenchymal injury and cirrhosis development. There is a strong association to IBD and a greatly increased risk of cholangiocarcinoma. Endoscopy has a crucial role in the management of these patients, diagnostic, as well as therapeutic

Diagnostics

The diagnosis of PSC is based on typical ductographic appearance. This is now mostly done by high quality MRCP, with ERCP reserved for select equivocal cases and children. However, after the initial diagnosis is made, most diagnostics includes the assessment of dominant strictures, with the need for sampling to detect or exclude development of dysplasia or cholangiocarcinoma. Ductal brushing is still the mainstay but is suboptimal, and ancillary techniques are emerging, including ductoscopic directed biopsies and molecular diagnostics.

Therapeutics

15-20% of patients develop dominant strictures which are mostly amenable to endoscopic treatment, with the aim to delay time of transplantation. Recent data indicate that balloon dilation is comparable in efficacy to short term stenting, but with a favourable adverse event profile.

Post transplant complications may also be handled effectively by endoscopy, in particular anastomotic or ischemic strictures. Hepaticojejunostomies or duct-duct anastomoses can be effectively dilated or stented, and the access to altered anatomy is greatly improved by the introduction of balloon enteroscopy.

In conclusion, interventional endoscopy plays a pivotal role in PSC and should be included in any multidisciplinary program that handles these patients.

Keywords: Endoscopy



PB 7-3

Parasite Infestation

Nonthalee Pausawasdi

Internal Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Parasitic infestation of biliary tract generally occurs in the tropical areas. It is associated with poor sanitation, overpopulation, and low-socioeconomic environment. It is increasingly recognized worldwide due to the rise in the number of intercontinental immigrants. The diagnosis can be challenging as clinical manifestations may mimic other causes of hepato-biliary tract infection. Diagnostic tools such as computerized tomography (CT) scan and magnetic resonance imaging (MRI) can be helpful but the definite diagnosis may not always be obtained based on imaging alone. Endoscopic retrograde cholangiopancreatography (ERCP) has been shown to offer both diagnosis and treatment.

There are many species of commonly seen parasites involving hepato-biliary system: primary biliary parasites including, *Clonorchis Sinensis*, *Fasciola* species, *Opisthorchis* species, and *Dicrocoelium dendriticum*; hepatic involvement includes *Echinococcus* species known as hydatid cyst. The clinical presentations vary depending on the type and site of infestation. Symptoms may be caused by direct transmission of the parasites through the papilla, rupture of parasites into the biliary tree, or compression of the biliary tree. The symptoms include obstructive jaundice, acute cholangitis, cholecystitis, abdominal pain, acute pancreatitis, liver cyst, and liver abscess. Long term infestation of *Clonorchis sinensis* has been shown to be associated with hepatocellular carcinoma; whereas, *Opisthorchis* is associated with cholangiocarcinoma.

The infestation of parasites in the gastrointestinal tract can be identified by stool examination. The presence of eosinophilia and abnormal liver function tests support the diagnosis of parasites. CT scan, MRI, endoscopic ultrasound (EUS) can be used to assess for bile duct dilatation and demonstrate the parasite; other findings including liver cyst, liver abscess, and mass may also be detected. Nonetheless, conventional radiological studies may not provide definite diagnosis in many circumstances. Thus, ERCP is an important diagnostic and therapeutic tool in suspected cases.

The helpfulness of ERCP in the treatment of biliary parasites differs depending on type of the parasites. ERCP with endoscopic sphincterotomy (ES) is useful in the clearance of parasites from the bile duct allowing parasite extraction for *Fasciola hepatica* and *Ascaris Lumbricoides*. In addition, ERCP may be a bridge to safe surgery for *Echinococcus granulosus* by extracting vesicles from the biliary tree preoperatively.

In summary, biliary parasites can result in serious health problems if not treated properly. The diagnosis should be considered in patients presenting with hepato-biliary tract obstruction or infection in endemic area. Cross-sectional imaging studies are helpful diagnosis tools; where ERCP with ES offers both diagnostic and therapeutic value.

Keywords: Biliary parasites, Parasitic infestation, Endoscopy for biliary parasites



PB 7-4

Portal Hypertension and Ischemic Cholangiopathy

Jong Jin Hyun

Internal Medicine, Korea University College of Medicine, Ansan, Korea

Biliary changes seen in patients with portal hypertension have been described under different names such as pseudosclerosing cholangitis, portal (hypertensive) biliopathy, portal ductopathy, portal cholangiopathy, ischemic cholangiopathy, vascular biliopathy, etc. Since the biliary changes or cholangiopathic findings are observed especially in patients with extrahepatic portal vein obstruction (EHPVO) that results in portal cavernoma formation, the nomenclature “portal cavernoma cholangiopathy (PCC)” was suggested by the Indian Association for the Study of Liver Working Party.

When portal cavernoma forms secondary to EHPVO, it can cause extrinsic impressions/indentations and strictures in the bile ducts, mostly the in extra-hepatic bile ducts. Natural history of PCC is still not yet fully understood but it is believed that PCC is a slowly progressive disease. Although endoscopic retrograde cholangiopancreatography remains the gold standard for diagnosing PCC, abdominal ultrasound, computed tomography, and magnetic resonance imaging are more frequently applied because of their non-invasiveness and advances in diagnostic quality and accuracy.

If EHPVO is diagnosed before PCC develops, anticoagulation with low molecular weight heparins can be administered to attempt recanalizaion of the portion vein. However, patients with cholagiopathic features are mostly asymptomatic and biliary changes result in cholestasis or jaundice due to stricture or choledocholithiasis only in a small proportion of patients. When patients develop symptoms, endoscopic intervention is the treatment of choice for resolving biliary strictures with plastic or metals stents and removing bile duct stones. If the biliary stricture does not resolve endoscopically, transjugular intrahepatic portosystemic shunt can be attempted in select patients. If the biliary stricture remains to be problematic, biliary surgery may be necessary.

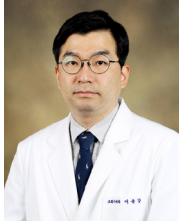
Keywords: Portal hypertension

IDEN International
Digestive
Endoscopy
Network
2019

June 15 (Sat), 2019

Nurse Session





NS1-1

Revised Gastrointestinal Endoscope Reprocessing Process in a Nutshell

Yong Kang Lee

National Health Insurance Service Ilsan Hospital, Korea

Curriculum Vitae

Educational Background

- Feb 2007 Graduate bachelor's degree of medical doctor, Yonsei University College of Medicine, Seoul, Korea
- Feb 2012 Graduate Residency, Department of Internal medicine, Yonsei University College of Medicine, Seoul, Korea

Professional Experiences

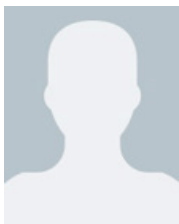
- May. 2015 ~ Feb. 2017 Clinical & research Fellowship (instructor), Department of Gastroenterology, Yonsei University College of Medicine, Seoul, Korea
- Mar. 2017 ~ present. Assistant professor, Department of gastroenterology, National Health Insurance Service Ilsan hospital

Professional Organizations

- Dec. 2018 ~ present. Member of scientific committee, Korean college of Helicobacter and Upper gastrointestinal research
- Dec. 2018 ~ present. Member of disinfection management committee. Korean Society of Gastrointestinal Endoscopy

Main Scientific Publications

- Park JC, **Lee YK**, Kim SY. et al., Long-term outcomes of endoscopic submucosal dissection in comparison to surgery in undifferentiated-type intramucosal gastric cancer using propensity score analysis. Surgical Endoscopy 2018
- **Lee YK**, Jung KS, Kim DY. et al., Conventional versus drug-eluting beads chemoembolization for hepatocellular carcinoma: Emphasis on the impact of tumor size. Journal of gastroenterology and Hepatology. 2017
- Nam DH, **Lee YK**, Park JC. et al., Prognostic Value of Early Postoperative Tumor Marker Response in Gastric Cancer. Annals of surgical oncology 2013
- **Lee YK**, Kim SU, Kim DY. et al., Prognostic value of α -fetoprotein and des- γ -carboxy prothrombin responses in patients with hepatocellular carcinoma treated with transarterial chemoembolization. BMC Cancer 2013



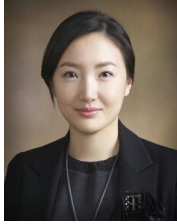
NS1-2

Appropriate selection and use of high-level disinfectants in Korea

Soo-Jeong Cho

Seoul National Univeristy, Korea

No Contents



NS1-3

New Paradigm: Endoscopic Reprocessing System

Young Seon Kim

Soon Chun Hyang University Seoul Hospital, Seoul, Korea

Curriculum Vitae

Educational Background

- Kyung Bok National University, South Korea - Nursing, February 2000

Professional Experiences

- ESGNA, Conference poster presentation, Vienna, 2014
 - The effects of audiovisual instructional materials on the levels of bowel preparation in patients receiving endoscopic examination of large intestines
- ICN, oral presentation, Korea, 2015
 - The effects of bowel preparation performance, grade and education satisfaction of patients by using an informative audio-visual medium

Professional Organizations

- The Korean Society of Gastrointestinal
- Endoscopy Nurses and Associates (KSGNA) - Publishing chairperson of KSGNA

Main Scientific Publications

- Registered Nurse
- Fields: Digestive Disease Center



NS1-4

How to Overcome Infections Associated with Reprocessed Duodenoscopes

Hyung-Keun Kim

 The Catholic University of Korea, Uijeongbu St. Mary's Hospital, Korea

Curriculum Vitae

Educational Background

- 1989.3~1995.2. MD. College of Medicine, The Catholic University of Korea,
- 1995.3~1996.2. Internship in Kangnam St. Mary's Hospital, The Catholic University of Korea
- 1996.3~2000.2 Residency Training (Internal Medicine) in Kangnam St. Mary's Hospital, The Catholic University of Korea
- 2003~2005. A Master of Medical science. Internal Medicine(Gastroenterology), The Catholic University of Korea
- 2006~2009. PhD. Internal Medicine(Gastroenterology), The Catholic University of Korea

Professional Experiences

- 2003.5~2004.2 Clinical Fellow, Department of Internal medicine, St. Mary's Hospital, The Catholic University of Korea
- 2004.3~2006.3 Instructor, Department of Internal medicine, Uijeongbu St. Mary's Hospital, The Catholic University of Korea
- 2006.4~2010.3 Assistant Professor, Department of Internal medicine, Uijeongbu St. Mary's Hospital, The Catholic University of Korea
- 2010.4~2015.3 Associate Professor, Department of Internal medicine, Uijeongbu St. Mary's Hospital, The Catholic University of Korea
- 2011.8~2013.1 Visiting scientis, Pancreatobiliary disease program in Cedars-Sinai Medical Center, LA, USA
- 2015.4~to date Professor, Department of Internal medicine, Uijeongbu St. Mary's Hospital, The Catholic University of Korea

Professional Organizations

- Disinfection team manager, Disinfection/Sedation Board of the Korean Society of Gastrointestinal Endoscopy
- Pancreatobiliary team manager, Insurance Board of the Korean Society of Gastrointestinal Endoscopy
- Assistant administrator, Insurance Board of the Korean Pancreatobiliary Association
- Insurance Board Member of the Korean Society of Gastroenterology

IDEN International
Digestive
Endoscopy
Network
2019 2019

June 15 (Sat), 2019

Luncheon Symposium 2





LS 2

How SnareMaster Plus Changes Polypectomy?

Takeuchi Yoji

Department of Gastrointestinal Oncology, Osaka International Cancer Institute, Osaka, Japan

Endoscopic polypectomy of colorectal adenomatous polyp is widely applied to prevent development of colorectal cancer and to reduce mortality. Hot snare polypectomy (HSP), which is performed with electrocautery, is conventionally used for polypectomy. However, cold snare polypectomy (CSP), which does not include electrocautery, has grown in popularity, worldwide, because of its technical ease and low incidence of adverse events, including haemorrhage and post-polypectomy coagulation syndrome. While the indication of CSP is limited to non-pedunculated subcentimeter polyp (<10 mm), underwater EMR (UEMR), which is electrocautery snarectomy without submucosal injection under total immersion of the lesion in water, is adopted to moderate sized (10-25 mm) polyps or pedunculated polyps. UEMR can provide better completeness of resection compared with conventional EMR.

SnareMaster Plus is a newly well-designed electro-surgical snare, which can be used with/without electrocautery. When it is used for CSP, the sharpness of tissue resection and flexibility of the snare tip are great advantages compared to previous snares. Additionally, the thinness of the wire is suitable for UEMR to avoid perforation. Furthermore, since it can be used with or without electrocautery, we can use it for both CSP and UEMR and it is effective not only for cost-benefit, but also for selection of appropriate procedure for various kinds of lesions. Therefore, SnareMaster Plus can provide a new era of polypectomy in our daily practice.

Keywords: Polypectomy



ABSTRACTS

POSTER

IDEN 2019
International Digestive Endoscopy Network



Travel Grant



Best Poster



Distinguished Poster

PUG-01

Clinical Outcomes of Over-The-Scope-Clip for Acute Upper Non-Variceal Gastrointestinal Bleeding: A Systematic Review

Xiaowei Tang

Department of Gastroenterology, Affiliated Hospital of Southwest Medical University, Luzhou, China

Background/aims: Recent studies have shown that over-the-scope-clip (OTSC) system allowed for effective hemostasis for refractory GI bleeding lesions. So we aimed to conduct a systematic review to evaluate the effectiveness and safety of the OTSC system for management of acute non-variceal upper GI bleeding.

Methods: A comprehensive literature search was conducted on PubMed, EMBASE, and Cochrane Library covering the period from January 2007 to December 2018. The search terms included "gastrointestinal bleeding" AND "OTSC OR over the scope clip". The literature was selected independently by two reviewers according to the inclusion and exclusion criteria. The statistical analysis was carried out using Comprehensive Meta-Analysis software version 3.0.

Results: A total of 15 studies including 669 patients with 678 GI bleeding lesions were identified. The major cause for GI bleeding was the peptic ulcer (70.61%). Pooled technical success was achieved in 662 lesions (95.4%; 95% confidence interval (CI), 93.0%-97.0%), and the pooled clinical success was achieved in 591 lesions (85.1%; 95% CI, 77.9%-90.2%). The incidence of re-bleeding was reported in 64 patients and the post-procedure 30-day mortality was 10.2% (n=68). Only 2 (0.3%) patients occurred complications after OTSC system procedure.

Conclusions: Our study demonstrated that the OTSC system was a technically feasible modality and highly efficacious in achieving hemostasis in acute non-variceal upper gastrointestinal bleeding.

Keywords: Over-the-scope-clip system, Acute upper non-variceal gastrointestinal bleeding, Systematic review

PUG-02



Role of Cd34, Itgb4, Usp22 and Myc in Patients with Helicobacter Pylori Related Chronic Gastritis and Gastric Cancer

Taweesak Tongtawe¹, Theeraya Simawaranon² and Wareeporn Wattanawongdon²

¹School of Surgery, Medicine, Nakhon Ratchasima, ²Translational Medicine Program, Medicine, Nakhon Ratchasima,

³Helicobacter Pylori Research Unit, Medicine, Nakhon Ratchasima, Thailand

Background/aims: Study of gene expression levels, making it possible to know the mechanism of cancer. We investigated the gene expression profile of genes occurring in cancer pathways in chronic gastritis, precancerous gastric lesion and gastric cancer by using RT2 profiler PCR arrays for screening novel biomarkers to real clinical use.

Methods: Paraffin-embedded tumor tissues from 10 for chronic gastritis, 10 for precancerous gastric lesion and 10 for gastric cancer were extracted using a RNezy[®] mini kit by following the manual of the extraction kit and measuring the quantity and quality of RNA and cDNA synthesis. RT2 Profiler PCR Arrays which code which primers of genes interested in studying a total of 84 genes and 3 gene housekeeping on the RT2 Profiler PCR Arrays for analysis by the Real-time PCR method.

Results: The result shows that, high gene expression of CD34, ITGB4, USP22 and MYC in precancerous gastric lesion and gastric cancer tissues, including significant association with a clinically poor prognosis and 5-year overall survival in gastric cancer tissues ($P < 0.05$).

Conclusions: High expression of CD34, ITGB4, USP22 and MYC may serve as a novel biomarkers for clinical usefulness to detect early gastric cancer, including to surveillance after treatment and predict prognosis in gastric cancer patients.

Keywords: Novel biomarkers, Gastric cancer

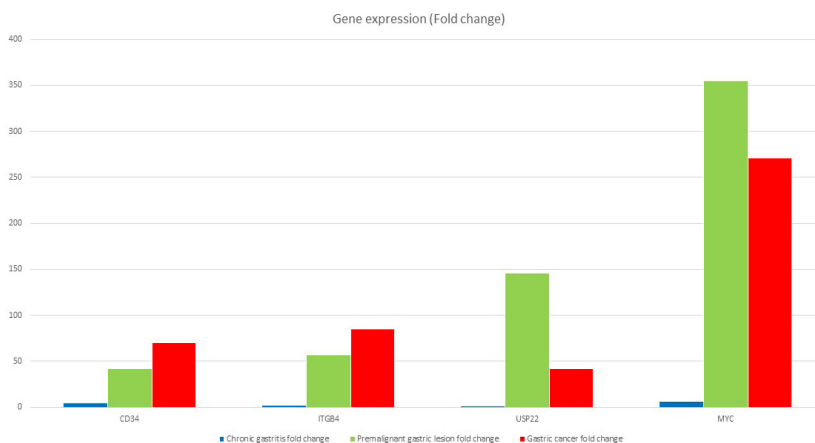


Figure 1. Gene expression fold change and Gastric mucosal pathology

Gene expression	Gastric mucosal pathology			OR;95% CI	p value
	Chronic gastritis	Precancerous	Gastric cancer		
CD34	4.94	41.93	70.03	OR = 2.38; 95% CI, 1.46-4.16	0.031*
ITGB4	2.06	56.89	56.89	OR = 1.92; 95% CI, 1.23-3.24	0.041*
USP22	1.25	146.02	42.22	OR = 2.64; 95% CI, 1.84-4.32	0.024*
MYC	6.54	354.59	270.60	OR = 5.21; 95% CI, 2.82-7.35	0.004*

Clinicopathological characteristics	Gene expression			
	CD34 OR;95% CI, P-value	ITGB4 OR;95% CI, P-value	USP22 OR;95% CI, P-value	MYC OR;95% CI, P-value
Histologic Grade (G) (%) G3-G4 (80)	2.21 (1.56-3.37), 0.021*	1.71 (1.14-3.65), 0.041*	2.48 (1.48-4.56), 0.037*	4.26 (1.84-8.14), 0.014*
Primary Tumor (T) T3-T4 (70)	1.92 (1.27-2.69), 0.032*	2.26 (1.38-4.24), 0.036*	2.32 (1.61-5.28), 0.021*	6.13 (2.27-9.27), 0.001*
Regional Lymph node (N) N1 (90)	3.12 (1.58-6.22), 0.024*	1.93 (1.48-3.48), 0.034*	2.34 (1.23-4.32), 0.026*	4.12 (2.33-7.33), 0.016*
Distant Metastasis (M) M1 (10)	3.43 (1.81-6.36), 0.032*	2.21 (1.82-3.41), 0.031*	3.32 (1.42-6.12), 0.032*	3.35 (1.48-6.24), 0.033*
5-years survival	2.28 (1.93-5.52), 0.035*	2.63 (1.84-4.58), 0.038*	3.61 (1.82-6.19), 0.029*	4.82 (2.31-8.81), 0.018*

Table 1. The distribution of clinicopathological characteristics of gastric cancer related to gene expression

PUG-03



Cd24 Expression Predicts a Poor Prognosis in Patients with Gastric Cancer

Tanyalak Rakchat^{1,2} and Taweesak Tongtawee^{1,2}

¹School of Medicine, Medicine/Suranaree University of Technology, Nakhon Ratchasima, ²Helicobacter Pylori Research Unit, Medicine/Suranaree University of Technology, Nakhon Ratchasima, Thailand

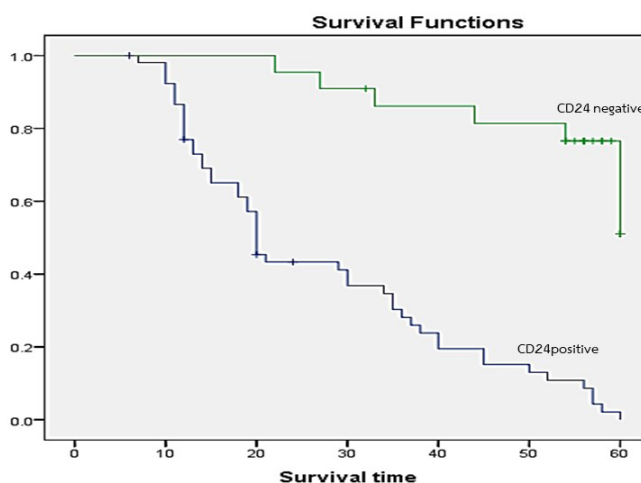
Background/aims: The expression of CD24 is also associated with poor prognosis in many cancer patients. This study was to determine CD24 expression and correlation with clinicopathological outcome in patients with gastric cancer.

Methods: Immunohistochemistry was performed in 400 Gastric cancer tissues to evaluate CD24 expression of gastric cancer tissues as well as correlation to clinicopathological outcomes. 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: CD24 were found positive in 283 (70.75%) of gastric cancer tissue. CD24 expression in gastric cancer tissues were significant associated with poor clinicopathological outcomes, including vascular invasion (OR=5.61, 95% CI=2.26-8.89, p=0.014), Lymphatic invasion (OR=7.17, 95% CI=3.47-12.39, p=0.027), high pathological TNM stage (OR=2.48, 95% CI =1.48-5.18, P=0.037), high CEA level (OR= 4.96, 95% CI= 2.02-7.12, P=0.032) and poor 5 years survival (P=0.012).

Conclusions: Our study indicates that, CD24 expression correlation with poor clinicopathological outcome. CD24 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: C24, Gastric cancer



Overall survival of patients with gastric cancer and their expression of CD24.

Patient's demographics data	CD24 status		P value
	CD24 negative	CD24 positive	
Age (year \pm SD)	56.03 \pm 10.42	59.32 \pm 12.63	0.251
Sex male (%)	65(55.55)	125(44.16)	0.097
Underlying condition (%)			
• HT	11(9.40)	22(7.77)	0.752
• DM	15(12.82)	30(10.60)	0.413
• Hyperlipidemia	8(6.83)	10(3.53)	0.073
• Smoking	19(16.23)	40(14.13)	0.348
• Alcohol	15(12.82)	20(7.06)	0.169
• Family history of gastric cancer	4(3.41)	11(3.88)	0.983
CD24 [Positive (n) (%)]	117(29.25)	283(70.75)	0.001*

Comparison between the groups were done by using ANOVA. *p < 0.05 considered as statistically significant

Gastric mucosal pathology	CD24 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 (%)				
• < 5.0ng/ml	101(86.32)	67(23.67)	4.78(1.29-7.67)	0.039*
• \geq 5.0ng/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

Patients demographic data and clinical correlation

PUG-04



***Helicobacter pylori* Pathogenicity Factors Related to Gastric Cancer in Thailand**

Titaya Wichaisaeng¹ and Taweesak Tongtawee¹

¹School of Medicine, Medicine, Nakhon Ratchasima, ²Helicobacter Pylori Research Unit, Suranaree University of Technology, Nakhon Ratchasima, Thailand

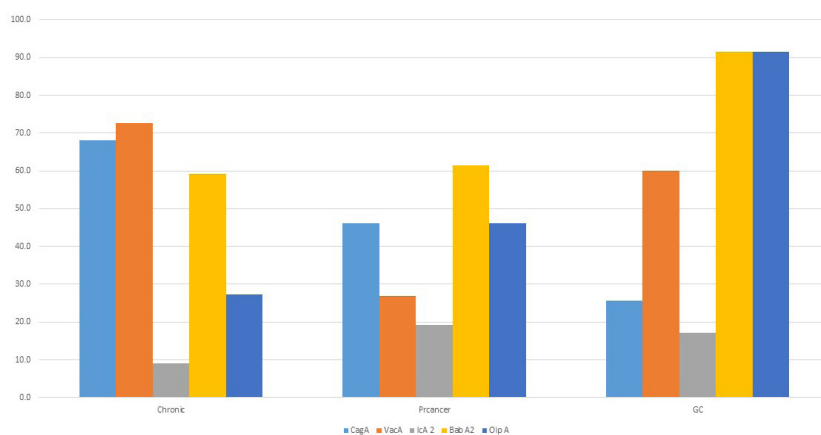
Background/aims: Gastric cancer is a highly aggressive cancer with a high mortality rate. Although the causal relationship between *H. pylori* infection and the development of gastric cancer. However, studies on virulence gene and gastric cancer not yet a clear conclusion. We investigated the association between *H. pylori* virulence gene and gastric cancer development in 83 *H. pylori* isolates from gastric biopsies originating from patients.

Methods: The prevalence of genotype was assessed by real time PCR for CagA, VacA, Ica 2, Bab A2, Oip A. We divided gastric biopsies to 3 groups, including 22 for chronic gastritis, 26 for precancerous gastric lesion and 35 for gastric cancer then led to the relationship between virulence gene and clinical histopathological parameters.

Results: High prevalence of Bab A2, Oip A in precancerous gastric lesion and gastric cancer (91.4% and 91.4% respectively). Bab A2, Oip A increases the risk of developing gastric cancer was statistically significant as compared with CagA, VacA [OR=1.86 (95% CI: 1.04-3.27, P=0.038 and OR=2.89 (95% CI: 1.46-4.82), P=0.029 respectively].

Conclusions: Our results show an elevated prevalence of infection with *H. pylori* strains carrying known virulence genotypes with high genetic diversity. Bab A2, Oip A increases the risk of developing gastric cancer. Virulence gene examination in *H. pylori* infected patients useful in predicting gastric cancer and can follow up patients more closely.

Keywords: Virulence genes, Gastric cancer



Prevalence of virulence genes among gastric mucosal pathology

Prevalence of virulence genes among gastric biopsies

Virulence genes	CagA	VacA	IcaA 2	Bab A2	Oip A
Chronic gastritis	68.2	72.7	9.1	59.1	27.3
Precancerous	46.2	26.9	19.2	61.5	46.2
Gastric cancer	25.7	60.0	17.1	91.4	91.4

Prevalence of virulence genes among gastric mucosal pathology

Virulence genes	Chronic gastritis (n=44)	Precancerous lesion (n=52)	Gastric cancer (n=70)	OR(95%CI)	P- value
Cag A	30 (68%)	24 (46%)	18 (26%)	0.68(0.37-0.84)	0.541
Vac A	32 (73%)	14 (27%)	42 (60%)	0.47(0.29-0.84)	0.485
IcaA 2	4 (9%)	10 (19%)	12 (17%)	0.64(0.39-0.92)	0.814
Bab A2	26 (59%)	32 (62%)	64 (91%)	1.86(1.04-3.27)	0.038 [†]
Oip A	12 (27%)	24 (46%)	64 (91%)	2.89(1.46-4.82)	0.029 [†]

Multivariate regression analysis among gastric lesion and virulence genes

Prevalence of virulence genes and relationship between virulence gene and clinical histopathological parameters

PUG-05

Acquired Hemophilia a with Gastrointestinal Bleeding

Narae Park¹ and Jinseok Jang²

¹Health Care Center, Samsung Changwon Hospital, Changwon, Korea, ²Gastroenterology, Dong-A University Hospital, Busan, Korea

Peptic ulcer disease is the most common cause of acute gastrointestinal bleeding, followed by variceal bleeding, Mallory–Weiss syndrome, and malignancy. On the contrary, acquired hemophilia A is a very rare hemorrhagic disease, which usually manifests with musculoskeletal bleeding, caused by autoantibodies against coagulation factor VIII.

A 78-year-old man presented to the Emergency Department with melena. Dieulafoy's lesions were observed on esophagogastroduodenoscopy, and endoscopic cauterization was performed. However, the patient complained of back pain and symptoms indicative of upper gastrointestinal bleeding. Abdominopelvic computed tomography was performed, and hematoma in the psoas muscle was detected. Antibodies against coagulation factor VIII were confirmed with a blood test, and the diagnosis of acquired hemophilia A was made.

Here, we report a case of acquired hemophilia A presenting with upper gastrointestinal bleeding symptoms and present a brief review of literature.

Keywords: Gastrointestinal hemorrhage, Hemophilia a, Factor 8 deficiency, Acquired



Oozing type bleeding in the greater curvature of the stomach's upper body.



A 7-cm hematoma in the right psoas muscle.

PUG-06 

Clinical Outcomes and Post-Procedural Complications of ESD of Gastric Neoplasia Involving the Pyloric Channel

Ah Young Yoo¹, Jong-Jae Park¹, Moon Kyung Joo¹, Boem Jae Lee¹, Hoon Jae Chun², Sang Woo Lee³, Chang-Hun Yang⁴ and Eun Young Kim⁵

¹Gastroenterology, Korea University Guro Hospital, Seoul, Korea, ²Gastroenterology, Korea University Anam Hospital, Seoul, Korea, ³Gastroenterology, Korea University Ansan Hospitals, Ansan, Korea, ⁴Internal Medicine, Dongguk University Gyeongju Hospital, Gyeongju, Korea, ⁵Gastroenterology, Catholic University of Daegu School of Medicine, Daegu, Korea

Background/aims: Gastric neoplasia involving pyloric channel (GNPC) is technically difficult and post-procedural stenosis is concerned. We evaluated the feasibility and effectiveness of the endoscopic submucosal dissection (ESD) for GNPC, and predictive factors for stenosis during follow-up.

Methods: Ninety-seven patients with GNPC underwent ESD from January 2007 to October 2017. We retrospectively analyzed the short-term clinical outcomes and post-procedural stenosis.

Results: Among 97 patients, male were 59 (60.8%), and mean age was 63.1 years. Fifty-eight cases (59.8%) were tubular adenoma (42 low grade dysplasia, 16 high grade dysplasia) and 34 (35.1%) were early gastric cancer. In 46 cases (47.4%), conventional anterograde ESD without retroflexion in the duodenum was performed, and 51 cases (52.6%) were resected by the retroflexion method. Seventy-seven lesions (79.4%) were located at pyloric channel and either antral or bulb side, and 20 cases (20.6%) were located throughout antrum and bulb. En bloc resection rate and R0 resection rate were 87.6% (85/97) respectively. Post-procedural stenosis was observed in 16 cases (16.5%). By multivariate analysis, resected circumference of pyloric channel $\geq 75\%$ was the only predictive factor for stenosis (odds ratio; 8.15, 95% confidence interval; 1.97-33.74, $p=0.004$). However, all the stenosis was managed with conservative method such as balloon dilatation. Compared with anterograde resection, retroflexion method was performed in tumors located throughout antrum and bulb (17/51, 33.3% vs 9/46, 6.5%, $p=0.001$), and larger tumors (17.1 mm vs 11.8 mm, $p=0.004$).

Conclusions: ESD is a feasible method for treatment of GNPC. Retroflexion method may be effective for larger tumor located throughout antrum and bulb. However, if resected circumference of pyloric channel is over 75%, post-procedural stenosis is expected.

Keywords: Pyloric channel, Endoscopic submucosal dissection, Stenosis, Retroflexion

PUG-07



Feasibility and Long-Term Efficacy of Endoscopic Treatment of Gastrointestinal Stromal Tumors in Upper GI Tract

Jong Jae Park¹, Jin Sung Koh¹, Moon Kyung Joo¹, Boem Jae Lee¹, Hoon Jae Chun², Sang Woo Lee³, Chang-Hun Yang⁴, Eun Young Kim⁵ and Kyung Eun Lim¹

¹Gastroenterology, Korea University Guro Hospital, Seoul, Korea, ²Gastroenterology, Korea University Anam Hospital, Seoul, Korea, ³Gastroenterology, Korea University Ansan Hospital, Ansan, Korea, ⁴Internal Medicine, Dongguk University Gyeongju Hospital, Gyeongju, Korea, ⁵Internal Medicine, Catholic University of Daegu School of Medicine, Daegu, Korea

Background/aims: Endoscopic resection has been introduced for the treatment of subepithelial tumors (SETs) in the upper GI tract (UGIT). We aimed in this study to investigate the feasibility and long-term efficacy of endoscopic resection of gastrointestinal stromal tumor (GIST) in UGIT.

Methods: Between March 2005 and February 2018, 126 cases of GIST in UGIT were resected. We retrospectively analyzed clinicopathologic parameters and recurrence rate.

Results: Mean age was 57.6±12.4 years, and male:female ratio was 50:76. 51 tumors (40.5%) were located in the (40.5%) on body of stomach, followed by 34 (27.0%) on fundus, 24 (19.0%) on cardia, and 16 (12.7%) on antrum. 104 cases (82.5%) was resected by endoscopic submucosal dissection (ESD), followed by endoscopic mucosal resection (EMR) in 10 (7.9%), and endoscopic submucosal tunnel dissection (ESTD) in 8 (6.3%). Endoscopic full thickness resection (EFTR) was performed in 3 cases (2.4%). In terms of complication, 8 macroperforation (6.3%), 8 microperforation (6.3%), and 7 major bleeding (5.6%) were noted. According to the NIH classification, 64 patients (50.8%) were corresponding to very low risk, followed by low risk 42 (33.3%), intermediate risk 14 (11.1%) and high risk 6 (4.8%). En bloc resection rate was 72.2% (91/126), and R0 resection rate was 22.2% (28/126). R1 resection rate was 68.3% (86/126) and R2 resection rate was 7.1% (9/126). Among 68 patients who were followed-up longer than 12 months, 2 patients (2.9%) showed recurrence during 31.7 months of follow-up period.

Conclusions: Endoscopic resection of GIST appears to be a feasible procedure with relatively low rate of recurrence, even low R0 resection rate.

Keywords: Gastrointestinal stromal tumor, Endoscopic resection, Upper gastrointestinal tract

PUG-08

Result of Oral Erythromycin Suspension for Acute Upper Gastrointestinal Bleeding

Amarjargal Batdelger¹, Badamsuren Dorjgotov¹, Khishgee Duinkherjav², Tseweendari Otgon², Enkh-Ulzii Mendbayar² and Yanjiv Otgonbayar³

¹Department of Gastroenterology, Third State Central Hospital, Ulaanbaatar, ²Department of Endoscopy, Third State Central Hospital, Ulaanbaatar, ³Department of Emergency, Third State Central Hospital, Ulaanbaatar, Mongolia

Background/aims: This study aims are we are using oral suspension erythromycin, a motilin receptor agonist for acute UGI bleeding and results of the endoscopic analysis.

Methods: We performed a case control study design. In the control group we selected 23 patients who presented with hematemesis or melena within 24 hours and were assigned to the erythromycin group before endoscopy since 2019. In the case group we sampled in disease history of 46 patients with a same symptoms in our hospital in 2017-2018. The outcome was satisfactory visualization of endoscopy, identification of a bleeding source, duration of endoscopy.

Results: A total of 69 patients were assigned. Erythromycin administration before endoscopy showed statistically significant improvement in adequate gastric emptying (OR 0.047; 95% CI: 0.012-0.189, $P<0.001$), gastric mucosa visualization (OR 15.2; 95% CI: 3.88-59.7, $P<0.001$) and the identification of a bleeding source ($P<0.05$). On the other hand, length of hospital stay ($P=0.127$) and duration of procedure ($P=0.58$) showed no significant differences.

Conclusions: Oral erythromycin suspension prior to emergency endoscopy for acute UGI bleeding seems to provide satisfactory endoscopic visualization and gastric emptying and identification of a bleeding source for the treatment process is effective.

Keywords: Erythromycin, Gastrointestinal bleeding, Endoscopy

PUG-09

Risk Factors of Rebleeding among Patients with Nonvariceal Upper Gastrointestinal Bleeding with Anticoagulant Therapy

Won Shik Kim, Moon Kyung Joo, Beom Jae Lee and Jong-Jae Park

Department of Internal Medicine, Korea University College of Medicine Guro Hospital, Seoul, Korea

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 during anticoagulant therapy. 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 June 2017, 55 patients with oral anticoagulants were hospitalized due to nonvariceal UGIB and followed up at Korea University Guro hospital. We retrospectively reviewed the clinical characteristics and compared them between patients with and without rebleeding.

Results: The most common cause of UGIB was peptic ulcer in 46 patients (83.6%). Rebleeding after hemostasis occurred in 14 patients (25.5%). There were no significant differences between patients with and without rebleeding on age, gender, concomitant medication of antiplatelet or nonsteroidal anti-inflammatory drugs, restart of anticoagulant, *Helicobacter pylori* status, hypotension (systolic blood pressure <90 mmHg), Hemoglobin, platelet count, INR, BUN and presence of endoscopic stigmata. Univariate analysis revealed that duodenal location (50.0 vs. 12.2%, $p=0.006$) and comorbidities including renal failure, liver disease and malignancy (71.4 vs. 28.6%, $p=0.036$) were significantly different between patients with and without rebleeding. In multivariate analysis, duodenal location (OR 18.7 $p=0.006$) and comorbidities (OR 8.0, $p=0.048$) were also significant risk factors for rebleeding.

Conclusions: Despite of successful endoscopic hemostasis for UGIB, the rebleeding rate was considerable. Physicians need to be more careful about rebleeding if patients have the duodenal lesion or comorbidities.

Keywords: Anticoagulant, Upper gastrointestinal bleeding, Rebleeding

PUG-10 

Gastric Ulcer –risk Factor for Rebleeding

Khishgee Duinkherjav, Nyamsuren Munkhbat, Enkh-Ulzii Mendbayar and Tseveendari Otgon

Department of Endoscopy, The Third Central Hospital, Ulaanbaatar, Mongolia

Background/aims: A gastrointestinal endoscopy is a powerful diagnostic method for upper gastrointestinal ulcers, detecting risk of rebleeding gastric ulcers and selecting the most appropriate treatment method. Ulcers can be successfully treated, and most people heal well. When treated with antibiotics and other medications, the success rate is 80 to 90 percent. Rebleeding, which occurs in 10-15% of patients with gastric ulcer bleeding, is associated with a two- to fivefold mortality increase, depending on the presence of other risk factors. According to other researchers there were 103 cases per 100,000 people per year for bleeding from gastric ulcer. Therefore, identification of the predictors of rebleeding seems meaningful in order to identify high-risk patients who require close observation and rapid treatment in case of the development of rebleeding.

Methods: A hospital based retrospective study was conducted on 71 patients with acute ulcer hemorrhage who underwent therapeutic endoscopic procedures between 2015.01.01 and 2017.12.31 (n=71). The risk of bleeding was assessed by Blatchford, Rockall and AIMS65. We assessed risk of rebleeding ulcer, size and length by endoscopy.

Results: Fourteen (21.9%) patients assessed upper gastrointestinal ulcer rebleeding. Rebleeding time was determined by endoscopy: 1-24 hours 8(11.0%); 24-48 hours 3(4.1%); 48-96 hours 3(4.1%), and above 120 hours 1(1.4%). The risk of hemorrhage was determined according to the Forrest classification, and the rebleeding groups were 1a-4, 1b-1, 2a-5, 2b-1, 2c-2, and 3-1. The rebleeding ulcer group was diagnosed by location with 1 on the antrum, 4 on the angulus, 2 on the great curve, and 3 multilocation. The rebleeding ulcer sizes were: 7 patients with 0.6-1.5 cm, 4 patients with 1.6-3.0 cm and 3 >3 cm patients. In regard to the presence of rebleeding, depending on the location of the upper gastrointestinal tract, 0.239 statistically significant differences between positive and negative coverage were observed ($p=0.043$). The difference between statistical significance (-0.243) and statistical significance is negligible ($p=0.039$) in determining whether the location of the beam is dependent on Forrest classification. Considering whether the rebleeding rate is related to the endoscopic procedure, the positively weak 0.339 correlates with statistical significance ($p=0.004$). The repeat hemorrhage is 0.823 statistically significant ($p<0.000$), with a strong positive stage of the ulcer depth III ($p<0.000$). The repeat hemorrhage rate was 0.176 statistically significant ($p<0.05$) with a weak positive correlation with the use of reduce gastric acid drugs ($p<0.05$).

Conclusions: Upper gastrointestinal ulcers location is inducing rebleeding ulcer. The size of the upper gastrointestinal ulcer depends on the depth and size of the ulcer. The usage of reduce gastric acid drugs influence rebleeding ulcer risk.

Keywords: Gastric ulcer, Rebleednig risk, Ulcer bleeding

PUG-11



Gastric Peroral Endoscopic Pyloromyotomy Versus Gastric Electrical Stimulator for Refractory Gastroparesis

Parit Mekaroonkamol^{1,2}, Shanshan Shen^{2,3}, Hui Lou^{2,4}, Cicily Vachaparambil², Guifang Xu^{2,5}, Huimin Chen^{2,6}, Liang Xia^{2,6}, Steve Keilin², Field Willingham², Jennifer Christie², Edward Lin⁷, Qiang Cai²

¹Division of Gastroenterology, King Chulalongkorn Memorial Hospital, Chulalongkorn University, Bangkok, Thailand, ²Division of Digestive Diseases, Emory University School of Medicine, Atlanta, GA, USA, ³Division of Gastroenterology, The Affiliated Hospital of Nanjing University Medical School, Nanjing, Jiangsu, China, ⁴Department of Pancreatobiliary Disease, Fourth Military Medical University, Xi'an, Shaanxi, China, ⁵Department of Gastroenterology, Shanghai Jiaotong University, Shanghai, China, ⁶Department of Gastroenterology, The First Affiliated Hospital of Nanchang University, Nanchang, Jiangxi, China, ⁷Department of Surgery, Emory University School of Medicine, Atlanta, GA, USA

Background/aims: Gastric peroral endoscopic pyloromyotomy (GPOEM) and gastric electrical stimulator (GES) are both treatment options for refractory gastroparesis. This study compared the long-term clinical outcomes of GPOEM versus GES for such patients.

Methods: Consecutive patients with refractory gastroparesis who underwent GPOEM or GES at a single center during 2009-2018 were included. One-to-one propensity score matched by gender, age, body mass index, etiology, duration of the disease, and preoperative gastric emptying scintigraphy grade resulted in inclusion of 23 pairs of patients. The primary outcome was clinical response and duration, which was defined as the time from the procedure to the recurrence (medically refractory symptoms requiring >2 gastroparesis-related hospitalizations with a GCSI score ≥ 3 for six months). The secondary outcomes included clinical recurrence and the incidence of adverse events.

Results: GPOEM had significantly better clinical response than GES (hazard ratio [HR], 0.39; 95% confidence interval [CI], 0.16 to 0.95; $p=0.041$). The mean duration of response was 29.9 months (95% CI, 25.7 to 34.0) in the GPOEM group and 21.6 months (95% CI, 15.98 to 27.3) in the GES group. At a mean follow-up of 25.7 months (95% CI, 22.46 to 28.89), the Kaplan-Meier estimates of clinical response rate at 12-month and 24-month were 86.5% (95% CI, 63.8 to 95.4) and 76.6% (95% CI, 52.5 to 89.6) in the GPOEM group versus 71.6% (95% CI, 47.2 to 86.2) and 53.7% (95% CI, 29.2 to 73.1) in the GES group. Recurrence had occurred in 6 patients in the GPOEM group (26.1%) versus 13 patients (56.5%) in the GES group (relative risk [RR], 0.54; 95% CI, 0.30 to 0.97; $p=0.036$). Adverse events rates were similar in both groups (4.3% in GPOEM and 26.1% in GES, $p=0.10$). While GPOEM was effective for all subtypes of gastroparesis, GES appeared to have no effect in idiopathic gastroparesis.

Conclusions: Among patients with refractory gastroparesis, clinical response was better and lasted longer with GPOEM than with GES.

Keywords: Gastroparesis, Pyloromyotomy, Gpoem, Gastric stimulator, Clinical outcome

PUG-12

Histologic Discrepancy between Endoscopic Biopsy and Endoscopic Resection Specimen in Esophageal Squamous Neoplasms

Moon Won Lee, Gwang Ha Kim, Bong Eun Lee, Jun Woo Park and Eun Young Park

Department of Internal Medicine, Pusan National University College of Medicine, Busan, Korea

Background/aims: We aimed to investigate the histologic discrepancy between endoscopic forceps biopsy (EFB) and Endoscopic resection (ER) specimen in superficial esophageal squamous neoplasms (SESNs) and predictive factors affecting the discrepancy.

Methods: This retrospective observational study involved 77 patients (84 lesions) who underwent endoscopic resections for SESNs, between January 2005 and August 2017, at the Pusan National University Hospital. Following slide reviews, the histopathologic concordance between endoscopic forceps biopsy and endoscopic resection specimens was assessed.

Results: Among the 29 diagnostically discordant lesions, upgrades and downgrades of the histopathologic diagnoses occurred for 27 and 2 lesions, respectively. Multivariate analyses identified two factors that were significantly associated with the histopathologic discrepancies: upper esophageal location (odds ratio, 7.743; 95% confidence interval, 1.031-58.174; $P=0.047$) and tumor area per biopsy $\geq 158.6 \text{ mm}^2/\text{biopsy}$ (odds ratio, 5.933; 95% confidence interval, 1.051-44.483; $P=0.044$).

Conclusions: Tumor location and tumor area/biopsy were both significantly associated with the discrepancies between endoscopic forceps biopsy and endoscopic resection specimens.

Keywords: Endoscopy, Upper gi, Esophageal neoplasms, Esophagus

Table 2 Comparison of the histopathologic diagnoses between pre-treatment endoscopic biopsy and endoscopic resection specimens

Pretreatment endoscopic biopsy diagnosis	Final diagnosis of endoscopic resection specimen		
	LGIN ($n = 2$)	HGIN ($n = 8$)	SCC ($n = 74$)
LGIN ($n = 7$)	1	1	5
HGIN ($n = 28$)	1	3	21
SCC ($n = 49$)	0	1	48

HGIN, high-grade intraepithelial neoplasm; LGIN, low-grade intraepithelial neoplasm; SCC, squamous cell carcinoma.

PUG-13

Correlation of Endoscopic and Intraoperative Findings of Caustic Material Ingestion at the Philippine General Hospital

Geraldine Obsequio Floro¹, Mark Anthony De Lusong¹ and Angel Paolo Amante²

¹Internal Medicine, Philippine General Hospital, Manila, ²Surgery, Philippine General Hospital, Manila, Philippines

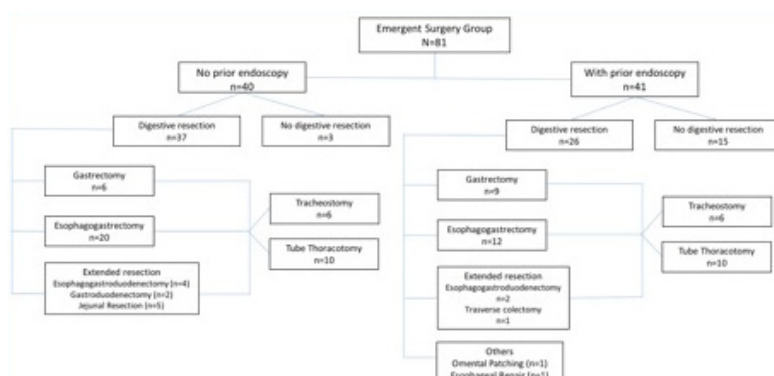
Background/aims: This study reviewed the utility of endoscopic grading in determining patients who will benefit from emergent surgical exploration to help in development of an institution-based algorithm in the management of CMI.

Methods: This was a review of adult CMI cases from 2008 to October 2017. Clinical parameters, Zargar classification and intraoperative findings were reviewed. Multivariate and univariate analysis were done.

Results: Of the 773 patients, 81 underwent emergent surgery, 40 of whom had preoperative gastroscopy. The stomach was the most frequently and severely affected. Fifteen patients did not have necrosis intraoperatively. Mortality rate was 3.89%. Dyspnea and acidosis were predictive of mortality, while thrombocytopenia was predictive of perforation. Surgery was associated with higher mortality, perforation and length of stay. The Zargar Classification was 96.4% sensitive and 10% specific in determining transmural necrosis with an overall diagnostic accuracy of 72.2%.

Conclusions: Zargar Classification is still a useful tool in determining the approach to patients with equivocal findings. The study shows that a conservative approach is feasible in patients with high grade injuries. This emphasizes the importance of considering physical exam, laboratory and endoscopy findings in management decisions.

Keywords: Caustic material ingestion, Zargar classification, Caustic ingestion



Summary of Surgeries among Caustic Material Ingestion

TABLE 8. DIAGNOSTIC ACCURACY OF ENDOSCOPIC GRADING OF NECROSIS IN PREDICTING INTRAOPERATIVE NECROSIS

		Intra-operative Necrosis		Total
		Positive (n=26)	Negative (n=10)	
Necrosis on endoscopy ⁺	Positive	25 (96.15)	9 (90)	34 (94.44)
	Negative	1 (3.85)	1 (10)	2 (5.56)
	Total	26 (100)	10 (100)	36 (100)
Sensitivity	96.15% (80.36 to 99.90)	Positive LR	1.07 (0.86 to 1.33)	
Specificity	10% (0.25 to 44.50)	Negative LR	0.38 (0.03 to 5.58)	
PPV	73.53% (69.02 to 77.59)	Prevalence	72.22% (54.81 to 85.80)	
NPV	50% (6.45 to 93.55)	Accuracy	72.22%	

PPV, positive predictive value; NPV, negative predicted value; LR, likelihood ratio.

⁺Zargar grade 3a or 3b

Table of Endoscopic and Intraoperative Finding Correlation

PUG-14

Submucosal Tunneling Endoscopic Resection for Esophageal Subepithelial Tumors : An Experience in a Single Center

Hyun Kwon Ju, Byung Sun Kim, Jin Woong Cho, Mi Rim Choi, Nayun Kang and Jihyun Han

Department of Internal Medicine, Presbyterian Medical Center, Jeon-Ju, Korea

Background/aims: Submucosal tunneling endoscopic resection (STER) is an innovative technique for treating esophageal SETs. Therefore, the authors report the initial experience of STER for esophageal SETs.

Methods: A retrospective study enrolled patients whom were diagnosed as esophageal SETs underwent STER at Presbyterian Medical Center, from May 2014 to March 2019.

Results: Total 8 patients were treated with STER. The lesions were located 2 cases in the middle esophagus, 5 cases in the lower esophagus and 1 case in the esophageal gastric junction (EGJ). The histopathological results revealed 7 cases of leiomyoma. The mean length of the long axis of the specimen was 21.1 ± 6.0 mm. The mean operation duration was 66.3 ± 25.1 min, and the mean duration of hospitalization was 8.6 ± 3.0 days. The complete resection rate was 75% (6/8). One case with a lesion in EGJ was unable to remove it because the mass was not visible after tunneling. One case with severe fibrosis performed STER twice, but still has remained mass. After the procedure, one (12.5%) patient was found pneumothorax and subcutaneous emphysema, was managed by conservative care. (Table 1)

Conclusions: STER may be feasible technique for treating esophageal SETs. Further research is needed for becoming safe treatment method.

Keywords: Esophagus, Leiomyoma, Submucosal dissection, Endoscopic mucosal resection

Patient no.	Age (years)	Sex	location	Size (mm)	Procedure time (min)	Complete resection /Adverse events	Pathology
1	49	F	IC 37cm	20	50	Yes/No	Leiomyoma
2	66	M	IC 40cm	15	45	Yes/No	Leiomyoma
3*	55	F	IC 32cm	30	82	No/No	Leiomyoma
4	74	M	IC 25cm	18	53	Yes/No	Leiomyoma
5	41	M	IC 40cm	22	60	Yes/No	Leiomyoma
6	59	F	IC 35cm	28	80	Yes/No	Leiomyoma
7	40	M	IC 28cm	15	117	Yes/Yes [‡]	Leiomyoma
8 [†]	70	F	EGJ	18	45	No/No	No

IC=The length from incisor; EGJ=Esophageal gastric junction; *The case with severe fibrosis, was performed STER twice; †The case has no visible mass after tunneling, ‡Pneumothorax and subcutaneous emphysema

PUG-15

Accuracy Comparison Study of Endoscopy Testing for *Helicobacter pylori* Compared with Non-Invasive Breath Testing in Patients

Amarzaya Chagnaadorj¹ and Bolormaa Munkhjav^{2,3}

¹Internal Medicine, Medtrauma Hospital, Ulaanbaatar, Mongolia, ²Internal Medicine, Mongolian National University, Ulaanbaatar, Mongolia, ³Department of Clinical Medicine, Inner Mongolia University for the Nationalities, Tong Liao, China

Background/aims: However, various diagnostic tests are available for determining *Helicobacter pylori* infection, accuracy and specificity are still not studied extensively in Mongolia. Among the patients with dyspepsia, *H. pylori* infection prevalence overall rate of 80.0% in all parts of Mongolia. Based on this knowledge, It is essential to compare the efficacy of non-invasive testing for *Helicobacter pylori* with that of endoscopic plus *H. pylori* testing in patients referred for endoscopic investigation of upper gastrointestinal symptoms.

Methods: 59 patients (mean age, 37.7±9.8 years; 21 male and 28 female), aged 18-60 referred for both endoscopic investigation, non-invasive breath test for *H. pylori* testing. Antral biopsy specimens were taken for urease test. No patient received specific treatment including antibiotics and PPIs for *H. pylori* before testing. The infection status for each patient was established by a concordance of test results.

Results: Of 59 patients with *H. pylori* infection by the breath test, 57 were positive by endoscopic urease test ($p<0.05$). This result shows that non-invasive breath test is as reliable as endoscopic urease test when it comes to *H. pylori* detection. The patients found the non-invasive breath test procedure less uncomfortable and distressing than endoscopy with or without sedation.

Conclusions: The noninvasive breath test and Endoscopy results are as accurate in predicting *H. pylori* status in untreated patients and less uncomfortable and distressing for the patient. However, sample size of the study should be increased and studied extensively.

Keywords: Non-invasive, Breath test, *H. pylori*, Urease test

PUG-16

Efficacy of Liver Stiffness Measurement and Platelet Count in Screening for High Grade Varices in Patients with Cirrhosis

Ashish Agarwal, Gyanranjan Rout, Sudheer Kumar Vuyyuru, Deepak Gunjan, Saurabh Kedia, Baibaswata Nayak and Shalimar

Gastroenterology and Human Nutrition Unit, All India Institute of Medical Sciences, New Delhi, India

Background/aims: Endoscopy is the gold standard for grading varices. The aim of this study was to validate Baveno VI guidelines which recommend avoiding endoscopy in patients with compensated cirrhosis with liver stiffness measurement (LSM) ≤ 20 kPa and platelet count $\geq 150,000/\text{mm}^3$.

Methods: Consecutive cirrhosis patients of hepatitis-B virus (HBV) and hepatitis-C virus (HCV) evaluated from Jan 2015 to May 2017 were included. High-grade varices (HGVs) were defined as grade III/IV varices or any varices with red colour signs on endoscopy. Receiver operator characteristic (ROC) curves were computed for LSM and platelet count and presence of HGVs. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy (DA) were reported.

Results: 295 patients (HBV 154 & HCV 141); mean age 43.1 ± 13.2 years; 127 (43.1%) males were included from an ongoing prospective study. The median LSM(IQR) was 19.7 (14.8-28.8) kPa and platelet counts(IQR) was $119000/\text{mm}^3$ (80000 - $160000/\text{mm}^3$). The area under ROC (AUROC) curve for LSM, platelet count and both combined as predictors for presence of HGVs were 0.58 (95% CI, 0.48-0.67), 0.68 (0.60-0.76) and 0.63 (0.54-0.71), respectively. LSM (at a cut-off of 21.4 kPa) had sensitivity, specificity, NPV, PPV and DA of 58.3%, 58.7%, 87.9%, 27.5% and 0.58, respectively. Platelet count (at a cut-off of $106500/\text{mm}^3$) had a sensitivity, specificity, NPV, PPV and DA of 62.5%, 61.1%, 86.6%, 19.4%, and 0.61, respectively. Combination of LSM and platelet count didn't improve the diagnostic accuracy. Using Baveno-VI cut-offs, the sensitivity, specificity, NPV, PPV and DA for prediction of HGVs for LSM and platelet count were 60.4%, 53.4%, 20.1%, 87.4%, 0.54 and 85.4%, 32.4%, 19.7%, 91.9%, 0.41 respectively. There were no differences in predictive values in patients with HBV & HCV.

Conclusions: Diagnostic performance of LSM and platelet count for prediction of high-grade varices is modest and more data is required before it can replace screening endoscopy.

Keywords: Non invasive, Varices, Liver stiffness measurement, Platelet count

PUG-17

Early Gastrointestinal Cancer: Diagnosis and Treatment at Hue University Hospital

Trung Quang Tran¹, Tan Minh Le¹, Huy Van Tran¹, Thuan Dang Cong², Goto Hidemi³ and Shuji Shimizu⁴

¹Gastrointestinal Endoscopic Center, Hue University Hospital, Hue, Vietnam, ²Pathologic Department, Hue University Hospital, Hue, Vietnam, ³Gastroenterology Department, Nagoya University Hospital, Nagoya, Japan, ⁴International Medical Division, Kyushu University Hospital, Fukuoka, Japan

Background/aims: Gastrointestinal (GI) cancers is common diseases. According to Globocan 2018, gastric cancer and colorectal cancer are the 3rd and 5th most commonly occurring cancer in Vietnam. It is true that advanced GI cancer has a very poor prognosis. However, early GI cancers have just been paid attention in recent years and the useful strategies for diagnosis and treatment in Vietnam are still insufficient. Thus, the purpose of our study is to assess the result of diagnosis and treatment for the early gastrointestinal cancer at Hue University Hospital, Vietnam.

Methods: All of hospitalized and outpatients who had suspected early cancer lesions by upper and lower endoscopy underwent enhanced magnification endoscopy for diagnosis early GI cancer. When early GI cancers confirmed by endoscopic images, endoscopic ultrasonography and/or pathology, we would remove them by ESD and follow-up.

Results: Before performing enhanced magnification endoscopy for diagnosis of early GI cancers, no early cancer cases were discovered. After 5 years applying, 65 early gastrointestinal cancers were detected; among them; stomach: 44 cases, esophagus: 9 cases and colon 12 cases. 51 cases were performed ESD successfully. En-block rate was 98%, no positive margins, maximum size of the lesion was 6 cm, minimum size was 1.6 cm. After follow-up 5 years post ESD: no recurrent cancer, the quality of life of patients were very good. Only 2 patients suffered new high grade dysplasia in stomach, both of them were indicated ESD to remove new lesions.

Conclusions: "Diagnosis and Management of the early GI cancer" has demonstrated early promising results in that it appears effective and relatively safe in Central Vietnam.

Keywords: Early gastrointestinal cancer, Magnification endoscopy, Enhancement image endoscopy, Endoscopic submucosal dissection

PUG-18

Long-Term Outcome of Early Gastric Cancer with Lateral Margin Positive after Endoscopic Resection

Byung Wook Yoon, Dong-Hyuk Yang, Young-Woon Shin, Weonjin Ko and Hyungkil Kim

Internal Medicine, Inha University Hospital, Incheon, Korea

Background/aims: The positive lateral margin after endoscopic resection (ER) of early gastric cancer (EGC), additional surgery or endoscopic submucosal dissection (ESD) are recommended. However, the additional surgery often difficult due to advanced age or patient's comorbid conditions. The aims of this study is to investigate of long term outcome in patients with positive lateral margin after ER.

Methods: We analyzed retrospectively 103 patients with positive lateral margin after ER.

Results: Of the 103 patients, 27 patients (26.4%) underwent re-do ESD in 17 patients and additional surgery in 10 patients within 3months. And 76 patients (73.6%) were observed under close surveillance. Median duration of follow-up period was 45.7 (6-132) months. Recurrence rates of early re-treatment group (3.7%, n=1/27) was lower than surveillance group (18.4%, n=14/76; p=0.05). five-year survival rates not significantly different between the two groups, at 100%, 97.4% respectively. In close surveillance periods, 14 patients were confirmed to local recurrence by follow-up biopsy, then delayed re-treatment was performed. (7 patients in re-do ESD, 5 patients in surgery, mean time after initial ER=27.5 months) Finally, a total of 24 patients were treated with re-ESD, and 17 patients were treated with additional surgery. Among these two groups, there were no significant difference in recurrence rates (8.3% vs. 0%) and five-year survival rates (both 100%). However, adverse events that related to treatment was more frequent in additional surgical group (2 ileus, 1 umbilical hernia).

Conclusions: Re-ESD which have a similar efficacy and a better quality of life, compared to additional surgery is a favorable option for control of recurrence or residual EGCs.

Keywords: Lateral margin positive, Egc, Esd, Re-esd

PUG-19

The 4th Space Surgery: Early Experience of Endoscopic Subserosal Dissection for Gastric Tumors in a Single Center

Jihyun Han, Jin Woong Cho, So Hee Yun, Byung Sun Kim, Min A Yang, Mi-Rim Choi, Na Yun Kang and Hyun Kwon Ju

Gastroenterology, Internal Medicine, Presbyterian Medical Center, Jeon-Ju, Korea

Background/aims: Endoscopic submucosal dissection has had technical limitations to resect gastric epithelial tumors accompanying severe fibrosis and mixed or exophytic gastric subepithelial tumors. Endoscopic subserosal dissection (ESSD) is a soluble technique working space of sub-serosa.

Methods: A retrospective study enrolled 16 patients who were diagnosed as gastric tumors underwent ESSD at Presbyterian Medical Center, from March 2010 to March 2019.

Results: A total of 16 patients who were treated with ESSD procedure. The mean age of the patients was 60.8 years. The mean length of long axis of the specimen was 18.0±8.0 mm. The mean operation time was 44.8 minutes, and complete resection rate was 87.5%. Regarding complications, there were 5 cases (31.5%) of adverse events; 2 cases of bleeding and 3 cases of perforation were treated conservatively. The histopathological results revealed 8 cases of leiomyoma (50.0%), 5 cases of GIST (31.25%), 2 cases of low-grade adenoma with severe fibrosis (12.5%), and 1 case of schwannoma (6.25%). Local recurrence was not found.

Conclusions: This ESSD procedure is a highly curable technique for treating gastric epithelial tumors with severe fibrosis and mixed or exophytic gastric SETs located in lesser curvature or fundus area considered dealing tricky in STER and EFTR methods.

Keywords: Serosa, Dissection, Gastrointestinal stromal tumor, Gastric tumor

Patient no.	Age	Sex	location	Tissue Size(mm)	Procedure time(min)	Complete resection /Adverse event	Pathology	Follow-up period (weeks)/Recurrence
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	63	Yes/No	GIST	486/No
14	71	F	PA/GC	8	165	Yes/Yes†	Schwannoma	469/No
15	57	F	UB/PW	12	35	Yes/No	Leiomyoma	7/No
16	52	F	Cardia	6	35	Yes/No	Leiomyoma	7/No

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

PUG-20

Interleukin-6 in Patients with Acute Variceal Bleeding

Rizwan Ahamed Zulfikar, Cyriac Abby Philips and Philip Augustine

Department of Gastroenterology, Ernakulam Medical Centre, Ernakulam, Kerala, India

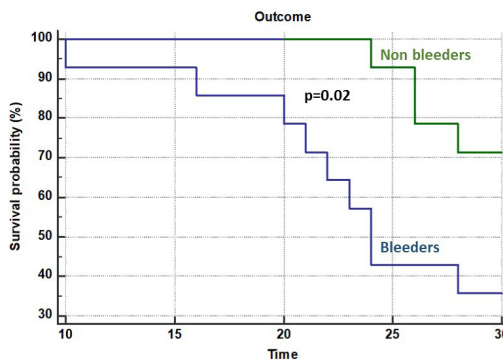
Background/aims: There is no strong singular predictor of outcomes in variceal bleed (VB) in cirrhotics (LC). The aim of this study was to investigate role of interleukin-6 in predicting mortality in AVB patients.

Methods: From June-December 2018 retrospective analysis of LC with VB (group A, n=14) compared to those admitted for non-VB (group B, n=14) was performed with regards to IL-6 levels at admission.

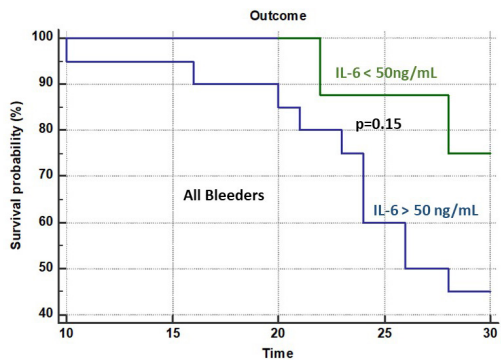
Results: The median CTP, MELD and MELD-Na scores (Group A, B) were 10;10.5, 20.5;23 and 21.5;23.5 respectively. IL-6 levels were higher in patients with VB (median 40.5 ng/mL) compared to those without AVB (32.6 ng/mL). Survival analysis using log-rank method revealed significantly higher mortality in group A than B [mean survival 24.8 vs 28.8 days; died 64.3% vs 28.6%, $p=0.02$, hazard ratio 3.5 (1.13-10.5)] at end of one month. More patients with IL-6 >50 ng/mL died when compared to those with IL-6 <50 ng/mL (55% vs 25%, $p=0.15$). Male sex and IL-6 >50 ng/mL at baseline significantly predicted mortality at one month ($p=0.01$) while, an IL-6 cut-off >44 ng/mL predicted death in the whole cohort (n=28) with a specificity of 71.4% with AUROC 0.536 (95% CI 0.339-0.725; $p=0.06$).

Conclusions: IL-6 has a singular prognostic value in patients with LC and AVB. Larger studies are required to identify the ideal cut off for predicting mortality.

Keywords: Variceal bleed, Interleukin-6, Endoscopy, Band ligation, Portal hypertension



Survival Plot



PUG-21

The Diagnostic Efficacy of Contrast Enhanced-Endoscopic Us in Differential Diagnosis of Gastric Gist and Non-Gist

Jaewoong Yoon, Hyunil Jang, Byungwook Bang, Kyesook Kwon, Yongwoon Shin, Weonjin Ko and Hyungkil Kim

Gastroenterology, Department of Internal Medicine, Inha University School of Medicine, Incheon, Korea

Background/aims: GIST represent the largest group of subepithelial tumors (SETs) of the upper GI tract. The differential diagnosis of GISTs is important because of malignant potential, in contrast to other SETs. Endoscopic ultrasound (EUS) and contrast-enhanced EUS (CE-EUS) is frequently used to diagnose GISTs, however, the characteristic features to distinguish GIST from non-GIST are still unknown. The aim of this study is to find specific features on CE-EUS in differential diagnosis of GIST with non-GIST.

Methods: We retrospectively reviewed the findings of CE-EUS of 25 hypoechoic tumors, located in gastric proper muscle layer from Jan 2014 to Dec 2016. The presence and degree of tumor vessel in the SET on CE-EUS was evaluated. In addition, the SETs were classified also according to enhancement pattern as hypo, iso, and hyper. The results were obtained by EUS guided fine needle aspiration with biopsy and/or surgical resection.

Results: 17 of 25 SETs were diagnosed as GIST by histological results. 6 were diagnosed as leiomyoma and 2 were schwannoma. In 14 of 17 GISTs tumor vessel was observed, and in 8 non-GISTs tumor vessels were not observed. On statistical analysis, the presence of tumor vessel was significantly related to GIST (OR, 4.250; 95% confidential interval, 1.8-10.0; $P < 0.001$). In 17 of GISTs hypoenhancement was observed in 5 cases, iso in 11 cases and hyper in 1 case. In 8 of non-GISTs, hypo was observed in 5 cases, iso in 2 cases, unenhancement in 1 case. The results showed that the tendency of correlation between iso-enhancement pattern and GISTs, but there was not statistically significant. (OR, 7.78; 95% CI 1.165-51.915; $P = 0.061$)

Conclusions: The findings of tumor vessel enhancement in CE-EUS is useful for differential diagnosis between GIST/non-GIST in gastric hypoechoic tumor of proper muscle layer. The echo patterns of contrast enhancement were insufficiency for differential diagnosis between GIST/non-GIST.

Keywords: Contrast enhanced eus, Gist, Non gist

PUG-22

Platelet Count to Spleen Diameter Ratio as a Predictor of Esophageal Varices in Patients of Liver Cirrhosis Due to Hepatitis C and B Viruses

Dagiisuren Bavuu¹, Bayarmaa Nyamaa² and Ariunaa Mishig-Ish¹

¹Department of Internal Medicine, Central Railway Hospital, Ulaanbaatar, ²Department of Gastroenterology, National University of Medical Sciences, Ulaanbaatar, Mongolia

Background/aims: Cirrhosis patients frequently undergo screening endoscopy for the presence of esophageal varices. This study was carried out to find diagnostic accuracy of platelet count to spleen diameter ratio as a predictor of esophageal varices in patients of liver cirrhosis due to Hepatitis C and B viruses taking upper gastrointestinal tract endoscopy.

Methods: 73 patients of either sex with cirrhosis of the liver secondary to Hepatitis C and B viruses (diagnosed by coarse echo texture with reduced liver span on abdominal ultrasonography and positive polymerase chain reaction for Hepatitis C and B viruses were considered as cirrhosis) were included in the study. All relevant investigations were carried out including upper gastrointestinal tract endoscopy, abdominal ultrasound scan, serum albumin level, serum bilirubin level, complete blood count, prothrombin time and other clinical sign were recorded.

Results: Twenty seven (36.9%) patients were male and 46 (63.1%) patients were females. In our study, mean platelet count was $187.57 \pm 59.21 \times 10^3/\text{UL}$ of patients without developed varices and mean platelet count was $105.80 \pm 51.60 \times 10^3/\text{UL}$ of patients with developed varices. Mean spleen diameter of patients with varices was 126.1 ± 23.7 (millimetre) mm and mean spleen diameter of patients without varices was 102.7 ± 11.6 mm. Mean platelet count to spleen diameter ratio of patients without varices was 1862.2 ± 656 and that of with varices was 891 ± 512 .

Conclusions: Platelet count to spleen diameter ratio has good diagnostic accuracy in identifying cases with esophageal varices. This test is cheap with no additional cost and can be done at a primary health care facility.

Keywords: Platelet count, Spleen diameter, Esophageal varices, Platelet count to spleen diameter ratio, Diagnostic accuracy

PUG-23

Abdominal Obesity Increases Risk for Esophageal Cancer: A Nationwide Population-Based Cohort Study of South Korea

Jae Ho Cho¹, Cheol Min Shin¹, Kyung Do Han², Hyuk Yoon¹, Young Soo Park¹, Nayoung Kim¹ and Dong Ho Lee¹

¹Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea, ²Department of Biostatistics, College of Medicine, the Catholic University of Korea, Seoul, Korea

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. 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-squared test and Cox proportional hazard model adjusted for confounding factors.

Results: After adjusting for BMI, abdominal obesity increased the risk of ESCC (HR 1.29, 95% CI 1.23-1.36). Waist circumference is associated with increased risk of ESCC in a dose-dependent manner (P for trend <0.0001).

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

PUG-24

Inhibitory Effects of β -Caryophyllene on *H. pylori* Infection: A Randomized Double-Blind, Placebo-Controlled Study

Hyun Ik Shim, Jae Ho Cho, Cheol Min Shin, Hyuk Yoon, Young Soo Park, Nayoung Kim and Dong Ho Lee

Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea

Background/aims: *Helicobacter pylori* infection is a common disease in South Korea, that causes various gastrointestinal symptoms, and its eradication rate is decreased lately. β -Caryophyllene is a natural bicyclic sesquiterpene that found in a wide range of plant species from cloves, basil, and cinnamon. β -caryophyllene is reported to have anti-inflammatory and anti-bacterial effects. We tried to evaluate the inhibitory effect of β -caryophyllene to *H. pylori* infection, and its possibility of use as an alternative gastrointestinal drug.

Methods: The study was a 8-week, randomized double-blind, placebo-controlled trial of subjects to two groups (β -caryophyllene 126 mg and placebo per day). Thirty-three were treated with β -caryophyllene and 33 were given a placebo. Inflammation level of *H. pylori* infiltration and eradication rates were measured through endoscopy and UBT in both group before and after the dose. And serum cytokine(TNF- α , IL-1 β , IL-6) was compared in both groups before and after the medication.

Results: Complete eradication was not found in both groups. Also no significant change in UBT, updated Sydney score was found. However, only β -caryophyllene group showed statistically significant improvement in nausea ($p=0.025$), epigastric pain ($p=0.018$), also decrease in serum IL-1 β level ($p=0.038$).

Conclusions: Single administration of β -caryophyllene was not effective in eradicating *H. pylori* infection. β -caryophyllene can be considered as an alternative therapy, since β -caryophyllene was effective in nausea, epigastric pain, and it decreased serum IL-1 β level.

Keywords: *Helicobacter pylori*, β -caryophyllene, Randomized double-blind, Placebo-controlled trial

PUG-25



Metabolic Syndrome Is Associated with Increased Risk of Esophageal Cancer: A Nationwide Cohort Study of South Korea

Hyun Ik Shim¹, Dong Ho Lee¹, Dong Jin Song¹, Cheol Min Shin¹, Kyungdo Han², Jae Ho Cho¹, Hyuk Yoon¹, Young Soo Park¹ and Nayoung Kim¹

¹Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea, ²Department of Biostatistics, College of Medicine, The Catholic University of Korea, Seoul, Korea

Background/aims: The relationship between metabolic syndrome (MetS) and esophageal cancer (EC) is largely unknown. To elucidate the association between MetS and its components and the risk of EC.

Methods: Retrospective cohort study with 22,809,490 Korean individuals of the National cohort who underwent regular mandatory health check-ups between 2009 and 2012 (followed up until 2016). Enrollees who had MetS or some components of MetS were compared with those who had null component. The primary outcome was newly developed EC adjusted for age, sex, smoking status, alcohol consumption, regular physical exercise, and body mass index.

Results: Of 6,296,816 individuals with MetS, 4,470 (0.07%) developed EC, whereas of 16,512,819 individuals without MetS, 7,563 (0.05%) developed EC ($p < 0.001$). Compared to subjects without MetS, the hazard ratio (HR) for development of in patients with MetS was 1.132 (95% confidence interval [CI]: 1.088-1.179). And as the number of components of MetS increased, development of EC tended to increase. Among components of MetS, high waist circumference, high blood pressure and hyperglycemia were associated with increased risk of EC, but high triglycerides and low high-density lipoprotein had no statistically significant relationship with the risk of EC. The association between MetS and EC was statistically significant only in men (HR 1.161, 95% CI: 1.113-1.211), in age of 40~64 year-old (HR 1.202, 95% CI: 1.114-1.296), in non-smoker (HR 1.157, 95% CI: 1.098-1.220), and in non-alcohol consumer (HR 1.158, 95% CI: 1.106-1.212).

Conclusions: MetS was associated with increased risk for EC. And as the number of MetS components increased, risk of EC tended to increase. Individuals who have MetS or some components may need careful screening and observation for EC.

Keywords: Esophageal cancer, Metabolic syndrome, Cohort study

PUG-26

Comparison Study of the Performance of Aqueous Chitosan as a Submucosal Injection Solution Using a 3-Dimensional Sensor

Han Jo Jeon¹, Yoon Tae Jeon¹, Kang Won Lee¹, Sang Hyun Kim¹, Sang Hoon Kim¹, Se Hyun Jang¹, Seong Ji Choi¹, Seung Han Kim¹, Jae Min Lee¹, Hyuk Soon Choi¹, Eun Sun Kim¹, Bora Keum¹, Hong Sik Lee¹, Hoon Jai Chun¹, Chang Duck Kim¹, Seung Jeong² and Seong Nam Kim³

¹Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea, ²Department of Biosystems & Biomaterials Science and Engineering, Seoul National University, Seoul, Korea, ³Medical Engineering Research Center, The Standard Co., Ltd., Seoul, Korea

Background/aims: In endoscopic resection, submucosal injection fluid plays an important role in improving the safety and efficacy of the procedure. Although various submucosal injection solutions have been developed, chitosan as a submucosal injection solution has advantages over other solutions. In study, we compare the performance and safety of submucosal injection fluids using 3-dimensional (3D) sensor.

Methods: Normal saline (NS), Eleview[®], TS-905 (0.4% sodium hyaluronate), and aqueous chitosan (1 mL each) were injected into the submucosal layer of stomachs of the pigs. The experiment was repeated eight times and the physicochemical properties of each solution were compared. Mucosal elevation height (MEH), angle of tangent (AOT), and elevated surface area (ESA) of the submucosal fluid cushion (SFC) for 30 min at 5-min intervals were measured by 3D sensor.

Results: All parameters were highest for chitosan throughout the measurement period. However, there was no statistically difference with TS-905 ($p > 0.05$). The rate of change of MEH was different between NS and chitosan ($P=0.024$). ESA rate of change in NS was significant with TS-905 and chitosan ($P=0.0062$), and Eleview[®] change rate of ESA was significant with TS-905 and chitosan, respectively ($P=0.0088$). The MEH, ESA, and AOT measured at 0 min were positively correlated with each other, with correlation coefficients of 0.394, 0.416, and 0.536 for MEH-ESA, MEH-AOT, and ESA-AOT, respectively.

Conclusions: Aqueous chitosan was superior to NS and Eleview[®] and was non-inferior to TS-905 with respect to MEH, AOT, and ESA.

Keywords: Submucosal injection fluid, Chitosan, Eleview, Hyaluronic acid, 3d-sensor

PUG-27 

Comparison Study of Refractory Gerd Treatment: Ares Vs Stretta Procedure

Yik Joon Jang, In Kyoung Yoo and Joo Young Cho

Digestive Disease Center, Cha Bundang Medical Center, Seongnam, Korea

Background/aims: The initial treatment option for gastroesophageal reflux disease (GERD) is anti-reflux medications such as proton pump inhibitors (PPI). But not all patients relive symptoms from drug therapy alone. There are two popular endoscopic treatment of medication refractory GERD; Anti-reflux endoscopic surgery (ARES) vs. Stretta procedure. This study aimed to compare the two endoscopic treatments in terms of clinical outcomes such as efficacy and complications for refractory GERD patients.

Methods: From December 2015 to July 2017, a total of 106 patients diagnosed with refractory GERD were enrolled in ARES group. And from May 2016 to July 2017, 29 patients with refractory GERD were enrolled Stretta procedure group. We compared the efficacy using such parameters as GERD symptom score (GERD-Q score), impedance planimetry, 24hr pH monitoring, esophageal manometry results. And short-term and long-term complications of two procedures are compared.

Results: The GERD-Q score and 24 hr pH monitoring were significantly improved in both groups. In ARES group, Mean post-treatment GERD-Q score was 7.54 ± 2.6 , compared to 10.87 ± 2.7 pre-treatment ($p < 0.001$). In Stretta procedure group, GERD-Q score was 8.87 ± 3.35 , compared to 12.6 ± 3.81 pre-treatment ($P < 0.012$). No serious complications were occurred in both groups. But in ARES group, 6 patients undergo post-treatment strictures, and were treated with balloon dilatation and steroid injections. And 3 patients from ARES group has minor bleeding, successfully treated with argon plasma coagulation.

Conclusions: Both ARES and Stretta are good alternative treatment options for refractory GERD patients rather than PPI therapy. Further study is needed to make better indication criteria for both procedures.

Keywords: Ares, Gerd, Stretta

PUG-28

The Experience of Using the Vacuum-Aspiration System in Case of Esophageal Anastomosis Dehiscence

Kuralay Kunafina¹, Aleksey Zelenyi² and Kanat Batyrbekov³

¹Endoscopy Department, Oncology Center, Nur-Sultan, ²Endoscopy Department, Oncology Center, Nur-Sultan,

³Endoscopy Department, Scientific Research Institute of Traumatology and Orthopedics, Nur-Sultan, Kazakhstan

Background/aims: The most effective treatment for cancer of the esophagus and stomach is surgical. Operations ending with the formation of esophageal anastomoses are considered to be the most difficult, and one of the main reasons for lethality is their dehiscence. Fujita H., Yamana H., Kakegawa T. Factors affecting leakage following esophageal anastomosis. *SurgToday* 1994). Publications of recent years show a clear positive trend in reducing the frequency of anastomosis insolvency, which is a reflection of the unconditional progress of surgical techniques and the improvement of instruments. The results of a systematic analysis of the largest series of observations published over the past 20 years show the incidence of postoperative failure of the anastomosis about 3% after open and 2.1% after laparoscopic operations (Siewert J.R. Et al., 1998). Mortality in the development of dehiscence of the esophageal-intestinal anastomosis is from 10% to 60%, amounting to about 45% in the middle and has no tendency to decrease (Sowa M. et al., 1992; Bottcher K. et al., 1994; Delattre JF et al., 2000; Asao T et al., 2001).

Methods: The elimination of the dehiscence of anastomoses is performed by surgical methods, as well as using minimally invasive treatment methods such as endoscopic sanitization of the wipe cavity by washing with antiseptic solutions, drainage of the cavity with thin polymer tubes removed through the nasal passage or percutaneous, endoscopic clipping of the defect and installation of self-expanding extents. All of these methods are not very effective. For the first time at the beginning of 2006, the first results were published on the successful application of a vacuum aspiration system to eliminate the inconsistency of colorectal, esophagogastric, and oesophago-intestinal anastomosis. The essence of this method is to create a local negative pressure that is transmitted to the numb flow cavity through a special porous spongy system, thereby creating a closed cavity from which exudate is removed, tissue swelling is reduced, microcirculation is improved, which in turn facilitates rapid regeneration by granulation and wound healing with separation. fistulous course.

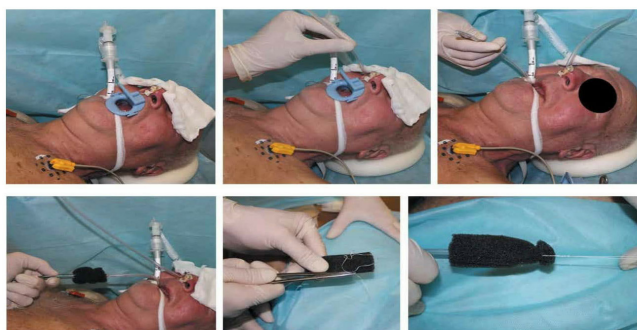
Results: Vacuum aspiration system consists of a polyurethane sponge, formed in the form of a cylinder with a drainage tube fixed to it. The technique of vacuum therapy is to install this system into the drip chamber parallel to the endoscope using biopsy forceps, which capture the sponge by the distal end. The drainage tube is directly connected to the vacuum suction with a discharge of 90-110 mm Hg. This procedure for installing the system is repeated every 3-4 days until the complete closure of the flow chamber and the defect of the organ wall. The use of vacuum therapy is terminated in the absence of radiological and endoscopic signs of dehiscence in the anastomosis zone. Patient Kh. born in 1967 Diagnosed with cardioesophageal cancer, T3NxM0, stage 2
- 08/01/2017- a gastrosplenectomy surgery was performed with resection of the abdominal esophagus.

- 07/08/2017- Signs of dehiscence of esophageal anastomosis.
- 08/10/2017-Endoscopic clips of the defect through the anastomosis line
- 08/10/2017- Overlay of eunostoma.

25.08.2017 made the installation of a vacuum sponge system. The sponge was replaced every three days; three replacements were completed. 05.09.2017 a complete fusion of the edges of the defect with the formation of a scar was observed.

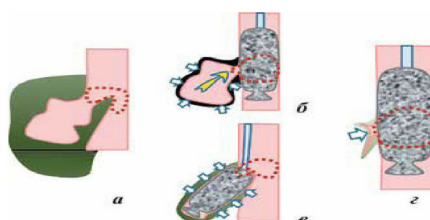
Conclusions: Our own experience, as well as the experience of our foreign colleagues, proves the effectiveness of using the vacuum aspiration system in the treatment of such a terrible complication as the dehiscence of the anastomoses of the digestive tract. The technique can successfully be used in gastro-intestinal, and colorectal and bariatric surgery.

Keywords: Anastomotic dehiscence, Vacuum system, Drainage system, Esophagoenteroanastomosis, Cardioesophageal cancer



Stages of installation of the vacuum-aspiration system. *A - the appearance of the patient; B- insertion of the gastric tube through the nose to the level of the oropharynx; C- excretion of the tube through the mouth; D - holding the tube through a vacuum suction system; E - fixation of the vacuum aspiration system at the distal end of the gastric probe using U-shaped sutures; F- the formation of the pigtail on the distal end of the vacuum aspiration system. Subsequently, it is captured by a knob, conducted through the channel of the endoscope, and allows for the fixation of the sponge during the endoscope.*

Diagram of the endoscopic installation of polyurethane sponge in the esophageal lumen



a - the anastomotic dehiscence (marked with a dotted line) with the presence of a cavity (red) and inflammatory changes in the surrounding tissues (green); б - installation of vacuum under the influence of negative pressure created in the porous system, the dotted line - the configuration of the anastomosis line when the vacuum aspiration system is installed); в - installation of a vacuum aspiration system in the cavity near the place of dehiscence (designations are the same); г - changes in the anastomosis and surrounding tissues at the stages of treatment (designation are the same) and aspiration system in the lumen of the esophagus (yellow arrow - direction of evacuation of contents from the cavity, white arrows - direction of retraction of adjacent tissues

PUG-29

Efficacy of Percutaneous Endoscopic Gastrostomy in Viet Tiep Hospital

Duong Dang¹ and Hoan Vu²

¹Gastroenterology, Viet Tiep Hospital, Haiphong, ²Gastroenterology, Viet Tiep Hospital, Haiphong, Vietnam

Background/aims: The development of the percutaneous endoscopic gastrostomy (PGE) was an important technological advancement for enteral access. The aim of this study is to assess the efficacy and safety of PEG in patients in VietTiep Hospital

Methods: 35 patients hospitalized from June 2013 to June 2017. The PEG kit of Winson-Cook (Pull technique).

Results: The PEG was successfully performed in 100% of cases. The mean time of the pull technical procedure was 23±4.5 min. The rate of minor and major complications was very low. No serious complications.

Conclusions: The use of PEG was effective and relatively safe.

Keywords: Percutaneous endoscopic gastrostomy, Dysphagia

PUG-30

Accuracy of Diagnosis of Chronic Gastritis and Hp Infection through Microvascular Pattern

Weonjin Ko¹, Jung-Wook Kim², Young Woon Chang², Joo Young Cho³, Ki Baik Hahm³ and Gwangil Kim⁴

¹Department of Internal Medicine, Inha University College of Medicine, Incheon, Korea, ²Department of Internal Medicine, Kyunghee University College of Medicine, Seoul, Korea, ³Department of Internal Medicine, Cha Bundang Medical Center, Seongnam, Korea, ⁴Department of Pathology, Cha Bundang Medical Center, Seongnam, Korea

Background/aims: Atrophic gastritis is a precursor lesion of gastric cancer and *Helicobacter pylori* 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 two 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 patterns.

Keywords: Regular arrangement of collecting venules, Subepithelial capillary network, Chronic gastritis, Hp infection

PUG-31

Efficacy and Safety of Ilaprazole Compared with Omeprazole in Nonerosive Reflux Disease (nerd) Patients: A Pilot Study

Ji Hyun Kim, Seung-Joo Nam, Sang Hoon Lee, Tae Suk Kim, Min Jong Lee, Jin Myung Park, Dae Hee Choi, Sung Chul Park, Chang Don Kang and Sung Joon Lee

Gastroenterology, Kangwon National University Hospital, Chuncheon, Kangwon Do, Korea

Background/aims: Nonerosive reflux disease (NERD) is a type of gastroesophageal reflux disease without mucosal damage observed on white light endoscopy. Symptomatic patients with NERD are managed with proton pump inhibitors (PPI) for 4 to 8 weeks, however studies have reported that only 50% patients respond to standard therapy. Ilaprazole is a newly developed PPI for management of acid-related disorders, with longer half-life and effective acid suppression. Previous studies have compared its effects with omeprazole in peptic ulcer, and gastroesophageal reflux disease, but no studies have compared its effects in NERD. This study aimed to compare efficacy and safety of Ilaprazole 20 mg with Omeprazole 20 mg in NERD patients.

Methods: Patients between ages 19 to 80 with symptoms of heartburn or regurgitation within 6 months were included. All patients received esophagoduodenoscopy to exclude patients with any mucosal breaks. After randomization, patients were prescribed with either 20 mg of Ilaprazole daily, or Omeprazole 20 mg daily. The primary outcome was complete disappearance of heart burn (no symptoms for 7 consecutive days) after 4 weeks of treatment, and secondary outcome was the GERD-Q score and adverse events.

Results: Twenty-two patients (6 male) were included for final analysis. Among 12 patients who took Ilaprazole, 5 (41.7%) reported complete disappearance of heart burn while 6 (60%) out of 10 patients who took omeprazole reported complete disappearance of heart burn ($P=0.39$). The mean total GERD-Q score showed improvement in both groups; 9.1 to 5.8 in Ilaprazole group ($P=0.67$) and 9.3 to 6.2 in omeprazole group ($P=0.42$). There were no significant differences in the incidence of adverse events between both groups.

Conclusions: The findings of this study suggest that Ilaprazole may be considered as a treatment option for patients with NERD with symptoms of heartburn. Further large scale studies are needed to verify such findings.

Keywords: Ilaprazole, Omeprazole, Nerd

PUG-32

Diagnosis of *Helicobacter pylori* Using the Rapid Urease Test: An Experience in Resunga Hospital (Rural Part of Nepal)

Yam Bahadur Thapa Bhujel

General Department, Resunga Hospital, Gulmi, Nepal

Background/aims: Endoscopy is not easily available in our Rural community. This study designed to assess the endoscopic findings of the dyspeptic syndrome and detection of *Helicobacter pylori* using the rapid urease test in Resunga hospital.

Methods: The study group includes patients reporting to hospital, who have dyspepsia, were advised to endoscopy at Resunga Hospital, from a period of Feb 2019 to April 15 2019.

Results: Total 78 patients (Female 46 and male 32) received UGI endoscopy. Gastroduodenitis being the most common finding seen in 42 (53.84%) followed by Peptic Ulcer in 6 (7.69%), Gastro-esophageal Reflux disease 7, esophageal varices 3 and Ca. of stomach 1. Normal finding were seen on 19 patients (24.35%). And out of 42 patients of gastroduodenitis 34 patients had rapid urease test (RUT) and 27 (64.28%) were positive, male 6 and female 21. The patients with RUT positive got *Helicobacter pylori* eradication treatment from Resunga Hospital.

Conclusions: Upper GI endoscopy has a significant role in screening and diagnosing the dyspeptic symptoms in rural community. Gastritis is the major cause of Upper abdominal pain, which is mostly due to *H. pylori*. The rapid urease test is a rapid, cheap and simple test that detects the presence of urease in the gastric mucosa, where biopsy is not available easily.

Keywords: Endoscopy, Rapid urease test (rut), *Helicobacter pylori*, Rural community

PUG-33

Diagnostic Utility of 13c-Urea Breath Test in Rapid Urease Test Negative Dyspeptic Patients Who Are on Long Term PPI

Sukanta Chandra Das¹, Naymul Hasan², Birendra Nath Saha³, Chanchal Kumar Ghosh⁴ and Abdul Rahim Miah⁴

¹Gastroenterology Division of Medicine, General Hospital, Narayanganj, ²Gastroenterology, Shaheed Ziaur Rahman Medical College, Bogra, ³Gastroenterology, Shaheed Tazuddin Ahmad Medical College, Gazipur, ⁴Gastroenterology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh

Background/aims: The most common human infection of upper GIT is H pylori which migrates from gastric antrum to the proximal stomach following acid suppression therapy. Due to this redistribution of H. pylori, there might be sampling error while taking tissue from stomach for RUT. The 13C-UBT is a non-invasive, simple and safe alternative which have minimal chance of this error. In this study, we want to re-evaluate RUT negative dyspeptic patients by doing 13C-UBT.

Methods: This cross sectional study was done among 50 patients attended in OPD at General Hospital, Narayanganj Bangladesh, who were diagnosed as RUT negative Non Ulcer Dyspepsia according to ROME IV criteria and who were on long term PPI. Then patients were re-evaluated for H. pylori status by UBT using film-coated [13C] urea tablets after stopping PPI for 2 weeks. Breath samples were collected at 0 and 30 min after administration of a UBT tablet and values were measured by infrared spectrometry. The chi-squared test was used for testing association between qualitative variables and the 't' test was used for quantitative variables. A value of $p < 0.05$ was considered significant.

Results: Mean age of patients of this study was 35.96 ± 13.37 . Among them 64% was male and 36% was female. Total 18% of study population had positive UBT. 55.55% of those patients who had Gastritis on endoscopy showed positive UBT and those who had no mucosal abnormality on endoscopy showed 9.75% positive UBT. This difference is statistically significant ($P = 0.008$).

Conclusions: 13C-UBT can be a reliable alternative to re-evaluate RUT negative dyspeptic patients particularly who are on long term PPI before concluding non HP Gastritis or non HP Dyspepsia.

Keywords: 13c-urea breath test, Rapid urease test, Dyspepsia

PUG-34

Gastric Outlet Obstruction from Gastroduodenal Crohn's Disease Conservatively Managed with Infliximab

Gizelle Mica Silla

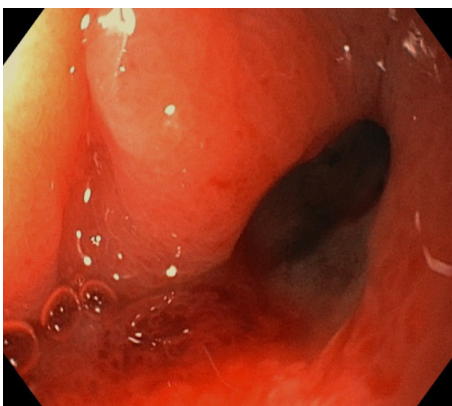
Department of Medicine, Up- Philippine General Hospital, Manila, Philippines

Background: Gastroduodenal Crohn's disease is rare, with a rate of 0.5-4.0%. A unique case of CD with gastric outlet obstruction as the presenting symptom was managed medically with Infliximab.

Clinical Presentation: A 36-year-old male presents with an 8 – month history of vomiting, epigastric pain, and weight loss. Endoscopy showed a pyloric ulcer with duodenal bulb stricturing. Biopsy revealed active chronic duodenitis. Colonoscopy showed chronic non-specific inflammation with negative TB – PCR. Infliximab was given at 0, 2, 6 weeks for the impression of Duodenal Crohn's. Marked weight gain and improvement of symptoms and surgery was avoided at this point.

Conclusion: Duodenal CD is diagnosed by clinical evaluation, endoscopy and biopsies. Surgery is necessary once patient is medically refractory with obstructive symptoms. High index of suspicion is needed. Medical therapy with biologics increase the response rates of patients avoiding unnecessary surgeries. Treatment recommendations are largely based on limited evidence hence optimal treatment algorithm remains subjective and undefined.

Keywords: Crohn's disease, Gastric outlet obstruction, Infliximab



Pyloro-antral narrowing with a large clean based ulcer contiguous to the duodenal bulb



EGD after 3rd dose of Infliximab

PUG-35

Caustic Material Ingestion: A 5-Year Experience in a Tertiary Toxicology Referral Center

Gizelle Mica Silla

Department of Medicine, Up - Philippine General Hospital, Manila, Philippines

Background/aims: Caustic Material ingestion's (CMI) worldwide epidemiological data are scarce because of underreporting and it still remains an important public health problem. The study aims to describe the demographic profiles, clinical and endoscopic findings, management and outcomes of caustic ingestion.

Methods: This is a retrospective cross-sectional study of adult patients admitted at the UP-PGH for caustic ingestion from January 2013 to June 2018 which aimed to determined incidence of caustic ingestion and clinico-demographic profiles of patients. Severity of mucosal injury were correlated with the intervention done to the patient. In-patient mortality and surgery rates were also identified.

Results: Three hundred ninety-nine patients admitted for CMI were included. Equal number of males 199 (49.87) and females 200 (50.13), mean age of 32.67+13.14. There werew 332 cases of intentional ingestions (83.42%). Mortality rate was 2% while surgical rate was 7%. Cases due to acid ingestion had higher mortalities (80%) than alkali ingestion. Injury to the esophagus were mostly 2A (36.4%). In the stomach the most severely affected area was the fundus, with 42% (3A and 3B injuries). For those who underwent surgical management, 92% had 3B injuries to the cardia, fundus and body.

Conclusions: The results of the study revealed that there are 80 new cases of caustic ingestion per year at this institution. Intentional ingestion was seen in most cases. Acidic substance ingestion caused majority of the mortality. Endoscopic Zargar classification of severity of injury is determinant to the management of the patient and detrimental to decision making.

Keywords: Caustic material ingestion, Toxicology, Retrospective

PUG-36

Prevalence of Gastric Ulcers and Duodenal Ulcers in a Tertiary Care Setting

Karlo Ivan Miguel Fontanilla and Ma Lourdes Daez

Internal Medicine, Philippine General Hospital, Manila City, National Capital Region, Philippines

Background/aims: Peptic ulcer disease is common especially in developing countries. Studies of prevalence of gastric ulcers in the Philippines show varying results. The objective of this study is to determine the prevalence of peptic ulcers at a government tertiary care hospital.

Methods: This study is a retrospective, cross-sectional study. Non probability sampling within the specified time period was done. The minimum sample size required to achieve a confidence interval of 95% is 307 reports. Age, sex, location at time of endoscopy; presence of ulcers, number and location, Forrest classification, endoscopic intervention and presence of *Helicobacter pylori* infection was recorded. Descriptive statistics such as means and standard deviations, frequency tables and cross tabulations were used. The Chi Square statistic and/or the Cramer's V was used to test for relationship between variables.

Results: A total of 946 endoscopy reports were reviewed. There was equal prevalence of peptic ulcers in inpatients (24.29%) and in outpatients (22.54%), ($\chi^2 (1)=0.4248$, $p=0.514563$). More severe ulcers in terms of Forrest Classification is seen in inpatients compared to outpatients ($\chi^2 (3)= 45.2902$, $p<0.00001$; $\Phi=0.33775895$). For inpatients, *Helicobacter pylori* prevalence was similar for those with and without ulcers ($\chi^2 (1)= 3.0726$, $p=0.07962$) However, for outpatients *Helicobacter pylori* prevalence was higher among those with ulcers ($\chi^2 (1)= 9.4558$, $p=0.002105$).

Conclusions: The prevalence of peptic ulcer disease remained high in this institution. However despite the persistent prevalence of the disease, severity, morbidity and mortality from peptic ulcers have all decreased.

Keywords: Prevalence, Peptic ulcer disease, Esophagogastroduodenoscopy, Forrest classification, *Helicobacter pylori*

PUG-37

Forrest 2a Ulcer at the Gastric Cardia Managed with Rubber Band Ligation - Alternative Endoscopic Management

Karlo Ivan Miguel Fontanilla, Hashamiya Babaran and Ma Lourdes Daez

Internal Medicine, Philippine General Hospital, Manila City, National Capital Region, Philippines

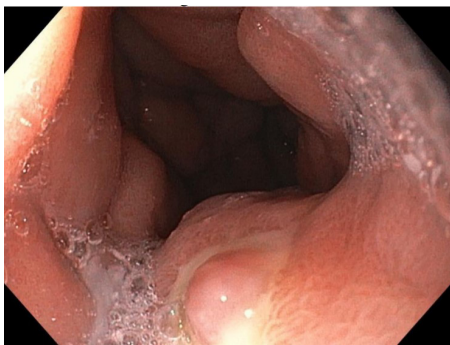
Significance: Ulcers with a non-bleeding visible vessel have a high rate of bleeding. Endoscopic management of ulcers at the cardia can be difficult due to the anatomy of the proximal stomach.

Case presentation: A 52 year old male presented with a 1 year abdominal enlargement, and jaundice. He was admitted due to abdominal pain and melena. He was seen stable, icteric and with an epigastric mass. Initial consideration was bleeding esophageal varices.

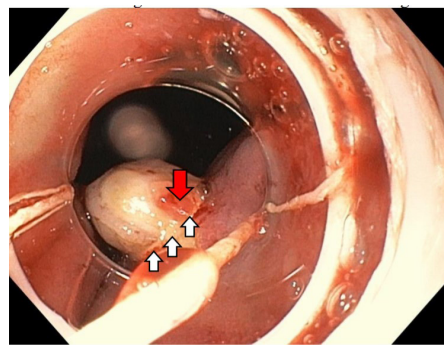
Management: He was given Terlipressin boluses and omeprazole drip and was scheduled for emergent endoscopy. Large varices with red color sign were noted at the distal esophagus. At the cardia, a linear ulcer with an NBBV was seen. The plan was epinephrine injection and clipping. Rubber band ligation was considered as a salvage therapy if clipping was unsuccessful. After injection with epinephrine, profuse bleeding was noted. A decision was made to proceed with band ligation. A rubber band was deployed over the lesion with note of control of bleeding. Rubber band ligation of the esophageal varices was done afterwards. The patient was eventually discharged after 4 days with no recurrence of bleeding in the interim.

Conclusions: Rubber band ligation is a viable endoscopic therapy alternative for NBBV if hemoclipping is deemed difficult.

Keywords: Gastric ulcer, Non bleeding visible vessel, Rubber band ligation, Alternative management



Linear ulcer with a Non Bleeding Visible Vessel at the Gastric Cardia. The plan was epinephrine injection and clipping. Rubber band ligation was considered as a salvage therapy if clipping was unsuccessful.



Ulcer with Non Bleeding Visible Vessel after Rubber Band Ligation. Red arrows depict the ruptured vessel. Smaller white arrows depict the deployed rubber band.

PUG-38

***Helicobacter pylori* Infection in Patients with Liver Cirrhosis: Prevalence with Portal Hypertensive Gastropathy**

Anuudari Sharaa¹, Nyam Bizuya², Bayarmaa Nyamaa¹ and Shinebayar Narantuya³

¹Internal Medicine Department, National University of Medical Science, Ulaanbaatar, ²Internal Medicine Department, Dornod Medical Center, Dornod, ³Molor Laboratory, Laboratory, Dornod, Mongolia

Background/aims: *Helicobacter pylori* infection has been recognized as one of the most common chronic bacterial infections in humans and associated with peptic ulcer disease and gastric adenocarcinoma. The role of *Helicobacter pylori* (*H. pylori*) in the pathogenesis of portal hypertensive gastropathy (PHG) in cirrhotic patients is poorly defined. The aim of this study investigates prevalence of *H. pylori* infection and its association with PHG in patients with liver cirrhosis.

Methods: We performed retrospective study and conducted in the Internal Medicine Department, Dornod Medical center from 2017 to 2018. We examined prevalence of *H. pylori* infection in 54 cirrhotic patients with PHG and using an anti-*H. pylori* IgG ELISA.

Results: Out of the 54 cirrhotic patients with PHG, men were 34, women were 20. 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 cirrhotic patients with PHG in Mongolia, which might be related to severity of PHG.

Keywords: *Helicobacter pylori* (*h. pylori*), Portal hypertensive gastropathy, Cirrhosis

PUG-39

Efficacy of Mucosal Incision and Forceps Biopsy for Subepithelial Tumors

Yun Jae Shin, Si Hyeong Lee, Dong Hoon Lee, You Sun Kim, Tae Young Park, Soo Hyung Ryu and Jeong Seop Moon

Department of Internal Medicine, Seoul Paik Hospital, Seoul, Korea

Background/aims: Most of subepithelial tumors (SETs) are incidentally found during screening endoscopies. Acquiring sufficient tissue is important for the definite diagnosis of SETs. The aim of this study was to evaluate the usefulness and safety of Mucosal Incision and Forceps Biopsy (MIFB).

Methods: We retrospectively reviewed performed MIFB in Seoul Paik Hospital between January 2015 and April 2019. We reviewed procedure records and post-procedure medical records to confirm the adverse effects. We examined tumor size, location, origin of layer, pathological diagnosis, treatment and procedure related complications.

Results: A total of 18 subjects (Male : Female=5 : 13, Age : 36~81 years old, Median age : 58 years old) were enrolled in the study. Mean size was 1.9 cm (range, 0.6 cm to 2.8 cm). The locations of tumors were 5 cases in antrum, 6 cases in body, 4 cases in cardia, 2 case in fundus and 1 case in esophagus. Pathological diagnosis of subepithelial tumor could be obtained in 16 of the 18 cases (GIST, n=6; leiomyoma, n=7; ectopic pancreas, schwannoma, n=1; and regenerating epithelium n=1) The MIFB technique was not diagnostic in 2 cases. For the pathological diagnosis, wedge resections were done. One was diagnosed as schwannoma and the other was diagnosed as plexiform fibromyxoma. 16 cases were originated in the muscularis propria (MP) layer, 1 case was originated in the submucosa layer and 1 case was originated in the muscularis mucosa layer.

During the procedure, bleeding occurred at the mucosal incision site in most cases and easily controlled. In 5 cases, bleeding was controlled after epinephrine injection. In 1 case, micro-perforation was occurred and underwent surgical resection because MIFB specimen had relatively high malignancy potential in EUS and its feature. There was no delayed bleeding or perforation.

Conclusions: The diagnostic efficacy of current tissue sampling techniques for SETs is limited. MIFB can be used as one of several methods to obtain adequate tissue samples of SETs.

Keywords: Incision biopsy, Subepithelial tumors, Mucosal incision and forceps biopsy

PUG-40

Endoscopic Histoacryl Injection Is Safe and Effective Modality for Hemostasis of Non-Variceal Bleeding

Si Hyeong Lee, Yun Jae Shin, Dong Hoon Lee, You Sun Kim, Soo Hyung Ryu, Tae Young Park and Jeong Seop Moon

Department of Internal Medicine, Seoul Paik Hospital, Inje University College of Medicine, Seoul, Korea

Background/aims: Histoacryl is one of the materials that can be used as a sclerosing agent and is known to be effective in endoscopic hemostasis of acute gastric variceal bleeding. In addition, it can be applied to hemostasis of non-variceal GI bleeding with relatively simple manipulation and is also effective. However its effect has not clearly known in ulcer bleeding. We reviewed patients who had undergone treatment endoscopically with Histoacryl and assessed the effectiveness and side effects according to ulcer bleeding.

Methods: We retrospectively reviewed 13 ulcer bleeding cases treated endoscopically with Histoacryl in Seoul Paik Hospital from August 2005 to June 2018. All cases were categorized by each disease. For the cases of bleeding, initial hemostasis rate and rebleeding rate within 7 days were evaluated. We reviewed the procedure records and post-procedure medical records to confirm the adverse effects.

Results: Among 13 cases treated with Histoacryl, 12 were ulcer bleedings, 1 was post-ESD bleedings, and 10 were gastric ulcers, 3 were duodenal ulcers. Initial hemostasis was obtained from all bleeding cases. The delayed bleeding rate within 7 days was 7.7% (only 1 case, AGC ulcer bleeding). No significant complication was observed, but 1 patient were expired within six months due to GIST perforation unrelated to this procedure.

Conclusions: According to our data, Endoscopic Histoacryl injection treatment is safe and has a high success rate of hemostasis for non-variceal GI bleeding. Therefore, it is considered to be a useful method for upper GI bleeding which is difficult to hemostasis.

Keywords: Non-variceal bleeding, Gastric ulcer, Histoacryl injection

PUG-41

Short-Term Results of Gastric Peroral Endoscopic Myotomy in Antrum and Pylorus

Mi-Rim Choi, Min A Yang, Jihyun Han, Na Yun Kang, Hyun Kwon Ju, Byung Sun Kim, So Hee Yun and Jin Woong Cho

Gastroenterology, Presbyterian Medical Center, Jeonju, Korea

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: We retrospectively reviewed of all patients who experienced G-POEM in Presbyterian medical center between April 2016 and March 2019. In this study, patients underwent selective circular muscle myotomy for various conditions. All procedures were performed by a single expert endoscopist.

Results: All 11 patients (7 men, 4 women; median age 74 years) successfully underwent G-POEM. 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 of neoplasia resecting more than 75% of the circumferential extent of antrum and 4 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 various situations. More research is needed to be accumulated in variety situations.

Keywords: Gastric poem, Peroral endoscopic myotomy, Pyloric stenosis, Gastroparesis, Gastric antral stricture

PUG-42

Peroral Endoscopic Myotomy (poem) for Achalasia Cardia: A Single Centre Experience Report

Stanley Khoo¹, Shiaw Hooi Ho¹, Peng Choong Lau², Wei Jin Wong², Sook Hui Chaw³, Pui San Loh³ and Sanjiv Mahadeva¹

¹Department of Gastroenterology, University Malaya, Kuala Lumpur, ²Department of Surgery, University Malaya, Kuala Lumpur, ³Department of Anaesthesiology, University Malaya, Kuala Lumpur, Malaysia

Background/aims: Peroral endoscopic myotomy (POEM) was introduced in 2008 as a novel minimally invasive and definitive treatment modality for achalasia cardia (AC). Herein we report our local treatment experience with POEM, performed jointly by both gastroenterologist and upper gastrointestinal surgeon.

Methods: Consecutive patients with AC who underwent POEM at our centre from November 2015 to April 2018 were included for analysis. Patient demographics, clinical features of AC, technical and procedural success, and complications were recorded. The POEM procedure (posterior approach) was conducted in a standard manner as described elsewhere under general anaesthesia. Technical success was defined as the ability to complete the POEM procedure from mucosal incision to subsequent myotomy and finally, mucosal closure. Procedural success was defined as a post-procedural Eckardt Symptom Score (ESS) of less than 2, or a reduction by 4 or more points at 2 months or more after a successful procedure. Post procedure, all patients were given standard OD dose PPI for at least 3 months duration.

Results: Twenty-six patients were included in the analysis. Patient demographics and clinical features are shown in Table 1. Overall technical success was achieved in 84.6% and procedural success in 95.5% of the patients. Subgroup analysis revealed that the technical success rate was 70.0% in the first ten patients which improved to 93.8% in the remaining 16 patients. Only minor complications were encountered in 7 patients (26.9%) which did not require additional endoscopic or surgical intervention. There was no patient with significant reflux symptoms requiring prolonged course of PPI longer than 6 months.

Conclusions: POEM is shown to be an effective and safe definitive treatment modality for AC in our local setting. Significant post procedure reflux symptoms requiring the continuous use of PPI was not observed in our study.

Keywords: Achalasia, Poem

Demographic/Clinical Features of AC/ Treatment Outcomes	Number of Subjects N (%)
Number of subjects	26
Mean age \pm SD (years)	44.0 \pm 16.9
Gender	
Male	11 (42.3)
Female	15 (57.7)
Ethnicity	
Malay	6 (23.1)
Chinese	11 (42.3)
Indian	9 (34.6)
Others	0
Chicago Classification	
Type 1	9 (34.6)
Type 2	13 (50.0)
Type 3	0
Unknown	4 (15.4)
Sigmoid Achalasia	
Type 1	1 (3.8)
Type 2	1 (3.8)
Overall Technical Success	22/26 (84.6)
First 10 patients	7/10 (70.0)
Remaining 16 patients	15/16 (93.8)
Procedural Success	21/22 (95.5)
Overall Complication	7/26 (26.9)
First 10 patients	4/10 (40.0)
Remaining 16 patients	3/16 (18.8)
Types of Complications	
Mucosal injury	3 (11.5)
Excessive bleeding	2 (7.7)
Transient cardiopulmonary compromise	1 (3.8)
Surgical emphysema	1 (3.8)
Retained Hemoclip applicator component in submucosal tunnel	1 (3.8)

PUG-43

Prognosis of Endoscopic Resection in Patient with Early Gastric Cancer with Undifferentiated Type Histology

Ha Won Hwang, Yong Woon Shin, Sung-Wook Park, Byoung Wook Bang, Kye Sook Kwon, Weonjin Ko and Hyungkil Kim

Department of Internal Medicine, Inha University School of Medicine, Incheon, Korea

Background/aims: In case of early gastric cancer (EGC) with undifferentiated type histology, which did not meet the extended criteria after endoscopic submucosal dissection (ESD), addition of surgical treatment should be recommended. In clinical practice, however, there are many patients who refuse or cannot be performed surgery due to old age and comorbidities. The aim of this study was to investigate the rate of recurrence and survival in those patients.

Methods: A total of 77 patients who had undergone ESD due to EGC with undifferentiated type histology from January 2005 to December 2015 were analysed retrospectively. Fifty six patients of them who did not receive additional surgery were subdivided into four groups, as with submucosal or lymphovascular invasion, diameter above 2 cm, positive lateral margin and curative resection according to risk of recurrence.

Results: The mean follow up period was 47.3 (12-117) months. Seven of 56 patients (12.5%) had local recurrence or lymph node metastasis during that period. The recurrence rates of the patients with submucosal or lymphovascular invasion, diameter above 2 cm, and positive lateral margin were 25% (5/20), 14.3% (1/6) and 0% (0/5) respectively. On the other hand, Among 24 patients who achieved curative resection without risk factors as above, no recurrence occurred. All of 7 patients with recurrence underwent surgery and 1 of them died of advanced gastric cancer. The mean duration of recurrence after ESD was 27.1 (12-69) months.

Conclusions: Surgical resection is the definite curative treatment in undifferentiated EGC with risk factors, such as submucosal invasion, lymphovascular invasion, larger than 2 cm in diameter after endoscopic resection. But in undifferentiated EGC without such risk factors after endoscopic resection, follow up or secondary endoscopic resection can be an alternative modality even in lateral margin positive patients.

Keywords: Endoscopic resection, Early gastric cancer, Undifferentiated type histology

PUG-44

Our Series of Poem Cases

Suleyman Gunay

Gastroenterology, Ataturk Training Research Hospital, Izmir, Turkey

Background/aims: Peroral endoscopic myotomi is a minimally invasive endoscopic treatment procedure that is performed in achalasia patients since 2010. We received an advanced endoscopic procedures training at CHA Bundang Medical Center in March-April 2017.

Methods: POEM was performed in 50 achalasia patients in gastroenterology endoscopy unit of our hospital between July 2018-April 2019. Demographic data, achalasia types, manometric results and Eckard scores of patients before the procedures were recorded.

Results: Demographic data of the patients were summarized in Table.

There were no complications after the first 20 cases. Duration of the procedure and number of the hemoclips use decreased. None of the patients who developed complications required intensive care unit. In 2 of the 9 patients who developed complications, tunnel stoma was opened after hemoclips failed in the post-POEM period and pleural abscess occurred. Bilateral pneumothorax in 2 patients and unilateral pneumothorax in 1 patients developed.

Conclusions: According to our experience, it is more easier to open and close the tunnel and also performing myotomy at 5 o'clock side. During the post-POEM period, it is useful to be awake for complications if persisten back pain occurs.

Keywords: Achalasia, Endoscopy, Peroral endoscopic myotomy

PUG-45

Variety of Gastric Mucosa Pathological Changes in Patients with Liver Cirrhosis and Portal Hypertension

Alina Khikhlova¹ and Elena Olevskaya¹

¹Endoscopy Department, Chelyabinsk Regional Clinical Hospital, Chelyabinsk, ²Department of Surgery, South Ural State Medical University, Chelyabinsk, Russia

Background/aims: To evaluate the gastric mucosa in patients with portal hypertension due to liver cirrhosis underwent endoscopic variceal ligation.

Methods: 155 patients with liver cirrhosis complicated portal hypertension were enrolled in the study. All patients had grade 3 of esophageal varices were and underwent to upper gastrointestinal endoscopy between 2015 and 2018 before and after endoscopic variceal ligation. Mean patient age was 52±11.2 years. The most common Child-Pugh category was B, followed by A and then C. Viral liver cirrhosis (35%) and alcoholic cirrhosis (24%) were prevailed. Statistical analysis was performed using IBM SPSS Statistics 21 for Windows.

Results: Gastritis was confirmed in 96 (62%) patients, associated with *Helicobacter pylori* infection in 28%. Erosions and ulcers observed in 50% of patients. Portal hypertensive gastropathy (PHG) were found in approximately 50% of patients. 8% of patients had increasing the severity of PHG during eradication of esophageal varices. 2 this patients bled from severe PHG. Gastric antral vascular ectasia (GAVE) confirmed histologically in 12 (8%) of patients, moreover it appeared after endoscopic treatment of esophageal in 8 patients. One patient was atypical of its localization in gastric cardia. In another case GAVE was complicated of massive bleeding and demanded emergency APC. Gastric polyps were present in about 28 (18%) of patients. Portal hypertensive polyps comprised 46% of all detected polyps. Tubular adenoma and endocrine tumors were seen in 2 patients.

Conclusions: Variety of gastric mucosa pathological changes occurs in patients with liver cirrhosis and portal hypertension. They can be a source of rare but dramatic bleeding. Thus patients require careful follow-up for prevention of variceal and non-variceal bleeding.

Keywords: Liver cirrhosis, Portal hypertension, Gave, Portal hypertensive gastropathy, Portal hypertensive polyps

PUG-46

Primary Gastric Mantle Cell Lymphoma

Hyun Ho Choi, Youngki Kim, Hyung-Keun Kim, Sang Woo Kim, Hiun Suk Chae and Sung Soo Kim

Internal Medicine, Uijeongbu St Mary's Hospital, College of Medicine, the Catholic University of Korea, Uijeongbu-Si, Gyeonggi-Do, Korea

Mantle cell lymphoma is a subtype of non-Hodgkin B-cell lymphoma, accounting for 6% of all non-Hodgkin lymphoma. It is characterized by an aggressive disease course with frequent involvement of regional lymph nodes and early metastasis. Although the stomach is the most common extranodal site of mantle cell lymphoma, primary gastric mantle cell lymphoma is rare. We report the case of a 50-year-old man diagnosed with mantle cell lymphoma who was admitted to our hospital for regular health examination.

A 50-year-old man visited our hospital for regular health examination. He did not have any clinical symptoms, past history of systemic illness, or family history of cancer. Physical examination was unremarkable and there was no lymphadenopathy. Esophagogastroduodenoscopy revealed military nodular appearance with erythema at antrum and body without polypoid lesions or ulcerations. Microscopic examination of the biopsy specimens showed dense lymphocytic infiltration with lymphocytic epithelial lesion. On immunohistochemistry examination, the cells were positive for cyclin D1, CD20, and Bcl-2, but negative for CD3 and CD5. It was diagnosed with mantle cell lymphoma. The subsequent abdomen CT, chest CT and PET CT demonstrated no discernible lesion and lymphadenopathies. Bone marrow biopsy also showed negative finding. Based on these findings, the diagnosis of Ann Arbor stage I mantle cell lymphoma was confirmed. The patient was referred to chemotherapy.

This case suggested that endoscopist should consider mantle cell lymphoma for differential diagnosis when a patient presents diffuse erythematous gastric mucosa with nodularity.

Keywords: Mantle cell lymphoma, Stomach, Endoscopy

PUG-47

Epiphrenic Diverticulum: A Case Report and Review of Literature

Dennis Martin Castro¹, Gian Carlo Carpio¹, Riz Cabalfin² and Frederick Dy¹

¹Department of Internal Medicine, Section of Gastroenterology, University of Santo Tomas Hospital, Manila,

²Department of Surgery, University of Santo Tomas Hospital, Manila, Philippines

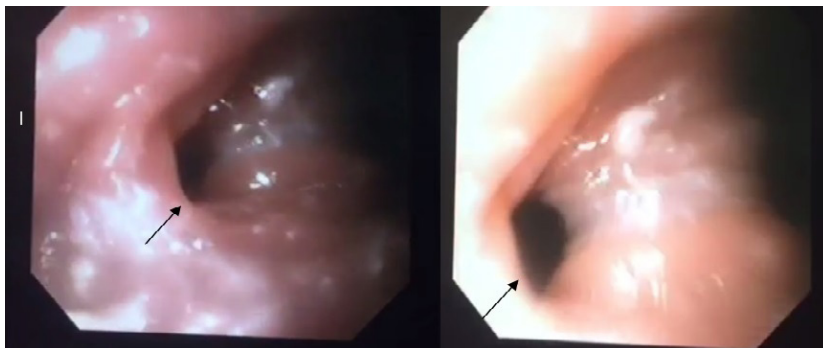
Significance: Epiphrenic diverticulum are rare esophageal diverticula. Most epiphrenic diverticula are asymptomatic and need no intervention. Inability to recognize the condition may result in lethal complications. The aim of this study is to further elucidate on the clinical presentation of patients with epiphrenic diverticulum and how to properly diagnose and treat the condition.

Clinical Presentation: Patient is a 61/F presenting with dysphagia of 1 month accompanied by weight loss.

Management: Endoscopy was done showing a diverticulum in the distal part of the esophagus. CT scan of the chest with contrast showed 5.3×6.4 cm mass at the posterior mediastinum related to the distal esophagus with internal densities and air fluid levels. Patient advised surgical consult due to persistence of symptoms. The patient underwent open thoracotomy with diverticulectomy.

Recommendation: The diagnosis of epiphrenic diverticulum is a challenge as the majority of patients are asymptomatic. Recognition of symptomatic patients and application of appropriate diagnostic tests and its correct interpretation is imperative. Symptomatic patients warrant intervention and determining patients who are candidates for non-surgical and surgical intervention is important.

Keywords: Epiphrenic diverticula, Case report



Endoscopy epiphrenic diverticula

PUG-48



Efficacy of Vonoprazan in Preventing Nsaid-Associated Ulcer Recurrence: A Meta-Analysis of Randomized Controlled Trials

Dennis Martin Castro¹, Clarel Camille Ng¹ and Timothy Bren Phoa¹

¹Department of Internal Medicine, Section of Gastroenterology, University of Santo Tomas Hospital, Manila,

²Department of Medicine, VRP Medical Center, Mandaluyong, Philippines

Background/aims: Vonoprazan is a novel potassium-competitive acid blocking agent and is used in the management of gastric and duodenal ulcers. Patients on long-term NSAID therapy are prone to develop ulcer recurrence. We aim to perform a systematic review and meta-analysis for the comparison of the effects of vonoprazan and proton pump inhibitors in NSAID-associated ulcer recurrence in randomized controlled trials (RCTs).

Methods: A systematic and comprehensive search was performed using MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials (CENTRAL), Google Scholar, and clinical trial registries, for studies published up to December 2018. Only RCTs will be included. Primary outcomes of ulcer recurrence and secondary outcomes of gastrointestinal bleeding will be studied. The quality of included studies will be assessed using the modified risk of bias tool. This systematic review and meta-analysis will be performed according to the protocol recommended by the Cochrane Collaboration and reported according to the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines. All statistical analyses will be conducted using RevMan 5.3.

Results: There were 2 studies identified with a total of 1217 participants. Our statistical analysis show that there were no significant difference between vonoprazan 10 mg (OR-0.45 CI (0.19-1.06); P=0.07; I²=6%), and vonoprazan 20 mg (OR-0.59 CI (0.26-1.30); P=0.19; I²= 0%) compared to lansoprazole 15 mg in reducing ulcer recurrence but the data favors vonoprazan groups. There was no significant difference in vonoprazan 10 mg (OR-0.33 CI (0.10-1.12); P=0.07; I²=48%) in reduction of bleeding occurrence, but vonoprazan 20mg (OR-0.24 CI (0.06-0.98); P=0.05; I²=19%) significantly reduced bleeding occurrence compared to lansoprazole.

Conclusions: Vonoprazan (10 mg and 20 mg) was as effective as lansoprazole in preventing NSAID-associated ulcer recurrence. Vonoprazan 20 mg is more effective than lansoprazole in preventing occurrence of bleeding.

Keywords: Vonoprazan, Nsaid ulcers, Recurrence, Meta-analysis

PUG-49

Lack of Association between *Helicobacter pylori* Infection and Diabetes: A Cohort Study

Jeung Hui Pyo¹, Hyuk Lee², Sung Chul Choi¹, Yoon-Ho Choi¹, Yang Won Min², Byung-Hoon Min², Jun Haeng Lee², Kyunga Kim³ and Jae J Kim²

¹Center for Health Promotion, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea,

²Department of Medicine, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea,

³Statistics and Data Center, Research Institute for Future Medicine, Samsung Medical Center, Seoul, Korea

Background/aims: *Helicobacter pylori* (*H. pylori*) infection has been reported to increase the risk for onset and progression of type 2 diabetes mellitus, as well as complications, but the relationship remains controversial. The aim of this study was to investigate the association between *H. pylori* infection and the risk of type 2 diabetes, impaired glucose tolerance (IGT), diabetic nephropathy, and glycemic control.

Methods: We performed a retrospective cohort study of 16,091 subjects without diabetes at baseline who underwent repeated health examinations. Subjects were categorized as seropositive and seronegative for *H. pylori*. Hazard ratio (HRs) and 95% confidence intervals (CIs) were calculated using Cox proportional hazard modelling.

Results: During the follow-up period of 107,809.7 person-years, 1,338 (8.3%) newly diagnosed cases of diabetes occurred. There was no statistically significant difference in cumulative incidences of diabetes between *H. pylori* seropositive and seronegative subjects. In the multivariate Cox proportional-hazards regression models adjusted for potential confounders, *H. pylori* seropositivity and diabetes (HR 1.02; 95% CI 0.89-1.16; p-value=0.834), IGT (HR 0.99; 95% CI 0.94-1.05; p-value=0.754), diabetic nephropathy (HR 0.99; 95% CI 0.82-1.20; p-value=0.934), or glycemic control (HR 1.05; 95% CI 0.91-1.23; p-value=0.496) were not significant.

Conclusions: In this large cohort study, the development, complication, or control of diabetes was not associated with *H. pylori*. The association between *H. pylori* and diabetes may have been confounded by lifestyle or metabolic factors.

Keywords: *Helicobacter pylori*, Diabetes mellitus, Impaired glucose tolerance, Diabetic nephropathy, Glycemic control

PUG-50

Safety and Efficacy of Endoscopic Submucosal Dissection on Patients with End Stage Renal Disease: Multicenter Study

In Kyung Yoo¹, Younkyung Oh², Young Ju Suh², Gwang Ho Baik³, Sun Moon Kim⁴, Young Dae Kim⁵, Chul-Hyun Lim⁶, Jung Won Jeon⁷, Su Jin Hong⁸, Byoung Wook Bang⁹, Joon Sung Kim¹⁰, Jun-Won Chung¹¹ and Chan Gyoo Kim¹²

¹Department of Gastroenterology, Cha Bundang Medical Center, Seongnam-Si, Korea, ²Department of Biomedical Sciences, Inha University, Incheon, Korea, ³Department of Internal Medicine, Hallym University College of Medicine, Chuncheon, Korea, ⁴Department of Internal Medicine, Konyang University Hospital, Seoul, Korea, ⁵Department of Internal Medicine, Inje University Sanggye Paik Hospital, Seoul, Korea, ⁶Department of Internal Medicine, The Catholic University of Korea Eunpyeong St. Mary's Hospital, Seoul, Korea, ⁷Department of Internal Medicine, Kyung Hee University Hospital at Gandong, Seoul, Korea, ⁸Department of Internal Medicine, Soonchunhyang University School of Medicine, Bucheon, Seoul, Korea, ⁹Department of Internal Medicine, Inha University College of Medicine, Incheon, Korea, ¹⁰Department of Internal Medicine, Incheon St. Mary's Hospital, College of Medicine, Incheon, Korea, ¹¹Department of Internal Medicine, Gachon University, Gil Medical Center, Incheon, Korea, ¹²Center for Gastric Cancer, National Cancer Center, Goyang, Korea

Background/aims: There is not much known about ESD for patients with end-stage renal disease (ESRD) on dialysis. This study aimed to assess the safety, efficacy, and clinical outcomes of gastric endoscopic resection in patients with ESRD compared to those in patients without.

Methods: Between February 2008 and December 2018, 47 ESRD patients and propensity score matched 470 non-ESRD patients who were treated by EMR or ESD for gastric neoplasia were enrolled. Their medical records were reviewed retrospectively. Clinical outcomes and complications were evaluated. Matching was performed using a 1:10 optimal matching algorithm. For matched data, clustered comparisons were performed using the GEE (generalized estimation equation).

Results: En bloc resection rates were similar between ESRD group and control group ($p=0.14$), although complete resection rates (86.96%) of ESRD group were lower than that of control group (94.69%, $p=0.04$). Post ESD bleedings were more frequent in ESRD group (25.53% vs 5.32%, $p<0.001$). All post ESD bleedings were controlled by endoscopic hemostasis but a patient of control group received surgery. There was no perforation in ESRD group (0% vs 1.49%, $p=0.40$). In a multivariate logistic analysis, hemodialysis was a most significant predictor for bleeding risk (OR 6.29; 95% CI 3.17-12.45; $p<0.001$) after endoscopic resection.

Conclusions: Endoscopic resection for the treatment of early gastric neoplasia may be feasible in the patients with ESRD, although post-ESD bleeding risk is higher than control group.

Keywords: End stage renal disease, Endoscopic resection, Bleeding

PUG-51 

Clinical Significance of Regional Lymph Node Enlargement in Patients with Egc within the Expanded Criteria for ESD

Woojin Jeong¹, Jong Kyu Park¹, Dong Seok Lee² and Sang Jin Lee¹

¹Department of Internal Medicine, Gangneung Asan Hospital, Gangneung, Korea, ²Department of Internal Medicine, Seoul National University Boramae Medical Center, Seoul, Korea

Background/aims: Lymph node (LN) metastasis is negligible in early gastric cancer (EGC) within expanded criteria for endoscopic submucosal dissection (ESD). However, regional lymph nodes in abdominal CT scans are sometimes enlarged in patients with EGC within the expanded criteria for endoscopic submucosal dissection (ESD). In this study, we investigated the clinical significance of regional lymph node enlargement on abdominal CT scan in patients with EGC within the expanded criteria for ESD.

Methods: From December 2010 to April 2015, among 301 patients with EGC within the ESD expanded criteria, 47 patients with regional lymph node enlargement shown by abdominal CT scan were prospectively enrolled. We performed surgical resection or periodic follow-up with abdominal CT scans and upper endoscopy every 6 months to evaluate whether the enlarged lymph nodes are due to metastasis or a reactive change.

Results: The mean age of the 47 patients (36 males, 11 female) was 65.1 years. The enlarged lymph nodes were usually single (26/47, 44.6%) and sized as follows: 7 nodes were ≤ 5 mm, 23 were 6-10 mm, and 17 were ≥ 10 mm. Four of the 47 patients initially underwent surgical resection, and 8 patients underwent surgical resection after ESD. However, there was no lymph node metastasis in surgical specimens. Thirty-five patients received ESD and periodically followed up at a median duration of 57 months (range: 36-88 month). The enlarged lymph node disappeared in 12 of 35 patients, decreased in 9 patients and remained the same size in 13 patients, and increased in 1 patient.

Conclusions: Regional lymph node enlargement on abdominal CT scan in patients within expanded criteria for ESD of EGC may be not due to metastasis but a reactive change.

Keywords: Early gastric cancer, Lymph node enlargement, Endoscopic resection

PUG-52

A Case of Intramural Esophageal Dissection Combined with Extensive Pneumomediastinum after Endoscopy

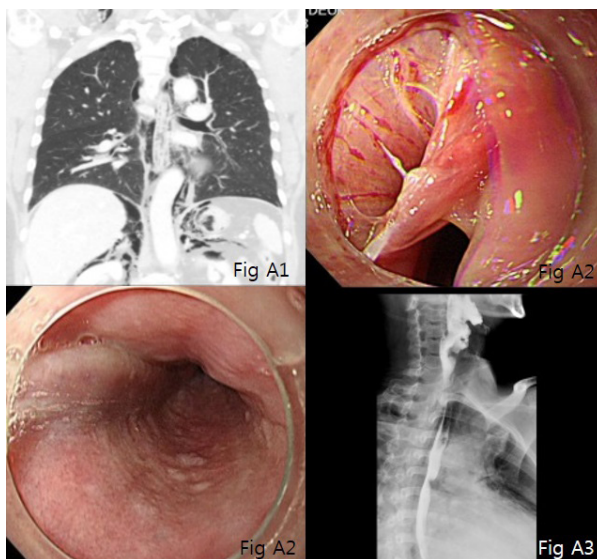
Young Ki Kim, Hyung-Keun Kim, Hyun Ho Choi, Hiun Suk Chae, Sung Soo Kim, Sang Woo Kim, Sung Chul Cho, Woo-Jung Kim and Seon-Bin Yoon

Internal Medicine, Uijeongbu St Mary's Hospital, Uijeongbu, Korea

Intramural esophageal dissection (IED) is a rare disease in which submucosal and muscle layer are separated by mucosal injury and hemorrhage. It is known to occur spontaneously as well as mechanical damage such as foreign body and endoscopy. We report a rare case of iatrogenic IED complicated with pneumomediastinum and successfully improved by conservative management.

A 53 years old male was hospitalized with chest pain, which began after the esophagogastroduodenoscopy (EGD) in local clinic. Chest CT showed submucosal air collection along the esophageal field, accompanied by pneumomediastinum and pneumoperitoneum (Fig A1). EGD was performed, and submucosal dissection was observed in the right lower of the left pyriform sinus and no clear perforation was observed (Fig A2). Because the vital signs were stable and CT showed no sign of a distinct mediastinitis, conservative treatment with antibiotics were performed. After two days, esophagography was performed, and there was no evidence of contrast leakage (Fig A3). Seven days later, previous esophageal submucosal air and pneumomediastinum were all disappeared and only a small amount of pneumomediastinum was observed on chest CT. The patient was discharged 11 days after, and is currently under follow-up without any complications.

Keywords: Intramural esophageal dissection, Pneumomediastinum



PUG-53

Clinical Outcomes of Metachronous Gastric Cancer after Endoscopic Resection for Early Gastric Cancer

Jue Lie Kim¹, Sang Gyun Kim¹, Jung Kiim², Jae Yong Park³, Hyo-Joon Yang⁴, Hyun Ju Kim⁵ and Hyunsoo Chung¹

¹Department of Internal Medicine and Liver Research Institute, Seoul National University College of Medicine, Seoul, Korea, ²Division of Gastroenterology, Department of Internal Medicine, Armed Forces Capital Hospital, Gyeonggi, Korea, ³Division of Gastroenterology, Department of Internal Medicine, Chung-Ang University Hospital, Seoul, Korea, ⁴Division of Gastroenterology, Department of Internal Medicine and Gastrointestinal Cancer Center, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea, ⁵Health Promotion Center, Seoul National University Hospital, Seoul, Korea

Background/aims: Patients treated with endoscopic submucosal dissection (ESD) for early gastric cancer (EGC) have a risk of metachronous gastric cancer (MGC). The aim of this study was to evaluate the clinical outcomes of MGC after ESD for EGC between re-ESD and surgery group.

Methods: A total of 1510 patients who underwent ESD for EGC from January 2005 to May 2014 were retrospectively reviewed, and 112 patients with MGC were analyzed according to the type of treatment; re-ESD and surgery group. Clinicopathological factors affecting the subsequent treatment and long-term outcomes of MGC were evaluated.

Results: The median duration to development of MGC was 47 months. In multivariate analysis, lower body mass index (BMI) ($p=0.037$), multiplicity ($p=0.014$) of index cases were significantly associated with subsequent surgery for MGC. In cases of MGC, diffuse or mixed type of Lauren ($p=0.009$), depth of tumor invasion over mucosa ($p=0.001$), upper location of stomach ($p=0.049$) were associated with surgery group. Overall survival was significantly lower in surgery than re-ESD group after treatment for MGC (Log Rank test; $p=0.01$).

Conclusions: Lower BMI and multiplicity of index cancer were significantly associated with surgical resection of MGC. Close follow-up is mandatory to minimize additional treatment for cases with high risk of advanced MGC after ESD for EGC.

Keywords: Early gastric cancer, Endoscopic submucosal dissection, Metachronous gastric cancer, Surgery, Survival rate

PUG-54



Risk Factors of Non-Curative Resection with Early Gastric Cancer after Endoscopic Resection: ESD Research Group

Si Hyung Lee¹, Seung Woo Jeon², Kang Nyeong Lee³, Jong Jae Park⁴ and Su Jin Hong⁵

¹Internal Medicine, Yeungnam University, Daegu, Korea, ²Internal Medicine, Kyungpook National University School of Medicine, Daegu, Korea, ³Internal Medicine, Hanyang University College of Medicine, Seoul, Korea, ⁴Internal Medicine, Korea University College of Medicine, Seoul, Korea, ⁵Internal Medicine, Soonchunhyang University College of Medicine, Bucheon, Korea

Background/aims: Endoscopic submucosal dissection (ESD) is accepted as a standard treatment in early gastric cancer. The purpose of this study was to investigate the risk factors and long-term clinical outcomes of non-curative resection in a large-scale population.

Methods: We retrospectively analyzed the clinical data of 3,094 patients who underwent ESD of early gastric cancer from March 2005 to March 2018 in 13 institutions in Korea. First, we analyzed the risk factors for non-curative resection and for local recurrence after ESD of early gastric cancer. And then, we analyzed the difference in overall survival rate (OS) and disease-specific survival rate (DSS) between curative resection and non-curative resection with no additional treatment.

Results: In this study, non-curative resection rate was 21.4% (661/3,094). In terms of tumor characteristics, undifferentiated carcinoma, upper third location, large tumor, ulceration, and submucosal (SM) invasion were more frequent in the non-curative resection group. In multivariate regression analysis, risk factors affecting non-curative resection of ESD were old age, undifferentiated tumor, location of tumor at upper part, tumor size of ≥ 2 cm, and the presence of an ulcer. In the Cox proportional hazards regression analysis, a tumor size of ≥ 2 cm, SM invasion, horizontal margin positive, and lymphovascular invasion were risk factors for local recurrence. In the Kaplan-Meier analysis of the OS and DSS of the curative resection group and non-curative resection with no additional treatment group, there was no statistically significant difference in OS between the two groups (Log rank $P=0.788$) and DSS was significantly lower in the non-curative resection group (Log rank $P=0.038$).

Conclusions: The clinician should be aware of risk factors for non-curative resection and local recurrence in ESD of early gastric cancer, and should consider additional treatment when non-curative resection occurs.

Keywords: Stomach neoplasm, Endoscopic submucosal dissection, Incomplete resection, Follow-up

PUG-55

Facial Hemiparesis and Oropharyngeal Dysphagia Developed after Endoscopic Hemostasis: A Case Report

Heung up Kim, Soo-Young Na, Sun-Jin Boo and Hyun Joo Song

Internal Medicine, Jeju National University School of Medicine, Jeju, Korea

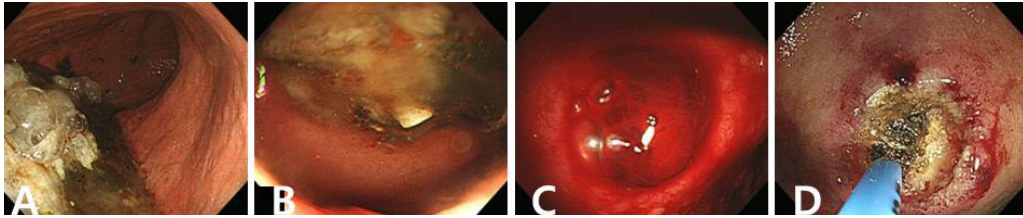
It is common to stop antiplatelet therapy to prevent further bleeding in the case of active upper gastrointestinal bleeding. However, there is a possibility of embolism or infarct associated with discontinuation of anti-platelet agents.

A 75-year-old man visited ER with 2 days of melena. He had a history of diabetes mellitus, hypertension. He also had coronary stent due to angina and took aspirin and clopidogrel. Initial vital signs were blood pressure 97/70 mmHg, heart rate 89/min, respiration rate 20/min, body temperature 36.5. Immediately after the ER visit, aspirin and clopidogrel were stopped. The first endoscopic trial failed because of retained food material. On the second look endoscopy performed at the next morning, active duodenal ulcer bleeding was found and successfully treated with electrocautery and argon plasma coagulation.

After endoscopic treatment, the patient complained of throat pain and mild right facial numbness, but the physician considered it as a temporary symptom and reassured. On the fourth admission day, the patient complained a typical oropharyngeal dysphagia. MR brain images showed a distinct left lateral medullary infarction. So the patient transferred to department of neurology and rehabilitation to treat the sequelae. During the 2-year observation period, the patient's dysphagia had improved, but the sensory abnormality of the right face and left body persisted.

Discontinuation of antiplatelet agents in the patient with acute upper gastrointestinal bleeding may causes embolism or infarct. The possibility of lateral medullary infarction should be considered in patients with unilateral facial palsy and oropharyngeal dysphagia after endoscopic treatment.

Keywords: Peptic ulcer bleeding, Endoscopic hemostasis, Anticoagulant, Cerebral infarction, Complications



Endoscopic photography. A-B, Endoscopy taken at the first hospital day failed due to food material. C-D, Active duodenal ulcer bleeding was detected and treated with electrocautery and argon plasma coagulation at the second hospital day.



Magnetic resonance images of brain. Typical findings of acute right lateral medullary infarction is seen. Arrow denote the lesion.

PUG-56

Comparison of Endoscopic Submucosal Dissection and Surgery for Early-Stage Esophageal Squamous Cell Carcinoma

Hyun Deok Lee, Hyunsoo Chung, Sang Gyun Kim, Soo-Jeong Cho, Ayoung Lee, Jue Lie Kim and Jinju Choi

Department of Internal Medicine and Liver Research Institute, Seoul National University College of Medicine, 103 Daehak-Ro, Jongno-Gu, Seoul 03080, Korea

Background/aims: Endoscopic submucosal dissection (ESD) is widely accepted treatment option for early-stage esophageal squamous cell carcinoma (SCC). Aim of this study was to compare overall survival (OS), disease specific survival (DSS) and rate of recurrence of such patients underwent ESD or surgery.

Methods: We retrospectively reviewed patients who underwent ESD or surgery for stage Tis-T1 esophageal SCC in Seoul National University Hospital from January 2005 to December 2017. To minimize selection bias, propensity score-matched analysis was used to compare OS, DSS, rate of recurrence and adverse event (Figure 1).

Results: In overall study population, there were significant differences in histologic differentiation, tumor size, depth of invasion, LV 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 (97.2% vs 97.2%; $P=1.00$), DSS (100.0% vs 97.2%; $P=1.00$), rate of recurrence (8.3% vs 11.1%; $P=1.00$) and adverse event (30.6% vs 47.2%; $P=0.147$) were comparable between the 2 groups. Hospital stay was shorter among patients who received ESD (3.58 days vs 29.2 days; $P=0.00$) (Table 1).

Conclusions: Long term outcomes of ESD comparable with surgery in patients with stage Tis and T1 esophageal squamous cell carcinoma.

Keywords: Esophageal squamous cell carcinoma, Endoscopic submucosal dissection, Propensity score-matched analysis

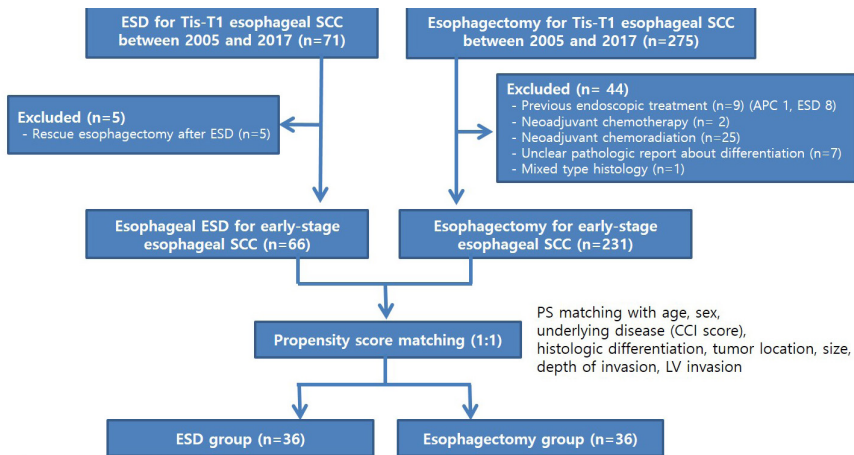


Figure 1. Patients flow diagram.

Table 1. Characteristics of patients with ESD and surgery for early-stage esophageal cancer

Variables	Before PS matching			After PS matching		
	ESD (n=66)	Op (n=231)	P value	ESD (n=36)	Op (n=36)	P value
Age, y	66.7 (±7.9)	66.7 (±8.0)	0.314	67.7 (±8.2)	66.3 (±9.3)	0.512
Sex						
Male	61 (92.4%)	219 (94.8%)	0.547	34 (94.4%)	34 (94.4%)	1.000
Female	5 (7.6%)	12 (5.2%)		2 (5.6%)	2 (5.6%)	
Charlson Comorbidity index						
0	40 (60.6%)	133 (57.6%)	0.875	21 (58.3%)	22 (61.1%)	0.839
1	13 (19.7%)	52 (22.5%)		6 (16.7%)	7 (19.4%)	
≥2	13 (19.7%)	46 (19.9%)		9 (25.0%)	7 (19.4%)	
Tumor location						
Cervical esophagus	0 (0.0%)	1 (0.4%)	0.378			0.375
Upper thoracic	2 (3.0%)	9 (3.9%)		1 (2.8%)	2 (5.6%)	
Middle thoracic	28 (42.4%)	74 (32.0%)		12 (33.3%)	15 (41.7%)	
Lower thoracic	34 (51.5%)	139 (60.2%)		21 (58.3%)	17 (47.2%)	
EGJ	2 (3.0%)	8 (3.5%)		2 (5.6%)	2 (5.6%)	
Tumor size	16.8 (±9.0)	28.6 (±16.5)	0.000	18.2 (±10.2)	16.3 (±8.1)	0.388
Differentiation						
High grade dysplasia	34 (51.5%)	16 (6.9%)	0.000	13 (36.1%)	11 (30.6%)	0.882
Well	21 (31.8%)	33 (14.3%)		11 (30.6%)	12 (33.3%)	
Moderate	12 (16.7%)	161 (69.7%)		12 (33.3%)	13 (36.1%)	
Poorly	0 (0.0%)	21 (9.1%)				
Depth of tumor invasion						
pTis	35 (53.0%)	15 (6.5%)	0.000	13 (36.1%)	11 (30.6%)	0.798
pT1a	24 (36.4%)	73 (31.6%)		17 (47.2%)	17 (47.2%)	
pT1b	7 (10.6%)	143 (61.9%)		6 (16.7%)	8 (22.2%)	
LV invasion (+)	4 (6.1%)	52 (22.5%)	0.003	1 (2.8%)	2 (5.6%)	1.000
LM metastasis	N/A	60 (26.0%)	N/A	N/A	2 (5.6%)	
RO resection	55 (83.3%)	217 (93.9%)	0.006	29 (80.6%)	35 (97.2%)	0.055
f/u duration (mean, month)	34.1 (±25.3)	49.8 (±33.8)	0.001	36.7 (±28.2)	52.5 (±30.0)	0.025
Overall adverse event	15 (22.4%)	120 (51.9%)	0.000	11 (30.6%)	17 (47.2%)	0.147
Hospital stay (mean, days)	3.4 (±1.9)	29.3 (±32.1)	0.000	3.58 (±2.17)	29.2 (±32.8)	0.000
All cause mortality	1 (1.5%)	19 (8.2%)	0.055	1 (2.8%)	1 (2.8%)	1.000
Disease specific mortality	0 (0.0%)	9 (3.9%)	0.215	0 (0.0%)	1 (2.8%)	1.000
Recurrence	4 (6.1%)	54 (23.4%)	0.002	3 (8.3%)	4 (11.1%)	1.000

PUG-57

Gastric Neuroendocrine Tumor of Rindi Type 3 has a Higher Incidence and a Benign Prognosis in Korea

Sunah Suk, Soo Yeon Choi, Dae Young Cheung, Jin Il Kim, Soo-Heon Park and Yunjung Park

Department of Internal Medicine, Yeouido St. Mary's Hospital, the Catholic University of Korea College of Medicine, Seoul, Korea

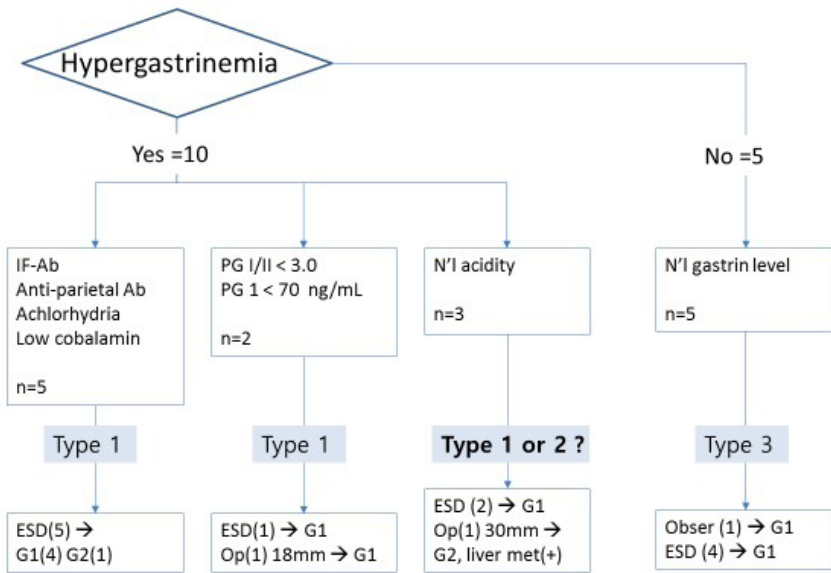
Background/aims: Gastric neuroendocrine neoplasms come from enterochromaffin-cell-like cell hyperplasia. ECL cell hyperplasia is attributed to hypergastrinemia and gastric mucosal atrophy. *H. pylori* infection is most responsible for atrophic gastritis and might possibly contribute to gastric NEN.

Methods: Patients with gastric NEN were enrolled from Jan 2012 to Mar 2018 consecutively. Medical records were reviewed by using electronic data base.

Results: During the study period, a total of 34 subjects presented 37 NENs. 19 subjects were excluded due to incomplete work up for gastrin level and gastric atrophy status. Finally, data from 15 subjects were analyzed. *H. pylori* infection was positive 1/10 subjects (10%) and atrophic gastritis was evident in 7/15 subjects (47%). Mean tumor size was 9.9 mm (\pm 8.1 mm). Hypergastrinemia was identified in 9 subjects (60%) and imposed Rindi type 1. Six subjects (40%) with gastrin level within normal limit are classified Rindi type 3, but microscopic examination showed well differentiated neoplasm and Grade 1 proliferation for all.

Conclusions: *H. pylori* infection showed no significant contribution for the development of gastric NEN. Sporadic gastric NEN with normal serum gastrin level, Rindi type 3, revealed higher incidence than that of Western studies and benign nature in histology.

Keywords: *Helicobacter pylori*, Neuroendocrine neoplasm, Rindi classification



PUG-58

Five-Year Progress of Gastric Mucosa-Associated Lymphoid Tissue Lymphoma Presenting as Gastric Outlet Obstruction

Soo Yeon Choi, Dae Young Cheung, Yun Jung Park, Sun Ah Suk, Jin Il Kim and Soo Heon Park

Internal Medicine, The Catholic University of Korea College of Medicine, Seoul, Korea

Background: We report a case of gastric MALT lymphoma presenting as gastric outlet obstruction (GOO).

Case: A 74-year-old woman visited the clinic for vomiting.

4 years and 5 months ago she had visited for anemia. Upper endoscopy revealed gastric ulcers. Histology showed chronic inflammation with *H. pylori*. Before the histology reported, she was prescribed with acid suppressant and became lost to follow-up.

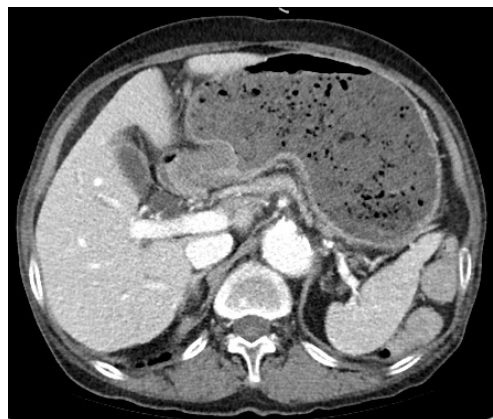
2 years and 8 months ago she revisited for aggravated gastric ulcers with *H. pylori* infection. She was prescribed for *H. pylori* eradication and lost again. Final histology was MALT lymphoma.

At this time, gastric ulcers showed nodular base. Antrum were narrowed. Food stuffing the body suggested GOO. CT and PET scan showed full layered encircling mass with high FDG uptake in antrum and enlarged mesenteric lymph nodes.

Laparoscopic distal gastrectomy with lymph node dissection were 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: Mucosa-associated lymphoid tissue lymphoma, Stomach, Gastric outlet obstruction



PUG-59

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

Sunah Suk¹, Dae Young Cheung¹, Yujung Park¹, Jae Young Cho¹, Dong Jin Kim², Jin Il Kim¹, Soo-Heon Park¹ and Wook Kim²

¹Department of Internal Medicine, The Catholic University of Korea College of Medicine, Seoul, Korea, ²Department of Surgery, The Catholic University of Korea College of Medicine, Seoul, Korea

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 Dec 2018.

Results: Among the 35 patients with dNETs, 12 were excluded, follow-up loss (3), transfer-out (2), treatment refusal (2), invisible after forceps biopsy (2), poorly differentiated histology (2), and the presence of metastatic lesion (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, 3 with surgery only and 4 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

PUG-60

Accuracy of Endoscopic Ultrasound for Superficial Esophageal Cancer Prior to Endoscopic Submucosal Dissection

Jinju Choi, Hyunsoo Chung, Ayoung Lee, Jue Lie Kim, Hyun Deok Lee, Soo-Jeong Cho and Sang Gyun Kim

Internal Medicine, Seoul National University Hospital, Seoul, Korea

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 and we aimed to estimate the practicality of endoscopic ultrasound (EUS) to determine clinical T stage.

Methods: We included superficial esophageal cancers treated with surgical resection or ESD between 2005 and 2018. Full pathologic reports were reviewed retrospectively and pathologic T staging was compared to clinical stage evaluated by EUS.

Results: Among 317 superficial esophageal cancer cases, 257 cancers were resected surgically and 60 cancers were treated with ESD. 154 (48.6%) cancers were staged as pT1a and 93/154 (60.4%) pT1a tumors were correctly classified as clinical T1a and sensitivity and specificity of EUS for evaluating the presence of submucosal invasion were 82.2% and 60.4% respectively. EUS accuracy of T1a staging was better for good histologic type using miniprobe.

Conclusions: EUS can provide therapeutic strategy for selecting early esophageal cancers that can be treated endoscopically. For better accuracy, miniprobe can be used and additional modalities should be considered.

Keywords: Endoscopic ultrasound, Superficial esophageal cancer, Endoscopic ultrasound

EUS	pT1a	pT1b
Underestimation, N (%)	-	29 (17.8%)
Accurate, N (%)	93 (60.4%)	72 (44.2%)
Overestimation, N (%)	61 (39.6%)	62 (38.0%)
Total	154	163

Pathologic versus clinical EUS T staging.

	Correct cT	Overestimated cT	
Age (years)	66.43	64.05	P=0.067
Sex, N(%)			P=0.506
Male	84(90.3%)	53 (86.9%)	
Female	9(9.7%)	8 (13.1%)	
Smoking, N(%)			P=0.147
Never smoker	61 (65.6%)	33(54.1%)	
Ex-smoker	14(18.7%)	17 (27.9%)	
Current smoker	18 (19.4%)	11(18.0%)	
Probe, N(%)			P<0.001
Conventional	44(48.4%)	51 (83.6%)	
Miniprobe	47(51.6%)	10 (16.4%)	
Location, N(%)			P=0.183
Upper	2 (2.2%)	2 (3.4%)	
Middle	31 (34.4%)	14 (23.7%)	
Lower	55(61.1%)	38 (64.4%)	
GE junction	2 (2.2%)	5 (8.5%)	
Gross type, N(%)			P=0.110
Superficial	73 (85.9%)	42 (75.0%)	
Ulcerative	11 (12.7%)	10 (17.9%)	
Protruding	1 (1.2%)	4 (7.1%)	
Tumor size (mm)	19.52	22.78	P=0.189
pN staging, N(%)			P=0.199
0	42 (100.0%)	57 (95.0%)	
1-4	0 (0.0%)	3 (5.0%)	
Histology N(%)			P=0.001
High grade dysplasia	35(40.2%)	6 (10.9%)	
SqCC W/D	20 (23.0%)	17 (30.9%)	
SqCC MP/D	32 (36.8%)	32 (58.2%)	
L invasion, N(%)			P=0.348
Absent	80 (97.6%)	56 (94.9%)	
Present	2 (2.4%)	3 (5.1%)	
V invasion, N(%)			
Absent	82 (100.0%)	59 (100.0%)	
Present	0 (0.0%)	0 (100.0%)	
PN invasion, N(%)			
Absent	82 (100.0%)	59 (100.0%)	
Present	0 (0.0%)	0 (100.0%)	

SqCC; Squamous cell carcinoma, W/D; well differentiated
MP/D; moderate-to-poorly differentiated, L; lymphatic, V; vascular, PN; perineural

Comparison of baseline characteristics between two T1 esophageal cancer groups divided by EUS result.

PUG-61

Endoscopic Submucosal Dissection for Undifferentiated-Type Early Gastric Cancer. A Meta-Analysis

Ayoung Lee, Hyunsoo Chung, Jue Lie Kim, Jinju Choi, Hyun Deok Lee, Soo-Jeong Cho and Sang Gyun Kim

Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea

Background/aims: To evaluate the efficacy, safety and survival of endoscopic submucosal dissection (ESD) for undifferentiated-type early gastric cancer (UD-EGC).

Methods: A systematic literature review was conducted using the core databases. En-bloc resection, complete resection, curative resection, overall recurrence, overall adverse event, overall survival rate (OSSR) and disease-free survival rate (DFSR) were extracted and analyzed. A random effect model was applied. The methodological quality was assessed using the Newcastle-Ottawa Scale. Publication bias was evaluated using a funnel plot.

Results: Nineteen retrospective studies between from inception to April, 2019 were identified (1,536 EGC lesions with UD-EGC). The total en-bloc resection, complete resection and total curative resection rates were estimated as 93.5% (95% CI: 0.901-0.958), 80.0% (0.728-0.856), and 63.0% (0.510-0.736), respectively. The overall recurrence and adverse event rate were 7.3% (0.049-0.109) and 9.3% (0.076-0.114). The OSSR after ESD and after curative ESD are 93.7% and 95.0%. The DFSR after ESD and after curative ESD are 98.0% and 98.5%.

Conclusions: ESD for small (<2 cm) intramucosal UD-EGC was also feasible and showed an excellent survival rate. Further prospective studies to compare the therapeutic outcome between surgery and ESD are needed.

Keywords: Undifferentiated-type, Early gastric cancer, Endoscopic mucosal dissection, Meta-analysis

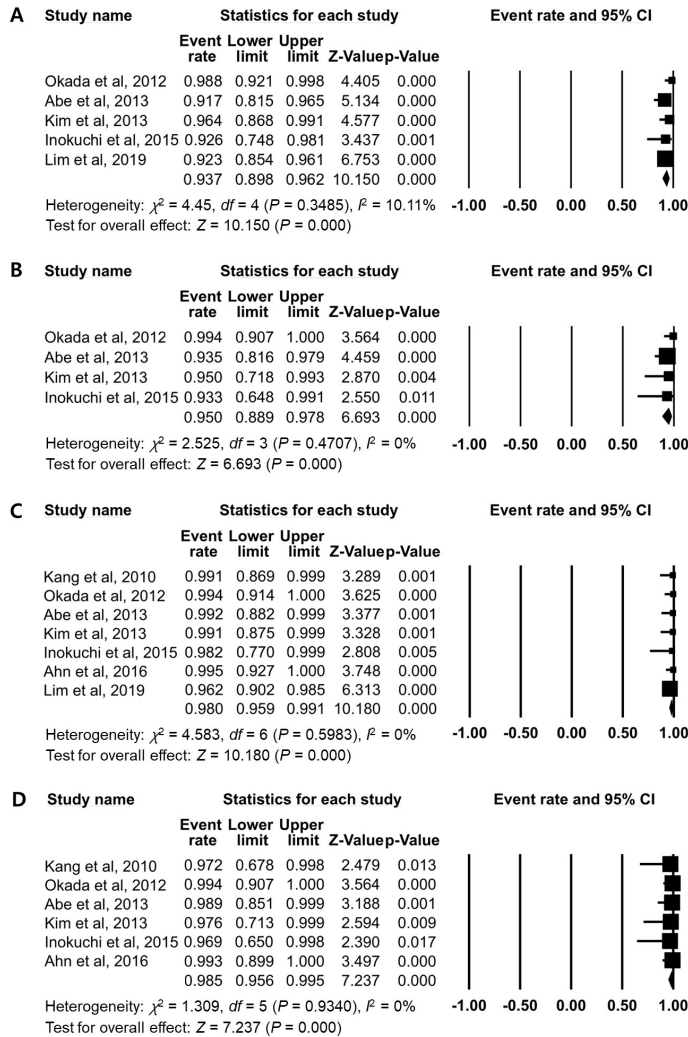


Figure 1. Enrolled studies A: Overall survival rate with ESD; B: Overall survival rate with curative ESD; C: Total disease-free survival rate; D: Total disease-free survival rate with curative ESD

PUG-62

Clinical Outcomes of Endoscopic Resection for Low-Grade Dysplasia & High-Grade Dysplasia on Gastric Pretreatment Biopsy

Jung Won Jeon¹, Sun Moon Kim¹, Cheol Hyun Lim¹ and Gwang Ho Baik¹

¹Internal Medicine, Kyung Hee University, Seoul, Korea, ²Internal Medicine, Kun Yang University, Daejeon, Korea, ³Internal Medicine, Catholic University, Seoul, Korea, ⁴Internal Medicine, Hallym University, Chuncheon, Korea

Background/aims: A portion of gastric low-grade dysplasias (LGDs) and high-grade dysplasias (HGDs) on forceps biopsy (FB) are diagnosed as early gastric cancer (EGC) after endoscopic resection (ER). This study aims to evaluate the clinical outcomes of ER for gastric LGD and HGD on pretreatment forceps biopsy (FB) and factors to predict the pathologic upstage to EGC.

Methods: From March 2005 to February 2015, patients who underwent ER for LGD and HGD on pretreatment FB in 14 hospitals in South Korea were enrolled, and medical records of patients involved in this study were reviewed retrospectively.

Results: 2150 patients diagnosed as LGD and 1534 patients diagnosed as HGD by pretreatment FB were underwent ER. 589 cases of 2150 LGD cases (27.4%) were diagnosed with EGC after ER. Helicobacter pylori infection, smoking history, tumor location in middle third of stomach, tumor lesion size ≥ 10 mm, depressed lesion, and the presence of ulcer significantly predicted EGC. 1129 cases of 1534 HGD cases (72.7%) were diagnosed with EGC after ER. previous Hx of G cancer, Helicobacter pylori infection, smoking history, tumor location in upper third of stomach, tumor lesion size ≥ 10 mm, depressed lesion and the presence of ulcer were significantly associated with EGC. Furthermore, an increasing number of risk factors was significantly associated with an increasing rate of upstage diagnosis to EGC.

Conclusions: Endoscopic resection should be recommended in cases of LGD and HGD showing factors to predict pathologic upstage to EGC. Furthermore, an increasing number of factors to predict pathologic upstage to EGC was significantly associated with an increased rate of diagnosis to EGC.

Keywords: Low-grade dysplasia, High-grade dysplasia, Endoscopic resection, Early gastric cancer, Risk factors

PUG-63

Role of Interstitial Cells of Cajal on Gastric Slow Wave Patterns during Gastric Electrical Stimulation

Han Jo Jeon, Hoon Jai Chun, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee and Chang Duck Kim

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/aims: Gastric electrical stimulation (GES), which has been reported to have therapeutic potentials for gastroparesis. However, effective application methods of GES on stomach is not defined. The Interstitial cells of Cajal (ICC) are recognized as mediators of neuromuscular transmission in the gastrointestinal tract and as pacemakers involved in the modulation of gastrointestinal motility. We aimed to investigate the efficacy of GES according to distribution of ICC in various gastric lesions of porcine models.

Methods: The study was performed in healthy fasted weaner pigs surgically implanted with gastric serosal electrodes and endoscopically applied electrodes. The experiment consisted of a 10-minute baseline, a 10-minute GES, and a 10-minute recovery. Acquisition of gastric electrical signals was performed before, during, and after electrical stimulation. A multi-channel recorder (Acknowledge 4.4, MP150; Biopac Systems, Santa Barbara, CA) was used to record gastric myoelectrical activity throughout the study. Immunohistochemical labelling of interstitial cells of Cajal was performed using an anti-Kit antibody.

Results: The number of c-kit (+) cells appeared to be 12.13 ± 6.02 in the fundus, 18.93 ± 11.93 in the body, and 23.04 ± 6.86 in the antrum when observed at high-power magnification. Electrogastrogram recordings demonstrated that elevated frequency amplitude ratio with increased density of c-kit (+) cells during gastric electrical stimulation.

Conclusions: Intensity and distribution of interstitial cells of cajal in gastrointestinal tract might affect gastric slow wave patterns during electrical stimulation.

Keywords: Cajal, Interstitial cell, Gastric slow wave, Gastric electrical stimulation, C-kit

PUG-64

Waist Circumferences Is the Independent Risk Factor of the Esophagitis Diagnosed by National Cancer Screening Program

Yong Kang Lee¹, Jeong Hun Seo¹, Byung Kyu Park¹, Yong Seok Cho¹, Sang Yun Shin¹ and Jung Hwa Hong²

¹Department of Internal Medicine, National Health Insurance Service Ilsan Hospital, Goyang, Korea, ²Institute of Health Insurance & Clinical Research, National Health Insurance Service Ilsan Hospital, Goyang, Korea

Background/aims: This study was performed to clarify the association between metabolic syndrome and the asymptomatic reflux esophagitis and to find out which one of the diagnostic criteria of the metabolic syndrome is mostly correlate with asymptomatic reflux esophagitis.

Methods: The study subjects were an adult population who visited a National Health Insurance Ilsan hospital for national cancer screening program of Korea from March 2011 to December 2016. Among 101,435 screened, 9,117 (8.98%) subject diagnosed with reflux esophagitis. One to one propensity score-matched 8,537 pairs of with and without esophagitis subjects were compared.

Results: Mean age was 58.8 years old. Male were two third (70.7%). A half of the subjects were non-smokers (48.3%) and one third responded to the questionnaire as they are moderate alcohol consumer (32.3%, >80 g of ethanol per week). Proportion of subjects accompanied with hiatus hernia was about 8.4%. Metabolic syndrome was more prevalent in esophagitis group (45.3% vs. 53.6%; $P<0.001$). The esophagitis groups showed higher rate with fulfilment of a diagnostic criterion of waist circumferences in metabolic syndrome (17.7% vs. 23.0% in men and 9.6% vs. 12.9% in women; All $P<0.001$). As waist circumference increased, the grade of reflux esophagitis became more severe, assessed by the trend test ($P=0.003$). Unadjusted odds ratio of metabolic syndrome for esophagitis was 1.512 (95% CI 0.944-2.244; $P=0.085$). Adjusted odds ratios of waist circumferences for esophagitis was 1.355 (95% CI 1.017-1.807; $P=0.382$).

Conclusions: Waist circumference is a reliable predictive factor for the prevalence and severity of asymptomatic reflux esophagitis.

Keywords: Gastroesophageal reflux diseases, Asymptomatic reflux esophagitis, Metabolic syndrome, Waist circumferences

PUG-65

Efficacy of Da-5204 for Gastroesophageal Reflux Disease: A Randomized, Double-Blind, Placebo-Controlled Pilot Study

Jae Ho Cho, Hyun Ik Shim, Hyuk Yoon, Cheol Min Shin, Young Soo Park, Nayoung Kim and Dong Ho Lee

Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea

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 2 groups: pantoprazole 40mg 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 ($\geq 50\%$ reduction) of reflux symptoms using Gastroesophageal Reflux Disease Questionnaire (GerdQ) questionnaire.

Results: Final analyses included 29 patients with the DA-5204 group and 30 patients with the placebo group. At weeks 4, there was a significant 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

PUG-66

Endoscopic Submucosal Tunnel Dissection for Esophagogastric Subepithelial Tumors: Flap Necrosis or Flap Detachments

Sang Youn Lim, Jong-Jae Park, Beom Jae Lee, Moon Kyung Joo, Jae Seon Kim and Hyo Jung Kim

Department of Internal Medicine, Korea University Guro Hospital, Seoul, Korea

Background/aims: Recently, endoscopic resection of esophageal or gastric subepithelial tumors (SETs) originating from the muscularis propria (MP) by endoscopic submucosal tunnel dissection (ESTD) method has been introduced for maintenance of the GI tract mucosal integrity. We aimed to evaluate the incidence of flap necrosis or incomplete sealing of flap after ESTD method for resection of upper gastrointestinal (UGI) SETs originating from MP layer.

Methods: Between January 2012 and January 2018, 25 patients who presented with UGI SETs located in the stomach (n=23) and esophagus (n=2) were treated by ESTD method. A submucosal tunnel was endoscopically created by dissecting 4cm from the lesion. After careful dissection of the tumor from the surrounding submucosal tissue and the unaffected MP layer, the SETs were completely removed using insulated tip (IT) knife. The mucosal entrance of the tunnel was closed using endoclips after removal of tumor.

Results: En bloc resection rate was 91% (19/21). The mean tumor size was 17 mm (range 7-35 mm). The mean procedure time was 59 minutes (range 18-239 minutes). The histopathologic diagnoses were 9 gastrointestinal stromal tumors (GISTs) with low risk, 2 schwannomas, 3 leiomyomas, 1 angiodysplasia, 1 benign collagenous nodule, and 5 ectopic pancreas. A total of 9/21 cases (43%) had incomplete sealing of flap after ESTD. Among them, 1 SET was located in the esophagus, and 8 in the stomach (4; antrum, 3; body, 1; cardia).

Conclusions: ESTD for esophagogastric SETs could avoid the stricture of ESD site, but not always reduce the risk of postoperative GI tract leakage and secondary infection due to flap necrosis or flap detachment especially after procedure for gastric lesion.

Keywords: Endoscopic resection, Endoscopic submucosal tunnel dissection, Subepithelial tumor

PUG-67

Stenting of Cicatricial Stenosis of Esophagus in Children

Nodir Arifdjanov¹, Makhmud Aliev², Uktam Tilavov², Gulnora Adilova¹ and Bakhodir Karimov¹

¹Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Tashkent, ²Pediatric Surgery, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

Background/aims: To study the effectiveness of biodegradable stents in children with cicatricial stenoses of the esophagus.

Methods: We included 11 children in this study, aged 4 to 16 years. Stent implantation was performed under endoscopic X-ray control.

Results: Seven patients had postburn cicatricial stenosis of esophageal. Four patients had cicatricial stenosis after esophageal atresia repair. An X-ray examination revealed stenosis with a lumen diameter less than 3-4 mm. The effectiveness of this method of treatment depended to a large extent on the correctly selected characteristics of the stent: its length, radial force and diameter. As a result, stenting was able to keep the "physiological" lumen of the esophagus for more than 3 months, saving children from the need for repeated bougienage. In all patients in terms of stent biodegradation, a good dilating result was obtained. After 10 months, one patient underwent repeated bougienages along the restenosis guide with re-stenting, which resulted in a lasting positive effect. The remaining 10 patients after a single implantation of the stent in terms of 9-18 months have no dysphagia.

Conclusions: The use of biodegradable stents in the treatment of esophageal stenoses replace systematic bougienage and balloon dilatation and reduces the treatment time.

Keywords: Cicatricial stenosis, Postburn stenosis, Esophagus, Stenting, Biodegradable stent

PUG-68

Endoscopic Patterns of Ingested Foreign Bodies of Esophagus in Children

Khabibulla Akilov, Doniyor Asadullaev and Shoilkhom Shakhaydarov

Pediatric Surgery, Republican Scientific Center of Emergency Medicine, Tashkent, Uzbekistan

Background/aims: Purpose of this study was to analyze the characteristics of complicated forms of esophageal foreign body ingestions in children.

Methods: We analyzed data of 174 children diagnosed with ingested foreign bodies of esophagus in referral emergency center of Uzbekistan during 2017 to 2019. There were 94 boys and 80 girls. Patients at admission were performed X-Ray and upper GI endoscopy (UGIE). For the purposes of the present study, foreign body ingestions (FBI) categorized into the following major groups: button batteries (BBs), magnets, sharp/pointed objects, food impaction, and coins/blunt objects.

Results: The average age of children with FBI of esophagus were 4.32 ± 0.36 years. The most frequent complaints in admittance were nausea (64%), vomiting (60%) and hypersalivation (59%). 170 (98%) patients underwent endoscopic examinations. According to the UGIE coins are the most common ingested objects, found in 105 (62%) in children, esophageal food impaction was observed in 20 (11.7%) patients and pointed objects in 15 (8.8%) observations. Plastic products were found much less frequently - in 9 (5.3%) children, button batteries in 8 (5%), and magnet ingestions in 2 (1.2%) cases. In the remaining 9 observations foreign bodies not detected in the esophagus. Complications were noted in 7 (4%) patients with FBI in the esophagus. The mean age of patients with complications was 3.4 ± 2.26 years. Most often, complications ($n=5$; 2.8%) are noted among children with button batteries. In 2 cases (plastic toy and pointed bone) complications were also noted. 2 (1.15%) patients required open surgical interventions.

Conclusions: Coins are the most common ingested objects among children in the Uzbekistan. The likelihood of the development of severe complications in FBI of the esophagus was 3.4%, and it were more often occurred among children with magnet ingestions.

Keywords: Foreign body ingestion, Esophagus, Complications, Upper endoscopy, Children

PUG-69

Endoscopic Pneumatic Dilation for Pediatric Achalasia: Six-Year Experience from a Tertiary Endoscopy Center

Ariani Dewi Widodo¹, Ido Narpati Bramantyo², Cathline Freya Adhiwidjaja³, Budi Purnomo¹ and Eva Jeumpa Soelaeman¹

¹Pediatric Gastrohepatology Division, Department of Pediatrics, Harapan Kita Women and Children Hospital, Jakarta,

²Department of Radiology, Harapan Kita Women and Children Hospital, Jakarta, ³ Pediatric Surgery Department, Harapan Kita Women and Children Hospital, Jakarta, Indonesia

Background/aims: Achalasia is a primary esophageal motor disorder, quite rarely found especially in children, incidence 0.11 cases per 100,000 children. Aim of study is to evaluate endoscopic pneumatic dilation in children with primary achalasia.

Methods: Retrospective study conducted from 2012-2019 in tertiary endoscopy center for pediatric patients 0-18 yo with primary achalasia of esophagus underwent endoscopic pneumatic dilation. Follow-up at 12 months after time of diagnosis on effectiveness (no. of pneumatic dilation required) and complications.

Results: Five children with primary achalasia of esophagus underwent endoscopic pneumatic dilation identified during study period, 2 girls (siblings) and 3 boys. Mean age 7.5 (range 2.75-12.3) years old. Baseline mean Eckardt score 7.8. Diverticles present in 3 cases. 30-mm achalasia balloon used in 3 cases, regular pneumatic dilation balloon in two smallest children. At 12-mo follow up, 2-6 times (mean 3 times) pneumatic dilation procedures done in each patient. No complications found. One boy went to surgery due to bleeding diverticulum. Complete symptoms relief (mean Eckardt score 2) documented at 12 mo.

Conclusions: Endoscopic pneumatic dilation therapy of achalasia in children is safe when delivered with the right technique, few adverse effects with a good success rate.

Keywords: Achalasia, Pediatric, Diverticle, Pneumatic dilation



Before pneumatic dilation



Partial improvement after one pneumatic dilation

PUG-70

Diagnostic Utility of Endoscopic Ultrasonography-Elastography in Gastric Submucosal Tumors: A Pilot Study

Joo Young Cho, In Kyung Yoo and Sung Pyo Hong

Digestive Disease Center, Bundang Cha Medical Center, Cha University, Seongnam, Korea

The etiology of gastric submucosal tumors (SMT) is assessed by endoscopic ultrasound (EUS) and EUS guided fine needle aspiration (FNA). However, despite of the invasive procedures, it is often difficult to obtain specimens because of the lesion size and mobility. Therefore we investigated the potential of endoscopic ultrasound elastography (EUS-EG) using strain ratio to differentiate among gastric SMTs.

We prospectively registered 23 patients with gastric SMT diagnosed by esophagogastroduodenoscopy in Bundang Cha Medical Center between April 2018 and October 2018. The patients underwent EUS-EG (EG-3670URK; PENTAX Medical, a division of HOYA Co., Ltd., Tokyo, Japan) combined with diagnostic ultrasound imaging systems (ARIETTA 70a; Hitachi Aloka Medical Ltd., Tokyo, Japan) and were assessed the strain ratio. Pathologic confirmations were done. Elastic scores of gastric SMT, measured as strain ratio, were compared to the histological diagnosis.

Of the 23 patients with a confirmed diagnosis, fifteen had leiomyoma, three had ectopic pancreas, two had lipoma and there was one case of gastrointestinal stromal tumor (GIST), schwannoma, hamartoma, each. The location of SMT was most common in cardia 6 (26%), followed by the esophagus 5 (21.8%), body 5 (21.8%), antrum 5 (21.8%), and angle 1 (4.3%), duodenal bulb 1 (4.3%). Tumor diameter was 10-28 mm. With regard to the strain ratios, leiomyomas showed relatively low value ranging from 2.0 to 16.4. On the other hand, GIST and schwannoma showed higher strain ratio, 52.3 and 62.0, respectively. Among SMTs which were suspicious for Leiomyoma or GIST according to the initial EUS finding, higher strain ratio favored for GIST rather than leiomyoma.

Quantitative EUS-EG is a supplementary diagnostic method for identifying gastric SMT, especially in differentiating between leiomyoma and GIST. However, further studies with large sample size and inclusion of other subtypes of SMTs are necessary to set up the cut-off value of strain ratio in differential diagnosis of gastric SMTs.

Keywords: Endoscopic ultrasonography-elastography, Gastric submucosal tumors, Gastrointestinal stromal tumor, Leiomyomas

Table 1. Characteristic of patients

Age	Sex	Location of SMT	Size (cm)	Pathology	
1	75	M	angle	2.4	Lipoma
2	60	M	antrum	2.5	Lipoma
3	59	F	cardia	1.0	Leiomyoma
4	31	F	cardia	0.7	Leiomyoma
5	56	M	esophagus	2.8	Leiomyoma
6	53	F	body	0.7	Leiomyoma
7	37	F	cardia	0.7	Leiomyoma
8	51	M	body	2.0	Leiomyoma
9	76	F	esophagus	0.7	Leiomyoma
10	49	M	esophagus	0.9	Leiomyoma
11	44	F	cardia	2.0	Leiomyoma
12	51	M	esophagus	3.0	Leiomyoma
13	66	F	body	1.1	Leiomyoma
14	40	F	esophagus	1.0	Leiomyoma
15	34	M	cardia	2.0	Leiomyoma
16	60	M	body	2.3	Leiomyoma
17	42	M	cardia	2.5	Leiomyoma
18	44	M	antrum	1.5	Ectopic pancreas
19	38	F	antrum	1.1	Ectopic pancreas
20	50	F	antrum	1.5	Ectopic pancreas
21	38	M	duodenal bulb	1.0	Hamartoma
22	73	M	body	2.0	GIST
23	58	F	antrum	1.5	Schwannoma

Table 2. Pathology - Strain ratio Results

Pathology	Strain ratio
Lipoma	1.1
Leiomyoma	2.0-16.4
Ectopic pancreas	1.7-11.0
Hamartoma	26.4
GIST	52.3
Schwannoma	62.0

PLG-01

The Prevalence of Sessile Serrated Polyp in Colorectum and Its Relationship to Synchronous Colorectal Advanced Neoplasia

Sz-luan Shiu¹, Hung-Chin Ho¹ and Kashida Hiroshi²

¹Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan, ²Department of Gastroenterology and Hepatology, Kindai University, Osaka-Sayama, Japan, ³Evidence-Based Practice and Policymaking Committee, Taichung Veterans General Hospital, Taichung, Taiwan

Background/aims: The aim of this systemic review and meta-analysis is to evaluate the true prevalence of sessile serrated adenoma/polyp (SSA/P) and its relationship to synchronous colorectal advanced neoplasia.

Methods: A comprehensive, computerized research was performed on PubMed published from 1 January 2010 to 6 July 2018 to search relevant articles without language limitation. Clinical trials were included in narrative systemic review if they matched the following inclusion criteria: (1) published as case-controlled study, cohort study or cross-sectional study; (2) defined objectively for diagnosis of SSA/P within studies; (3) addressed the prevalence and characteristics of SSA/P. Within these trials if they met additional criteria involving reported outcome of risk of advanced neoplasia in relation to SSA/P they were enrolled into meta-analysis.

Results: The prevalence of all SSA/Ps in this review ranged from 0.038 to 20.23% and pooled prevalence was 2.7% (95%CI, 1.9-3.9%). In subgroup analysis the overall prevalence of SSA/P between period of 2010-2014 and period of 2015-2018 showed 2.7% (95% CI, 1.2-6.0%) and 2.8% (95% CI, 1.9-4.1%) respectively. We calculated the pooled data on the risk of SSA/P and synchronous advanced neoplasia in patient with SSA/Ps available from 8 trials resulting in pooled OR of 3.53 (95% CI, 2.39-5.20, I²=4%) without detection in heterogeneity test.

Conclusions: In this systemic review the prevalence of SSA/P was 2.7% (95% CI 1.9-3.9%) and was no difference between the period of 2010-2014 and 2015-2018. Besides SSA/P is associated with increasing risk of synchronous advanced neoplasia in colorectum.

Keywords: Sessile serrated adenoma/polyp, Colorectal advanced neoplasia

PLG-02 

Optical Biopsy of Colon Adenoma Using Deep Learning Algorithm

Seong Ji Choi¹, Youngjae Kim², Eun Sun Kim¹, Kihwan Choi², Sehyun Jang¹, Han Jo Jeon¹, Sang Hoon Kim¹, Seung Han Kim¹, Jae Min Lee¹, Hyuk Soon Choi¹, Bora Keum¹, Yoon Tae Jeon¹, Hong Sik Lee¹, Hoon Jai Chun¹ and Chang Duck Kim¹

¹Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea, ²Korea Institute of Science and Technology, Seoul, Korea

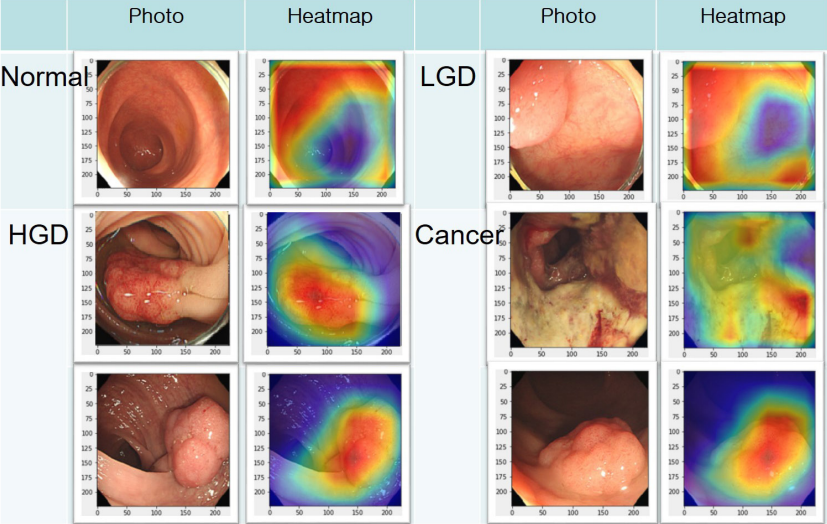
Background/aims: To spot the polyp and predict its pathology more accurately, there has been not only promising imaging technique development but also several studies using artificial intelligence for polyp recognition and its classification. The aim of this study is to develop computer-aided diagnostic system for colon adenoma.

Methods: We labeled the colonoscopic data into 4 classes according to the final pathology; Normal, Low-grade dysplasia, High-grade dysplasia, and Adenocarcinoma. The total number of colonoscopic pictures was 2507; Normal, 903; Low-grade dysplasia, 738; High-grade dysplasia, 459; and Adenocarcinoma, 407, and we separated them into the train set and the test set. We removed unnecessary black pads from the original images, and we resized our data into 224 by 224 for modeling.

Results: We used a ResNet50 model pre-trained with Imagenet data to classify the adenoma. The model we used classified the class with 86% accuracy. We used a few data augmentation methods to improve the data and utilized heatmap technique to explain the results. We also compared our data with the classification pilot test results from 6 endoscopists.

Conclusions: The trained model successfully distinguished the colon adenoma pathology. There should be follow up studies to detect and diagnose the colon adenoma in real-time practice.

Keywords: Deep learning, Colon adenoma, Optical biopsy, Artificial intelligence



PLG-03

Dyslipidemia Is an Independent Risk Factor for Advanced or Any Colorectal Neoplasia: An Observational Cohort Study

Seung Bum Lee¹, Jae Ho Park¹, Seok Won Jung¹, Minsu Ock² and Moon-Chan Kim³

¹Department of Internal Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Korea,

²Department of Preventive Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Korea,

³Department of Family Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Korea

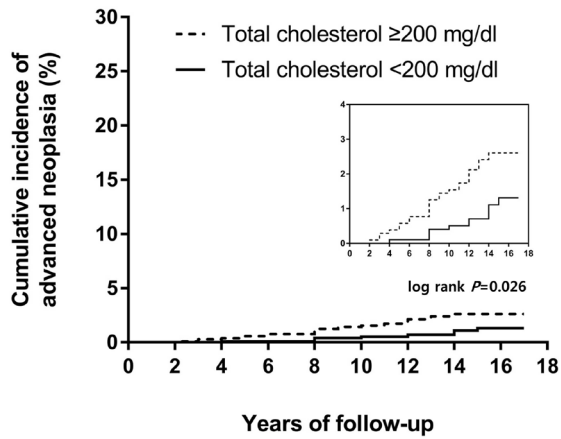
Background/aims: Colorectal neoplasia is associated with metabolic syndromes. We aimed to investigate the long term incidence of colorectal neoplasia according to components of metabolic syndrome.

Methods: We performed a 16 year retrospective observational analysis of data from 2,232 healthy adult individuals undergoing screening sigmoidoscopy or colonoscopy as a part of employee health screening between January 2002 and December 2003. Patients who developed colorectal neoplasia within the first 2 years of enrolment were excluded.

Results: 2,028 were considered eligible for analysis. The mean age of the study population was 47.1±6.7 years, and 1,786 (88.1%) were male. Occurrence of advanced colorectal neoplasia and any colorectal neoplasia were observed in 40 and 293 patients. The overall incidences were 0.13% and 0.96% per year, respectively. Multivariate analyses including baseline characteristics revealed that higher level (≥ 200 mg/dl) of total cholesterol and lower level (< 60 mg/dl) of HDL cholesterol served as an independent risk factor for advanced colorectal neoplasia (HR 2.56 with 95% CI 1.14 to 5.72; $p=0.023$) and any colorectal neoplasia (HR 1.54 with 95% CI 1.09 to 2.17; $p=0.014$), respectively.

Conclusions: Dyslipidemia is an independent risk factor for advanced or any colorectal neoplasia in the long term period.

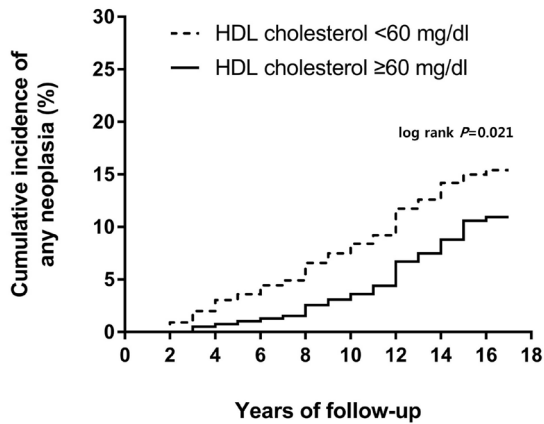
Keywords: Colorectal neoplasia, Surveillance, Dyslipidemia, Metabolic syndrome



Number at risk

Total cholesterol ≥ 200 mg/dl	1037	1032	1023	1014	29
Total cholesterol < 200 mg/dl	991	991	987	984	41

Cumulative incidence of advanced colorectal neoplasia



Number at risk

HDL cholesterol < 60 mg/dl	1641	1591	1533	1448	252
HDL cholesterol ≥ 60 mg/dl	387	384	377	361	82

Cumulative incidence of any colorectal neoplasia

PLG-04 

Feasibility of Enteral Stents with a New Method for Malignant Obstruction in Rt Side Colon

Chang Beom Ryu¹, Jun Yong Bae² and Moon Sung Lee¹

¹Department of Internal Medicine, Soonchunhyang University College of Medicine, Bucheon, Korea, ²Department of Internal Medicine, Seoul Medical Center, Seoul, Korea

Background/aims: Self-expandable metallic stent (SEMS) is widely used to treat malignant colonic obstruction. However, most reports about SEMS insertion have concentrated on the left colon and very tough to insert SEMS on the right colon, especially distal ascending colon.

Methods: This study aimed to (1) investigate the effectiveness of new insertion technique with SEMS for right-sided colonic obstruction and (2) compare the safety and technical success of SEMS insertion.

Results: Technical and clinical success of Rt side colonic obstruction was achieved in all patients of both groups. (cap group: 4/4, papillotome group: 9/9) range 66 to 100 percent.

Other adverse events (such as bleeding and perforation) were not happened. Bowel preparation status in both group were all poor. Expected length of lesion, maximum diameter of small bowel, maximum diameter of large bowel, and distribution of bowel dilatation | Total procedure time, Intubation time to lesion, total time from cannulation to stent deployment were not statistically different but trials of cannulation in papillotome group was lower than cap group (1.11 ± 0.25 vs 2.5 ± 0.91 , $p < 0.001$).

Conclusions: A new technique of curved type guiding tube with SEMS insertion for right-sided colon, especially distal ascending colon is significantly more effective than straight type guiding tube, and this procedure was safer and less technically challenging than expected. SEMS insertion should be considered for treating right-sided malignant colonic obstruction.

Keywords: Enteral stent

PLG-05

Efficacy and Safety of Limited-Water-Exchange and Air Insufflations Colonoscopy in Minimal

Cherng Harnng Lim

Internal Medicine, Lukang Christian Hospital, Taichung, Taiwan

Background/aims: The line between patient's comfort and colonoscopy effectiveness are always a tricky issue to endoscopist to cope with, particularly in tertiary hospital with limited human resources. Our objective is to compare limited water exchange and limited air inflation colonoscopy in minimal sedated patient. Colonoscopy effectiveness regarding patient's pain score, drug dosage, adenoma detection rate, time to cecum and terminal ileum will be assessed in this study.

Methods: We collected patients underwent colonoscopy in tertiary hospital (Changhua Christian Hospital Lukang branch) from 2016 Dec 01 to 2017 May 01. A total of 77 patients who received scheduled colonoscopy procedure were using either limited water exchange method (Group A) or limited air insufflation method. Water exchange method been used in this study was using a foot-switch controlled water pump (PENTAX SA-P2) infused through the accessory channel of the colonoscopy during insertion phase. In limited air insufflation group, limited air will be infused during insertion phase. Limited water will be used for washing residual stool, as needed.

Results: Overall cecal intubation rate in both group was 100%. The mean procedure time to reach cecal was in water exchange and air insufflation method was 9.9 ± 4.5 minutes and 11.5 ± 6.8 minutes respectively ($P=0.24$). As for terminal ileum intubation time was 10.8 ± 4.8 minutes in water exchange method with intubation rate 92.10%. The mean terminal intubation time was 11.3 ± 6.7 minutes with intubation rate 89.74% ($P=0.73$). Adenoma detection rate in water exchange was 44.44% and 53.85% in air insufflation method. The maximum pain scores were significant lower in WC group (1.8 ± 2.1 vs. 4.3 ± 2.7) (AC) respectively. The median dose of meperidine and dromicum been applied during colonoscopy was 0.54 mg/kg and 0.03 mg/kg (WC) vs. 0.63 mg/kg and 0.026 mg/kg (AC). None of the participants had complication in both groups.

Conclusions: Although this study did not compromise the adenoma detection rate in water exchange group. But the overall result, including procedure duration and lower pain score lead to less sedated medication are needed. Therefore limited water exchanged method is a promising method in minimal sedated or unsedated patients.

Keywords: Water exchange, Air insufflations, Colonoscopy

PLG-06

Efficacy and Safety of Viscous Solutions Versus Normal Saline Injection for Endoscopic Mucosal Resection: A Metaanalysis

Timothy Bren Phoa¹, Dennis Martin Castro² and Clarel Camille Ng²

¹Department of Internal Medicine, VRP Medical Center, Mandaluyong City Metro Manila, ²Department of Internal Medicine, UST Hospital, Manila, NCR, ³Department of Medicine, Mount Carmel Diocesan General Hospital, Quezon Province, Philippines

Background/aims: Submucosal injection is an important step during endoscopic mucosal resection (EMR). Various solutions have been studied with two new submucosal injection agents introduced within the past years claiming to maximize procedural success, ease of use and improved patient safety. Prior analyses on this very topic did not yet include data from newer studies pertaining to the use of such agents. The present study aims to perform a meta-analysis on the efficacy and safety of different viscous solutions (VS) versus normal saline (NS) in colorectal EMR.

Methods: Two reviewers conducted independent search of available medical literature from PubMed and the Cochrane Register of Controlled Trials for all human randomized controlled trials comparing a viscous solution and normal saline for colonic EMR. Methodologic quality of studies was assessed by JADAD score. En Bloc resection rate, residual lesions on follow up, procedural time and adverse event rates were collated. Pooled odds ratio estimates at 95% confidence interval were calculated using fixed or random effects model.

Results: Eight prospective randomized trials were included enrolling 964 patients (490 in NS group and 474 in VS group). There was a significant improvement in En Bloc resection rate (OR 1.54; 95% CI 1.09-2.18; $p=0.02$; $I^2=59\%$) with a significant reduction in rate of residual lesions (OR 0.57; 95% CI 0.40-0.82; $p=0.002$; $I^2=0\%$) seen- both favouring VS over NS. On sensitivity analysis, the difference in En Bloc resection rate was mostly accounted for by the 2 studies on the newer submucosal agents. No statistically significant difference was noted between groups with regards to overall adverse event rates and in the duration of the procedure.

Conclusions: VS use can lead to improvement in patient outcomes primarily with better En Bloc resection rates and fewer residual lesions on follow up. Direct comparison of older versus the newer agents may be necessary to establish definitive benefit of these new submucosal agents over other VS.

Keywords: Endoscopic mucosal resection, Submucosal injection, Normal saline, Viscous solution

PLG-07

Status of Radiation Proctitis in Yangon General Hospital

Nang Khinphonetint, Thein Myint, Moe Myintaung, Tin Moewai and Swe Monmya

Gastroenterology, University of Medicine 1, Yangon, Yangon, Myanmar

Background/aims: Radiation proctitis is one of the commonest complications of radiation therapy directed at pelvic malignancies. It can cause rectal bleeding which can be severe and may lead to anemia and need of blood transfusion.

Methods: The data was retrospectively collected from the medical record of Gastroenterology department, Yangon General hospital, Myanmar in 2018.

Results: Among 681 patients who had undergone colonoscopy in 2018, 22 patients were diagnosed as radiation proctitis with male female ratio of 3:19. The youngest patient was 37 years and the oldest one was 82 years. Almost all patients were needed for endoscopic therapy with argon plasma coagulation (APC). During 6 months follow up, majority of patients did not need for more APC, only one patient needed another two sessions of APC, 5 patients needed one more session. Apart from the rectal pain after procedure in 5% of the patients, no other serious complications occurred.

Conclusions: Radiation proctitis is not uncommon complication following radiation therapy to pelvic malignancies and argon plasma coagulation is an effective and safe method to treat the radiation proctitis.

Keywords: Radiation proctitis, Argon plasma coagulation

Table 1. No. of patients

	Total patients (22)	Lesion in rectum and anal canal	Lesion upto sigmoid colon	APC applied
Male	3	3	-	3
Female	19	12	7	17

Table 2. APC session and complication

	One session	2 sessions	3 sessions	Rectal pain
Male	2	1	-	-
Female	11	4	1	1

PLG-08

A Stomach Tumor Incidentally Observed

Bo Hye Song, Kye Sook Kwon, Won Jin Ko, Hyung Gil Kim and Yong Woon Shin

Internal Medicine, Inha University Hospital, Incheon, Korea

A 75-year-old man was admitted to the emergency room with left chest pain, weight loss, and general weakness from three weeks before. Clinically, there was no abdominal pain, tenderness, and decreased breathing sound. Lt. pleural effusion was observed in the chest x-ray and diagnostic thoracentesis was progressed. Pleural fluid evaluation revealed elevated LDH (above 1800 U/L), CEA (61.14 ng/mL; ULN, <5.20 ng/mL) but negative cytology. Chest and abdominal computed tomography (CT) images of suspected malignant pleural effusion were obtained. Loculated pleural effusion and antero-lateral portion of the spleen with septation-like cystic lesion of 3.3 cm in size were shown. The wall of the colonic structure followed by spleen was thickened and infiltrated around. AS gastroduodenoscopy, colonoscopy, and PET-CT for further evaluation, a large ulcerofungating mass was encirculated in the lumen of the splenic flexure in the proximal descending colon. He underwent a palliative operation due to a spleen and pleural metastasis of colon cancer. He also received distal pancreatectomy because of severe adhesion to adjacent organ. After complete resection, FOLFIRI was performed up to 10 times for palliative chemotherapy.

After 11 months operation, CT showed a suspicious new mass of stomach cancer that was not previously seen. On gastroduodenoscopy, a 2.5×2.5 centimeters SET was observed in the gastric fundus.

On additional EUS, hypo-echoic lesion was suspected involvement of serosal invasion. In histological examination of CD7(-), CD20(+) and CDX2(+) adenocarcinoma, we could confirm that originated from colon cancer. The patient underwent surgery to prevent complications such as bleeding. In this patient, direct invasion of remnant cancer cells or seeding during the surgery could be possible, however the cause is not known exactly. As in this case, proximal descending colon is adjacent to the spleen, pancreas and stomach, careful monitoring after surgery is necessary.

Keywords: Colon cancer, Metastasis

PLG-09

Compare Endoscopic Finding with Histopathological Features in Colorectal Polyp

Ngo Thi Hoai, Vu Van Khien and Mai Hong Bang

Gastroenterology, Military Central Hospital 108, Hanoi, Vietnam

Background/aims: Evaluation of endoscopic characteristics, lesions on surface pattern, vessels and histopathology of colorectal polyps.

Methods: Establish research profile and collect information: age, gender, endoscopic characteristics, pit pattern image, vessels structure image and histopathology of colorectal polyps.

Results: Polyps are more common in men than women (with a ratio of 2.96). Common age is over 60 years old (52.7%). Endoscopic results: 01 polyp (46.1%) 2 polyps (22%) and ≥ 3 polyps (31.9%). Location of polyps: common in sigmoid and rectum colon. The size of polyps >2 cm in 32.8%. Percentage of Pit pattern according to KUDO classification (IV+V) is: 58,3% and NICE classification (type 2+ type 3) 81,2%. Histopathological characteristics: Tubular adenoma, villous adenoma, tubulovillous adenoma and carcinoma polyps accounts for 64.8%, 3.3%, 12.1% and 19,8%, respectively.

Conclusions: There is an association between endoscopic finding and histopathology in colorectal polyps.

Keywords: Colorectal cancer, Colorectal polyp

PLG-10

Picosulfate/magnesium Citrate Solution for Bowel Preparation Compared to Peg Solution; A Randomized, Prospective Study

Sang Hoon Kim, Yoon Tae Jeon, Han Jo Jeon, Se Hyun Jang, Kang Won Lee, Sanghyun Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Division of Gastroenterology and Hepatology, Korea University College of Medicine, Seoul, Korea

Background/aims: Bowel preparation is the most important colonoscopy quality indicator because it affects both the cecal intubation and adenoma detection rates. Ingestion of a large volume of PEG, as well as its unpleasant taste, results in low compliance rates and unsatisfactory cleansing quality. To reduce drug dose and increase patients satisfaction, we would like to compare the efficacy and patient satisfaction of the following three methods: 2 Liters of PEG-ascorbic acid mono regimen versus 1 Liters of PEG-ascorbic acid plus bisacodyl versus Sodium picosulfate with magnesium citrate (SPMC) plus bisacodyl.

Methods: This study was a single center, randomized, prospective, observer-blinded study. The study was performed from april 2018 to July 2018 and we enrolled 300 patients and randomly classified them into three groups of 100 patients each. To evaluate bowel cleansing, we used the Boston bowel preparation scale (BBPS). The degree of discomfort and satisfaction of the patients in the bowel preparation process was investigated through questionnaire.

Results: Baseline characteristics of the three groups were similar. There was no significant difference in the bowel preparation quality using BBPS in three groups. Abdomen fullness was statistically significantly lower in SPMC and bisacodyl group (P-value=0.003). Also patients' satisfaction compare with previous preparation was significantly higher in the SPMC and bisacodyl group (P-value=0.016).

Conclusions: In this study, the combination of SPMC and bisacodyl group is similar for the improvement of the bowel preparation than the other PEG groups. However, the SPMC and bisacodyl group patients feel more comfortable than other groups. Therefore, in order to satisfy both good intestinal cleansing and patient compliance, we conclude that bowel preparation with the SPMC and bisacodyl group might be the better method than others.

Keywords: Bowel preparation, Picosulfate, Bisacodyl, Polyethylene glycol, Bbps

PLG-11

Clinical Outcomes after Colonoscopic Submucosal Dissection for Lesions with Ulcer or Scar

Na Yun Kang, So Hee Yun, Jin Woong Cho, Yong Keun Cho, Ji Woong Kim, Gum Mo Jung, Young Jae Lee, Min A Yang, Byung Sun Kim, Jae Sun Song, Hyun Kwon Ju, Mi-Rim Choi and Jihyun Han

Gastrointestinal Internal Medicine, Presbyterian Medical Center, Jeonju, Korea

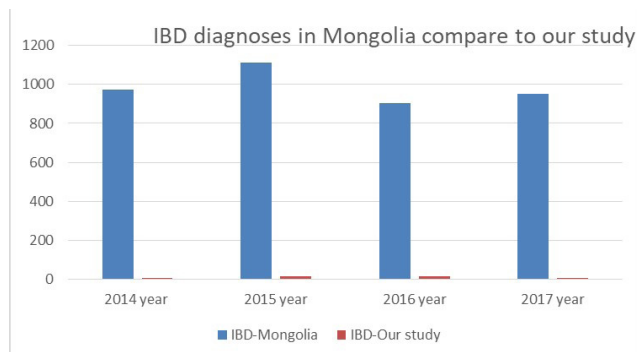
Background/aims: Indications of endoscopic submucosal dissection (ESD) in colorectal tumors is the lesions confined to superficial submucosa. Scar or ulcerations are the important factors that makes ESD difficult. We reviewed the results and complications of ESD for colon lesions with ulcers or scars, and evaluated feasibility and safety.

Methods: We retrospectively reviewed medical records of patients underwent colorectal ESD at Presbyterian medical center between April 2011 and March 2019.

Results: We identified 29 patients (18 males, 11 females; age range 41-87 years). In 6 patients, ESD was done on primary lesion with ulcer or scar and other 23 patients were performed ESD for ulcer or scar associated with previous incomplete resection. Mean resection time was about 40 min (7-95 min) and mean longitudinal diameter of resected lesions was 23.45 mm. Histology results were 17 adenocarcinoma, 5 carcinoid tumor, 2 high grade dysplasia, 3 low grade dysplasia, 1 inflammatory fibroid polyp and 1 chronic colitis. We found one case of microperforation which was treated conservatively using endoscopic clip closure. Delayed perforation was found in one case and surgery was required. Two patients needed additional surgery for incomplete resection and local recurrence.

Conclusions: ESD in the colorectal lesions with scar or ulcer may be safe and effective treatment.

Keywords: Ulcer, Fibrosis, Endoscopic resection, Neoplasms, Colon



PLG-12

Risk Factor of Lymph Node Metastasis in Endoscopically Resected T1 Colorectal Cancer

Eunyoung Park, Donghoon Baek, Joonwoo Park, Geunam Song, Bongeun Lee and Moonwon Lee

Gastroenterology, Pusan National University Hospital, Busan, Korea

Background/aims: Early colorectal cancer has risk of LN metastasis of 6.3% to 17%, and submucosal invasion more than 1000 um, 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 endoscopically resected 262 submucosal invasive colon cancers from 2007 to 2017. Of them, 141 tumors which underwent subsequent colectomy with lymph node dissection because of unfavorable pathologic findings.

Results: The overall LN metastasis rate was 18.4% (26/141). In the univariate and multivariate analysis, LVI and tumor budding were significantly associated with LN metastasis (odds ratio [OR], 3.824; $p=0.029$ and OR, 3.658; $p=0.013$, respectively) and moderately-differentiated adenocarcinoma was also associated with LN metastasis (OR, 2.808; $p=0.040$). Submucosal depth was not associated with LN metastasis 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, Endoscopic resection

	LN metastasis (+)	LN metastasis (-)	P-value
Age, years, mean ± SD	62.8 ± 9.4	63.8 ± 9.3	0.835
Sex, n (%)			0.551
Male	82 (71.3)	17 (65.4)	
Female	33 (28.7)	9 (34.6)	
Location, n (%)			0.099
Right colon	43 (37.4)	6 (23.1)	
Left colon	58 (62.8)	19 (73.1)	
Rectum	14 (12.2)	1 (3.8)	
Size, mm, n (%)	15.2 ± 6.8	11.9 ± 5.8	0.356
Macroscopic type, n (%)			0.351
Sessile	62 (53.9)	18 (69.2)	
Superficial	16 (13.9)	2 (7.7)	
LST	37 (32.2)	6 (23.1)	
Resection method, n (%)			0.630
ESD	11 (9.6)	1 (3.8)	
Hybrid ESD	52 (45.2)	12 (46.2)	
EMR	52 (45.2)	13 (50.0)	
Resection type, n (%)			0.405
En bloc resection	105 (91.3)	25 (96.2)	
Piecemeal resection	10 (8.7)	1 (3.8)	
Complications, n (%)			0.295
Acute bleeding	1 (0.9)	0	
Delayed bleeding	1 (0.9)	1 (3.8)	
Perforation	9 (7.8)	0	
Pathology, n (%)			0.092
Well-differentiated	55 (47.8)	7 (26.9)	
Moderately-differentiated	59 (51.3)	19 (73.1)	
Poorly-differentiated	1 (0.9)	0	
Submucosal invasion depth (µm)			0.636
< 1000	13 (11.3)	3 (11.5)	
1000 ≤ x < 2000	38 (33.0)	8 (30.8)	
2000 ≤ x < 3000	33 (28.7)	5 (19.2)	
≥ 3000	31 (27.0)	10 (38.5)	
LVI, n (%)	11 (9.6)	7 (26.9)	0.027
Budding, n (%)	15 (13.0)	10 (38.5)	0.008

	Univariate analysis		Multivariate analysis	
	OR	p-value	OR	p-value
Age		0.579		
< 65 yrs	1.000			
≥ 65 yrs	1.273 (0.542-2.988)			
Sex, n (%)		0.551		
Male	1.000			
Female	0.076 (0.380-1.876)			
Location, n (%)				
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, n (%)				
Well-differentiated	1.000			
Moderately-differentiated	2.53 (0.987-6.485)	0.053	2.808 (1.047-7.529)	0.040
Poorly-differentiated	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

PLG-13

Clinical Characteristics and Prognosis of Elderly Patients with Colorectal Cancer Undergoing Surgical Resection

SooHwan Kim¹, Jae Seung Soh¹, Sang-Woo Lim², Hyun Lim¹, Ho Suk Kang¹ and Jong Hyeok Kim¹

¹Department of Internal Medicine, University of Hallym College of Medicine, Anyang, Korea, ²Department of Colorectal Surgery, University of Hallym College of Medicine, Anyang, Korea

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 the analysis of 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 post-operative 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 after considering the risks and benefits of surgery.

Keywords: Colorectal cancer, Elderly, Prognosis, Surgery

PLG-14

Ectopic Appendix Detected during Colonoscopy: A Report of Two Cases

Tuan Kieu Van¹, Lien Thikim Lien⁴, Viet Tuan Tran¹, Huong Thilan Ha¹, Ngoc Thivan Pham¹, Long Duc Vu², Nhung Thi Vu³, Dung Van Nguyen⁵ and Hieu Ngoc Ngo⁶

¹Functional Examination Department, Bach Mai Hospital, Hanoi, ²Surgery Department, Bach Mai Hospital, Hanoi, ³Pathology Department, Bach Mai Hospital, Hanoi, ⁴Functional Examination Department, Bai Chay Hospital, Quang Ninh, ⁵Oncology Department, Bai Chay Hospital, Quang Ninh, ⁶Pathology Department, Bai Chay Hospital, Quang Ninh, Vietnam

Introduction: Vermiform appendix and mesoappendix is rarely detected during endoscopy. Recently, we have diagnosed two cases of appendix in the rectum during colonoscopy.

Methods: Case report.

Results: The two cases were found in two different hospitals in 2016 and 2018, respectively. The first case was suspicious of a rectal tumor and was surgically resected and found to be appendix tissue on histology. With regard to the second case, it was detected by an endoscopist who already knew the first case. On further inspection a small slit was noted between the “polyp” and the rectal wall. Considering lesion characteristics, in addition with experience of the first case, he suspected it as an ectopic appendix. Seven days after the colonoscopy, the patient had abdominal pain and other signs suggestive of appendicitis. She subsequently underwent surgical resection of the lesion. Histological examination of the specimen demonstrated appendicitis.

Conclusions: Ectopic appendix penetrating the colorectum is very rare. However, it can be seen during colonoscopy or rectoscopy. The presence of a slit between the lesion and colorectal wall may be useful in distinguishing a tumor or a polyp from an ectopic appendix.

Keywords: Ectopic appendix, Colonoscopy

PLG-15

Feasibility and Accuracy of Innovative 3 Dimensional Colonoscope Image Using Fiber Brag Grating Sensor

Han Jo Jeon¹, Bora Keum¹, Kang Won Lee¹, Sang Hyun Kim¹, Sang Hoon Kim¹, Se Hyun Jang¹, Seong Ji Choi¹, Seung Han Kim¹, Jae Min Lee¹, Hyuk Soon Choi¹, Eun Sun Kim¹, Yoon Tae Jeon¹, Hong Sik Lee¹, Hoon Jai Chun¹, Chang Duck Kim¹, Kyu Min Kang², Jun Sik Kim², Min Su Jang² and Jin Seok Kim²

¹Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea, ²Center for Bionics, Korea Institute of Science and Technology, Seoul, Korea

Background/aims: Colonoscopy is difficult procedure, largely due to unpredictable looping during insertion. If the endoscopist is able to see the colonoscope on the image display, fewer attempts are needed to straighten the shaft of the scope. A prototype Fiber Brag Grating (FBG) scope guided endoscopy provides a facility for continuous viewing on a monitor of the position of the colonoscope during examination. The aim of this study was to evaluate the accuracy and feasibility of the innovative 3D Colonoscope image using FBG sensor.

Methods: In the first part of the study, the FBG sensor was inserted into the working channel of a general colonoscope in the first 100 cm from the tip of the scope. Then, the scope was placed in front of the monitor to confirm movement of the scope in all three dimensions. We evaluated loop formation such as N loop, alpha loop, reverse alpha loop, with the 3D imaging monitor. In the second part of the study, 5 patients underwent colonoscopy with a FBG sensor, the colonoscope can be displayed in anteroposterior or lateral view, or in both positions together. The fluoroscopy was used in all investigations for comparison.

Results: In the first part of the study, the results showed that the shape sensor was reliable at a maximum bending curvature of 80mm⁻¹. The average tip position error was 1.22 ± 0.82 mm, which corresponds to $0.82 \pm 0.7\%$ of the total length of the sensor. Colonoscope movement and loops were detected correctly through the monitor. The prototype FBG in the second part of the study showed a high correlation and little discrepancy with the comparative findings on fluoroscopy. During the colonoscopy, we could confirm the shape of the loop made in the body.

Conclusions: Image of colonoscopy reconstructed by FBG sensor can be successfully applied to display colonoscope configuration. This flexible, thin and almost weightless shape sensor would be a novel technique for identification of colonoscope shape.

Keywords: Fiber brag grating, Colonoscope, 3d image, Feasibility, Loop formation

PLG-16

Spontaneous Self-Extraction of Rectal Foreign Body: Case Report

Yongseok Lee, Daejin Kim, Jihun Jang, Sangmyoung Yeo, Hyunsoo Kim, Hanjun Ryu,
Yunjin Chung, Jaekwon Jeong, Changkeun Park and Jaekwang Lee

Gastroenterology and Hepatology, Daegu Fatima Hospital, Daegu, Korea

1. Introduction: Foreign body within the rectum occurs infrequently and its management is difficult and challenging for the emergency department physician due to variation in type of objects, host anatomy, time of insertion, and amount of local contamination.

2. Case report: A 19-y-old male presented to the emergency department after transanal insertion of a sex toy. On plain film radiograph and CT scan, a cylindrical material about 15 cm in length was seen in rectosigmoid junction. The patient had no symptoms and signs of bowel perforation, so we initially performed sigmoidoscopy to confirm the object and remove it. But we could not take it out by using retractors and clamps, so the patient was transferred to the department of general surgery in order to remove the foreign body by surgical method or observe to extract spontaneously. Two days later, rectal foreign body was expelled after defecation of itself.

3. Discussion: Foreign bodies within the rectum are an infrequent occurrence with a wide variety of objects either inserted or swallowed, and the management depends on its depth and the consequence it caused. The approach to the patients includes a careful history and physical examination, a high index of suspicion for any evidence of perforation, a creative approach to nonoperative removal, and appropriate short-term follow-up to detect any delayed perforation. And surgery is generally required if this is not successful and in all patients with evidence of peritonitis or perforation. Objects that lie more proximally in the rectum or distal colon are more challenging than objects in the distal rectum since they are often not accessible via typical transanal approaches. So when we can not take it out by sigmoidoscopy, if the patients with rectal foreign bodies that are soft, blunt and located proximally are clinically stable and had no any other complications, we may choose the careful observation strategy rather than surgical method to extract it.

Keywords: Rectal foreign bodies, Transanal removal, Sigmoidoscopy

PLG-17

Clinical Features and Prognostic Factors of Stercoral Ulcer

Min Cheol Kim, Kyeong Ok Kim and Byung Ik Jang

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Yeungnam University College of Medicine, Daegu, Korea

Background/aims: Stercoral ulcer is an uncommon cause of colon ulcer. It usually causes no symptoms, but may result in gastrointestinal tract bleeding or perforation. Only several case reports about massive bleeding due to stercoral ulcer had been reported. So, we investigated to clarify the clinical manifestations and outcomes of stercoral ulcer complicated with bleeding.

Methods: We performed a retrospective study using medical records of the patients who had stercoral ulcer on colonoscopy in Yeungnam university medical center from January 2010 to July 2017. We analyzed clinical outcomes of patients with stercoral ulcer such as recurrent bleeding of hemorrhagic stercoral ulcer (Re-bleeding).

Results: In total 123 subjects with stercoral ulcer, 79 subjects (64.23%) were presented with lower gastrointestinal bleeding. Overall re-bleeding risk of hemorrhagic stercoral ulcer was high (32.9%). The risk of re-bleeding was not different according to characteristics of ulcer base, but ulcer with clean base, which is thought to low risk of re-bleeding, showed considerable in number of re-bleeding (19.2%). In multivariate logistic regression analysis, shock at presentation (OR=13.146, 95% CI; 2.645-65.332), transfusion (OR=7.231, 95% CI; 1.684-31.052), CVA (OR 6.652, 95% CI; 1.143-31.314), taking clopidogrel (OR=6.037, 95% CI 1.251-29.131), and 3 or more comorbidities (OR=4.4, 95% CI; 1.092-18.319) were significantly associated with increased risk of re-bleeding. However, endoscopic therapy for hemostasis did not show any statistical significance with risk of re-bleeding (OR=3.135, 95% CI; 0.664-14.816).

Conclusions: Overall re-bleeding risk of stercoral ulcer is high. And such risk is much higher in patients at risk, such as multiple co-morbidities and massive bleeding. Aggressive treatment of stercoral ulcer, prophylaxis of constipation, and intensive management for hemorrhagic stercoral ulcer may be needed in this kind of patients.

Keywords: Stercoral ulcer, Colon ulcer

PLG-18

Treatment of Hemorrhagic Shock Owing to Massive Rectal Bleeding Following Prostate Biopsy by Endoclipping

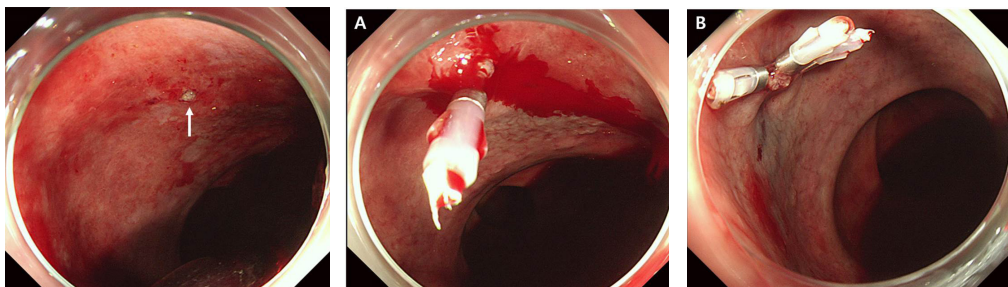
Donghoon Baek, Geunam Song, Eunyoung Park, Joonwoo Park and Moonwon Lee

Gastroenterology, Pusan National University Hospital, Busan, Korea

A 66-year-old male showed increased prostate-specific antigen from 2.7 to 5.1 ng/mL during follow-up. He underwent transrectal ultrasound (TRUS)-guided prostate biopsy with an 18-gauge needle. One hour later, massive rectal bleeding occurred. His urologist performed digital compression. However, bleeding continued. He was referred to the gastroenterology department for endoscopic management. His blood pressure was 87/42 mmHg, and heart rate was 122 bpm. Emergency sigmoidoscopy was performed, and the rectum was full of fresh blood and clots. The needle puncture site was detected in the ventral part of the rectal wall. Endoscopic clipping achieved immediate hemostasis. The patient became normalized, and he was discharged 2 days later.

TRUS-guided prostate biopsy is a well-established procedure for initial prostate biopsy. Approximately 8% of patients reported severe rectal bleeding after the biopsy. Management of massive rectal bleeding includes rectal packs in situ, manual compression, endoscopic hemostasis, and embolotherapy. Endoscopic management includes sclerotherapy, endoscopic band ligation, and endoscopic clip placement. In this case, massive rectal bleeding after TRUS-guided prostate biopsy was treated safely and effectively by endoscopic hemostasis with endoclipping.

Keywords: Prostate biopsy, Rectal bleeding, Endoscopic hemostasis



PLG-19

A Retrospective Analysis of Clinical Profile of Patients Who Underwent Colonoscopy at Rural Hospital in Nepal

Samir Thapa Chhetri

General Surgery, UMHT, Tansen, Nepal

Background/aims: Colonoscopy is used both diagnostically and therapeutically and allows examination and treatment of lower GI pathologies. However, colonoscopy requires the understanding and mastery of cognitive and technical skills. Although Upper GI Endoscopy is widely available, colonoscopy facilities are relatively rare in developing country like Nepal especially in the rural areas. The purpose of this study was to see the clinical profile of patients presented for colonoscopy including the common presentations, indications and findings at our hospital in the last 2 years.

Methods: A retrospective analysis from March 2017 to March 2019, a total of 84 patients were selected who underwent colonoscopy in our hospital. Colonoscopy was done in under intravenous sedation after bowel preparation. Colonoscopic abnormalities were noted and biopsied if indicated and sent for histopathological examination.

Results: 84 patients underwent colonoscopy in our centre during the study period, among them 52 (61.9%) were male and 32 (38.1%) were female. The mean age was 46.01 ± 18.9 years. Procedure was completed in 80 (95.4%) patients. The most common indications for colonoscopy were rectal bleeding, altered bowel habit and non specific chronic abdominal pain. Significant lesions were seen only in 36 (42.9%) patients. The finding in colonoscopy were nonspecific proctitis 8 (9.5%), rectal polyp 6 (7.1%), colonic polyp 6 (7.1%), non specific colitis 4 (4.8%), ulcerative colitis 5 (6%), haemorrhoids 5 (6%), anal fissure 2 (2.4%), rectal ulcer 3 (3.6%). Fistula 2 (2.4), ca rectum 1 (1.2%), ca rectosigmoid junction 1 (1.2%), ca splenic flexure 1 (1.2%), Ogilvie syndrome 1 (1.2%) and hemangioma colon 1 (1.2%).

Conclusions: The study shows that most patients who present with rectal bleeding or altered bowel habits may benefit from colonoscopy. Significant lesions may be seen in 42.9% of patients according to our study. Beside diagnostic, colonoscopy can also help in therapeutical removal of colorectal polyp.

Keywords: Colonoscopy, Rectal bleeding, Altered bowel habit, Colitis, Colorectal polyp

PLG-20

Diverticular Disease of the Colon: Analysis of the Clinical Characteristics and Risk Factors in Adult Filipino Patients

Clarel Camille Ng

Gastroenterology, University of Santo Tomas, Manila, Philippines

Background/aims: Colonic diverticular disease (CDD) is common in Western countries, however, it is not very well described in the Southeast Asian regions. This study describes the clinical characteristics and predictive factors of CDD among Filipino patients.

Methods: Between January 2014 to December 2016, 2736 adult patients who underwent colonoscopy in a single tertiary referral center were enrolled into this study. Of these, 651 (23.8%) had CDD. Demographic data and endoscopic findings were recorded. Chi square test and log regression analysis were used to determine the association between age, gender, BMI, smoking, and co-morbidities with CDD.

Results: Among those patients with CDD, 491 (75.4%) underwent colonoscopy due to rectal bleeding 158 (32%), abdominal pain 135 (32%), and constipation 80 (16%). Another 160 (25%) patients had colonoscopy for colorectal cancer screening. Majority were males 403 (62%), and mean age was 62± years old. Right-sided diverticulosis (38.4%) is more common and diffuse diverticulosis is observed to significantly increase with advancing age. Multivariate analysis showed that age >50 years (OR 2.58; CI 1.99-3.34), male gender (OR 1.1; CI 0.92-1.3), obesity (OR 2.84; CI 2.0-4.1), smoking (OR 1.6; CI 1.3-2.0), hypertension (OR 1.7; CI 1.45-2.1), diabetes (OR 2.4; CI 2.0-3.0), atherosclerosis (OR 2.5; CI 1.74-3.71), dyslipidemia (OR 1.54; CI 1.22-1.95) and metabolic syndrome (OR 1.1; CI 0.69-1.75) were positively correlated with diverticular disease.

Conclusions: The prevalence of colonic diverticulosis in Filipino patients is almost similar in the other Asian population. Up to a quarter of adult Filipino patients have diverticulosis that was predominantly located at the right colon. It was demonstrated in this study that the most common clinical presentation in these patients were hematochezia and abdominal pain. Male gender, obesity, smoking, hypertension, diabetes, dyslipidemia and the metabolic syndrome increase the likelihood of diverticulosis in our population.

Keywords: Diverticulosis, Colon, Diverticular disease, Adult Filipinos, Retrospective

PLG-21

Endoscopic Images, Histologic Aspects of Colorectal Large Polyps and Polypectomy Result

Duc Van Pham

Internal Gastroenterology, 198 Hospital, Hanoi, Vietnam

Background/aims: Colorectal polyps is a common disease worldwide. Almost malignant tumors of colon proceed from adenoma polyps, especially polyps over 20 mm diameter. Endoscopic polypectomy is now approved in reducing incidence of colorectal adenocarcinomas. Purposes of this study are evaluating clinical symptoms, colonoscopic images, histologic characteristics of large colorectal polyps and results of endoscopic polypectomy.

Methods: A prospective, cross-sectional study was conducted at 198 hospital on patients who underwent colonoscopy with polypectomy or surgery from June 2015 to January 2017, follow-up period in 18-36 months after polyps resection. Age, sex, endoscopic and histopathologic characteristics, and outcomes of endoscopic polypectomy were recorded.

Results: 67 patients with 71 large polyps were collected. The mean age of patients with colorectal adenoma over 20mm diameter was 59.3 ± 11.8 . Only 5.97% patients had 2 large polyps in colorectum, almost had one, with common range size from 20 to <30 mm, 71.9% of patients had large polyps in sigmoid colon and rectum. In histology, adenoma rate was 91.6%, including: villous adenoma was 8.5%. Four patients had adenocarcinoma tissues in the head of their polyps: 2 cases were in-situ non invasion and two were sub-mucosa invasion. Villous adenoma polyps had 66.7% of high-grade dysplasia (HGD) compared to Tubulovillous adenoma and Tubulous adenoma polyps had 22.2% and 8.7% ($p=0.042$). In our study, endoscopic polypectomy was safe and effective therapy. No patient had severe complication due to polypectomy.

Conclusions: Adenoma polyps (tubulous, tubulovillous, and villous adenoma) were common (91.6%) in colorectal large polyps. Dysplasia had been found in 73.1% of large polyps. In villous adenoma, HGD rate (66.7%) was significant higher than the rate in tubulovillous and tubulous adenoma ($p=0.042$). 5.6% of patients had adenocarcinoma polyps. Colonoscopy is essential for screening polyps and early cancer of colorectum, especially for over 50 years old cases.

Keywords: Narrow band image, Colorectal polyp, Large polyp, Polypectomy, Villous adenoma

PLG-22

Association of Colonic Diverticulosis and Colonic Adenoma: A Cross-Sectional Study in Philippine General Hospital

Ray Anthony Bartolome

Internal Medicine, Philippine General Hospital, Manila, Philippines

Background/aims: An association between colonic diverticulosis and colonic adenoma was demonstrated in many studies. However, findings in other studies yielded conflicting results. The study aims to determine the association of diverticulosis and colonic adenoma.

Methods: All patients who underwent colonoscopy in PGH between January 2017 and December 2017 were screened for eligibility. Patients with incomplete colonoscopy examination, inadequate bowel preparation, history of prior colonic resection, repeated colonoscopy within one year, colorectal malignancy, inflammatory bowel disease were excluded. The estimated sample size was 948. The crude OR was estimated at 95% confidence level to determine the association of diverticulosis and colonic adenoma. Likewise, adjusted OR was estimated at the same confidence level using logistic regression.

Results: A total of 990 patients were included in the study. The mean age is 53.5 years and 54% are males. A total of 128 patients (13%) have diverticulosis. A total of 167 (16.9%) were found to have adenoma. The odds of finding colonic adenoma in patients with diverticulosis is 1.3-fold higher than those without diverticulosis (95% Confidence Interval: 0.82-2.08). Adjusting for Age and sex of patients, the adjusted OR is 0.98 (95% CI: 0.60-1.58, p value=0.92) which indicates that frequency of adenoma was not higher in patient with colonic diverticulosis compared to those without diverticulosis.

Conclusions: The current study did not show any association between colonic diverticulosis and colonic adenoma/advanced adenoma.

Keywords: Colonic adenoma, Colonic neoplasia, Colonic diverticulosis, Colonic neoplasm, Colonic polyp

PLG-23

Focal Myositis after Endoscopic Mucosal Resection of Colon LST

Ju-Il Yang and Hakeung Jeon

Internal Medicine, Good Gang-An Hospital, Busan, Korea

Post-polypectomy coagulation syndrome, thermal injury, bleeding, perforation, peritonitis could happen after endoscopic mucosal resection (EMR). Among many complications, myositis following EMR was mainly focused on this study.

58-year-old male was diagnosed with 2 cm-sized cecal LST (laterally spreading tumor). He was referred to our hospital and admitted for treatment. He had a history of surgery for left colon cancer and ampulla of Vater cancer. EMR was performed. 8hrs after the procedure, the patient experienced severe right inguinal pain with fever of 38.2. Laboratory test revealed a WBC count of $33910/\text{mm}^3$, neutrophil count for $26720/\text{mm}^3$, CRP level of 10.6 independently leading to inflammatory response. Whole abdomen CT was performed, and there was an abnormally swelling of right iliacus muscle with perimuscular fluid collection. Notably, there was no abnormality in the right colon at the site where EMR was performed on CT. Myositis of the right iliacus muscle was diagnosed. Intravenous antibiotics (piperacillin/tazobactam) was initiated on the next day after EMR, and massive fluid therapy with crystalloid was performed. After administrating antibiotics for 3 days, there was no longer fever and laboratory test revealed a WBC count of $14470/\text{mm}^3$ and CRP level of 5.12. The patient got improved and discharged on 8th post-polypectomy day. Pathological analysis revealed a cecal tubular adenoma with moderate dysplasia.

There are several predictable causes of complications after EMR, such as post-polypectomy coagulation syndrome (PPCS), transmural burn syndrome, infection after submucosal saline injection. Also, it is possible that more than one mechanism contributes to the inflammatory process. Here, we report a case of focal myositis following EMR of a cecal LST, which was successfully treated with antibiotics. Myositis of the iliacus muscle following EMR is extremely rare and cecal EMR may be rare cause of myositis.

Keywords: EMR, Colon adenoma, Myositis, Polypectomy coagulation syndrome, Colon LST

PLG-24

Clinical Outcomes of Nonsurgical Management of Perforation in Patients Undergoing Colorectal Submucosal Dissection

Yu Sik Myung, Phill Hoon Yoon, Myong Ki Baeg, Seok-Hoo Jeong, Hong Suk Park, Gwang-Mo Kim and Jaeouk Shin

Gastroenterology, Department of Internal Medicine, International St. Mary's Hospital, Catholic Kwandong University, Incheon, Korea

Background/aims: Perforation is the most serious adverse event of colorectal endoscopic submucosal dissection (ESD). Surgery has been the main treatment in colorectal perforation. We investigated the clinical course of nonsurgical management of perforation in patients undergoing ESD.

Methods: Between Jan 2010 and Dec 2017, we analyzed a database of 440 patients with colorectal tumors who underwent ESD at two centers. We retrospectively analyzed medical record and compared these characteristics of a perforation group with control group without perforation.

Results: Perforation occurred in 31 of the 440 colorectal ESD (7.0%). 29 patients were included. 15 cases (51.7%) were flank perforation. 13 (44.8%) were microperforation, and one case (3.5%) was delayed perforation. 15 flank perforation patients were successful endoscopic closure and improved without surgery. 13 microperforation and 1 delayed perforation patient improved with conservative treatment. In comparison of flank perforation and microperforation group, the procedure time was longer in the flank perforation group and total hospital/fasting period were longer in microperforation group.

Conclusions: Patients with colorectal perforation during ESD can be considered nonsurgical management if the endoscopic clipping is successful.

Keywords: Colorectal tumor, Endoscopic submucosal dissection, Perforation, Clip

Table 1. Baseline characteristics and clinical course of patients

Characteristic	Perforation (n=29)	Control (n=409)	P-Value
Age (years)	59.89 ± 13.47	60.58 ± 11.81	0.876
Sex (M/F), n	19/10	236/172	0.481
Co-morbidity (yes/no), n	18/11	211/198	0.275
Tumor Size (mm)	29.24 ± 16.26	28.90 ± 14.34	0.942
Tumor location, n			
Right/Left/Rectum	13/10/6	116/163/130	0.691
Macroscopic type, n			
Proliferating LST-G/LST-NG	5/11/13	116/163/130	0.109
Fibrosis (present/absent), n	16/13	112/297	0.001
Pathology, n			0.150
Adenoma, LGD/HGD	12/7	104/103	
Adenocarcinoma, M/SM	3/6	93/70	
Carcinoid/Etc	0/1	32/7	
Resection methods, n			0.128
ESD	20	330	
ESD = snaring	9	79	
Operator, n			0.507
Expert (>50 ESD cases)	25	371	
Non-expert (<50 ESD cases)	4	38	
Center volume, n			0.223
High volume	21	334	
Low volume	8	75	
Procedure time, min*	73.34 ± 60.58	63.84 ± 56.31	0.211
Mean WBC count on POD 1*	11105.86 ± 4466.75	8465.51 ± 3197.00	<0.001
Maximal body temperature*	37.38 ± 0.64	36.94 ± 0.40	<0.001
Proportion of abdominal pain (yes/no), n	14/15	89/320	0.001
Hospital stay period, day*	7.79 ± 1.93	5.41 ± 0.91	<0.001
Fasting period, day*	4.65 ± 1.79	2.41 ± 0.81	<0.001

Table 3. Clinical course of flank perforation and microperforation

Characteristic	Flank-Perforation (n=15)	Microperforation (n=13)	P-Value
Age (years)	56.00 ± 13.06	59.84 ± 14.69	0.887
Sex (M/F), n	11/4	7/6	0.433
Co-morbidity (yes/no), n	8/7	9/4	0.390
Tumor Size (mm)	32.40 ± 19.48	26.30 ± 12.07	0.316
Tumor location, n			
Right/Left/Rectum	5/5/5	8/4/1	0.097
Macroscopic type, n			
Proliferating LST-G/LST-NG	4/7/4	13/9	0.108
Fibrosis (present/absent), n	9/6	7/6	0.743
Pathology, n			0.794
Adenoma, LGD/HGD	6/3	6/3	
Adenocarcinoma, M/SM	1/5	2/1	
Carcinoid/Etc	0/0	0/1	
Resection methods, n			0.689
ESD	11	8	
ESD = snaring	4	5	
Operator, n			0.600
Expert	12	12	
Non-expert	3	1	
Center volume, n			0.221
High volume	9	11	
Low volume	6	2	
Free air (yes/no), n	4/11	13/0	<0.001
Procedure time, min*	68.80 ± 35.31	44.30 ± 31.73	0.066
Mean WBC count on POD 1*	11301.33 ± 4778.27	10376.92 ± 3965.48	0.618
Maximal body temperature*	37.38 ± 0.61	37.28 ± 0.68	0.680
Proportion of abdominal pain (yes/no), n	4/11	9/4	0.024
Hospital stay period, day*	7.00 ± 1.77	8.46 ± 1.71	0.029
Fasting period, day*	4.06 ± 1.62	5.07 ± 1.70	0.098

Table 2. multivariate predictors of ESD-induced perforation

Predictor	OR (95% CI)	P-Value
Submucosal fibrosis	4.366 (1.901 – 10.027)	0.001
Tumor location (colon vs rectum)	4.265 (1.444 – 12.601)	0.009

Table 4. Clinical course according to absence of free-air

Characteristic	Free-air (n=17)	No free-air (n=11)	P-Value
Mean WBC count on POD 1*	9892.94 ± 864.60	12385.45 ± 5191.09	0.111
Maximal body temperature*	37.26 ± 0.59	37.45 ± 0.70	0.451
Proportion of abdominal pain (yes/no), n	12/5	1/10	0.001
Hospital stay period, day*	8.58 ± 1.69	6.27 ± 1.10	<0.001
Fasting period, day*	5.29 ± 1.65	3.36 ± 1.03	<0.001

PLG-25

Case Report: Small Bowel Obstruction Secondary to Incarcerated Femoral Hernia

Johaniya Dimaporo and Virgilio Banez

Department of Internal Medicine - Section of Gastroenterology, Manila Doctors Hospital, Metro Manila, Philippines

Significance: Femoral hernia is a rare cause of small bowel obstruction. This type of hernias is at high risk of incarceration and strangulation due to the narrow femoral canal and femoral ring. Therefore, can lead to symptoms of obstruction that may require emergency surgery and possible bowel resection.

Clinical presentation: This is a case of a 74-year-old woman, single, who sought consult at our institution due to increase in abdominal girth. Patient has no comorbidities and previous surgeries. She had pulmonary tuberculosis three years ago completely treated for 6 months with antituberculous medications. Examination revealed one 3.0 cm×3.0 cm, non-tender lump in the left inguinal area.

Management: Computerized tomography of the abdomen with contrast showed small bowel obstruction and left indirect inguinal hernia¹. Initial impression was small bowel obstruction probably secondary to ileocecal mass probably from tuberculosis versus malignancy. Patient was referred to surgery and on intra-operation findings showed incarceration of proximal segment of ileum (approximately 250 cc from the Ligament of Trietz) at the left femoral canal without signs of gangrenous bowel². Explore laparotomy with proximal bowel decompression, reduction of femoral hernia and left femoral herniorrhaphy was done. She was stable after operation.

Recommendation: Hernias should always be considered as one of the possible causes of gastrointestinal obstruction. Our case emphasizes the significance of meticulous history taking and clinical examination as any delay in diagnosis will increase the risk of mortality and morbidity for the patient.

Keywords: Small bowel obstruction, Femoral hernia

PLG-26

The Study of Colonoscopic Biopsy in the Diagnosis of IBD

Javkhlan Tsengenbayar¹, Enkh-Amar Ayush², Ankhzaya Bayanzul² and Bayarmaa Bold¹

¹Department of Internal Medicine, Seoul Hospital, Ulaanbaatar, ²Department of Internal Medicine, National University of Medical Sciences, Ulaanbaatar, Mongolia

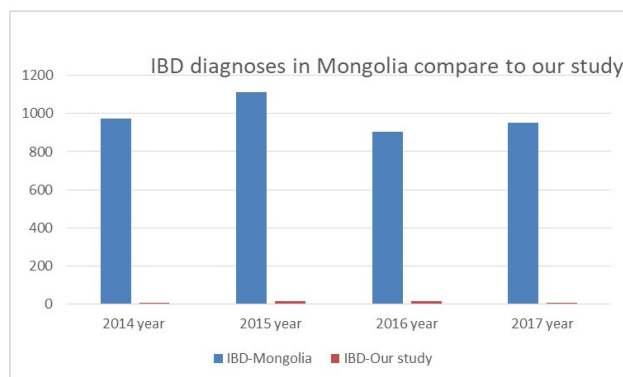
Background/aims: IBD is considered at high risk for developing colorectal cancer. Every year there are about 5000 cancer diagnosed /including CRC/ in Mongolia, but 75% of them were diagnosed by the latest stages. Our study did some survey at colonoscopic biopsy in the diagnose of IBD at government hospitals.

Methods: We collected data from the Gastroenterology department of two main government hospitals in Ulaanbaatar, from 2014-2018, were analyzed by retrospective study. In this study involved colon tissue biopsy cases around 610. Included pathological diseases were Colitis, UC, Crohn's disease and so on.

Results: A total of 610 patients has done colonoscopy and biopsy were included in our analysis respectively. Endoscopy and biopsy conducted 610 patients was evaluated 6% (37) with UC, 1% (7) with Crohn's disease and 44% (271) were colitis. The prevalence of colorectal cancer 12% (73) in colon diseases.

Conclusions: Compare to in total 3938 cases of IBD incidence that diagnosed at Mongolia from 2014-2018, our study showed that only 44 cases of IBD incidence diagnosed at these government hospital by biopsy. Based on this observations, further we need to use more histopathology method and new diagnostic investigations of IBD at government hospital, since government hospital had main role in our gastrointestinal field.

Keywords: Inflammatory bowel disease, Colorectal cancer, Colonoscopic biopsy



PLG-27

Adenoma Miss Rate and the Location of the Adenoma

Dongwoo Kim, Ja Seol Koo, Jae Won Lee, Jeong Hun Park, Young Eun Ahn, Byung Hun Lim, Min Koo Kim, Jung Wan Choe, Seung Young Kim, Jong Jin Hyun, Sung Woo Jung, Hyung Joon Yim and Sang Woo Lee

Internal Medicine, Korea University Ansan Hospital, Ansan-Si, Korea

Background/aims: The adenoma miss rate affects the quality of the colonoscopy. The aim of this study is to compare the adenoma miss rate according to the location of the adenoma.

Methods: From January 2011 to February 2016, patients who underwent more than two colonoscopy within 3 years and had adenomas on the first colonoscopy were included. Adenoma larger than 5 mm found on second colonoscopy were considered as missed adenoma. The adenomas located from cecum to splenic flexure were classified to right side adenoma and the adenomas located on sigmoid colon and rectum were classified to left side adenoma. The adenomas on both side of colon were classified to right side adenomas. The location of adenomas on the first colonoscopy were compared between the groups with and without missed adenomas.

Results: 216 patients aged ≥ 40 years were analyzed retrospectively. Mean age was 60.0 years and male was 158 (73.1%). And mean time interval between two colonoscopy was 17.2 months. There was no significant difference in age, sex, insertion time, examination time and mean interval time of the colonoscopy. The adenoma miss rate was 19.7%. The missed adenomas were found in 36 patients and the other patients had no missing adenomas. Among the patients with missed adenoma, 12 (16.2%) had right side adenoma and 24 (16.9%) had left side adenoma on the first colonoscopy. In the patients with no missed adenoma, 62 (83.8%) had right side adenoma and 118 (83.1%) had left side adenoma on the first colonoscopy. There was no significant difference in the location of adenoma found on the first colonoscopy ($p=0.898$).

Conclusions: The location of the adenoma was not associated with the adenoma miss rate although some studies have reported the relation of adenoma miss rate and the location of the adenomas. Further evaluation about the risk factors for the adenoma miss rate is needed.

Keywords: Adenoma miss rate, Location of adenoma, Colonoscopy

PLG-28 

Efficacy of Repeat Forward-View Examination of the Right Side Colon during Colonoscopy

Su Young Kim¹, Jun-Won Chung², Sang Jin Lee², Kwang an Kwon², Kyoung Oh Kim², Yoon Jae Kim², Jung Ho Kim² and Dong Kyun Park²

¹Division of Gastroenterology, Department of Internal Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea, ²Division of Gastroenterology, Department of Internal Medicine, Gachon University, Gil Medical Center, Incheon, Korea

Background/aims: Generally, colonoscopy is less effective for detecting colorectal adenomas in the right side colon compared to distal colon. Repeat forward-view (RF) examination of right side colon has been suggested to increase of adenoma detection rate (ADR), however, studies of the efficacy of RF examination are lacking. The aim of our study was to determine whether RF examination in the right side colon would enhance right-sided ADR.

Methods: We performed a prospective, randomized controlled trial (RCT), including asymptomatic subjects who underwent a screening colonoscopy. Subjects were randomized to the RF group, in which the right side colon was examined twice in the forward view, or to the standard forward-view (SF) group, in which the right side colon was examined once in the forward view. The primary outcome was the right-sided ADR on RF examination of the right side colon.

Results: A total of 640 subjects completed the study protocol (RF group: 320 and SF group: 320). The right-sided ADR in RF group was significantly higher compared with SF group (17.5% vs. 11.9%; $P=0.044$). In RF group, additional 31 adenomas were found, and resulting in an increased the detection rate of adenoma by 38.3% when compared with first forward-view. The ADR of the whole colon was similar in both group. The total withdrawal time was not significantly different (RF group: 8.6 ± 7.7 vs. SF group: 7.0 ± 8.4 ; $P=0.083$). The higher number of subjects were recommended a short-term surveillance interval (1-3 years) in the RF group.

Conclusions: In our prospective RCT, RF examination in the right side colon increased the right-sided ADR, and can be easily applied in clinical practice.

Keywords: Colonoscopy, Adenoma, Proximal colon

PLG-29

Simple Endoscopic Scoring of Patients with Rectal Cancer after Concurrent Chemoradiotherapy

Jae Hyun Kim, Ji Hun Choi, Do Hyeong Lee, Sanghwan Byun, Kyoungwon Jung, Sung Eun Kim, Won Moon, Moo in Park and Seun Ja Park

Gastroenterology, Kosin University College of Medicine, Busan, Korea

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 0-3 according to post-CCRT findings. The scoring criteria were as follows: 0=no ulcer; 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: 35-76). Patients with a low score (≤ 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: 1.11-21.50, $p=0.036$).

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

PLG-30



Differences in Degree of Intestinal Mucosal Damage According to the Polypectomy Technique

Sang Hyun Kim, Hoon Jai Chun, Kang Won Lee, Han Jo Jeon, Se Hyun Jang, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee and Chang Duck Kim

Department of Internal Medicine, Korea University, Seoul, Korea

Background/aims: Cold snare polypectomy (CSP) is now the primary technique for the resection of polyps up to 10 mm in size. In recent studies, CSP showed less complication, such as delayed bleeding and perforation, than conventional hot snare polypectomy (HSP) under various conditions. However, we do not know why CSP showed better outcomes than HSP methods. In this study, we aimed to define the mechanism of damage of the cutaneous mucosa by comparing of healing patterns between the two other site by CSP compared to HSP using the porcine colon.

Methods: Colonoscopy was performed on day-1, 3, 5 of each porcine. Two CSPs and two HSPs were performed on each experiment day. And the healing pattern of previous lesions on the next follow up day was taken picture through an endoscope. After sacrificing porcines, we obtained the porcine intestine and confirmed pathologic findings of polypectomy site. We compared the degree of damage to the mucosal membrane in HSP and CSP.

Results: The results showed that the healing of the CSP site was faster than the HSP site. The inflammatory findings were less. Histologically, Cutting surface by CSP limited to the mucosal layer and only had shallow damage of the submucosal layer. In contrast, the HSP site was found with deeper damage to the submucosal layer. Pathologic changes of the thermal damage on the lower surface of the HSP sites were observed maybe due to the electrical burn.

Conclusions: We find that cutting site recovery is faster than HSP when CSP is performed. In our opinion, CSP is less damaged compared to HSP because of the possibility of shallow depth of cutting. The characteristics of the non-heat-treated CSP technique cause histologic differences between the two groups. These differences are visually confirmed to affect the lesion healing pattern.

Keywords: Cold snare polypectomy, Hot snare polypectomy, Electrical burn, Intestinal mucosa, Damage

PLG-31

Acute Appendicitis Initiated after Bowel Preparation: A Case Report

Soo in Choi

Internal Medicine, Inje University Sanggye Paik Hospital, Inje University College of Medicine, Seoul, Korea

A 45-year-old male visited for removal of colon polyps detected at colonoscopy 2 years ago. He did not have past medical history. When he arrived on the scheduled day, he complained nausea and epigastric pain which started after taking last laxative. He presented a direct tenderness on epigastric area without peritoneal sign and vital signs were stable. He referred to the emergency department. The white cell counts was elevated of 15,600/ μ l and other findings were normal. He had used a same laxative before without specific events. He was developed a high fever of 39.2 $^{\circ}$ C and abdominal computed tomography (CT) was shown a distended appendix with appendicolith and perihepatitis. Laparoscopic appendectomy was performed and histological examination revealed acute suppurative appendicitis. He was discharged at five days after surgery uneventfully. In this case, it was difficult to detect typical sign of appendicitis because of an unusual location of appendiceal tip at right subhepatic space, higher than normal.

Conclusions: Appendicitis after bowel preparation before colonoscopy is extremely rare, but in certain patients, bowel preparation alone can trigger appendicitis. If a patient complains abdominal pain, it is necessary to perform an additional examination without being overlooked.

Keywords: Bowel preparation solutions, Colonoscopy, Appendicitis

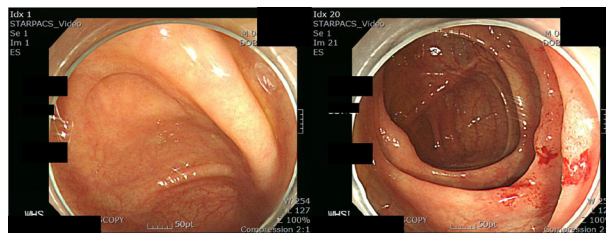


Figure 1. The appendiceal orifice and two ascending colon polyps which shown at colonoscopy 2 years ago.

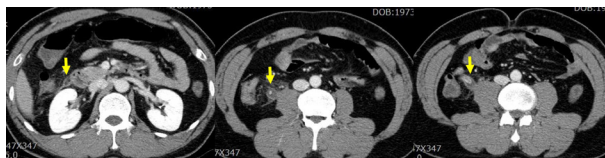


Figure 2. The appendiceal tip with inflammation which shown at unusually higher site on CT.

PLG-32

The Use of a Second Endoscope for the Removal of a Trapped Endoloop

Sujata May Mansukhani, Rafael Chan and Veronica Nica Carrasco

Gastroenterology, Manila Doctors Hospital, Manila, Philippines

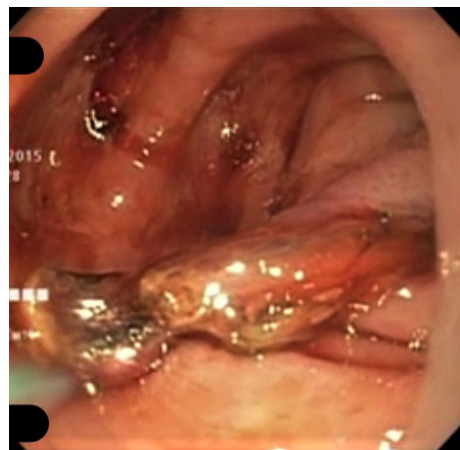
Colorectal cancer, the second leading cause of death worldwide, can be prevented by screening colonoscopy. During colonoscopy, polyps can be found and subsequently removed. A detachable snare has been used to prevent post-polypectomy bleeding during removal of large polyps. However, complications may occur. Knowledge of the complications and their management may guide endoscopists should they encounter these in their practice.

A 41-year old male underwent colonoscopy due to hematochezia. On colonoscopy, a 2.5×2.5 cm pedunculated polyp with a broad base was seen at the sigmoid colon. An endoloop (Olympus Loop MAJ-254 30 mm) was deployed at the base of the polyp, however, the detachable snare could not be released from the hook wire of the operating part despite multiple attempts. Since the snare loop and coil sheath were attached to the polyp, we were unable to remove the colonoscope. A transnasal gastroscope was then inserted side by side to the colonoscope. Snare polypectomy was done above the trapped endoloop for greater field of view. A needle knife was then used to cut below the endoloop to release it. There was noted minimal post-polypectomy bleeding which was controlled by the use of hemoclips. There was no delayed bleeding noted on follow-up.

Keywords: Detachable snare, Endoloop, Polypectomy, Colonoscopy, Transnasal gastroscope



Endoloop at the base of the polyp which could not be released from the hook wire



Needle knife used to cut the below the endoloop

PLG-33

Endoscopic Features for Selection of Colorectal Cancer Amenable to Endoscopic Resection

Young Min Kim, Jae Jun Park, Da Hyun Jung, Jie-Hyun Kim, Young Hoon Youn and Hyojin Park

Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Background/aims: There was limited data regarding endoscopic features for predicting invasion depth of colorectal cancer. We aimed to identify endoscopic findings for selection colorectal cancer amenable to endoscopic resection.

Methods: From January 2010 to April 2018, a total of 366 patients who underwent colonoscopy and diagnosed with colorectal cancer invaded mucosa, submucosa, and muscularis propria were enrolled at Gangnam Severance Hospital. We retrospectively reviewed endoscopic image of 384 tumors of enrolled patients and compared endoscopic findings between superficial and deep invasive cancer. Superficial cancer was defined as cancer invaded mucosa or submucosa less than 1000 μm , whereas deep invasive cancer was defined as cancer invaded submucosa greater than 1000 μm or muscularis propria. Endoscopic findings evaluated include shape, size, location, and seven morphological (i.e., demarcated depression, stalk swelling, fullness, fold convergence, deep ulcer, ulcer bleeding, nodular surface, and pit pattern) of tumor.

Results: Among the morphological features, demarcated depression (49.1% vs. 4.9%), fullness (3.1% vs. 0.4%), and fold convergence (9.4% vs. 0.9%) was more common in deep cancer than in superficial cancer. In the type of polyp, flat shape was more common in superficial cancer than in deep invasive cancer (17.8% vs. 6.9%). Among deep invasive cancer, 77.4% of polyps showed non-structural pit pattern, whereas 12.9% of superficial cancer showed non-structural pit pattern. In the multivariate analysis, demarcated depression (odds ratio [OR] 8.43, 95% CI 3.75-18.92) and non-structural pit pattern (OR 12.08, 95% CI 6.74-21.64) were independent predictive factors for deep invasive cancer.

Conclusions: Demarcated depression and non-structural pit pattern of colorectal tumors were identified as independent predictive factors for deep invasive cancer. Meticulous endoscopic observation considering these parameters may be useful in selecting colorectal cancer patients amenable to endoscopic resection.

Keywords: Colorectal cancer, Endoscopic resection, Endoscopic features

PLG-34

Intestinal Anisakiasis, Should It Be Operated?

In Seon Lee, Sae Kyung Joo and Ji Won Kim

Department of Gastroenterology, Seoul National University Boramae Medical Center, Seoul National University of College of Medicine, Seoul, Korea

Background/aims: Anisakiasis is a parasite infection caused by the consumption of raw or insufficiently pickled, salted, smoked, or cooked wild marine fish infected with larval nematodes belonging to the family Anisakidae.¹ Anisakiasis usually occurs in the stomach, and can easily be diagnosed by digestive tract endoscopy. On the other hand, enteric anisakiasis is very rare, and its definitive diagnosis is difficult.² The aim of this study is to analyze the clinical and endoscopic features in ileocolic anisakiasis.

Methods: From January, 1992 to July, 2011, ileocolic anisakiasis disease was diagnosed in 6 patients at our hospital. And we collected 24 patients who are diagnosed in other hospital. It was collected and analyzed the data of enteric anisakiasis. 9 cases are already published.

Results: More than 70% were males. The average age was 50 years. Overall, acute abdominal pain was a major symptom, mostly developed within 48 hours after ingestion of raw fish, which last for 1 to 30 days. The 11 (45.8%) described raw fish ingestion. 8 cases were found anisakis by routine exam incidentally. Eosinophilia was found in 8.3%. Colonoscopy was performed in 21 (87.5%) cases and showed anisakis larva in 19 (90.5%) cases. 23 cases (95.8%) were diagnosed by demonstration of anisakis worm by colonoscopy or surgery. Eosinophilic infiltration was found in all surgical specimens. 19 (79.2%) underwent colonoscopic removal of Anisakis larvae.

Conclusions: For diagnosis, the history of ingestion of raw fish was most important and colonoscopy could be helpful. And surgical intervention should be avoided if clinical history and diagnostic exams suggest this parasitic disease because endoscopic treatment is sufficient.

Keywords: Anisakis simplex, Anisakidosis, Intestine, Colonoscopy

PLG-35

Sigmoidoscopy Is Good Tool for Evaluating Endoscopic Severity of Ulcerative Colitis Patients

Jun Hyung Lee¹, Jun Lee¹, Subum Park², Yoo Jin Lee³, Dong Hoon Baek⁴, Geom Seog Seo⁵, Sang Wook Kim⁶, Eun Soo Kim⁷ and Tae Oh Kim⁸

¹Department of Internal Medicine, Chosun University School of Medicine, Gwangju, Korea, ²Department of Internal Medicine, Pusan National University School of Medicine, Yangsan, Korea, ³Department of Internal Medicine, Keimyung University School of Medicine, Daegu, Korea, ⁴Department of Internal Medicine, Pusan National University School of Medicine, Busan, Korea, ⁵Department of Internal Medicine, Wonkwang University School of Medicine, Iksan, Korea, ⁶Department of Internal Medicine, Chonbuk National University Medical School, Jeonju, Korea, ⁷Department of Internal Medicine, Kyungpook National University School of Medicine, Daegu, Korea, ⁸Department of Internal Medicine, Haeundae Paik Hospital, Inje University College of Medicine, Busan, Korea

Background/aims: The treatment strategy for inflammatory bowel disease are shifting from simple control of symptoms toward completely deep remission including clinical and endoscopic remission. Especially, endoscopic healing is a major target of treatment. The aim of this study is to determine if sigmoidoscopy is a suitable tool for evaluating the inflammatory status of ulcerative colitis patients.

Methods: We retrospectively analyzed the medical records and endoscopic results of patients with ulcerative colitis followed by colonoscopy in 7 tertiary hospitals from January 2012 to December 2018. This study examined 337 patient's colonoscopic videos during the period. Segment was divided into rectosigmoid colon (observable range with sigmoidoscopy) and whole colon. The severity of mucosal inflammation in each segment was assessed using the endoscopic Mayo score and the ulcerative colitis endoscopic index scale (UCEIS). The rectosigmoid and the whole colon were scored separately and worst score of the rectosigmoid was compared with the worst score of the whole colon in both endoscopic Mayo score and UCEIS.

Results: Among the 337 ulcerative colitis patients, the average of endoscopic Mayo score of whole colon is 1.24 and in case of rectosigmoid colon is 1.15. The average of UCEIS of whole colon is 2.70 and in case rectosigmoid colon is 2.47. The agreement endoscopic Mayo score between entire colon and rectosigmoid colon is observed with a kappa value of 0.807 ($p=0.00$), and agreement of UCEIS between entire colon and rectosigmoid colon is observed with a kappa value of 0.908 ($p=0.00$).

Conclusions: There is a very high level of agreement in assessment of followed UC patient's endoscopic severity between colonoscopy and sigmoidoscopy in followed UC patients. Considering cost and complication, Sigmoidoscopy is good tool for evaluating of endoscopic severity of ulcerative colitis patients.

Keywords: Ulcerative colitis, Endoscopic severity, Sigmoidoscopy

PLG-36

Small Bowel Malignant Tumors of Small Bowel Diagnosed by Balloon-Assisted Enteroscopy: A Single Center Experience

Ah Young Yoo, Beom Jae Lee, Kyung Eun Lim, Won Sik Kim, Sang Yoon Lim, Yeon Ho Lee, Sung Min Kim, Moon Kyung Joo and Jong-Jae Park

Gastroenterology, Korea University Guro Hospital, Seoul, Korea

Background/aims: Small bowel malignancy is rare, accounting for less than 5% of gastrointestinal cancer. We aimed to investigate the clinicopathological features of small bowel malignant cancer which were diagnosed by video capsule endoscopy and double balloon-enteroscopy in single tertiary center.

Methods: We retrospectively analyzed VCE and DBE findings performed in Korea University Guro Hospital from 2010 through 2018.

Results: A total of 503 VCE and 115 DBE exams were performed at 452 patients. Small bowel malignancies were diagnosed in 29 patients (15 males, mean age 60.4 years ranged from 42 to 81). 8 patients had lymphoma, 8 had primary adenocarcinoma, 7 had GIST and 4 had metastatic cancer. Abdominal pain and obstructive symptom was the most common findings in malignant lymphoma (7/8, 87.5%) and metastatic cancer (3/4 75%). Obscure GI bleeding was the most common symptom of GIST (87.5%) and adenocarcinoma (62.5%). Among 8 cases of lymphoma, 5 cases were DLBL, 2 cases were MALT lymphoma and 1 was peripheral T-cell lymphoma. Most common location of lymphoma was ileum (7/8, 87.5%). In contrast, most common location of GIST was proximal small bowel including duodenum (7/8, 87.5%). Endoscopic findings of lymphoma were ulceroinfiltrative with luminal narrowing lesions (5/8), followed by stricture (2/8) and mass forming lesion (1). In cases of adenocarcinoma, ulceroinfiltrative lesion was most common finding (50%).

Conclusions: About 6% of patients who received both VCE and DBE were diagnosed as small bowel malignancy. Malignant lymphoma, adenocarcinoma and GIST were the most common small bowel malignant tumors. These findings showed the differences of clinical characteristics of each small bowel malignancy and merit further study.

Keywords: Small bowel malignancy, Video capsule endoscopy, Double balloon enteroscopy

PLG-37

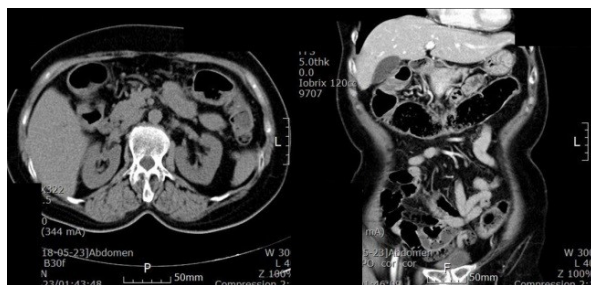
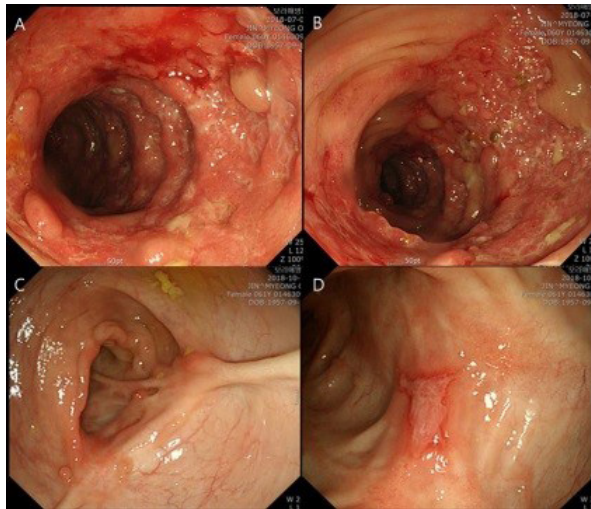
Co-Infection of TB Colitis with Cmv Colitis in Immunocompetent Patient

Jinsun Yang and Jiwon Kim

Internal Medicine, Seoul National University College of Medicine, Seoul, Korea

There were some case reports who has intestinal co-infection of tuberculosis and CMV in HIV patients as immunocompromised host. But immunocompetent host also can be co-infection with tuberculosis and CMV. Here, we reported a case of Co-infection of tuberculosis and CMV colitis who has any other medical disease. She was transfer from other hospital to our hospital in OPD with CMV colitis. Her chief complaint was abrupt severe periumbilical pain. She did abdominal CT, colonoscopy and biopsy of T-colon colitis, and figured out it was CMV colitis as pathology. So we treated her with ganciclovir 2 weeks, but it wasn't work. Laboratory studies showed slightly elevated CRP (5.95), ESR (28), dropped Hemoglobin (11). Abdominal CT suspected dilatation of T-colon with no significant transition point. Colonoscopy showed a geographic huge longitudinal ulcer at T-colon (AV 50~55 cm). ANCA, ASCA were negative, so we rolled out of ulcerative colitis or Crohn's disease. Therefore we started with HERZ as TB colitis. After 3 months later, we did follow-up colonoscopy, found out that the colitis was improved. But she failed of eyesight as a side-effect of ethambutol, so we discontinue it, consulted with ophthalmologist. After all she gets better now, expecting follow up colonoscopy next month.

Keywords: Co-infection, Tb colitis, Cmv colitis, Immunocompetent host



PLG-38

A Case of Ischemic Colitis Induced by Polyethylene Glycol (PEG) Solution with Ascorbic Acid

Jeongmin Choi

Internal Medicine, Inje University Sanggye Paik Hospital, Seoul, Korea

Ischemic colitis is the common form of intestinal ischemia. Polyethylene glycol (PEG)-based bowel preparation solution is believed to be very safe. To our knowledge, this is the first case of ischemic colitis induced by 2L PEG solution with ascorbic acid.

Herein, we report a rare case of a patient with severe ischemic colitis, after she was prepped with 2L PEG solution with ascorbic acid.

Case report: A 78-year-old woman was admitted to our hospital for colonoscopic removal of colonic polyps. She had a history of hypertension and diabetes. One month ago, she had undergone a colonoscopy, which was found to have multiple colonic polyps. On admission, the patient was prepared for the colonoscopy with a 2 L polyethylene glycol (PEG) solution with ascorbic acid. Two hours after ingestion of 1 liter of PEG with ascorbic acid, the patients complained of severe low abdominal pain, which was followed by hematochezia. She stopped ingestion of PEG solution due to the pain and hematochezia. Her abdomen was soft to palpation with moderate tenderness on the whole abdomen; however, there was no sign of peritonitis. The initial laboratory data showed an elevated WBC 15400 / μ L and CRP 3.61 mg/dL, but all other data were normal, including hemoglobin 12.8 g/dL. On the next day, the colonoscopic examination found severe colitis at the sigmoid colon with edema, circumferential hematoma, indicating ischemic colitis. We stopped the colonoscopic examination and decided to delay the endoscopic resection therapy. An endoscopic biopsy was compatible with findings of ischemic colitis and showed erosions and hemorrhages. The patient was managed conservatively, with intravenous fluids, nil by mouth and empirical antibiotics. She recovered uneventfully and was discharged on the 9th hospital day without complications. We performed a follow-up colonoscopy after 2 months and observed totally normal colonoscopic mucosa.

Keywords: Colonoscopy, Ischemic colitis, Polyethylene glycol

PLG-39

Mantle Cell Lymphoma Involving Colon: Rare Entity

Amna Subhan Butt and Fatima Sharrif

Medicine, Aga Khan University Hospital, Karachi, Pakistan

Mantle cell lymphoma (MCL) is a subtype of the B-cell non-Hodgkin lymphomas (NHL) and comprises about 7% of adult NHL. While the presentation of MCL is highly variable. Here we report a case of mantle cell lymphoma involving colon.

Case 1: A 69-year-old gentleman presented to our hospital with 8 months history of loose stools, fever, fatigue and weight loss. General physical examination revealed moderate pallor with lymphadenopathy. Systemic examination revealed ill-defined, vague, non-tender and firm mass in right lower quadrant. Her hemoglobin was 9.3 gm/dl, WBC counts 23500/mm³. Peripheral film showed anemia with nucleated RBCs, leucoerythroblastic picture and 8% blast cells. Bone marrow examination was normal. Lysed peripheral blood specimen showed mature B-lympho-proliferative disorder, suggesting B-cell NHL. CT chest and abdomen revealed extensive abdominal and mediastinal lymphadenopathy, circumferential asymmetric nodular wall thickening and multiple luminal narrowing in entire colon. Colonoscopy showed thickened, edematous mucosa with polypoid appearance throughout the colon. He was diagnosed as MCL on biopsy. Mantle cell international prognostic index (MIPI) was 7.73 (>6.2=high risk). He was started on bendamustine plus rituximab (BR chemotherapy). After first cycle he was admitted with febrile neutropenia and sepsis. The patient died during hospital admission.

Case 2: 54-year-old female presented with 5 months history of altered bowel habits, bleeding per rectum, abdominal pain, low grade fever and weight loss. Abdominal examination revealed 3 finger hepatomegaly and 2 finger splenomegaly. Her bone marrow was normal. Colonoscopy showed circumferential, polypoid mass at 3 cm from the anal verge. Biopsy showed MCL. MIPI was 5.53 (low risk). This patient received 8 cycles of R-CHOP (rituximab, cyclophosphamide, hydroxydaunorubicin, oncovin and prednisone) followed by 3 cycles of maintenance rituximab but she developed relapse and lost to follow up.

Keywords: Mantle cell lymphoma, Colon, Polyps, B-cell nhl

PLG-40

Increase of Tuberculosis Due to Combination Therapy in Inflammatory Bowel Disease: A Population-Based Study in Korea

Seong Ji Choi, Eun Sun Kim, Sanghyun Kim, Kang Won Lee, Han Jo Jeon, Sehyun Jang, Sang Hoon Kim, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/aims: Recent researches reported that inflammatory bowel disease (IBD) in Asia has become more prevalent. Since IBD is chronic inflammation disorder and its relapse is frequent, obtaining and maintaining remission is important. As our knowledge on the pathogenesis of IBD deepened, many immunosuppressants and biological agents were introduced and confirmed to be both safe and effective. However, biologics known as anti-tumor necrosis factor (anti-TNF) agents was reported to lose response over time in 23-46% of patients. Therefore, combination therapy adding immunomodulator drug such as azathioprine was introduced and showed better outcome by optimizing biologic pharmacokinetics and minimizing immunogenicity. Adversely, rates of tuberculosis are increased, but there is no large population data estimating and comparing these risk in combination therapy.

Methods: We used 2008-2016 data of the South Korean Health Insurance and Review Agency (HIRA), and odd ratio (OR) for tuberculosis in IBD patients who underwent either anti-tumor necrosis factor (TNF) agent, azathioprine, or combination therapy.

Results: Between 2008 and 2016, 47,760 patients were newly diagnosed as IBD, 29,440 as UC and 15,320 as CD. We compared the risk of tuberculosis according to the medication divided into 5 groups; infliximab only, azathioprine only, combination of azathioprine and infliximab, azathioprine monotherapy and infliximab monotherapy, and azathioprine and infliximab whether simultaneously or separately. We also compared the risk between male and female. Table 1 shows the results.

Conclusions: Our study shows that Korean IBD patients are at risk for tuberculosis, and this results may highlight the importance of screening for tuberculosis in IBD patients.

Keywords: Inflammatory bowel disease, Azathioprine, Infliximab, Tuberculosis

PLG-41

Reduction of Butyrate-Producing Microbiota in Korean Ulcerative Colitis Patients

Seong Ji Choi¹, Hyuk Soon Choi¹, Jae Ryang Choo², Mi Kyung Sung², Seung Han Kim¹, Jae Min Lee¹, Eun Sun Kim¹, Bora Keum¹, Yoon Tae Jeen¹, Hong Sik Lee¹, Hoon Jai Chun¹ and Chang Duck Kim¹

¹Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea, ²Department of Food and Nutrition Medicine, Sookmyung University, Seoul, Korea

Background/aims: Alteration of intestinal microbiota is associated with onset and pathogenesis with inflammatory disease. Pathogenesis and epidemiology of Asian UC patients are differ from European or American patients. However, there are no data for Asian UC patient's gut microbiota and reduction of butyrate producing bacteria. We evaluated alteration of microbiota especially butyrate producing bacteria. We also assessed the bacterial effect on mucin production in vitro study using normal and colon cancer cell line.

Methods: Butyrate producing bacterias (*Faecalibacterium prausnitzii*, *Clostridium leptum*, *Clostridium coccides*/*Eubacterium rectale*, *Roseburia intestinalis*, and *Bacteroides uniformis*) from 22 UC patients in mild or maintenance of remission status and 25 age and sex-matched healthy controls was analyzed. Predominantly reduced bacteria was selected from our UC patients group, we treated with the bacteria to normal colon cell line (NCM 460) and colon cancer cell line (HT-29). After 24 hours, mRNA of MUC2, CAMP, LL-37 were analyzed, which related with mucosal producing or synthesis of cathelicidin antimicrobial peptide.

Results: *Clostridium coccides*/*Eubacterium rectale*, *Roseburia intestinalis*, and *Bacteroides uniformis* were reduced in UC patients significantly ($p=0.002$, 0.008 , and 0.024 , respectively). Also *Faecalibacterium prausnitzii* and *Clostridium leptum* had the tendency that reduced in UC ($p=0.078$ and 0.089). *Eubacterium rectale* was selected to in vitro study using normal and colon cancer cell lines. MUC2, CAMP, and LL-37 were elevated significantly after treated *Eubacterium rectale* treatment ($p<0.05$).

Conclusions: We found a reduction in *Clostridium coccides*/*Eubacterium rectale*, *Roseburia intestinalis*, and *Bacteroides uniformis*, which well-known butyrate-producing bacteria. *E. rectale* improve the mucin producing markers in intro study using colon cancer cell lines. These results suggest that reduction of butyrate producing bacterial species contribute to the pathogenesis of Asian UC patients.

Keywords: Inflammatory bowel disease, Microbiota, Ulcerative colitis

PLG-42

Characterization of Contractile Properties of Smooth Muscle in Porcine Intestine Model

Sang Hyun Kim, Yoon Tae Jeon, Kang Won Lee, Han Jo Jeon, Se Hyun Jang, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Department of Internal Medicine, Korea University Anam Hospital, Seoul, Korea

Background/aims: Electrical stimulation therapy is a new way to treat digestive disorders such as constipation, colonic inertia. It is necessary to understand the physiology of smooth muscle contraction in developing novel medical devices related with electrical stimulation therapy. The aim of this study is to measure the active characteristics of smooth muscle with acetylcholine in porcine intestine segment.

Methods: We used five female pigs and obtained ten centimeters of each porcine small intestine. To measure passive characteristics of small intestine, a universal testing machine with a tensile rate of 30 mm/min. To estimate the active characteristic parameters of smooth muscle and isometric and isotonic intestinal motility of smooth muscle, muscle contraction was induced by applying the stimulation solution (HTK solution containing 1mM of acetylcholine chloride). Then, we obtained the maximum muscle contractile force of the specimens to measure the isometric and isotonic intestinal motility.

Results: In tensile test, the maximum repulsive force, that indicate passive muscle force of smooth muscle 0.702 N, was measured. In the isometric and isotonic contractions in the porcine small intestine, the maximum myotility, 12.35 mN, was obtained in isometric experiments, and the maximum velocity of muscular contraction, 0.4476 mm/min, was obtained in isotonic experiments. We demonstrated that in equal lengths, the muscle contraction velocity of the smooth muscle is 10-100 times slower than that of the skeletal muscle indicating force-velocity relationship of smooth muscle. And we obtained that the maximum contraction force from each individual percentage of active force (25%, 50%, and 100%) was achieved at $L/L_{opt}=1$.

Conclusions: We straighten out the active and passive property of porcine intestinal smooth muscle. Our study may be helpful for developing novel medical devices and understanding the physiology of smooth muscle in the porcine small intestine.

Keywords: Intestinal motility, Electrical stimulation, Cholinergics

PLG-43

The Risk of Delayed Bleeding after Colorectal Endoscopic Mucosal Resection without Prophylactic Clipping

Hyeonjin Kim, Jae Hyun Kim, Youn Jung Choi, Hye Jung Kwon, Sung Eun Kim, Won Moon, Moo in Park and Seun Ja Park

Internal Medicine, Kosin University College of Medicine, Busan, Korea

Background/aims: Bleeding is one of the major complications of colorectal polypectomy. The aim of this study was to identify the risk of delayed bleeding, especially after colorectal endoscopic mucosal resection (EMR) without prophylactic clipping.

Methods: Between April 2014 and August 2014, patients who underwent colorectal EMR (≥ 6 mm and < 2 cm) without prophylactic clipping were included. We evaluated the incidence of delayed bleeding and the factors associated with delayed bleeding after colorectal EMR without prophylactic clipping.

Results: A total of 717 colorectal polyps (≥ 6 mm and < 2 cm) of 243 patients resected by colorectal EMR in the study period were evaluated. Mean age of the patients was 63 years, and 165 patients were men and 78 patients were women. Mean polyp size removed by colorectal EMR was 9.0 mm (range 6.0-19.0) and the number of polyps larger than 1cm was 212 (29.6%). Delayed bleeding after colorectal EMR occurred in 12 polyps (1.7%) of 8 patients (3.3%). And there was no significant risk factor affecting to delayed bleeding.

Conclusions: In this study, we identified the incidence of delayed bleeding on colorectal polyps (≥ 6 mm and < 2 cm) after EMR without prophylactic clipping.

Keywords: Colorectal polyp, Endoscopic mucosal resection, Bleeding, Clip

PLG-44

Cost Comparison between Endoscopic Submucosal Dissection and Endoscopic Piecemeal Mucosal Resection in the Colorectum

Nam Seok Ham, Jeongseok Kim, Eun Hye Oh, Sung Wook Hwang, Sang Hyoung Park, Dong-Hoon Yang, Byong Duk Ye, Seung-Jae Myung, Suk-Kyun Yang and Jeong-Sik Byeon

Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea

Background/aims: Few studies have compared the cost of colorectal endoscopic submucosal dissection (ESD) and endoscopic piecemeal mucosal resection (EPMR). We aimed to investigate the cost-effectiveness of these approaches by analyzing clinical outcomes and costs.

Methods: Data from patients undergoing colorectal ESD and EPMR were retrospectively reviewed. Clinical outcomes (including procedure time, complete resection, and recurrence) were compared, and total direct costs (procedural and follow-up) were assessed.

Results: Data from 429 ESD and 115 EPMR patients were included in the analysis. In the ESD group, the complete resection rate was significantly higher (83.9% vs. 32.2%, $p < 0.001$), the recurrence rate was lower (0.5% vs. 7.1%, $p < 0.001$), the procedure time was longer (55.4 ± 47.0 vs. 25.6 ± 32.7 min, $p < 0.001$), and the total direct procedural costs at the initial resection timepoint were higher (1480.0 ± 728.0 vs. 729.8 ± 299.7 USD, $p < 0.001$) than in the EPMR group. The total number of surveillance endoscopies was higher in the EPMR group (1.7 ± 1.5 vs. 1.3 ± 1.1 , $p = 0.003$). The cumulative total cost of ESD or EPMR was comparable at the 3 year follow-up timepoint in the adenoma subgroup and at 2 years in the mucosal/superficial submucosal cancer subgroup.

Conclusions: Colorectal ESD was associated with higher complete resection and lower recurrence rates. EPMR showed better overall cost-effectiveness due to shorter procedure times, despite similar cumulative total direct costs. Selection of ESD or EPMR should be based on both clinical outcomes and cost-effectiveness.

Keywords: Endoscopic submucosal dissection, Endoscopic piecemeal mucosal resection, Laterally spreading tumor, Colorectal neoplasm, Cost

PPB-01

Clinical Outcomes of Lumen-Apposing Metal Stent for Treating Benign Gastrointestinal Strictures: A Systematic Review

Xiaowei Tang

Department of Gastroenterology, Affiliated Hospital of Southwest Medical University, Luzhou, China

Background/aims: The aim of this meta-analysis was to determine the efficacy and safety of lumen-apposing metal stent (LAMS) for benign gastrointestinal (GI) strictures.

Methods: Medline, Embase, Cochrane and PubMed databases were searched using the keywords "benign stricture", "gastrointestinal stricture", "stricture", "lumen-apposing metal stent", "metal stent", "AXIOS", "self-expandable stents" on December 2018. Articles were selected for review by two authors independently on the basis of predefined inclusion criteria and exclusion criteria. A meta-analysis using a random effects model was performed.

Results: Six studies with a total of 144 patients were included in the final analysis (60 males, 41.7%). Overall, the pooled technical success rate was 98.3% [95% confidence interval (CI): 0.962-1.004], clinical success rate was 73.8% (95% CI: 0.563-0.912) and adverse events rate was 30.6% (95% CI: 0.187-0.425). The most common complication associated with LAMS for benign GI strictures was migration, and the pooled events rate was 10.9% (95% CI: 0.058-0.160). According to locations of stricture, subgroup analysis was performed in terms of clinical success [Esophagogastric: 63.9% (95% CI: 0.365-0.914); Gastroduodenal: 67.4% (95% CI: 0.421-0.927); Gastrojejunal: 78% (95% CI: 0.638-0.922); Pylorus: 77.6% (95% CI: 0.551-1.002); Colonic: 85.3% (95% CI: 0.515-1.191)].

Conclusions: LAMS can results in most patients obtaining clinical symptom improvement or resolution, and it might be an alluring prospect for treating patients with this difficult condition.

Keywords: Lumen-apposing metal stent, Benign gastrointestinal strictures, Systematic review

PPB-02

Is Lumen-Apposing Metal Stents More Effective Than Plastic Stents for Pancreatic Fluid Collections: A Meta-Analysis

Xiaowei Tang

Department of Gastroenterology, Affiliated Hospital of Southwest Medical University, Luzhou, China

Background/aims: Recently, lumen-apposing-metal-stents (LAMS) has been designed to manage pancreatic fluid collections (PFC), and a few studies reported its efficacy and safety. Therefore, we conducted this meta-analysis to investigate the role of LAMS for PFC.

Methods: We searched the studies from Pubmed, Medline, Embase and Cochrane databases from inception to November 2018. We extracted the data and analyzed the technical success, clinical success as well as the adverse events (AEs) of LAMS to evaluate its efficacy and safety. The pooled risk ratios (RR) is utilized to compare the clinical outcomes of LAMS with plastic stent.

Results: Eighteen studies including a total of 1391 patients are included. The pooled technical success of LAMS for PFC was 97% [95% confidence interval (CI): 95%-98%], and the pooled clinical success was 87% (95% CI: 83%-90%). Regarding to AEs, the pooled event rate was 22% (95% CI: 16%-29%). Seven studies including 766 patients compared the clinical outcomes of LAMS with plastic stents. The pooled RR of technical success for LAMS and plastic stent was 1.01 (95% CI: 0.97-1.04, P=0.72). For the clinical success, the pooled RR was 1.02 (95% CI: 0.98-1.07, P=0.34). As for the overall AEs, the pooled RR was 1.44 (95% CI: 0.66-3.14, P=0.36).

Conclusions: Our current study revealed that LAMS has no obvious advantages over plastic stents for PFC. Further randomized controlled trials with large sample sizes comparing LAMS and plastic stents are warranted in future.

Keywords: Lumen-apposing metal stents, Plastic stents, Pancreatic fluid collections, Meta-analysis

PPB-03

Imaging Characteristics and Clinical Factors Associated with Difficult Selective Cannulation in ERCP

Jae Min Lee¹, Hong Sik Lee¹, Sehyun Jang¹, Han Jo Jeon¹, Sang Hoon Kim¹, Seong Ji Choi¹, Seung Han Kim¹, Hyuk Soon Choi¹, Eun Sun Kim¹, Bora Keum¹, Yoon Tae Jeen¹, Hoon Jai Chun¹, Chang Duck Kim¹ and Na Yeon Han¹

¹Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea, ²Department of Radiology, Korea University College of Medicine, Seoul, Korea

Background/aims: Endoscopic retrograde cholangiopancreatography (ERCP) is one of exclusive therapeutic endoscopic modalities for biliary and pancreatic diseases. However, selective cannulation of the common bile duct is sometime challenging step in ERCP. There is no standard system for predicting the cannulation difficulty. The aim of this study was to investigate the imaging characteristics and clinical factors associated with difficult selective cannulation in ERCP.

Methods: Data of abdominal computed tomography (CT) and clinical findings of patients who underwent ERCP in year 2017 were analyzed retrospectively. We compared the endoscopic results including cannulation time, success rate and use of rescue therapy such as pre-cut. Only patients with first time ERCP were included in the study.

Results: A total of 192 patients were included in the analysis. The overall cannulation success rate was 99.0% (190/192) and the rate of rescue therapy usage was 5.8% (11/190). The rate of guide-wire assisted technique usage was 11.0% (21/190) and the rate of double guide-wire technique usage was 2.1% (4/190). The median time for all successful cannulations was 90 seconds (range 16-1308). Imaging characteristics associated with difficult cannulation were presence of large duodenal diverticulum in CT scan, acute angle of common bile duct-duodenal wall and prominent peri-ampullary mucosa. Major papilla located inside the diverticulum was a significant risk factor for difficult selective cannulation. There was no significant factors (age, gender, body weight) related with cannulation time.

Conclusions: Characteristic CT findings can be useful in predicting cannulation difficulty before ERCP. A more careful approach is required when performing ERCP procedures in patients with risk factors.

Keywords: Ercp, Cannulation, Computed tomography, Risk

PPB-04

Severe Acute Pancreatitis Following Endoscopic Resection, Misunderstanding Accessory Papilla by Neoplasm

Tuan Minh Tran¹ and Joung-Ho Han¹

¹Gastroenterology and Hepatology, 175 Hospital, Ho Chi Minh, Vietnam, ²Division of Gastroenterology, Internal Medicine, Chungbuk National University Hospital, Cheongju, Korea

Pancreas divisum is globally found on 4-14% of the population. Pancreas divisum (PD), a congenital anomaly of the pancreas, usually has no clinical symptoms.

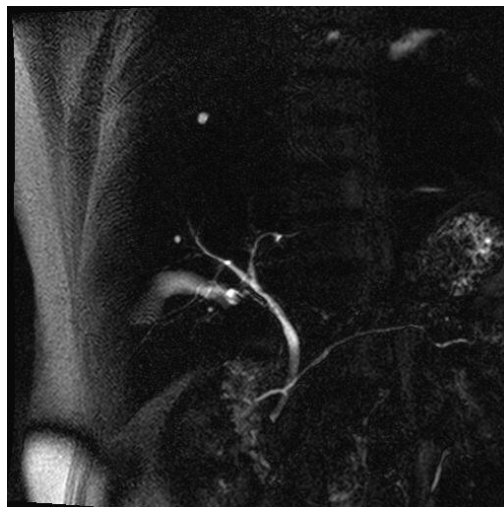
A 52-year-old female patient was admitted to our hospital with acute abdominal pain after performing upper gastrointestinal endoscope at the primary care clinic 6 hours ago. Acute pancreatitis was diagnosed through abdominal computed tomography (CT) and blood test findings. The patient continued having high fever and abdominal pain and recurred symptoms after 5 days. In order to determine the cause of the worsening condition, we asked for the endoscopic images of that clinics which referred to this patient. The photograph revealed the minor ampulla was resected by using the snare. She was discharged 14 days later. One month following endoscopic mucosal resection (EMR), Magnetic Resonance Cholangiopancreatography (MRCP) revealed pancreatitis divisum. The case of severe acute pancreatitis due to EMR as described here is the first case reported in literature review. It is worth noting that endoscopic quality management plays an important role in Korea.

Thus, it is strongly required that intervention gastroscopists of health checkups need to fully understand the normal structure of the duodenum.

Keywords: Pancreas divisum, Endoscopic mucosal resection



Esophagogastroduodenoscopy showed image after EMR



Coronal magnetic resonance cholangiopancreatography imaging showed pancreas divisum: the dorsal duct passing in front of the distal bile duct

PPB-05



Long Term Follow-Up of Transmural Stents in Patients with Walled Off Necrosis and Disconnected Pancreatic Duct Syndrome

Surinder Rana¹, Jimil Shah¹, Ravi Sharma¹ and Rajesh Gupta²

¹Gastroenterology, Post Graduate Institute of Medical Education and Research (pgimer), Chandigarh, ²Surgery, Post Graduate Institute of Medical Education and Research (pgimer), Chandigarh, India

Background/aims: Long-term indwelling transmural stents in patients with walled off pancreatic necrosis (WOPN) and disconnected pancreatic duct syndrome (DPDS) has been accepted as an effective strategy to decrease the risk of recurrence of pancreatic fluid collection (PFC). However, long term studies on safety and efficacy of leaving permanent indwelling plastic prosthesis are lacking.

Methods: Retrospective analysis of the data base of patients with WOPN treated with endoscopic transmural drainage over last 8 years was done to identify patients with DPDS and permanently intended indwelling transmural stents. Patients with indwelling stents for more than 3 years were only included in this study. The follow up data base was analysed for any recurrence of symptoms or PFC or complications.

Results: During last 8 years, 179 patients of WOPN were treated with endoscopic transmural drainage and 138 (77.09%) patients had DPDS. Of 138 patients, 56 patients (39 males; age range: 21-62 years) had an indwelling transmural stent/stents for >3 years. Amongst plastic prosthesis 67.85% of patients had 10 Fr stents and 32.14% of patients had 7 Fr stents. Neck (n=28; 50%) was the most common site of disruption followed by proximal body (n=16; 28.57%) and distal body (n=12; 21.43%). One patient (1.78%) developed recurrence of fluid collection 58 months later despite of in-situ stent which was successfully treated with repeat endoscopic transmural drainage. Two (3.5%) patients had asymptomatic spontaneous external migration of the transmural stent. Two (3.5%) patients developed complications 4 years later because of indwelling stent which were managed conservatively. No other complication of long term indwelling transmural stents was observed.

Conclusions: Long term indwelling transmural stents in patients with WOPN and DPDS are safe as well as effective in preventing recurrence of PFC.

Keywords: Acute pancreatitis, Local complications, Pancreatic fluid collection, Plastic stents

PPB-06 

Optimal Biliary Drainage for Biliary Anastomotic Strictures after Right-Lobe Living Donor Liver Transplantation

Min Su You¹, Woo Hyun Paik¹, Young Hoon Choi¹, Bang-Sup Shin¹, Sang Hyub Lee¹, Ji Kon Ryu¹, Yong-Tae Kim¹, Kyung-Suk Suh², Kwang-Woong Lee², Nam-joon Yi² and Suk Kyun Hong²

¹Department of Internal Medicine, Seoul National University Hospital, Seoul, Korea, ²Department of Surgery, Seoul National University Hospital, Seoul, Korea

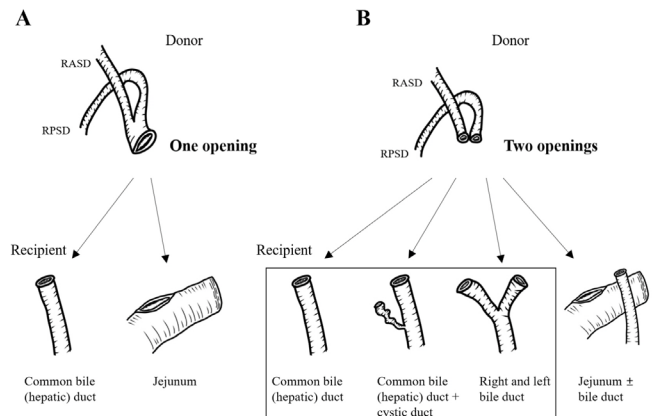
Background/aims: There are usually two bile duct anastomosis sites, namely, the right anterior segmental duct (RASD) and the right posterior segmental duct (RPSD), in right lobe (RL) living donor liver transplantation (LDLT). The efficacy and safety of unilateral and bilateral biliary drainage in patients with biliary strictures following RL-LDLT were investigated.

Methods: From January 2005 to December 2017, 883 patients at Seoul National University Hospital underwent RL-LDLT. Of these, 110 patients who had two duct-to-duct anastomosis sites developed biliary anastomotic strictures.

Results: The time from LDLT to biliary anastomotic strictures was 215.6 ± 187.3 days. At the initial ERCP, unilateral drainage was performed in 55 (50.0%) patients and bilateral drainage in 11 (10.0%) patients. There was no significant difference in the clinical success rates, complication rates, and 180-day mortality between the two groups. During follow-up, 71 (64.5%) patients required bilateral drainage more than once, while only 27 (24.5%) patients reached resolution with unilateral biliary drainage.

Conclusions: Most patients required bilateral biliary drainage more than once during follow-up. An active attempt should be made to drain bilaterally in patients with biliary anastomotic strictures following RL-LDLT.

Keywords: Postoperative stricture, Duct-to-duct biliary anastomosis, Biliary drainage, Liver volume, Overall resolution



PPB-07



Endoscopic Ultrasound-Guided Biliary Drainage Using Novel Fine Gauge Diathermic Dilator: A Pilot Study

Masanori Yamada, Takeshi Ogura, Atsushi Okuda and Kazuhide Higuchi

2nd Department of Internal Medicine, Osaka Medical College, Takatsuki City, Osaka, Japan

Background/aims: Endoscopic ultrasound-guided biliary drainage (EUS-BD) has been developed as an alternative method for failed ERCP. In this procedure, tract dilation is needed to insert the stent delivery system. To date, various technique has been reported regarding tract dilation among tract dilation technique, diathermic dilator is relatively used. However, burning effect may be one of disadvantage, which can lead to bleeding. Recently, novel fine gauge diathermic dilator (Fine 025) has been available in Japan. Top of this device is only 3Fr, therefore, burning effect may be reduced compared with conventional diathermic dilator. In this pilot study, technical feasibility and safety of this device were evaluated in EUS-BD procedure.

Methods: Between September 2017 and October 2018, patients who underwent EUS-BD were enrolled. Technical success was defined as successful stent deployment using only novel diathermic dilator as dilation device. Also, kinds of adverse events were evaluated.

Results: A total of 25 patients were retrospectively enrolled. Kind of procedures were EUS-guided gallbladder drainage (GBD) (n=5), EUS-guided hepaticogastrostomy (HGS) (n=17), and EUS-guided pancreatic duct drainage (PD) (n=3). Median procedure time was 10 min in EUS-GBD, 15 min in EUS-HGS, and 13 min (EUS-PD). Technical success was obtained in all patients. Abdominal pain was seen in only one patient who underwent EUS-PD.

Conclusions: In conclusion, novel fine gauge diathermic dilator may be useful in EUS-BD as dilation device, although additional case reports and prospective studies confirming this are needed.

Keywords: Eus, Biliary drainage, Dilation

PPB-08

Multimodality Drainage of Complicated Pseudocyst and Walled-Off Necrosis with Lumen- Apposing Metal Stent

Thanawat Luangsukrerak and Pradermchai Kongkam

Medicine, Chulalongkorn University, Bangkok, Thailand

Background/aims: Lumen-apposing metal stents (LAMS) are a novel instrument for pancreatic pseudocyst (PPC) and walled-off necrosis (WON) treatment. LAMS is not only provide drainage of collecting fluid, it also allows to perform direct endoscopic necrosectomy (DEN). Despite using LAMS, some complicated group still required multimodality drainage. In this study, We aimed to calculate the prevalence of complicated PPC and WON which needed multimodality drainage and to identify the risk of developing complicated PPC and WON.

Methods: We reviewed medical records in our center between January 2016 to March 2019. We recruited all PPC and WON cases who received EUS-guided drainage by using LAMS. Baseline characteristics and clinical outcomes were compared between complicated and uncomplicated group by using t-test and χ^2 .

Results: Fourteen patients required EUS guided drainage by using LAMS. Most of patients (57%) had WON. Half of patents required DEN. The incidence of complicated cases that required multimodality drainage was 29% (4 patients). All patient in complicated group had WON which required DEN. Three patients required percutaneous drainage from inaccessible further drainage by EUS-guided route. Other patient required second LAMS because of highly viscous collecting fluid. PPC and WON resolution time was not different among complicated and uncomplicated groups (27 vs. 30 days, $p=0.8$). There was no adverse event occurred in all patients. The baseline characteristics (age, sex, etiology of pancreatitis, present of chronic pancreatitis and pancreatic duct leakage) were not different between two groups excepted the size of fluid collection. In complicated group, size of fluid collection was larger than uncomplicated group (21 vs.14 cm, $p=0.04$).

Conclusions: Large WON is the risk factor of complicated case. Multimodality drainage was very helpful for improving clinical outcomes in complicated WON. Percutaneous drainage and Multiple gateway EUS-guided LAMS placement are safe options for this complicated patients.

Keywords: Lams, Pseudocyst, Walled-off necrosis, Eus

PPB-09

Initial Results of Modified Ercp for Treatment of CBD Stricture in Patients with Gastroenterostomy

Nguyen Thi Huyen Trang, Tran Anh Tuyet, Trinh Xuan Hung and Nguyen Lam Tung

Gastroenterology, 108 Military Central Hospital, Ha Noi, Vietnam

Background/aims: Endoscopic retrograde cholangiopancreatography (ERCP) in patients who have undergone gastroenterostomy (GE) is difficult because of the anatomic changes of the digestive tract. Aim of our study is to evaluate the efficacy of ERCP for treatment of CBD stricture in patients who have undergone Billroth II GE, by using a front-viewing endoscope.

Methods: A prospective study was done on CBD strictue cases with Billroth II GE underwent ERCP using a conventional endoscope.

Results: Ten CBD stricture patients with Billroth II GE underwent ERCP. Three patients had choledocholithiasis and seven patients had malignant biliary strictures. The probability of success of endoscopic treatment was 7/10 patients (70%) included bile duct stone removal 3/3 (100%) and biliary stent placement for malignant tumors 4/7 (57.1%); there was no case of complication.

Conclusions: ERCP using a front-viewing endoscope is feasible and may be the priority utilization in patients with Billroth II GE who have indication of removing bile duct stones or biliary stenting.

Keywords: Modified ercp, Gastroenterostomy

PPB-10

Utility of Double Guidewire Technique in Difficult Biliary Cannulation: Experience from a Single Tertiary Hospital

Marjorie Antonette Cardenas Fragante, Jonathan Crisostomo, Katrina Jewel Cham and Evan Ong

Section of Gastroenterology, Metropolitan Medical Center, Sta Cruz, Manila, Philippines

Background/aims: Double guidewire technique (DGT) has been performed with promising results in cases of difficult biliary cannulation. However, recent published studies on DGT have conflicting results. This study intends to report our experience in utilizing DGT in endoscopic retrograde cholangiopancreatography (ERCP) with difficult biliary cannulation and determine its rate of post-ERCP pancreatitis (PEP).

Methods: A retrospective database review of 8-year duration identified 1,597 patients with naïve papilla who undergone ERCP. The standard biliary cannulation method used was single guidewire technique (SGT). In difficult cannulation where there is persistent pancreatic duct cannulation, double guidewire technique was utilized. Precut papillotomy, rendezvous technique, and fistulotomy were employed when DGT failed or pancreatic duct cannulation was not previously achieved. The main outcome investigated was successful biliary cannulation and rate of PEP.

Results: Biliary cannulation using SGT was successful in 89.98% (1437/1597). Out of the 160 failed SGT, 129 underwent DGT with success rate of 91.47% (118/129). Of the 11 patients to whom DGT was not successful, precut papillotomy, fistulotomy and rendezvous techniques were employed having a success rate of 72.72% (8/11). The overall biliary cannulation rate increased from 89.98% to 97.37% using DGT as second line from SGT. Rate of PEP in DGT is 6.38%.

Conclusions: SGT can be used as a standard method having a high success rate in biliary cannulation. Cannulation rate can further increase with the utilization of DGT for those who have failed SGT. Other advanced techniques may be used as a salvage procedure in cases of unsuccessful DGT. PEP rate is satisfactory.

Keywords: Double guidewire technique, Dgt, Difficult biliary cannulation, Ercp, Retrospective

PPB-11

Efficacy and Safety of Simultaneous Side-By-Side Bilateral Placement of Braided-Type Metal Stents for Klatskin Tumor

Boram Cha¹, Seok Jeong¹, Jin-Seok Park¹ and Jae Hee Cho²

¹Department of Internal Medicine, Inha University Hospital, Incheon, Korea, ²Department of Internal Medicine, Gachon University, Gil Medical Center, Incheon, Korea

Background/aims: Side-by-side bilateral placement of self-expandable metal stent (SEMS) has had technical difficulty and limitation in malignant hilar bile duct obstruction. Recently braided type of SEMS with 6F introducer which makes it possible to do simultaneous bilateral stenting was developed. The aim of this study was to evaluate safety and efficacy of simultaneous side-by-side bilateral stenting (S-SBS-BS) of the braided type SEMS using 6F introducer for the management of malignant hilar biliary obstruction.

Methods: We reviewed the medical records of 8 patients who underwent S-SBS-BS of the SEMS with malignant hilar biliary obstruction between January 2016 and January 2018.

Results: The technical success rate and clinical success rate were all 100% (8/8). The success rates for distal end alignment of both stents were 100%. No early procedure-related adverse events occurred within 30 days after insertion of the stent. Median stent patency time was 211 days (range 79-728), and median survival time was 229 days (range 128-728).

Conclusions: The safety and efficacy of S-SBS-BS of SEMS in patients with malignant hilar bile duct obstruction seemed to be acceptable. Prospective controlled clinical studies are needed to verify the clinical utility of this stenting method for malignant hilar biliary obstruction.

Keywords: Klatskin tumor, Side-by-side bilateral biliary stent

PPB-12

Endoscopic Retrograde Cholangio-Pancreatography Related Complications- Analysis at Tertiary Care Center in Central India

Swapnil Kankare, Deepesh Sharma, Aashish Patil and Shrikant Mukewar

Department of Medical Gastroenterology, Midas Multispeciality Hospital Pvt Ltd., Nagpur, India

Background/aims: Endoscopic retrograde cholangiopancreatography (ERCP) was first performed in 1968 and has evolved since then by leaps and bounds. ERCP is a complex and technically demanding procedure with high inherent risk for adverse events. There is no comprehensive data available till date about ERCP procedures from Central India. The aim of this study was to review the complications of ERCP in a tertiary care center in Central India.

Methods: This Prospective, descriptive observational study was carried out at a tertiary care hospital in Central India. Study population consisted of the consecutive patients undergoing ERCP from May 2016 to May 2018 and fulfilling the inclusion/exclusion criteria. Patient's demographic characters and post-ERCP complications were reviewed.

Results: Five hundred and forty seven patients were included in the study. Among them 399 patients underwent ERCP for first time (naive patients) while 148 patients had previous papillary intervention like papillotomy, sphincterotomy or stent placement.

Mean age was 50.67 years with age ranging from 08 to 87 years. Male to female ratio was 1.29: 1. Post ERCP complications developed in 25 patients (4.57%). Pancreatitis was the most common post-ERCP complication in 9 (3.08%) patients. Average attempts needed for CBD cannulation were 1.7. Average time taken for procedure was 44.94 min. Bleeding and perforation occurred in 4 (0.73%) and 5 (0.91%) patients respectively. Fatality occurred in 9 (1.64%) patients out of these, 6 patients had advanced pancreato-biliary malignancies, 2 patients had pancreatic ascites and 1 patient had obstructive jaundice secondary to choledocholithiasis.

Conclusions: ERCP is highly effective and safe procedure in the hands of experienced endoscopist. Overall adverse event rates for ERCP are typically reported as 5% to 10% in most of the studies globally with post-ERCP pancreatitis being a commonest complication. ERCP related complication rates in our center are in line to those reported globally.

Keywords: Post ercp complications, Pancreatitis, Perforation, Bleeding

PPB-13

Endoscopic Minor Duodenal Papillotomy by Rendezvous Method - 2 Cases

Jihun Jang, Hyunsoo Kim, Hanjun Ryu, Sangmyung Yeo, Daejin Kim, Jaekwang Lee, Jaekwon Jung, Changkeun Park, Yunjin Chung and Yongseok Lee

Gastroenterology and Hepatology, Daegu Fatima Hospital, Daegu, Korea

Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) for the diagnosis and treatment of various pancreatic diseases is mainly performed through the major duodenal papilla. If pancreatography or endoscopic treatment is difficult via major duodenal papilla, it is necessary to approach through minor duodenal papilla.

It is often difficult to identify the opening of the minor duodenal papilla. There are various methods for finding opening, such as secretin administration, methylene blue solution, and so on. We used a rendezvous method of introducing a guidewire into the major duodenal papilla, and then guiding the opening of minor duodenal papilla. We traced it and succeeded in reaching the main pancreatic duct through minor duodenal papilla.

Case presentation: A 64-year-old woman came to the emergency center with fever and epigastric pain, and diagnosed necrotizing pancreatitis. We found severe angulation of the pancreatic duct in this patient. We couldn't reach the main pancreatic duct through major duodenal papilla. By rendezvous method, we found the opening of minor duodenal papilla from major duodenal papilla. A plastic stent was inserted in main pancreatic duct through minor duodenal papilla, and symptom of the patient was improved.

In another case, a 67-year-old female having pancreas divisum and chronic pancreatitis came to emergency center with epigastric pain, and diagnosed aggravated chronic pancreatitis. We used rendezvous method to the patient. We could pass the guidewire from stomach to the main pancreatic duct by using EUS with fine needle puncture, and could reach the opening of minor duodenal papilla. A plastic stent was inserted through the minor duodenal papilla and symptom of the patient was improved.

Conclusion: If it is difficult to reach the main pancreatic duct from the major duodenal papilla, in some cases, the rendezvous method can be a salvage technique.

Keywords: Endoscopic minor duodenal papillotomy, Rendezvous method, Pancreas divisum, Pancreatitis, Pancreatic duct angulation

PPB-14

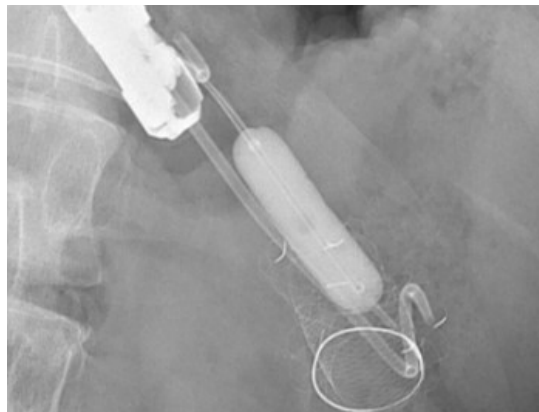
Endoscopic Removal of an Inwardly Migrated Lumen-Apposing Metal Stent after Cysto-Gastrostomy for Pancreatic Pseudocyst

Gunn Huh, Sang Hyub Lee, Jung Won Chun, Min Su You, Woo Hyun Paik, Ji Kon Ryu and Yong-Tae Kim

Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea

A 36-year-old man with history of acute pancreatitis 35 days before was referred to our department for evaluation of upper abdominal pain. Computed tomography (CT) revealed multiple radioopaque stones in the gallbladder and 12.3 cm-sized pseudocyst in the pancreas tail. He underwent EUS-guided cystogastrostomy with 16×20 mm lumen-apposing metal stent (LAMS) and an anchoring 7Fr ×5 cm double pigtail plastic stent. Seven weeks after the procedure, follow-up CT scan was performed, which showed nearly disappeared pseudocyst. During the endoscopy, the plastic stent was seen at the previously inserted site of the stomach as expected but the LAMS was not observed. Fluoroscopy showed the LAMS migrated inwardly into the cyst, hanging on the cyst-side pigtail end of the plastic stent. To remove the LAMS, an ERCP catheter was inserted along the plastic stent and a guidewire was advanced through the LAMS under fluoroscopic guidance. Additional puncture was done with a cystotome followed by tract dilatation with a 10 mm balloon catheter. Finally, both the LAMS and the plastic stent were successfully removed by an alligator. There was no procedure-related complication and the patient was discharged with a plan of elective laparoscopic cholecystectomy.

Keywords: Lumen-apposing metal stent, Extraluminal migration, Complication



PPB-15



Intraductal Placement of Non-Flared Fully Covered Metallic Stent for Refractory Anastomotic Biliary Strictures after Living Donor Liver Transplantation: Long-Term Results of Prospective Multicenter Trial

Jae Keun Park¹, Jeong-Ju Yoo¹, Jong Ho Moon¹, Yun Nah Lee¹, Seokjung Jo¹, Jong-Kyun Lee², Kyu Taek Lee², Kwang Hyuck Lee², Woo Jin Lee³, Sang Myung Woo³, Tae Hoon Lee⁴ and Sang-Heum Park⁴

¹Internal Medicine, Digestive Disease Center and Research Institute, Soonchunhyang University School of Medicine, Bucheon, Korea, ²Internal Medicine, Sungkyunkwan University School of Medicine, Seoul, Korea, ³Pancreatobiliary Cancer Clinic, National Cancer Center, Ilsan, Korea, ⁴Internal Medicine, Soonchunhyang University School of Medicine, Cheonan, Korea

Background/aims: Fully covered self-expandable metallic stent (FCSEMS) may be an effective modality for managing anastomotic biliary stricture (ABS) after liver transplantation. However, stent migration and stent-induced ductal injury are main limitations. The objective of this study was to evaluate the usefulness of an unflared, intraductal FCSEMS that was designed to minimize migration and ductal injury for refractory ABS after living donor liver transplantation (LDLT).

Methods: A total of 32 consecutive patients with symptomatic ABS after LDLT unresolved by plastic stents with or without balloon dilation at four tertiary medical centers were prospectively enrolled in this study. A short (3 or 5 cm) FCSEMS having long lasso (10 cm) used in this study had unflared convex ends to minimize tissue hyperplasia and smaller center portion to prevent migration. The FCSEMS was placed above the papilla in all patients and removed at 3-4 months after stenting.

Results: Technical and clinical success rates of intraductal placement with FCSEMS were 100% (32/32) and 81.2% (26/32), respectively. Early stent migration was observed in 5 (15.6%) patients. However, 3 patients with early stent migration had stricture resolution without needing additional intervention. Intended stent removal was successful in 27 (100%) patients (median, 101 days; range, 23-118 days). No stent-induced ductal change was observed in all patients. Stricture recurrence was observed in 11.5% (3/26) of patients during 639 days of median duration of follow-up (range, 366-2079 days).

Conclusions: Intraductal placement of an unflared short FCSEMS may be a promising option for refractory ABS after LDLT with minimal stent-induced ductal injury and stent migration.

Keywords: Bile duct stricture, Living donor liver transplantation, Fully covered self-expandable metallic stent

PPB-16

The Usefulness of Non-Flared Short Fcsems for Refractory Benign Pancreatic Strictures in Advanced Chronic Pancreatitis

Seokjung Jo, Jong Ho Moon, Yun Nah Lee, Jae Keun Park, Tae Hoon Lee, Sang-Woo Cha, Young Deok Cho and Sang Heum Park

Internal Medicine, Digestive Disease Center and Research Institute, Soonchunhyang University School of Medicine, Bucheon and Seoul, Korea

Background/aims: Fully covered self-expandable metallic stent (FCSEMS) have been used recently to treat refractory benign pancreatic stricture in advanced chronic pancreatitis. However, stent migration and stent-induced ductal change are main limitations. The aim of this study was to evaluate the usefulness of non-flared short FCSEMS that was designed to minimize ductal injury and migration for refractory pancreatic stricture in advanced chronic pancreatitis.

Methods: Total 25 consecutive patients with symptomatic benign pancreatic duct strictures that was unresolved with plastic stents were prospectively enrolled between August 2012 and July 2018. A short (3 or 5 cm) FCSEMS having long lasso (7 cm) used in this study has non-flared convex ends to minimize tissue hyperplasia and smaller center portion to prevent migration. The FCSEMS placement (intraductal or transpapillary) was performed across the stricture and removal was performed after 3 months.

Results: The technical and clinical success rates of FCSEMS placement (14 intraductal and 11 transpapillary stenting) were 100% (25/25), respectively. Stent migration was observed in 1 patients (4.0%) but improved stricture and not needed for additional intervention. Intended stent removal was successful in 24 patients (100%) (median duration of stenting, 109 days; interquartile range, 91-126). Follow-up ERCP showed resolution of duct strictures in all patients. Stent-induced ductal change was not observed in all patients. Stricture recurrence was observed in 8.0% (2/25) during 665 days of median duration of follow-up (interquartile range, 437-1244).

Conclusions: Non-flared short FCSEMS may be potentially effective option for refractory pancreatic stricture in advanced chronic pancreatitis with minimizing stent-induced ductal injury and stent migration.

Keywords: Pancreatic duct stricture, Chronic pancreatitis, Fully covered self-expandable metallic stent, Stent migration

PPB-17

Feasibility of Per-Oral Cholecystoscopy after Eus-Guided Gallbladder Drainage with a Lumen-Apposing Metal Stent for Acute Cholecystitis in Patients with Malignant Biliary Strictures

Yun Nah Lee, Jong Ho Moon, Jae Keun Park, Seokjung Jo, Tae Hoon Lee, Moon Han Choi, Sang-Woo Cha, Young Deok Cho and Sang-Heum Park

Internal Medicine, Digestive Disease Center and Research Institute, Soonchunhyang University School of Medicine, Bucheon and Seoul, Korea

Background/aims: The recent development of EUS-guided gallbladder drainage (EGBD) with a lumen-apposing metal stent has made endoscopic assessment through the stent possible. The aim of this study was to assess the feasibility and safety of per-oral cholecystoscopy via the lumen-apposing metal stent (LAMS) after EGBD.

Methods: Data from consecutive patients undergoing per-oral cholecystoscopy were analyzed. EGBD was performed using a LAMS (Spaxus™; Taewoong Medical Co., Ltd., Ilsan, South Korea) in all patients.

Cholecystoscopy using an ultraslim endoscope was performed 1 to 12 weeks after stent insertion. Patients' demographic data, technical success, types of intervention, and adverse events were recorded.

Results: Fifteen cholecystoscopies were performed in 13 patients. The indication of EGBD was an acute cholecystitis due to malignant cystic duct obstruction in 12 patient and gallstone in 1 patients. Fifteen of 15 cholecystoscopies were successful (93.3%). In one procedure, the endoscope failed to the gallbladder (GB) because of food impaction within GB. Narrow-band imaging endoscopy was performed in all patients and cholecystoscopy-guided target biopsy was achieved in 4 patients. After per-oral cholecystoscopy, position of all LAMS was maintained stable and adverse event was not observed.

Conclusions: Per-oral cholecystoscopy can be performed effectively and safely through the lumen-apposing metal stent (LAMS) after EGBD.

Keywords: Malignant biliary stricture, Acute cholecystitis, Eus-guided gallbladder drainage, Lumen-apposing metal stent

PPB-18

A Case of Early Diagnosis of Primary Sclerosing Cholangitis in a Patient with Ulcerative Colitis

Nam Yeol Cho

Department of Gastroenterology, Daejeon Sun Hospital, Daejeon, Korea

Background/aim: To emphasize the importance of alkaline phosphatase (ALP) level in a patient with ulcerative colitis (UC).

Case: A 52-year-old female patient who was diagnosed as having UC in 2011 visited our hospital. AST, ALT, T.B, D.B, ANA, SMA, IgM P-ANCA, Viral and tumor markers showed normal value and only ALP showed an increase to 589 IU/L. Colonoscopy revealed typical UC findings. A-CT and A-US revealed no abnormal findings. During the follow-up period (4 months), the ALP level increased from 484 to 714 IU/L. Thus, we performed MRCP for diagnosis of Primary Sclerosing Cholangitis (PSC) (fig.1) IgG sub 4 and IgG revealed normal values. ERCP performed to differentiate malignancy revealed a typical PSC finding (fig.2).

Discussion: In patients with UC, the prevalence of PSC is 5%. Although it can be accompanied by autoimmune antibodies and a marked increase in ALP level, the increase in ALP level in patients with PSC is only 3.7%. When PSC is present in patients with UC, the prevalence of cancer such as cholangiocarcinoma is high and the prognosis is poor. So, early diagnosis of PSC plays a decisive role in determining the prognosis of the patient.

Conclusions: We hereby report a case of early diagnosis of PSC based on persistent elevation of ALP level in UC patient who had no symptoms

Keywords: Alkaline phosphatase, Ulcerative colitis, Primary sclerosing cholangitis



Figure 1. Magnetic resonance cholangiography(MRCP) shows multiple strictures in the internal and external biliary tracts.

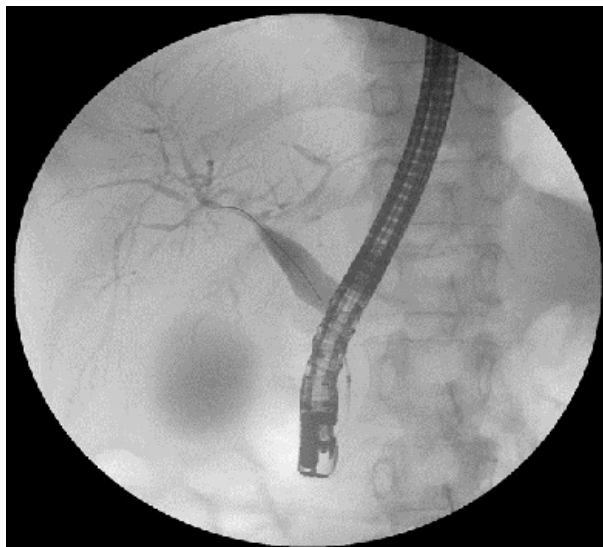


Figure 2. Endoscopic retrograde cholangiopancreatography (ERCP) shows typical findings of primary sclerosing cholangitis in which the inner side of the biliary tract is bead shaped.

PPB-19

Effective Chemotherapy Prolongs Stent Patency in Patients with Malignant Biliary Obstruction Due to Pancreatic Cancer

Jung Won Chun¹, Sang Hyub Lee¹, Jinwoo Kang¹, Gunn Huh¹, Min Su You¹, Woo Hyun Paik¹, Dong-Won Ahn¹, Ji Bong Jeong¹, Ji Kon Ryu¹ and Yong-Tae Kim¹

¹Department of Internal Medicine and Liver Research Institute, Seoul National University College of Medicine, Seoul, Korea, ²Department of Gastroenterology and Hepatology, SMG-SNU Boramae Medical Center, Seoul, Korea

Background/aims: Obstructive jaundice and cholangitis are common clinical manifestation of pancreatic cancers, especially located in head and neck of the pancreas. Management of endoscopic biliary stenting for malignant biliary obstruction that leads these symptoms is important in terms of quality of life and survival rate of patients. Maintaining the patency of the stent is an important issue, as the survival of the patients with pancreatic cancer is longer than before. However, few studies have investigated the effect of chemotherapy on the patency. In this study, we aimed to evaluate the differences in stent patency in terms of chemotherapy and the factors associated with longer patency.

Methods: A total of 173 patients underwent biliary metal stent placement for the first time after diagnosis with pancreatic cancer in our center from January 2015 to May 2017, were retrospectively analyzed. The relationship between treatment method (FOLFIRINOX group, gemcitabine -based group, and best supportive care group) and stent patency was assessed. Additionally, factors for longer stent patency related to the treatment were also evaluated.

Results: The median duration of stent patency was longer in chemotherapy group than that in best supportive care group (295 days versus 111 days, $P < 0.001$). FOLFIRINOX group showed the longest stent patency and overall survival of 391 days and 466 days, respectively ($P < 0.001$) Compared with patients who received best supportive care only, patients who underwent chemotherapy after stent insertion, especially with FOLFIRINOX, had longer stent patency in multivariate analysis (OR 0.234; 95% CI: 0.116-0.470; $P < 0.001$).

Conclusions: Our data indicate that chemotherapy prolongs stent patency in patients with malignant biliary obstruction. Much longer stent patency can be expected in patients treated with FOLFIRINOX.

Keywords: Chemotherapy, Folfirinox, Malignant distal biliary obstruction, Pancreatic cancer, Stent patency

PPB-20

Post ERCP Cholangitis; Lessons Learnt from a Prospective Study in a Tertiary Care Center of Sri Lanka

Rehan T Gamage and T G Amal Priyantha

Gastrointestinal Surgical Unit, Colombo South Teaching Hospital, Colombo, Sri Lanka

Background/aims: Ascending cholangitis is one of the most dreaded septic complications following Endoscopic Retrograde Cholangio Pancreatography (ERCP). Malignant strictures, multiple procedures & incomplete drainage of biliary tract are recognized risk factors of post ERCP cholangitis. This study was carried out to evaluate the septic complications with our current ERCP protocol.

Methods: Patient details and outcome following therapeutic ERCP were collected prospectively over 12 months (April 2018-March 2019). All the patients received an intravenous dose of prophylactic antibiotic. Patients with hilar cholangiocarcinoma were evaluated by endoscopic ultrasound scan (EUS) & percutaneous external biliary drains (EBD) were placed in Bismuth-Corlette type 3 and 4 strictures prior to ERCP. Carbapenems were the empirical drug of choice.

Results: 85 patients with a male to female ratio of 3:4 were followed up. Main indications for ERCP were common bile duct (CBD) stones (35%), malignancy (cholangiocarcinoma-16%, periampullary carcinoma-10%, carcinoma-head of pancreas-7%) & chronic pancreatitis (7%). Complications developed in 16 patients, which included cholangitis (10%), pancreatitis (5%) & perforation (1%). Among the cholangitis patients, 03 deaths were reported. They had either cholangiocarcinoma or periampullary carcinoma & failed to achieve complete biliary drainage after multiple ERCP. In contrast, Patients managed with dual stents (n=2) or prior EBD (n=3) only had mild to moderate cholangitis. There was no statistically significant difference in cholangitis between patients with CBD stones & malignant strictures.

Conclusions: Post ERCP cholangitis rate in this population is higher than current literature (2-5%). Our current protocol on malignant strictures may be effective in minimizing septic complications as this study doesn't demonstrate a significant difference of cholangitis between CBD stones and malignancy. Avoiding multiple procedures & achieving complete biliary drainage appear to improve the outcome.

Keywords: Endoscopic retrograde cholangio pancreatography, Cholangiocarcinoma, Ascending cholangitis, Common bile duct stones, Choledocholithiasis

PPB-21

Endoscopic Treatment of Difficult Common Bile Duct Stones in Elderly Patients

Andrei Mikhin, Stanislav Orlov, Konstantin Vasilenko and Aleksandr Sazhin

Department of Faculty Surgery No1, Pirogov Russian National Research Medical University, Moscow, Russia

Background/aims: According to the WHO, there is currently an increase in life expectancy, at the same time, choledocholithiasis is increasingly common in the elderly population, and therefore the frequency of ERCP in these patients is gradually increasing. However, when performing ERCP in elderly patients, the risk of complications and mortality is higher, so it is important to correctly evaluate all the risks of endoscopic intervention and plan the stages of treatment of patients with choledocholithiasis.

Methods: Between 2010 and 2017, 239 patients (183 women, 56 men) over 75 years old (mean age 81.9 years) were treated for choledocholithiasis at the clinic. Of the 239 patients, 148 (61.9%) had a difficult choledocholithiasis. The diagnostic algorithm in patients with choledocholithiasis included clinical and laboratory examination, ultrasound, according to the indications of MRCP or endosonography, the final method was ERCP.

Results: All 239 patients underwent ERCP. Lithoextraction (with or without lithotripsy) or biliary stenting was performed depending on the characteristics of the choledocholithiasis, as well as the general condition of the patient. In 48 out of 148 (32.4%) patients with difficult choledocholithiasis with a high risk of developing complications, the treatment of choledocholithiasis was performed step by step. The installation of a biliary plastic stent, as a first step, allows to avoid emergency interventions and to perform delayed lithoextraction, after stabilization of the patient's condition. Of the 239 elderly patients who underwent ERCP for choledocholithiasis, 12 (5%) developed complications, death was observed in 5 (2.2%) cases.

Conclusions: Step-by-step treatment, in which bile duct stenting is performed at the first stage, allows removing stones after patient's condition stabilizes, minimizing the likelihood of complications in elderly patients with difficult choledocholithiasis and severe concomitant pathology, thus is a good and safe option for endoscopic treatment.

Keywords: Ercp, Difficult common bile duct stones, Elderly patients, Endoscopic biliary stenting, Stone removal

PPB-22

Efficacy of Stent Placement to Reduce the Stone Recurrence after the Endoscopic Removal of Common Bile Duct Stones

Jung Hye Choi and Young Koog Cheon

Division of Gastroenterology, Department of Internal Medicine, Konkuk University Medical Center, Seoul, Korea

Background/aims: After endoscopic treatment of common bile duct (CBD) stones, recurrence of choledocholithiasis due to small stone fragments and post-endoscopic retrograde cholangiopancreatography (ERCP) cholangitis occur in a few cases. The aim of our study was to determinate that biliary stenting after the stone removal might reduce the recurrence of CBD stones and the incidence of post-ERCP cholangitis.

Methods: We had a retrospective single center study of the data for 483 patients who underwent ERCP for the removal of CBD stones. Differences between patient groups were assessed by chi-square tests and t-test. The effect of predictor variables on the recurrence of CBD stone was examined with multivariate regression.

Results: The incidence of stone recurrence and post-ERCP cholangitis was lower in the stenting group (7% vs 4.1%, $p=0.006$ and 4.6% vs 2.7%, $p=0.256$). The stone size was larger in the stenting group ($p=0.031$), had multiple stones ($p=0.020$), and more performed lithotripsy ($p<0.001$). Multivariate analysis showed placing biliary stent decreased the occurrence of stone recurrence (HR=0.31, $p=0.005$).

Conclusions: Biliary stenting after CBD stone removal reduced stone recurrence. In patients who had large, multiple stones and conducted lithotripsy, preventive biliary stent insertion could reduce stone recurrence.

Keywords: Biliary stent, Stone recurrence, Common bile duct stone, Residual stone, Cholangitis

Table 1

Comparison of the number, size of the stone, procedure time and the primary outcomes

	Non-stenting (n=219)	Stenting (n=264)	P-value
Procedure time (min)	14.7±7.6	19.2±9.2	<0.001
Multiple CBD stones (no, %)	73 (33.3)	123 (46.6)	0.020
EML (no, %)	11 (5.0)	42 (15.9)	<0.001
Largest stone size (mm)	14.5±7.0	16.1±8.0	0.031
Stone recurrence (no, %)	34(7)	20(4.1)	0.006
Rate of cholangitis	10(4.6)	7(2.7)	0.256

EML: Endoscopic mechanical lithotripsy

Table 2

Association of stone recurrence with clinical factors by multivariate logistic regression analysis

	OR (95% CI)	P-value
Age	1.02 (1.00-1.05)	0.165
Stent	0.31 (0.14-0.70)	0.005
EML	2.78 (1.12-6.89)	0.027
Procedure time	1.04 (1.00-1.08)	0.060
Stone size (mm)	1.03 (1.00-1.08)	0.20
Gallstone	0.63 (0.31-1.27)	0.196

CI: confidence interval; EML: Endoscopic mechanical lithotripsy

PPB-23

Valentino's Syndrome - Post ERCP Duodenal Perforation Presenting as Acute Appendicitis

Karlo Ivan Miguel Fontanilla and Ruter Maralit

Internal Medicine, Philippine General Hospital, Manila City, National Capital Region, Philippines

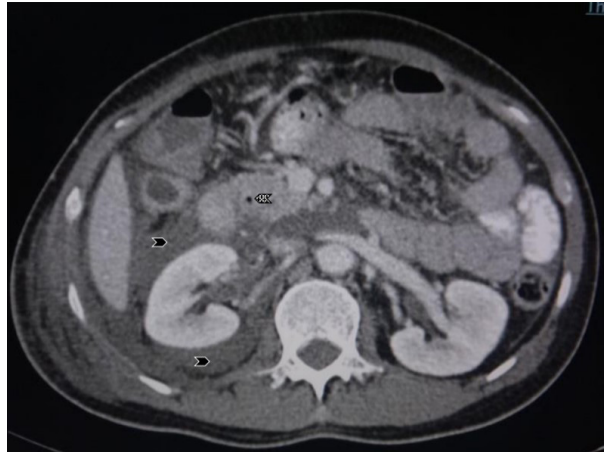
Significance: ERCP is generally safe but carries risks for pancreatitis, bleeding, infection and perforation. To the date of writing, this is the first reported case of Valentino's syndrome after ERCP – duodenal perforation mimicking acute appendicitis.

Case presentation: A 45 yo male underwent ERCP for choledocholithiasis after presenting with RUQ pain. Difficult cannulation was noted during ERCP. Four days after, he developed tachycardia associated with RLQ pain and tenderness, Rovsing's Sign and Iliopsoas sign but no fever.

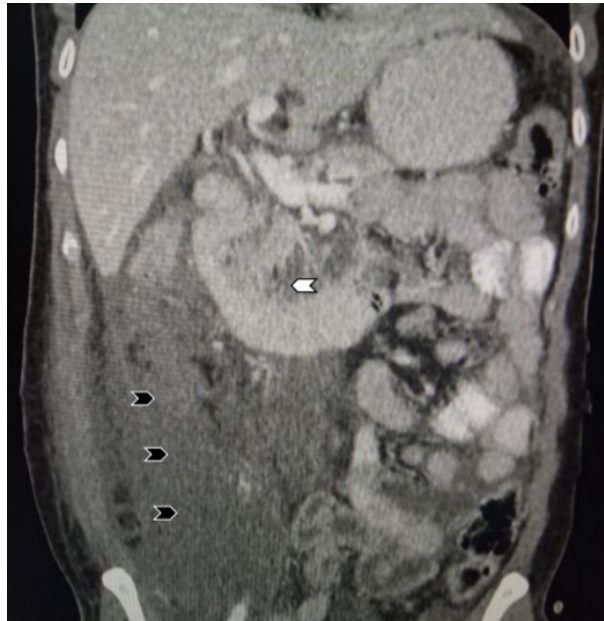
Management: He was managed as acute appendicitis. CT scan was done and showed a perforation in the 2nd duodenum, and normal appendix. He was managed as a case of post-ERCP perforation and was referred to surgery. Immediate return of billous fluid and air was noted upon entry into the peritoneum during surgery. A perforation at the posterior aspect of D2 was noted. He underwent duodenorrhaphy and pyloric exclusion gastrojejunostomy and was sent home after a course of piperacillintazobactam.

Conclusion: Duodenal perforation can mimic acute appendicitis. Intestinal contents can leak and pass along the right paracolic gutter to the appendicial fossa. This is an important differential diagnosis which must be considered in patients who underwent ERCP.

Keywords: Ercp, Perforation, Mimic, Appendicitis, Valentino syndrome



Abdominal CT scan done four days after ERCP, Axial cut. A heterogeneous non enhancing fluid collection in the right hemiabdominal region involving the perinephric and paracolic areas of the retroperitoneum (black arrowhead). A small interspersed air pocke



Abdominal CT scan done four days after ERCP, Coronal cut. A heterogeneous non enhancing fluid collection in the right hemiabdominal region involving the inferior perihepatic region as well as in the right perinephric and paracolic areas of the retroperito

PPB-24

Endoscopic Transpapillary Gallbladder Drainage for Patient with Acute Cholecystitis and Unfit for Urgent Surgery

Hyung Ku Chon¹, Dong Eun Park² and Tae Hyeon Kim¹

¹Internal Medicine, Wonkwang University College of Medicine and Hospital, Iksan/Chonbuk, Korea, ²Surgery, Wonkwang University College of Medicine and Hospital, Iksan/Chonbuk, Korea

Background/aims: Endoscopic trans-papillary gallbladder drainage (ETGBD) is alternative modality for patient with acute calculus cholecystitis (ACC) and unfit for either surgery or percutaneous cholecystostomy. We aim to evaluate the safety and efficacy of ETGBD by using either endoscopic trans-papillary gallbladder stenting (ETGBS) or endoscopic naso-gallbladder drainage (ENGBD) as a bridging or definitive treatment options of the patients with ACC when cholecystectomy must be delayed or cannot be performed.

Methods: From July 2014 to November 2018, 171 patients with ACC who tried to perform ETGBD were retrospectively reviewed. Their technical success rate, clinical success rate, and adverse events were evaluated. In ETGBS group, stent patency, recurrence rate of ACC or other stent related complications were also analyzed.

Results: The technical and clinical success rate of ETGBD was 90.6% (155/171) and 99.3% (154/155), respectively. A visible cystic duct by cholangiography in patients with ETGBD success was more significantly observed than in those with ETGBD failure [65.8% (102/155) vs 25% (4/16), $p=0.001$]. ETGBS group had significantly higher proportion of more than American Society of Anesthesiologists (ASA) III (86.7% vs 6.9%, $p<0.001$) with underlying dementia (48.2% vs 2.8%, $p<0.001$), less performing interval cholecystectomy (12% vs 68.1%, $p<0.001$), older (78.94 ± 11.37 vs 65.9 ± 14.22 , $p=0.018$) than ENGBD group. Of 64 patients [33 women, mean age 79.4 ± 10.9 , more than grade III ASA class 90.5% (58/64)] without ETGBS removal, median biliary events free interval was 267 days (IQR 162-391 days) as calculated by the Kaplan Meier curve. The adverse events occurred 7.6% (mild pancreatitis=9, post endoscopic sphincterotomy bleeding=3, hematoma=1), but all were treated by conservative management.

Conclusions: ETGBD may be a suitable modality for patients with ACC and unfit for urgent cholecystectomy. ETGBS may be useful definitive treatment option for high surgical risk patients with acceptable adverse events.

Keywords: Acute cholecystitis, Endoscopic transpapillary gallbladder drainage, Endoscopic transpapillary gallbladder stenting, Endoscopic nasobiliary gallbladder drainage

PPB-25

Case Report: A Case Hemobilia Caused by Hepatic Artery Pseudoaneurysm

James Crisfil Fructuoso Montesa, Jerica Cristel Esguerra, Virgilio Banez and Johaniya Dimaporo

Internal Medicine - Section of Gastroenterology, Manila Doctors Hospital, Metro Manila, Philippines

Significance: Hemobilia from rupture of hepatic artery pseudoaneurysm is a life-threatening vascular complication. This study aim to present a rare case of hemobilia from hepatic pseudoaneurysm who presented with hematemesis.

Methods: This is a case of a 58/F who sought consult at a local institution due to hematemesis and persistent severe anemia despite transfusion. Patient was found out to have right hepatic artery pseudoaneurysm as cause of bleeding on EGD and CT angiogram. She was aggressively resuscitated and successfully managed via endovascular embolization.

Results: Esophagogastroduodenoscopy (EGD) revealed choledochoduodenal fistula just above the ampullary opening with blood clot. CT scan angiography of the upper abdomen is suggestive of pseudoaneurysm at the distal portion of the right hepatic artery. Patient then was aggressively resuscitated and successfully managed via endovascular embolization.

Conclusions: The diagnosis of visceral artery aneurysm rupture should be considered in any patient presenting with gastrointestinal bleeding. Ct angiography is the diagnosis modality of choice. Early aggressive resuscitation is essential and definitive management should be primarily with endovascular embolization.

Keywords: Hemobilia, Hepatic artery pseudoaneurysm



Figure 1. Preembolization angiogram demonstrating a replaced right hepatic artery with descending intrahepatic branch feeding a large pseudoaneurysm with active extravasation



Figure 2. Post-embolization angiogram

PPB-26 

Application of In-Stent Radiofrequency Ablation for the Reopening of Occluded Biliary Metal Stents

Eui Joo Kim, Yeon Suk Kim and Jae Hee Cho

Internal Medicine, Gachon University College of Medicine, Gachon University Gil Medical Center, Incheon, Korea

Background/aims: Endobiliary radiofrequency ablation (RFA) is regarded as an effective local ablation therapy in malignant biliary obstruction. We aim to evaluate the feasibility and efficacy of in-stent RFA for occluded self-expandable metal stents (SEMS).

Methods: Fifteen patients with malignant biliary obstruction and occluded SEMS were retrospectively included. All patients underwent temperature controlled RFA (80°C, 7-10 W, >120 seconds) through the occluded SEMS followed by additional stent placement.

Results: Twenty-three sessions of in-stent RFA were performed on 15 patients with malignant biliary obstruction (pancreatic cancer 3, bile duct cancer 8, GB cancer 2, Ampulla of Vater cancer 2). The overall technical and clinical success rates were 87% (20/23) and 78% (18/23), respectively. There were two complications including cholecystitis and early SEMS occlusion by sludge (13d after RFA). Total of 12 (52%) sessions were technically successful. In 8 (35%) sessions, repeated RFA was accomplished with early interruption of RFA (total RFA time > 120 s), and RFA was failed in 3 (13%) sessions due to early RFA termination caused by contact between RFA electrode and SEMS mesh. The risk of failed/early interruption of in-stent RFA was significantly higher in the second SEMS revision than in the first SEMS revision (OR 13.2, CI 1.2-140.7). In 15 patients, median (range) time of the second SEMS patency and survival after RFA was 111 (9-260) days and 184 (9-361) days, respectively.

Conclusions: In-stent RFA can be safely applicable for tumor in/overgrowth of SEMS. Caution should be taken that RFA interruption may occur due to contact between occluded SEMS and RFA electrodes.

Keywords: Radiofrequency ablation, Malignant biliary tract obstruction, Endoscopic retrograde cholangiopancreatography, Ingrowth, Overgrowth

PPB-27

An Unusual Late Complication after Endoscopic Papillectomy

Chih-Sheng Su and Ming Hui Lin

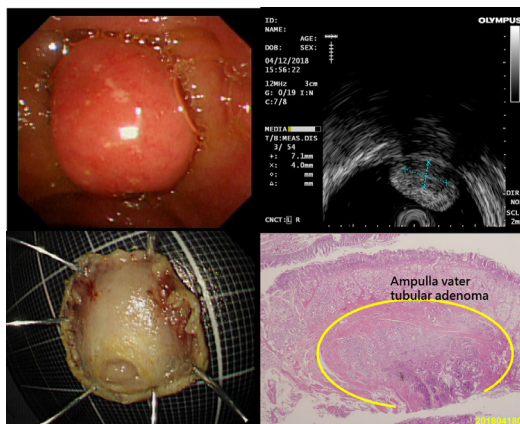
Division of Gastroenterology, Department of Internal Medicine, Taiwan Adventist Hospital, Taipei City, Taiwan

Endoscopic papillectomy (EP) is reported to be a safe and reliable procedure for complete resection of ampullary neoplasms. The objective of this clinical case report is to highlight an unusual late complication after EP.

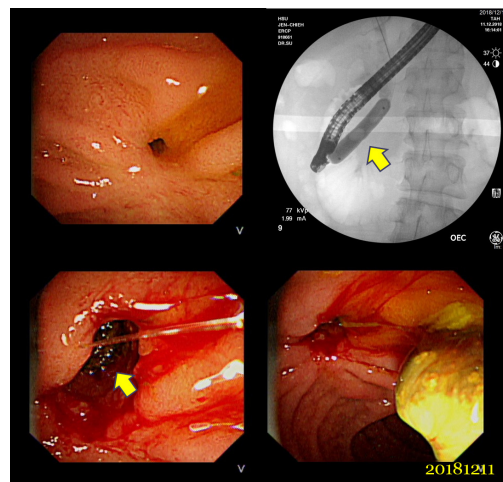
This 47-year-old male patient presented to have post-prandial abdominal pain for two months. Upper GI endoscopy reported duodenal ulcers with *H. pylori* infection, and an ampullary neoplasm. Abdominal sonography showed gallbladder stones. EUS revealed a 0.74×0.6 cm hypoechoic tumor within the ampulla Vater. He underwent EP with a successful complete resection. There was no immediate complication. Seven months later, he suffered from acute right upper abdominal pain and icteric looking. CT revealed a calcified stone impacted in distal CBD. ERCP followed laparoscopic cholecystectomy was performed.

Several studies had mentioned the common immediate procedure-related complications after EP, such as bleeding, pancreatitis, and perforation. In this case, we first demonstrate the presence of CBD stone after EP. Decrease of the ampulla Vater sphincter pressure from EP or sphincterotomy may have the similar higher risk for CBD stone in patient of gallbladder stones. Thus, EP followed by cholecystectomy may be a treatment choice for them.

Keywords: Endoscopic papillectomy, Choledocholithiasis



Ampulla Vater tumor, post endoscopic papillectomy



CBD stone, post sphincteroplasty and extraction

PPB-28

The Clinical Case of Primary Pancreatic Lymphoma

Valeriya Vereshchak, Ilya Iurichev and Olga Malikhova

Endoscopy, NN Blokhin National Medical Research Center of Oncology of the Ministry of Health of the Russian Federation, Moscow, Russia

Primary pancreatic lymphoma (PPL) is a very rare disease, about 0.5% of the total number of pancreatic tumors. Typically manifests the symptoms of cancer of the pancreatic head, and there was therefore difficult to make a differential diagnosis. 29-year-old man was hospitalized in the regional hospital with a mechanical jaundice. Abdominal computed tomography (CT) revealed an irregular solid lesion of the head of the pancreas, involving the upper mesenteric vein and the proximal portal vein. Organomegaly and lymphadenopathy were not detected. Verification has not been received. At the first stage, endoscopic stenting of the bile ducts was performed. The symptom of jaundice are resolved. The patient came to N.N. Blokhin NMRCO) after 4 months with a clinic of developed mechanical jaundice. Urgent drainage of the bile ducts with a plastic stent was performed. Further, the EUS-FNA was performed for verification (the immunophenotype of tumor cells corresponds to the classical Hodgkin's lymphoma (a variant NS I), with weak expression of CD20 on tumor cells, EBV-). Chemotherapy according to the scheme: prephase (cyclophosphane 600 mg IV), 1 cycle ABVD, 6 cycles EACOPP-14. After treatment CT showed a decrease in the tumor to 2 cm in diameter. It was decided to refrain from surgery taking into account the clinical and instrumental data of the expressed positive dynamics. ERCP and BDP were symptomatic step-by-step treatments not as a Bridge to Surgery, but as a Bridge to Recovery. The clinical case demonstrates the need for verification of pancreatic formations and the need for a balanced approach to the installation of SEMs. The disappearance of the tumor stricture of the bile tree is a rare clinical observation. The patient continues courses of polychemotherapy, there is no recurrence of jaundice.

Keywords: Lymphoma, Lymphoma, Hodgkin, Pancreatic diseases, Pancreatic neoplasms

PPB-29

A Case of Untreated Autoimmune Pancreatitis Developing Adenocarcinoma of the Pancreatobiliary Origin during Follow-Up

Kyu Won Lee, Jae Hyuck Chang, Tae Ho Kim, Chang Whan Kim and Sok Won Han

Department of Internal Medicine, The Catholic University of Korea, Seoul, Korea

Autoimmune pancreatitis (AIP) generally shows a favorable response to steroid. However, the natural course of untreated AIP still remains unknown. We report a case of untreated AIP developing a metastatic adenocarcinoma over 2 years after diagnosis.

A 66-year-old woman who presented pancreatic mass in computed tomography (CT) scan without symptom visited clinic. Laboratory findings showed normal range except for elevated serum IgG and IgG4 levels. MRI demonstrated an infiltrative mass in the pancreas head encasing superior mesenteric vessels. Considered as inoperable, sono-guided biopsy was performed. The biopsy showed consistent with type I AIP (Figure 1). 40 mg of prednisolone was started. 5 days later, the patient visited ER due to acute infarction, and prednisolone was discontinued. After recovery, the patient was reluctant to take prednisolone. A year later, CT revealed resolving state of peripancreatic infiltration. 2 years later, CT showed aggravated infiltration around pancreas head and ascites with peritoneal nodularity. Serum CA 19-9 level was 2,756 U/mL, and IgG4 was 950 mg/dL. Stent was inserted in duodenum due to obstruction. Diagnostic laparoscopy showed nodular peritoneal lesions (Figure 2). Biopsy indicated adenocarcinoma consistent with pancreatobiliary origin.

Keywords: Autoimmune pancreatitis

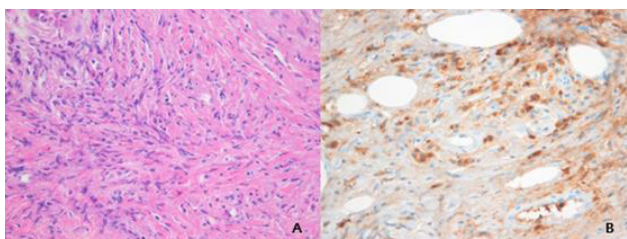


Figure 1. Biopsy pathology (A) HE (B) IgG4 stain

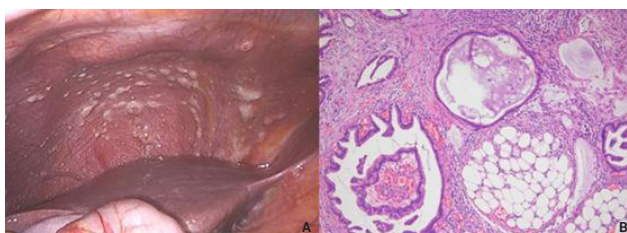


Figure 2. Laparoscopic findings (A) Gross (B) Microscopic findings

PPB-30

Vigorous Hydration for Prevention of Post-Ercp Pancreatitis: A Meta-Analysis

Adrian Manuel Fausto, Mariel Dianne Velasco, Geraldine Claire Floro, Jenis Emmanuel Camenforte and Therese Macatula

Department of Internal Medicine, Philippine General Hospital, Manila, Philippines

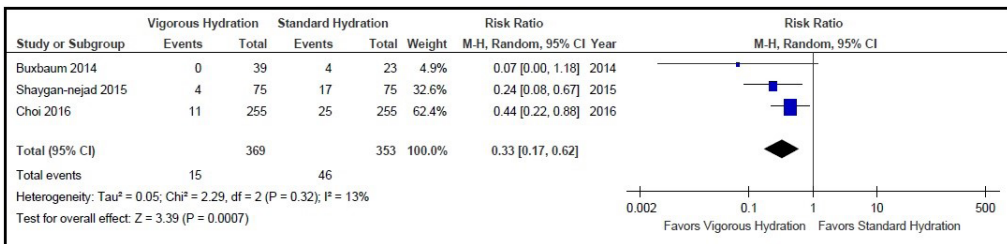
Background/aims: The role of vigorous periprocedural hydration as an effective prophylaxis for post-endoscopic retrograde cholangiopancreatography pancreatitis (PEP) is currently unclear. This study aims to conduct a meta-analysis to determine its efficacy.

Methods: Systematic search was done and randomized controlled trials comparing the effects of vigorous periprocedural hydration to standard hydration on patients undergoing ERCP were included. Primary outcome analyzed is the incidence of PEP. Secondary outcomes examined are incidence of hyperamylasemia and pancreatic pain. Data were analyzed using RevMan5.3 software.

Results: Ten articles were identified from literature search and seven were excluded. Subjects given vigorous periprocedural hydration had 67% less risk of having PEP compared to subjects given standard hydration [RR 0.33; 95% CI 0.17-0.62]. For secondary outcomes, patients given vigorous hydration had 51% less risk of having hyperamylasemia hydration [RR 0.49; 95% CI 0.35-0.68], and 72% less risk of having pancreatic pain [RR 0.28; 95% CI 0.07-0.118].

Conclusions: Vigorous periprocedural hydration can be used as an effective measure to prevent PEP in patients not at risk of developing fluid overload. However, further studies on its effect on already proven prophylactics should be investigated.

Keywords: Meta-analysis, Endoscopic retrograde cholangiopancreatography, Pancreatitis, Isotonic solutions, Lactated ringer's



Effect of vigorous hydration on incidence of post-ERCP pancreatitis using a random effects model.

PPB-31

A Rare Case of Hemosuccus Pancreaticus in Children: Successful Diagnosis Using Endoscopy

Ariani Dewi Widodo¹, Adiarto Nugroho², Ido Narpati Bramantyo³, Asri Dwi Rahmawati²,
Eva Jeumpa Soelaeman¹ and Budi Purnomo¹

¹Gastrohepatology Division, Department of Pediatrics, Harapan Kita Women and Children Hospital, Jakarta, ²Department of Surgery, Fatmawati General Hospital, Jakarta, ³Department of Radiology, Harapan Kita Women and Children Hospital, Jakarta, Indonesia

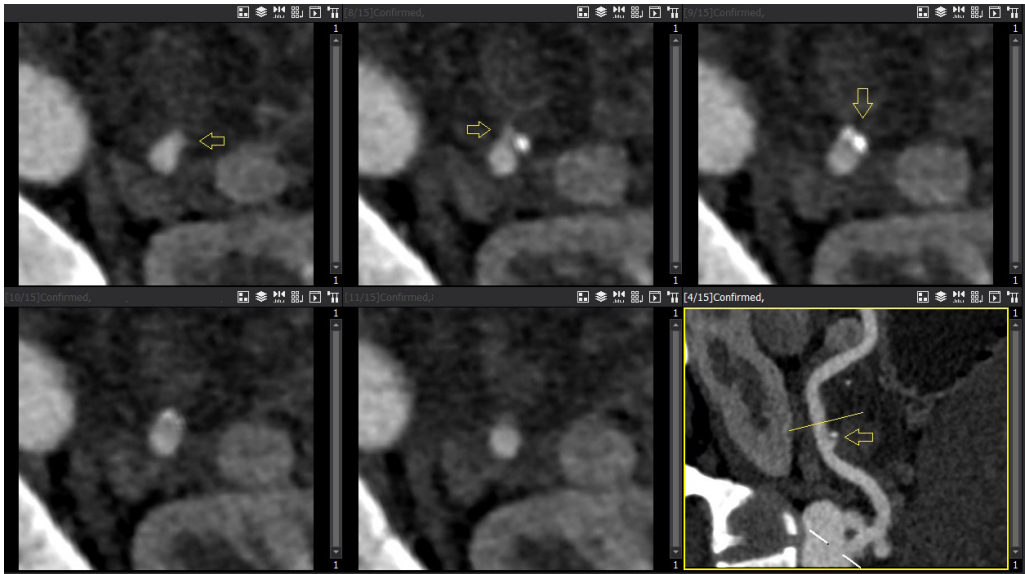
Introduction: Hemosuccus pancreaticus is a rare and life-threatening condition, a bleeding from ampulla of Vater through pancreatic duct. Bleeding source is from pancreas, pancreatic duct, or adjacent structures such as splenic and gastric arteries. It is mostly caused by acute or chronic pancreatitis, pancreatic pseudocysts, and pancreatic tumor.

Case: A 13-year-old female was consulted to our tertiary center with severe abdominal pain. Abdominal CT found multiple pancreatic calcification with dilatation of pancreatic duct and multiple pancreatic cysts, largest diameter 11.3 cm. Follow-up CT one month later found heterogenous mass at cauda pancreas with multiple calcifications at pancreatic head, largest cyst shrank to 7.33 cm. Six months later patient came with severe, acute abdominal pain (9 in VAS pain scale) followed by massive hematemesis. Upon arrival at emergency she was in hemorrhagic shock, Hb 5 g/dL. Fluid resuscitation, packed red cell transfusion, and somatostatin were given, and bleeding resolved the next day. First endoscopy did not find any source of bleeding.

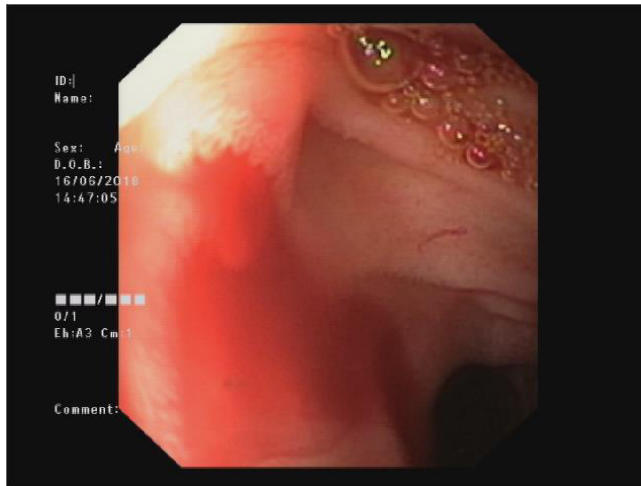
Episodes of severe abdominal pain and massive hematemesis recurred seven times within the next 3 months, always crescendo-decrescendo pain followed by hemorrhage, at first every 3-4 weeks then becoming more frequent. Third endoscopy right after hematemesis finally evidenced active bleeding out of Vater, raising suspicion of hemosuccus pancreaticus. MRCP confirmed subacute bleeding intra-pseudocyst, suggestive of chronic arterial injury at the splenic artery. Surgery and pathology confirmed chronic pancreatitis, duct stone, and pseudoaneurysm inside the pseudocyst.

Conclusions: Chronic pancreatitis can cause serious complications including pseudocyst, pseudoaneurysm, or both. Suspicion of hemosuccus pancreaticus should be made in severe abdominal pain and hematemesis. Endoscopy is diagnostic in 30% of cases and should be done on the right timing to observe the bleeding from the ampulla of Vater.

Keywords: Abdominal pain, Bleeding, Hemosuccus pancreaticus, Pancreatitis, Timing



CT Scan showing minimal eccentric calcification and soft plaque at splenic artery (arrows); approx. 4 cm from the proximal bifurcation, a sign of chronic arterial injury (r/o pseudoaneurysm)



Bleeding from Vater Papilla

PPB-32

Clinical Profile and Predictors of Choledocholithiasis among Patients Who Underwent Ercp in a Tertiary Referral Centre

Michelle Chu¹, Don Edward Rosello², Charlie Avila¹, Bernadette Moscoso¹ and Eden Gabriel¹

¹Gastroenterology-Internal Medicine, Cebu Doctors' University Hospital, Cebu City, ²Surgery, Cebu Doctors' University Hospital, Cebu City, Philippines

Background/aims: The aim of the study is to identify the clinical profile and early trends of biochemical markers in patients with common bile duct (CBD) stones who underwent endoscopic retrograde cholangiopancreatography (ERCP).

Methods: Medical records of 760 patients referred for ERCP for suspected CBD stones and successfully underwent ERCP were reviewed retrospectively. Laboratory data were obtained and analyzed.

Results: A final study population of 631 patients met the inclusion criteria. Females were predominant with the mean age of 49.46 ± 16.56 years. The only significant parameter between males and females was age ($\chi^2(3)=10.731$ and $p<.05$) as there were more male patients in the 46 to 60 years old group. Majority of the patients who had obstructive jaundice, biliary colic, elevated total bilirubin from 1.8 to 4.0 mg/dL and elevated alkaline phosphatase(ALP) had choledocholithiasis. About 249 (39.5%) patients whose alanine aminotransferase (ALT) was $>70\text{u/L}$ had choledocholithiasis. Chi-square tests with Yate's correction for continuity revealed that presence of gallbladder stones ($\chi^2(1)=6.695$ and $p<.05$), ALT($\chi^2(1)=18.603$ and $p<.05$) and elevated ALP ($\chi^2(1)=5.996$ and $p<.05$) were significantly associated with choledocholithiasis based on ERCP at 0.05 level of significance. Transabdominal ultrasound has a sensitivity of 36.2% and specificity of 87% in detecting choledocholithiasis.

Conclusions: ERCP is the gold standard in detecting choledocholithiasis. Females were more prone to have biliary disorders than males. Predictors of CBD stones were the presence of gallstones, high ALT and high ALP levels. It is advisable to do ERCP before cholecystectomy in patients with a combination of positive predictors for choledocholithiasis. The transabdominal ultrasound is still considered as a good screening tool for the detection of choledocholithiasis. This simple prediction rule may identify patients who are most likely to benefit from early interventions to diagnose and remove CBD stones.

Keywords: Choledocholithiasis, Ercp, Predictors

PPB-33

Guidewire-Assisted Drainage Removal under Fluoroscopy is Feasible and Safety Method Than Conventional Blind Method

Jae Hyuck Jun, Huapyeong Kang, Young Seok Doh, Ji Woong Jang, Sae Hee Kim, Il Hyun Baek and Sung Hee Jung

Departments of Internal Medicine, Eulji University College of Medicine, Daejeon, Korea

Background/aims: Percutaneous transhepatic gallbladder drainage (PTGBD) and percutaneous transhepatic biliary drainage (PTBD) are essential modaility for acute cholecystitis or biliary sepsis. But, PTGBD or PTBD could produce intra- and post-procedual complications such as cholangitis, bile leak, hemorrhage, pneumoperitoneum and dislodgement of the catheter. Although rare, PTGBD or PTBD catheter may migrate into the peritoneal cavity during remove the catheter. Therefore, we aimed to evaluate the safety and feasibility for guidewire-assisted catheter removal under fluoroscopy.

Methods: Guidewire-assisted catheter removal (PTGBD (n=21) and PTBD (n=2)) at EULJI Medical Center from Jun 1, 2018, to March 31, 2019 were retrospectively reviewed.

Results: The mean age of the group was 73.1 years, and male was 54.2%. Twenty-five percent of the patients were diagnosed with biliary sepsis. Cholangitis and cholecystitis accounted for the majority (50%), followed by cholecystitis (29.2%), cholangitis (12.5%), and cholecystitis and biliary pancreatitis (4.2%). The mean duration of tube maintenance period was 14.9 days. Before removal of PTGBD, patency of cystic duct was confirmed by tubography. Most of patients were discharged the next day after tube removal. Except for three patients who had long period of tube maintenance due to various other diseases, the mean duration of tube removal was 10.5 days. Although the duration of tube maintenance was not long, there was no delay in discharge due to complications such as bile leakage and so on. Any complications were not occurred after tube removal.

Conclusions: Although rare, when removing PTGBD or PTBD catheter, peritonitis and dislodgement of catheter may occur. Guidewire-assisted drainage removal under fluoroscopy is feasible and safety method than conventional blind method.

Keywords: Ptgbd, Ptbd, Cholecystitis, Catheter

PPB-34

Retrograde Endoscopic Management of Obstructive Jaundice in Atyrau Regional Hospital

Arman Aliyev and Shanayev Dauren

Endoscopy Department, Atyrau Regional Hospital, Atyrau, Kazakhstan

Background/aims: Until 2014 the main method of treatment of patients with obstructive jaundice in our hospital was open surgery, something that had high rate of complications and mortality.

Methods: ERCP was introduced in 2014 and since then 516 patients with obstructive jaundice underwent this procedure. There were 423 women and 93 men, aged 21 to 80 years. In 418 patients the nature of the biliary obstruction was benign: 392 cases of choledocholithiasis and 26 cases of stricture of the terminal part of the choledochus. Ninety-eight patients had tumors: 64 cases of pancreatic head cancer, 22 cases of biliary tract cancer, and 12 cases of papilla cancer. Choledocholithoextraction has been performed in 377 patients. In 20 cases, the calculus could not be removed. Then plastic stents have been used to relieve the jaundice, followed by open surgery. Fourteen out of 26 patients with stricture of the terminal part of the choledochus underwent papillosphincterotomy. Twelve patients with extended strictures required stenting. All patients with jaundice caused by tumors underwent stenting. Two patients with Bismuth-Corlette type 2 cholangiocarcinoma required bilateral stenting. In 16 cases, plastic stents have been replaced with SEMS.

Results: Bleeding was observed in 18 patients and all of them required endoscopic treatment. Twenty-four patients developed pancreatitis, four of these had pancreatic necrosis. Three of them required surgery, 1 died. In 2 cases re-stenting was performed due to stent migration. Perforation was diagnosed in 5 cases. Three patients required surgery, 1 patient was treated conservatively, 1 died. The overall mortality rate was 1%: 1 case of pancreatitis, 1 case of intestinal perforation, 1 case of MOF and 2 cases of sepsis.

Conclusions: Introduction of new endoscopic techniques for the management of obstructive jaundice significantly reduced morbidity and mortality, compared to open surgery.

Keywords: Obstructive jaundice, Endoscopic retrograde cholangiopancreatography, Choledocholithiasis, Stenting, Metal self-expanding stents

PPB-35

Therapeutic Diagnosis of Pancreatic Tuberculosis Mimicking Malignancy with Eus-Fna and Biopsy: A Case Report

Sangmyung Yeo, Jaekwon Jung, Hyunsoo Kim, Jaekwang Lee, Hanjun Ryu, Daejin Kim, Changkeun Park, Yunjin Chung, Jihun Jang and Yongseok Lee

Department of Internal Medicine, Daegu Fatima Hospital, Daegu, Korea, Republic of

Introduction: Pancreatic tuberculosis (TB) is extremely rare and difficult to diagnose. It is often masquerading its symptoms as more common conditions such as cancer. So, EUS-FNA sampling with an AFB smear is essential for diagnosis of pancreatic TB. But there were few data about AFB negative pancreatic TB.

Case Report: A 40-years-old man who have chronic alcoholic pancreatitis for 10 years was admitted with epigastric pain and weight loss. The initial laboratory findings showed WBC 14,010/ μ L, amylase/lipase 60/90 U/L, CA 19-9 0.6 U/mL. The dynamic CT scan showed multiple septated, irregular low-density mass (about 54 mm) at the tail of pancreas. The MRCP and EUS showed a large cystic mass with irregular wall thickening mimicking cystic malignancy. So, we performed EUS-FNA and biopsy. The biopsy was revealed as chronic granulomatous inflammation, but AFB test, tissue TB PCR and serum IGRA TB test were all negative. We thought that pancreatic TB could not be ruled out clinically, because of normal CA 19-9 and chronic granulomatous inflammation on biopsy and endemic area. So, we decided to try anti-TB drugs (HER) and follow up study for response. A CT scan after 1 month showed a reduction of size (about 30 mm). The patient was treated with same drugs for 9 months because we thought that the drugs are effective. At the end of treatment, the mass was about 10 mm. And 1 year later, the mass was disappeared on CT.

Conclusions: Pancreatic TB responds well to standard anti-TB drugs. But if the diagnosis is delayed, it can be fatal. Pancreatic TB could be suspected in patients with atypical pancreatic lesion with chronic granulomatous inflammation, especially if the patient is young, immunocompromised, or from an endemic area. When the diagnosis is suspected, appropriate screening for TB and EUS-FNA of the pancreatic lesion can lead to diagnostic confirmation, but AFB negative chronic granulomatous lesion could be tried to treat with anti-TB drug for avoiding unnecessary operation.

Keywords: Pancreatic tuberculosis, Pancreatic cancer, Therapeutic diagnosis, Pancreatitis, Eus-fna

PPB-36

Percutaneous Treatment of Common Bile Duct Stones in Cases with Difficult Endoscopic Retrograde Cholangiopancreatography

Woojin Jeong¹, Young Don Kim¹, Gab Jin Cheon¹, Jong Kyu Park¹ and Young Jong Cho²

¹Department of Gastroenterology, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Korea, ²Department of Radiology, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Gangneung, Korea

Background/aims: Endoscopic retrograde cholangiopancreatography (ERCP) is the standard treatment of common bile duct (CBD) stones. When this is not possible or not feasible, percutaneous CBD stone removal is used as an alternative treatment. We analyzed 146 patients who were treated with percutaneous removal of CBD stones.

Methods: Between January 2000 and February 2019, 146 patients (91 men, 55 women; age 33-92, mean age 73.5 years) with CBD stones were included. Percutaneous transhepatic biliary drainage was usually done with ultrasound and fluoroscopy. Stone removal was performed after alleviation of cholangitis at a mean of 5.76 days (range, 1-30 days). Balloon dilation of papilla was done with 8-12 mm balloons. Then stones were pushed out into the duodenum with occlusion balloon catheter. When the stone size was large, stones were fragmented using snare catheter.

Results: A complete stone removal was achieved in 138 of 146 (94.5%) patients. A total of 6 complications (4.1%) including bleeding at the ampulla of Vater (n=4) and perihepatic hematoma (n=2) occurred. Indications of percutaneous stone removal were unsuccessful biliary cannulation in 41 cases (28%), altered surgical anatomy in 61 cases (41.8%), and poor patient conditions in 44 cases (30.2%). Biliary system was approached from right intrahepatic duct (84, 57.5%), left intrahepatic duct (37, 25.3%), T-tube (8, 5.5%), and gallbladder (17, 11.6%). One to three sessions of removal were performed with a median of 1.27 sessions. Success in two sessions was achieved in thirty two patients and success in three sessions was achieved in three patients. The average stone number and size were 2.08 (range, 1-9) and 10.5mm (range, 3-40). The average procedure time was 25.2 minutes (range, 11-91).

Conclusions: Percutaneous CBD stone removal is an effective alternative treatment for patients who have failed ERCP, altered surgical anatomy, or are in poor condition.

Keywords: Percutaneous common bile duct stone removal, Endoscopic retrograde cholangiopancreatography, Common bile duct stone

PPB-37

Pancreas Volume and Elastase-1 as Prognostic Marker for Pancreatic Exocrine Insufficiency Following Pancreatic Resection

Young Wook Cho, Min Kyu Jung, Chang Min Cho and Jun Heo

Department of Internal Medicine, Kyungpook National University of Medicine, Daegu, Korea

Background/aims: Pancreatic resection can lead to pancreatic exocrine insufficiency (PEI). Fecal elastase-1 (FE-1) test is an effective marker for assessment of PEI in patients who underwent pancreatic resection. We measured pancreas volume, FE-1 level, and BMI of 36 patients who underwent pancreatic resection. The aims of this study were (1) to assess the relevance between reduced pancreas volume and decreased FE-1 level, (2) to assess the effectiveness of FE-1 level as predictive marker on underweight caused by PEI in patients with pancreatic resection.

Methods: 36 Patients who underwent pancreatic resection at Kyungpook national university hospital between April 2015 and December 2018 were enrolled. Pancreas volume, FE-1 level and BMI were measured in all 36 patients after pancreatic resection. Patients were divided into three groups according to FE-1 level: "normal" ($\geq 200 \mu\text{g/g}$), "intermediate decrease" (15-199 $\mu\text{g/g}$), "severe decrease" ($< 15 \mu\text{g/g}$). The association of pancreas volume, FE-1 level, and BMI was analyzed respectively.

Results: Mean FE-1 level was 100.3 $\mu\text{g/g}$. 7 patients (19%) had normal pancreatic exocrine function and 29 patients (81%) had PEI in patients who underwent pancreatic resection. In PEI patients, 19 patients had "intermediate decrease" FE-1 level and 10 patients had "severe decrease" FE-1 level. 8 patients had underweight on BMI (BMI <18.5). Reduction of pancreas volume was not significantly associated with decrease of FE-1 level ($P = .29$). But, reduction of pancreas volume has strong correlation with body weight loss as indicated by BMI ($P = 0.007$). Decreased FE-1 level was not significantly associated with decrease of BMI ($P = .84$). However, "severe decrease" of FE-1 level has the weak correlation with decrease of BMI ($P = .10$).

Conclusions: Pancreas volume and decrease of FE-1 level is a simple and useful predictive marker for PEI in patients who underwent pancreatic resection.

Keywords: Pancreatic exocrine insufficiency, Pancreatic resection, Pancreas volume, Fecal elastase-1, Bmi

PPB-38

Successful Treatment of Ampullary Tumor with Intraductal Extension by Endoscopic Snare Papillectomy Followed by Argon Plasma Coagulation Using Percutaneous Transhepatic Cholangioscopy

Woojin Jeong¹ and Sang Soo Lee²

¹Department of Gastroenterology, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Korea, ²Department of Gastroenterology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Background/aims: Endoscopic papillectomy is increasingly used for curative purpose of ampullary adenoma. Ampullary adenoma with distal bile duct invasion had been regarded as a contraindication for endoscopic resection with curative intention. We report patients with intraductal invasion of ampullary adenoma who are treated with endoscopic snare papillectomy followed by argon plasma coagulation (APC) ablation of intraductal lesion using percutaneous transhepatic cholangioscopy (PTCS).

Methods: We analyzed five patients with intraductal invasion of ampullary adenoma who are treated with endoscopic snare papillectomy followed by APC ablation of intraductal lesion using PTCS. We resected the tumor with polypectomy snare by using an ERBE generator. Biliary sphincterotomy was then performed and intraductal mass was pulled out to the duodenum using balloon catheter. Additional snare polypectomy was performed on the exposed mass. The papillectomy site was ablated with APC after papillectomy. For the complete removal of the intraductal invasion, we performed PTCS. Cholangioscopy showed a papillary mass above the papilla, which was ablated by the APC with forced mode.

Results: Endoscopic snare papillectomy followed by APC ablation of intraductal lesion using PTCS was performed in five patients (1 man, 4 women; mean age 69.2 years, 59-77 years). Clinical presentation included jaundice (n=1), abnormal liver function test (n=2), and abdominal pain (n=2). Histopathologic diagnoses were the following: tubular adenoma, tubular adenoma with high grade dysplasia, papillary adenoma, tubulovillous adenoma, and well-differentiated adenocarcinoma. There were no procedure related complications. During follow-up (mean 29 months), all of 5 patients had no recurrence.

Conclusions: Endoscopic papillectomy followed by APC ablation using cholangioscopy seems to be a feasible and effective alternative treatment option for patients with intraductal extension of ampullary adenomas who are unsuitable for surgery.

Keywords: Ampullary tumor, Endoscopic snare papillectomy, Intraductal extension, Argon plasma coagulation, Percutaneous transhepatic cholangioscopy

PPB-39

A Case of Multi-Organ Failure Caused by Dka Triggered by Post-ERCP Acute Pancreatitis without Hypertriglyceridemia

Sung Chul Cho, Hyung-Keun Kim, Young-Ki Kim, Woo-Jung Kim, Seon-Bin Yoon, Hyun-Ho Choi, Sang-Woo Kim, Sung-Soo Kim and Hiun-Suk Chae

Division of Gastroenterology, Department of Internal Medicine, Uijeongbu St Mary's Hospital, College of Medicine, the Catholic University of Korea, Uijeongbu, Korea

Post-ERCP acute pancreatitis (pERCP-AP) is the most common serious adverse event attributed to Endoscopic retrograde cholangiopancreatography (ERCP). Systemic complications related to acute pancreatitis include acute respiratory distress syndrome, multiple organ dysfunction syndrome, disseminated intravascular coagulation, hypocalcemia, hyperglycemia, and insulin dependent diabetes or diabetic ketoacidosis (DKA). In practice, the development of diabetic ketoacidosis induced by pERCP-AP is rare and generally associated with hypertriglyceridemia. However, herein we report a case of a 45-year-old female without hypertriglyceridemia, who was diagnosed with pERCP-AP complicated with diabetic ketoacidosis. The patient was admitted with cholangitis with distal CBD stone. ERCP was performed on admission day and there was a 2 cm-sized periampullary diverticulum. A small distal CBD stone was removed using stone removal basket after small sized endoscopic sphincterotomy and total procedure time was about 8 minutes. On the 2nd hospital day after ERCP, levels of serum amylase and lipase were elevated to 1,889 U/L and >2,800 U/L, and abdominal pain occurred. The patient was initially diagnosed with simple pERCP-AP. Though the symptoms were relieved after initiation of treatment, severe hyperglycemia (626 mg/dL), severe metabolic acidosis (pH 6.9), and high plasma osmolality (308 mOsm/kg) developed on 3rd hospital day. However, serum triglyceride levels remained within the normal range (245 mg/dL). Although we started the treatment of DKA using insulin pump and massive hydration, acute renal failure and acute respiratory failure was combined and progressed. She was transferred to intensive care unit and treated by mechanical ventilation and continuous renal replacement therapy. Fortunately she recovered and moved to the general ward on the 10th hospital day and was discharged on the 14th hospital day.

Keywords: Dka, Post-ercp pancreatitis, Hypertriglyceridemia, Acute pancreatitis, Diabetic ketoacidosis

PPB-40

The Diagnostic and Therapeutic Efficacy of Spyglass Ds System for Biliary Tract Lesions – Single Centre Experience

Bhavik Shah¹, Mahesh Kumar Goenka¹, Rachit Agarwal¹ and Usha Goenka¹

¹Department of Gastrosciences and Liver, Apollo Gleneagles Hospitals, Kolkata, West Bengal, ²Department of Diagnostic and Interventional Radiology, Apollo Gleneagles Hospitals, Kolkata, West Bengal, India

Background/aims: Evaluation of the bile duct with a cholangioscope is a recent diagnostic and therapeutic modality. This study aimed to evaluate the diagnostic and therapeutic efficacy of Spyglass DS cholangioscopy in various biliary tract lesions.

Methods: Consecutive patients undergoing cholangioscopy from May 2016 to December 2018 were enrolled in the study. The main outcomes were related to the success in confirming the nature of lesions and complete stone clearance. Spyglass directed biopsies were taken as indicated.

Results: 102 patients were studied, 52 (51%) were male with a median age of 62.5 (21-88) years. Indications for cholangioscopic assessment were CBD stricture (57.57%), Difficult CBD stone for laser lithotripsy (27.3%), CBD assessment (12.11%), pancreatoscopy for IPMN (2.01%) and to flush the abscess cavity (1.01%). Mean examination time was 3.15 (1.2-14.12) min excluding those patients who underwent lithotripsy. The mean examination time for lithotripsy was 15.04 (5.16-35.31) min. Cholangioscopy guided biopsy taken in 75.44% (43/57) and sample adequacy was 93% (40/43). Procedure was successful in 97% of patients. Lithotripsy was successful in 74.1% patients in first attempt, multiple attempts were required in 18.5% patients and it was unsuccessful in 7.4% patients. When cholangioscopic diagnosis of malignant stricture was compared with histopathology, sensitivity, specificity and accuracy were 91.1%, 80.9% and 87.2% respectively.

Conclusions: Evaluation with cholangioscopy significantly increases the diagnostic yield and clinical outcome. It has good efficacy in making accurate diagnosis of malignant biliary strictures with both visual impression as well as with biopsies. It also has excellent efficacy for the treatment of bile duct stones not amenable to conventional endoscopic therapy.

Keywords: Spyglass ds cholangioscopy, Lithotripsy, Malignant stricture

PPB-41

The Single-Center Experience of Endoscopic Treatment of Anastomotic Strictures after Live-Donor Liver Transplantation

Nurken Abdiyev¹, Yerlan Abdirashev¹, Maksat Doskhanov² and Zhasulan Baimakhanov²

¹Diagnostic and Therapeutic Endoscopy Division, National Scientific Center of Surgery Named after An Syzganov's, Almaty, ²Hepatopancreatobiliary and Liver Transplantation Surgery, National Scientific Center of Surgery Named after An Syzganov's, Almaty, Kazakhstan

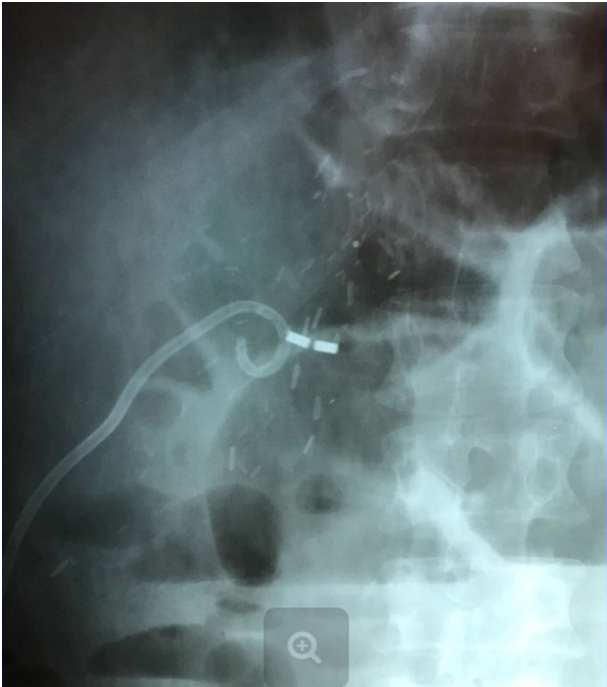
Background/aims: The purpose is a retrospective analysis of endoscopic treatment (ET) of biliary complications (BC) after LDLT.

Methods: From December 2015 to 2018, analyzed 76 cases after LDLT. The LT of right lobe in 70 (94,6%) patients, the left lobe in 3 (4%), right posterior section in 1 (0.9%). In 76(100%) cases in 26 (35%) patients BC occurred. Anastomotic strictures (AS) diagnosed in 20 (77%) patients. AS appeared due to the partial failure of the biliobiliary anastomosis with the creation of biloma in 6 (23%) patients. The ET was performed to 20 (80%) patients. Another BC of 5 (20%) patients was solved by PTBD and open surgery.

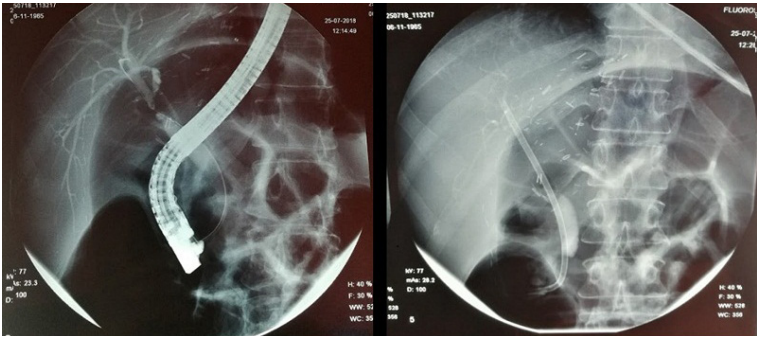
Results: The total success of minimally invasive treatment was 65%. ERCP was successful in 14 (53%) recipients. The "Rendezvous" technique was effective in 3 (12%) cases. In 2 cases this method was done and the magnetic compression anastomosis was used in 1 case. Failed ERCP 4 (15%) patients were treated with PTBD. Also, the BC of 5 (19%) patients were solved by surgery.

Conclusions: The success of ET of BC directly depends on the timely start of therapeutic measures. ET during the first 6 months from the LT has a more favorable outcome and requires fewer interventions. We do not exclude that the development of BC is associated with the technical aspects of biliary anastomosis during surgery.

Keywords: Ercp, LdlT, Anastomotic stricture



The magnetic compression anastomosis



ERCP: PS of AS

PPB-42

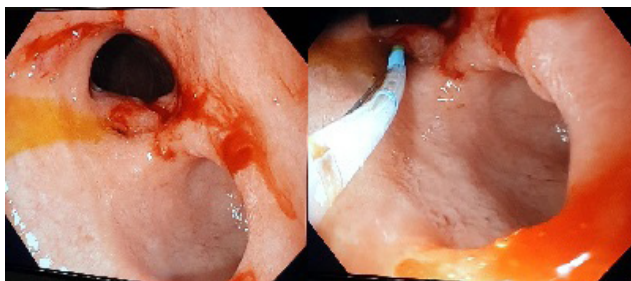
Trapped in a Tunnel: An Unusual Cause of Obstructive Jaundice

Amna Subhan Butt

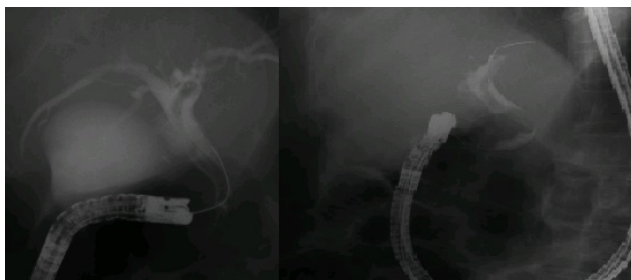
Medicine, Aga Khan University Hospital, Karachi, Pakistan

A 66 years old lady presented with one week history of upper abdominal pain, fever and vomiting. On examination she was icteric with moderate tenderness in right hypochondrium. Her Labs revealed WBC counts of $16000 \times 10^9/L$, Total Bilirubin 1.7 mg/dl, GGT 529 IU/dl, SGPT 421 IU/dl, alkaline Phosphatase 144 IU/dl. A linear filling defect was found on Magnetic Resonance Cholangiopancreatography. Suspecting cholestatic LFTs and cholangitis due to biliary Ascaris ERCP was done. On ERCP narrowing identified at the junction of first and second part of duodenum, an adjacent large diverticulum. Just proximal to the junction of D1 & D2 an opening noticed with drainage of bile intermittently. No ampullary opening seen in D2. Using same opening CBD was cannulated via sphincterotomy. Cholangiogram showed dilated CBD and a tubular defect in the CBD. The defect was moving and was extending to hepatic duct suggestive of Worm, most likely Ascaris. Multiple balloon sweeps were done to remove the worm but could not be extracted. Patient was started on Mebendazole and in a week time not only her symptoms resolved but no filling defect was found in CBD on ultrasound. Removal of Ascaris from biliary system with altered anatomy was challenging. However, patient was treated successfully with medical therapy.

Keywords: Ascaris, Biliary ascariasis, Endoscopic retrograde cholangiopancreatography



ERCP images showing narrowing at the junction of first, second part of Duodenum, a diverticul and an opening with draining bile



Cholangiogram showing linear filling defect which was moving likely Ascaris

PPB-43

Risk Factors for Duodenal Perforation Caused by Biliary Plastic Stent Migration

Jin Ho Choi, Ji Kon Ryu, Gunn Huh, Jung Won Chun, Min Su You, Woo Hyun Paik, Sang Hyub Lee and Yong-Tae Kim

Department of Internal Medicine and Liver Research Institute, Seoul National University College of Medicine, Seoul, Korea

Background/aims: Migration of biliary plastic stent (PS) inserted by endoscopic retrograde cholangiopancreatography can cause duodenal perforation and become a life-threatening condition, yet there is no study revealing its risk factors. We aim to report the incidence of duodenal perforation caused by biliary plastic stent migration and seek the risk factors.

Methods: All patients who received endoscopic retrograde cholangiopancreatography with a biliary plastic stent placement at our institution during January 2006 to August 2016 were reviewed. The etiology of disease, diameter, length, type of the PS and time to perforation was reviewed.

Results: A total of 6,371 endoscopic biliary drainage was done and 4,111 with PSs, and 2,994 with straight PS including 713 Tannenbaum stents. Eight patients with duodenal perforation caused by biliary PS were identified and all of the cases had at least one straight PS inserted. Duodenal perforation occurred in 0.27% of straight PS cases. All of these cases had at least 12 cm long straight PS inserted. Two of them had benign stricture and six of them had malignant stricture. Time to perforation ranged between 2 to 84 days. Straight PSs 12 cm ($p=0.001$) or longer and malignant etiology ($p=0.010$) were the risk factors of duodenal perforation caused by biliary PS migration.

Conclusions: The incidence of duodenal perforation caused by biliary PS migration is about 0.27% of straight PS cases. Straight PS at least 12 cm long and malignant etiology were the risk factors of duodenal perforation caused by PS migration.

Keywords: Duodenal perforation, Biliary stent, Migration, Risk factor

POT-01

Efficacy and Safety of EUS-Guided Biliary Drainage in Malignant Biliary Obstruction

Roshan Agarwala¹, Surinder Rana¹, Ravi Sharma¹, Lovneet Dhalaria¹ and Rajesh Gupta²

¹Gastroenterology, Post Graduate Institute of Medical Education & Research, Chandigarh, ²Surgery, Post Graduate Institute of Medical Education & Research, Chandigarh, India

Background/aims: Endoscopic ultrasound-guided biliary drainage (EUS-BD) is emerging as an alternative modality to percutaneous biliary drainage (PTBD) in cases of malignant biliary obstruction and failed endoscopic retrograde cholangiopancreatography (ERCP). We present our experience of EUS-BD in this setting.

Methods: This is a single centre retrospective study of EUS-BD, done for malignant biliary obstruction in a tertiary centre in North India performed between Jan 2017 to March 2019. The aim of the study was to assess the technical and clinical success rates of EUS-BD as well as the complications.

Results: A total of 16 patients were enrolled. The mean age was 63.8 ± 5.6 years. 13 (81.25%) cases were males, and 3 (18.75%) females. The primary diagnosis was carcinoma head of pancreas in 8 (50%) cases, cholangiocarcinoma in 5 (31.25%) cases and carcinoma neck of gall bladder in 3 (18.75%) cases. The indications for EUS-BD were failed ERCP in 9 (56.25%) cases, duodenal stenosis in 4 (25%), and acute cholecystitis in 3 (18.75%) cases. The mean serum bilirubin was 16.1 ± 4.1 mg/dL. EUS-choledochoduodenostomy (EUS-CDS) was performed in 7 (43.75%) cases. A fully covered 6 cm×10 mm self expanding metal stent (SEMS) was used in 6 of these cases, and Giobor™ biliary stent in 1 case. Antegrade drainage was done in 3 (18.75%) cases, wherein a 6 cm×10 mm uncovered SEMS was used. Hepaticogastrostomy (EUS-HGS) with a fully covered 8 cm×10 mm SEMS was done in 3 (18.75%) caeses. EUS guided gall bladder drainage was done in 3 (18.75%) cases with acute cholecystitis using a 3 cm×14 mm biflanged SEMS. Trans-gastric (antrum) route was used in 2 cases, and trans-duodenal route in 1 case. At 3 months of follow up, stent patency was present in 14 (87.5%) cases. 2 patients expired at 8 weeks due to malignancy. One patient had perforation needing surgery, whereas bile leak requiring PTBD was seen in one patient.

Conclusions: EUS-BD is safe and effective procedure for biliary drainage in patients with malignant biliary obstruction.

Keywords: Endoscopic ultrasound-guided biliary drainage, Hepaticogastrostomy, Antegrade drainage, Choledochoduodenostomy, Eus guided gall bladder drainage

POT-02

Risk Factors for Adverse Events Associated with Bile Leak during Endoscopic Ultrasound-Guided Hepaticogastrostomy

Atsushi Okuda, Takeshi Ogura, Masanori Yamada and Kazuhide Higuchi

2nd Department of Internal Medicine, Osaka Medical College, Takatsuki City, Osaka, Japan

Background/aims: Endoscopic ultrasound-guided hepaticogastrostomy (EUS-HGS) is performed for patients with advanced cancer because of poor prognosis and compromised status, and bile peritonitis may prove critical for such patients. In addition, this adverse event has the possibility of decreasing quality of life by prolonging the time until the start of oral intake, hospital stay, or chemotherapy. Predictors of bile peritonitis in EUS-HGS thus have considerable clinical impact. The aim of this study was to retrospectively determine risk factors of bile peritonitis as adverse events of EUS-HGS.

Methods: Patients who underwent EUS-HGS using a metal stent at our hospital between March 2016 and November 2018 were retrospectively enrolled. A receiver operating characteristic (ROC) curve was plotted to assess the influence of this distance and bile peritonitis and determine the optimum cutoff score for predicting risk of bile peritonitis. Multivariate analysis using logistic regression was performed to examine factors of bile peritonitis.

Results: A total of 68 patients were enrolled in this study. The area under the ROC curve was impressive, at 0.94 (95% confidence interval (CI), 0.89 to 1.00), and a distance of 2.50 mm offered 90.3% sensitivity and 87.5% specificity in predicting bile peritonitis. According to this multivariate analysis, procedure time (>20 min, HR 4.26, 95% CI 1.20 to 1286.21, P=0.039) and distance to the hepatic parenchyma (<2.50 mm, HR 11.00, 95% CI 11.00 to 11216.03, P=0.001) were significantly associated with bile peritonitis.

Conclusions: In conclusions, long procedure time and the short distance of hepatic parenchyma may be risk factors of adverse events associated with bile leakage.

Keywords: Endoscopic ultrasound-guided hepaticogastrostomy, Eus, Adverse events associated with bile leak

POT-03

EUS Guided Peripancreatic Cystic Fluid Drainage, Experience from Norvic International Hospital

Sandeep Raj Kunwar, Vijay Kiran Dahal, Barun Kumar Shah and Madhu Ghimire

Digestive Disease Centre, Norvic International Hospital, Kathmandu, Nepal

Background/aims: Walled off pancreatic fluid collection occur after an acute attack of pancreatitis approximately in 10 percent of cases. Although 40 percent of walled off pancreatic fluid collections resolve without intervention, expansion of the fluid collection can produce multiple complications. Previously pancreatic pseudocyst were managed surgically with substantial morbidity and mortality.

Endoscopic approach have 90 percent technical success with 10-15 percent morbidity and 70-80 percent fluid collection resolution.

Methods: Total of 5 patients with symptomatic walled off pancreatic collections went for successful EUS guided cystogastrostomy. 2 were males and 3 were females with an average age of 43 years. Cystic collections were measured on an average of 11 cm maximum diameter. Duration of the procedure averaged 3- minutes.

Results: All patients went successful EUS guided drainage of the walled off pancreatic collections. 2 developed mild fever and were treated with antibiotics for a week. Complete resolution was noted in all patients.

Conclusions: Pancreatic walled off collection can be drained safely with EUS guidance. It is completely safe, economical and patient can be discharged on the same day. Surgery can be reserved for special circumstances

Keywords: EUS, Pseudocyst, Cystogastrostomy, Dilators, Stents

EUS GUIDED DRAINAGE OF PERIPANCREATIC FLUID COLLECTIONS - EXPERIENCE AT NORVIC INTERNATIONAL HOSPITAL

Kunwar S, Dahal V, Shah B

INTRODUCTION

Walled-off pancreatic fluid collections occur after an acute attack of pancreatitis in approximately 10 percent of cases [1, 2]. According to the revised Atlanta classification, inflammatory pancreatic fluid collections include acute peripancreatic fluid collections, pseudocysts, acute necrotic collections, and walled-off pancreatic necrosis [3]. Pseudocysts represent more mature fluid collections also outside the pancreas (typically developing at least four weeks after acute pancreatitis), have a well-defined wall, and again there should be no solid material or pancreatic necrosis present.

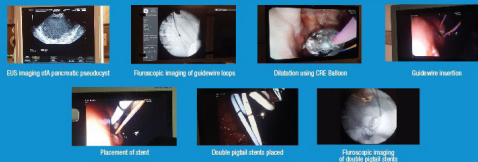
Walled-off pancreatic necrosis is a mature (typically developing at least four weeks after acute pancreatitis), encapsulated collection of pancreatic necrosis that may contain liquid and solid elements (with or without loculation). They may be intra- or extrapancreatic.

Limited natural history data suggest that up to 40 percent of walled-off pancreatic fluid collections resolve without intervention [5]. However, expansion of the fluid collection can produce abdominal pain, duodenal or biliary obstruction, vascular occlusion, or fistula formation into adjacent viscera, the pleural space, or pericardium. Spontaneous infection can develop. Digestion of an adjacent vessel can result in a pseudoaneurysm, which can produce a sudden, painful expansion of the cyst or gastrointestinal bleeding due to bleeding into the pancreatic duct (hemorrhagic pancreatitis) [6]. Pancreatic ascites or pleural effusion can result from disruption of the pancreatic duct with fistulization to the abdomen or chest, respectively. Previously, pancreatic pseudocysts were managed surgically. Most of the surgical literature is based on open surgical drainage procedures which was accomplished via cystgastrostomy, cystenterostomy (direct drainage or via a Roux limb), or resection. However, these approaches are associated with substantial morbidity and mortality (25 and 5 percent, respectively) [7-9].

Multiple reports have documented a high degree of success using endoscopic transmural drainage through the stomach or duodenum to manage walled-off pancreatic fluid collections. Overall, endotherapy is over 80 percent technically successful with 10 to 15 percent morbidity, 70 to 80 percent fluid collection resolution, and a 10 to 15 percent recurrence rate. [10-14]

METHODS

Total of 6 patients with walled off pancreatic collections went for successful Endoscopic ultrasound guided cystogastrostomy. Three were males and three were females with an average age of 43 years. Cystic collections were measured on an average of 12 cm maximum diameter. All patients were symptomatic with epigastric discomfort, pain and early satiety. With EUS guided vision a 19 gauge fine needle aspiration (FNA) needle was used to puncture the pancreatic fluid collection under direct visualization followed by wire placement and creation of the cystogastrostomy using slim dilators or brief bursts of cautery and the cystostome. Fluoroscopic guidance was used to confirm adequate looping of the wire within the fluid collection cavity. The tract was dilated for placement of dual, double pigtail plastic stents.



RESULTS

All patients went successful EUS guided drainage of the walled off pancreatic collections. 2 developed mild fever and were treated with antibiotics for a week. Cystic collection completely subsided in 5 of them and awaited on the sixth patient.

CONCLUSION

Pancreatic Walled-off collection can be drained safely with Endoscopic Ultrasound guidance. It is comparatively safe, economical and patient can be discharge on same day. Surgery can be reserved in special circumstances.

1. Cameron J. Acute pancreatitis. In: Surgery of the Alimentary Tract, 2nd edition, Shackelford RT, Zollinger OJ (Eds), WB Saunders, Philadelphia 1983 p:31
2. O'Rielly M, Connor JP, Foster IG. Pancreatic pseudocysts: classification, therapy, and results. Am J Surg 1985; 150:680.
3. AACE Consensus of Practice Committee. Shvedchik MA, Choudhri N, et al. Endoscopic approach for GI endoscopy. Gastrointest Endosc 2011; 81:81.
4. Arshad MP, Shah B, Choudhri N, Choudhri G, Choudhri N. Single-step EUS-guided transmural drainage of simple and complicated pancreatic pseudocysts. Gastrointest Endosc 2006; 63:797.
5. Colletti G, Sposito L, Sposito L, et al. Endoscopic drainage of pancreatic pseudocysts: a meta-analysis. Gastrointest Endosc 2008; 68:365.
6. Noh J, Choudhri N, Choudhri N, et al. Surgical treatment of pancreatic pseudocysts. Br J Surg 1997; 74:873.
7. Samuels VA, Pechman CC. Pancreatic pseudocyst. Gastroenterology 1989; 9:523.
8. Bergin S, Berman M. Diagnostic and therapeutic management of pancreatic pseudocysts. Surg Clin North Am 2007; 81:1447.
9. Arshad MP, Shah B, Choudhri N, Choudhri G, Choudhri N. Single-step EUS-guided transmural drainage of simple and complicated pancreatic pseudocysts. Gastrointest Endosc 2006; 63:797.
10. Arshad MP, Choudhri N, Choudhri N, et al. Endoscopic transmural drainage of pancreatic pseudocysts: a retrospective comparison with conventional endoscopic drainage. Gastrointest Endosc 2006; 64:608.
11. Knight M, Choudhri N, Arshad MP, Meier DH. Endoscopic management of pancreatic pseudocysts or abscesses after an EUS-guided FNA procedure for fluid ascites. Gastrointest Endosc 2006; 63:408.
12. Karamchandani S, Lopez T, Wilson DR, et al. EUS versus surgical approach for management of pancreatic pseudocysts. Gastrointest Endosc 2006; 64:162.
13. Park DJ, Lim SS, Moon SH, et al. Endoscopic ultrasound-guided versus conventional treatment drainage for pancreatic pseudocysts: a prospective randomized trial. Gastrointest Endosc 2008; 67:842.

POT-04

EUS Guided Pancreaticogastrostomy for Relief of Pain in Patients of Chronic Pancreatitis

Surinder Rana¹, Jimil Shah¹, Ravi Sharma¹ and Rajesh Gupta²

¹Gastroenterology, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, ²Surgery, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Background/aims: Endoscopic ultrasound-guided pancreatic duct drainage (EUS-PD) has been occasionally used as an alternative of surgery for relief of pain in patients in whom endoscopic retrograde pancreatography (ERP) has failed. Retrospective analysis was done to evaluate the indications, technical as well as clinical success rates and complications of EUS-PD.

Methods: The data base of patients with chronic pancreatitis who underwent EUS-PD over last five years was retrospectively analysed. The technical as well clinical success along with complications of EUS PD were analysed.

Results: Twelve patients (all males: age range 28 to 52 years) with chronic pancreatitis and dilated main pancreatic duct (diameter: 5-12 mm) were identified. The etiology of chronic pancreatitis was alcohol in 10 and idiopathic in 2 patients. EUS PD was technically successful in all patients. A 7 Fr (8 patients) and 5 Fr (4 patients) plastic stent was inserted. Clinical as well as radiological improvement was observed in all treated patients. One patient had minor self-limiting bleed and guide wire was slipped out during stent insertion in one patient. Self-limiting abdominal pain was observed in 3 patients. Over a follow up period of 3-58 months, 7/12 (58%) patients had recurrence of abdominal pain. External stent migration was observed in 5 patients with recurrence of abdominal pain. All stent migration were observed within 6 months of EUS PD.

Conclusions: EUS PD is a technically feasible and safe procedure in patients of chronic pancreatitis with dilated pancreatic duct and failed ERP. External stent migration of plastic stents is a major concern of EUS PD and therefore newer stents with anti-migration properties are needed to improve clinical results of EUS PD.

Keywords: Pancreticogastrostomy, Chronic pancreatitis, Endoscopic ultrasound, Ercp

POT-05

Mini Probe Eus in Submucosal Tumor Evaluation: Experience in a Regional Hospital

Ming Hui Lin

Department of Gastroenterology and Hepatology, Taiwan Adventist Hospital, Taipei City, Taiwan

Background/aims: Endoscopic Ultrasonography (EUS) is the procedure by placing the endoscope into the digestive tracts through mouth or anus to observe the gastrointestinal submucosa and the organs adjacent the digestive tracts by the ultrasonic probe of the endoscope. Therefore, the examination of EUS will be arranged if any gastrointestinal submucosal lesions suspected.

Methods: A total of 183 patients with suspected submucosal tumor were subjected to EUS examination over a one-year period (11/2017-1/2019) at this hospital (Taiwan Adventist Hospital), the tumors from 52 of these patients were subjected to biopsy, and a total of 5 patients received endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD); another 2 patients received endoscopic ultrasound-guided fine needle aspiration (EUS-FNA, 19-gauge needle).

Results: Ratio of tumor location: 1st layer: mucosal layer (6%), 2nd layer: muscularis mucosa (16.4%), 3rd submucosal layer (9.8%), 4th layer: muscularis propria (29.5%) and external compression or others (38.3%). Of the patients, pathology tissue diagnosis was performed for 59 persons (including digging biopsy, EMR/ESD, EUS FNA), and tumor tissue acquisition was performed 36 person times (61%) after preoperative diagnosis indicated submucosal foci (layers 2-4). In the pathology reports for these 36 patients, 3 persons (8.3%) had leiomyoma, 1 person (2.8%) had a gastrointestinal stromal tumor (GIST), 1 person (2.8%) had a cyst, 2 persons (5.6%) had carcinoids, and 29 persons (80.5%) had other non-specific finding.

Conclusions: Mini probe EUS enables very safe and effective detection of submucosal tumors, and most submucosal tumors are benign, and only require regular follow-ups. However, malignancy cannot be excluded in certain circumstances, and tumor resection through the endoscope or surgery will be first considered. If the patients refuse to accept or are not eligible for the endoscope intervention or surgery, the fine needle aspiration guided by the EUS may be considered.

Keywords: Miniprobe endoscopic ultrasonography, Submucosal tumors

POT-06

Digital Image Analysis of Endoscopic Ultrasonography is Helpful in Diagnosing Gastric Mesenchymal Tumors

Moon Won Lee, Gwang Ha Kim, Jun Woo Park, Eun Young Park and Bong Eun Lee

Department of Internal Medicine, Pusan National University College of Medicine, Busan, Korea

Background/aims: Endoscopic ultrasonography (EUS) is useful for the evaluation of malignant potential of GMTs, but has limitations, such as subjective interpretation of EUS images. Therefore, we aimed to develop a scoring system based on the digital image analysis of EUS images to predict gastrointestinal stromal tumors (GISTs).

Methods: We included 103 patients with histopathologically proven GIST, leiomyoma or schwannoma on surgically resected specimen who underwent EUS examination between January 2007 and June 2018. After standardization of the EUS images, brightness values, including the mean (Tmean), indicative of echogenicity, and the standard deviation (TSD), indicative of heterogeneity, in the tumors were analyzed.

Results: The sensitivity and specificity were almost optimized when the critical values of age, Tmean, and TSD were 57.5 years, 67.0, and 25.6, respectively. A GIST predicting scoring system was created by assigning 3 points for Tmean ≥ 67 , 2 points for age ≥ 58 years, and 1 point for TSD ≥ 26 . When GMTs with 3 points or more were diagnosed as GISTs, the sensitivity, specificity, and accuracy of the scoring system were 86.5%, 75.9%, and 83.5%, respectively.

Conclusions: The scoring system based on the information of digital image analysis is useful in predicting GISTs in case of GMTs that are 2-5 cm in size.

Keywords: Stomach, Endoscopic ultrasonography, Mesenchymal tumor, Image analysis

Table 3 Multivariate logistic regression analysis for predicting gastrointestinal stromal tumor in gastric mesenchymal tumors

	β -coefficient	Odds ratio (95% CI)	p-value
Age ≥ 58 years	1.887	6.600 (1.945–22.403)	0.002
T _{mean} ≥ 67	2.784	16.184 (4.951–52.897)	< 0.001
T _{SD} ≥ 26	0.947	2.577 (0.794–8.359)	0.115

CI confidence interval

POT-07

First Review of Esophageal Lesions by Endoscopic Ultrasonography at E Hospital

Hai Hoang Van

Department of Endoscopy, E Hospital, Ha Noi, Vietnam

Background/aims: The purposes of this study were to investigate the characteristics of esophageal lesions by endoscopy ultrasound at Endoscopy Department in E Hospital.

Methods: Esophageal lesions are divided into two types: benign submucosal tumors and esophageal cancers. All esophageal cancers were diagnosed by biopsy pathology, underwent EUS to examine the invasion into esophageal layers and local lymph nodes. Benign submucosal tumors are determined in location, size, border and echogenic characteristics.

Results: Our results show that: in total of 63 patients, male/female rate is 2.7:1; among 34 patients with esophageal cancer, 11 were determined as early cancer (32.3%), deep invasion cancer (late cancer) rate is 67.6%, lymph nodes appeared in 73.5% patients. Benign submucosal tumors are in 29/63 (46%) cases, 15/29 cases are tumors in muscularis propria and muscularis mucosa. Esophageal cysts are 8/29 (27.6%) and 5 cases are diagnosed as lipoma.

Conclusions: We concluded that EUS is high value method to determine the invasion of esophageal cancer and determine the characteristics of benign submucosal tumors.

Keywords: Eus, Esophageal, Cancer, Submucosal tumor

POT-08

EUS FNA of Various Abdominal Lymph Nodes–3 Month Experience at Digestive Disease Centre, Norvic International Hospital

Sandeep Raj Kunwar

Digestive Disease Centre, Norvic International Hospital, Kathmandu, Nepal

Background/aims: Diagnosis of abdominal Lymphnodes remains challenging despite advancement in imaging technologies. EUS has the benefit of being a minimally invasive, well-tolerated procedure, although results are operator-dependent. EUS-guided FNA provides samples for cytopathologic analysis, a major advantage over other techniques.

Methods: Total of 10 patients went for EUS Guided FNA for Abdominal Lymphnodes using a 22gz EUS FNA needle. 6 were males and 4 were females with an average age of 42 years. The site selected for EUS-FNA was identified and needle was advanced into the target lesion under direct EUS guidance. Prior to advancing the needle, flow Doppler imaging was obtained to avoid intervening blood vessels. When the needle entered the lesion of interest, the stylet was removed and negative pressure is applied with a 10 mL syringe. Prior to removing the needle, the negative pressure was released.

Results: Out of 10, 4 were malignant LN (2 Pancreatic adenocarcinoma/2 metastatic Lymphnodes), 3 were tuberculous lymphnodes, 2 reactive lymphadenopathy and one sample was inadequate for cytopathology examination.

Conclusions: EUS FNA is minimally invasive, well tolerated and a safe procedure and has a very high diagnostic yield.

Keywords: EUS, FNA, Lymphnode

EUS FNA OF VARIOUS ABDOMINAL LYMPH NODES

3 month experience at Digestive Disease Centre,
Norvic International Hospital

BACKGROUND

Endoscopic ultrasonography (EUS) has evolved from a diagnostic imaging modality to one that can also be used for invasive diagnostic and therapeutic procedures. Diagnosis of abdominal Lymphnodes remains challenging despite advancement in imaging technologies. EUS has the benefit of being a minimally invasive, well-tolerated procedure, although results are operator-dependent. The addition of FNA (EUS-guided FNA) provides samples for cytopathologic analysis, a major advantage over other techniques. These advances are largely due to the introduction of linear scanning instruments that can be used to place devices into the ultrasound plane of view, permitting various interventions including EUS-FNA.

Reported complication rates following endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) have been variable. At least four large published series (that together included over 1450 patients) found low complications rates from EUS-FNA (1-4).

In a large multicenter trial involving 554 consecutive mass or lymph node biopsies, only five complications were observed, all of which were nonfatal (1). Two patients had endoscope-induced perforation, two had febrile episodes following aspiration of cystic lesions, and one had hemorrhage from the wall of a pseudocyst.

OBJECTIVE

EUS FNA of various abdominal lymph nodes - Experience at Digestive Disease Centre Norvic International Hospital

METHODS

Total of 10 patients went for EUS Guided FNA for Abdominal Lymphnodes using a 22gz EUS FNA needle. 6 were males and 4 were females with an average age of 42 years. All patients were given propofol sedation in the presence of one anesthesiologist throughout the procedure. The site selected for EUS-FNA was identified and the needle catheter assembly was advanced through the endoscope and secured to the Luer lock adaptor. The needle was advanced into the target lesion under direct EUS guidance. Prior to advancing the needle, flow Doppler imaging was obtained to avoid intervening blood vessels. A swift jabbing motion was occasionally necessary to traverse the muscularis propria to enter the lesion. When the needle entered the lesion of interest, the stylet was removed and negative pressure is applied with a 10 mL syringe. Prior to removing the needle, the negative pressure was released.

The number of aspirates that was obtained approximately 10 passes for the lymph nodes. The aspirated material was prepared by spraying it onto glass slides. Dry and alcohol fixed slides were prepared.

After the material was sprayed onto the glass slides, a saline wash was performed through the needle, and the material was collected to be made into a cell block. The stylet was then wiped off to remove any remaining blood and the needle purged of any remaining fluid using air. The entire needle device was reassembled for further use. The slides were then sent for cytopathology.

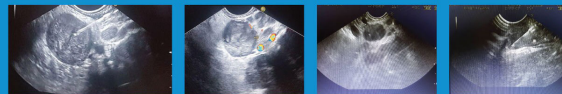
There were no post procedure complications. All patients were discharged on same day.

RESULTS

Out of 10, 4 were malignant LN (2 Pancreatic adenocarcinoma/ 2 metastatic Lymphnodes) , 3 were tuberculous lymphnodes, 2 reactive lymphadenopathy and one sample was inadequate for cytopathology examination.

CONCLUSION

EUS FNA is minimally invasive, well tolerated and a safe procedure and has a very high diagnostic yield.



- References
1. Williams JM, Wilson P, Gosselin M, et al. Endosonography-guided fine-needle aspiration biopsy: diagnostic accuracy and complication assessment. *Gastroenterology* 1993; 113: 1091.
 2. Williams JM, Saha RP, Achamkin L, et al. Endoscopic ultrasound-guided fine-needle aspiration biopsy: a large single center experience. *Ga* 1999; 44: 726.
 3. Zhou S, Prasad, Lakshmanan S, et al. Assessment of performance of EUS-guided fine-needle aspiration. *Gastrointestinal Endoscopy* 2001; 54: 413.
 4. Galloway MA, Tamhankar A, Venkatasubramanian S, Wilson CM. Frequency of major complications after EUS-guided FNA of solid pancreatic masses: a prospective evaluation. *Gastrointestinal Endoscopy* 2006; 63: 652.

POT-09

Removal of Intrahepatic Bile Duct Stones by Endoscopic Ultrasound-Guided Choledochoduodenostomy after Failed ERCP

Seung Goun Hong

Internal Medicine, Sam Anyang Hospital, Anyang, Korea

Background/aims: After failed removal of intrahepatic bile duct (IHD) stones by endoscopic retrograde cholangiopancreatography (ERCP), percutaneous lithotripsy is well-known effective procedure, but is time-consuming. The approach to IHD by endoscopic ultrasound (EUS)-guided choledochoduodenostomy (CDS) was recently performed for removal of IHD stones. The aim of the study is to evaluate the efficacy, safety and economic burden such as hospital stay of removal IHD stones of EUS-guided CDS after failed ERCP.

Methods: From 2017 until 2018, all three patients with IHD stones after failed ERCP were retrospectively reviewed. We then performed EUS-guided CDS with metal stent and removed IHD stones by basket, Roth net, retrieval balloon and electrohydraulic lithotripsy (EHL) 5-7 days later.

Results: Some amount of IHD stones retained in the first patient (Fig. 1A-E), but the stones were nearly removed in the next two patients (Fig. 1F-O). The serious complications including bleeding, infection, perforation were not noted. The range of duration of hospital stay from EUS-guided procedure to discharge was 9-16 days and no further procedure was required in the three patients until now.

Conclusions: The removal of IHD stones through the tract by EUS-guided CDS was effective and safe procedure after failed ERCP.

Keywords: Intrahepatic bile duct stone, Endoscopic ultrasound-guided choledochoduodenostomy

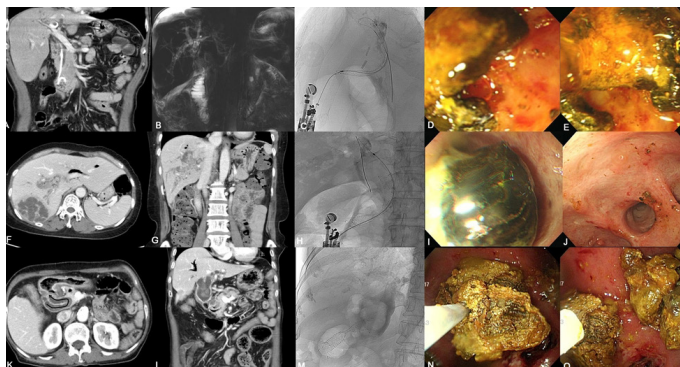


Figure 1.

POT-10



Clinical Utility of Directional Eflow for the Differential Diagnosis of Pancreatic and Peripancreatic Solid Masses

Jun Seong Hwang, Dong Wan Seo, Sung Woo Ko, Hoonsub So, Dong Wook Oh, Tae Jun Song, Do Hyun Park, Sang Soo Lee, Sung Koo Lee and Myung-Hwan Kim

Gastroenterology, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Background/aims: Contrast-enhanced harmonic endoscopic ultrasonography (CEH-EUS) can be used for differential diagnosis of pancreatic lesions. However, routine use of CEH-EUS is limited by its high cost, the lack of contrast agent availability and expertise with this technique. Directional eFLOW (D-eFLOW), a new high-definition modality for microvessels, uses built-in functions, it needs no additional cost and takes less time for examination. The purpose of this study was to investigate the usefulness of D-eFlow compared with CEH-EUS for differential diagnosis of pancreatic solid lesions, especially neuroendocrine tumors.

Methods: From January 2016 to February 2019, a total of 34 patients who received EUS and D-eFLOW examination to evaluate pancreatic and peripancreatic masses were analyzed, retrospectively.

Results: Concerning the detection of the neuroendocrine tumors, D-eFLOW had higher sensitivity and accuracy to CEH-EUS (100% vs. 91.7%, 78.9% vs. 77.8%). There was a good correlation between the D-eFLOW and CEH-EUS to evaluating the vascularity of tumors (correlation coefficient 0.683, $p < 0.05$).

Conclusions: In conclusion, D-eFLOW can be considered as an alternative method to CEH-EUS for the evaluation of pancreatic and peripancreatic solid tumors.

Keywords: Directional eflow, Contrast-enhanced harmonic eus, Pancreatic solid tumor

Values	
Mean age, y (range)	52.9 (32-68)
M : F ratio	17 : 17
Mean tumor size, cm (range)	1.67 (0.7-5.5)
Tumor location (%)	
Pancreatic head	21 (61.8)
Pancreatic body	7 (20.6)
Pancreatic tail	4 (11.7)
Peripancreatic area	2 (5.9)
D-eFLOW (n=34)	
Hypervascular	32
Hypovascular	2
CEH-EUS (n=32)	
Hypoenhancement	0
Isoenhancement	3
Hyperenhancement	
Early enhance & early wash-out	5
Early enhance & delayed wash-out	23
Early enhance & persistently enhance	1
Pathologic diagnosis (n=19)	
Neuroendocrine tumor	13
Gastrointestinal stromal tumor	3
Renal cell carcinoma	1
Solid pseudopapillary neoplasm	1
Accessory spleen	1

Table 1. Baseline characteristics (n=34)

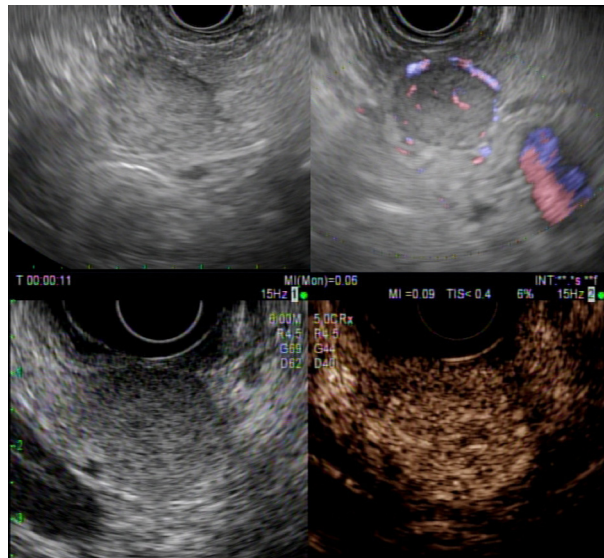


Figure 1. Pancreatic neuroendocrine tumor. (A) Peritumoral and intratumoral microvessel flows were shown on D-eFLOW. (B) The tumor shows a hyperenhancement in the early arterial phase on CEH-EUS.

POT-11

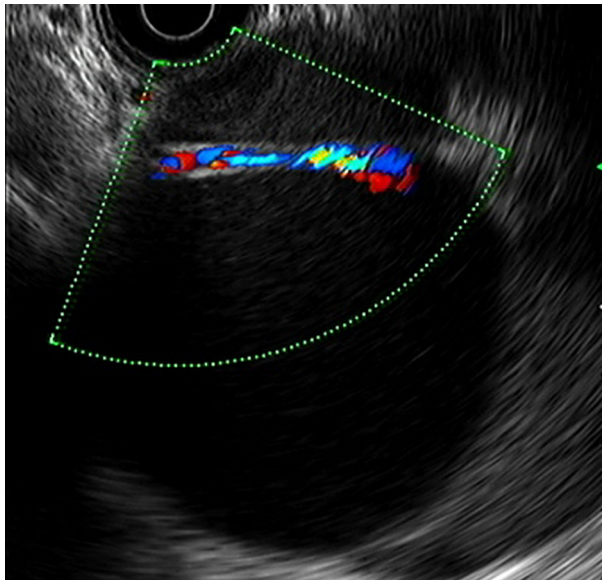
Bow-Like, Displaced Splenic Artery Due to Pancreatic Pseudocyst

Woojin Jeong, Young Don Kim, Jong Kyu Park, Sang Jin Lee and Goon Hee Han

Department of Gastroenterology, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung-Si, Gangwon-Do, Korea

A 26-year-old woman presented with diffuse abdominal pain four months ago. The patient usually drank two times a week but drank every day for one week six months ago. Abdominopelvic computed tomography (APCT) showed a pancreatic pseudocyst in the tail of the pancreas. The patient was treated with fasting and intravenous hydration. The patient had discharged upon the improvement of symptoms. After four months, the size of the pseudocyst was increased in the follow-up APCT and she was hospitalized for pseudocyst drainage. Magnetic resonance imaging/Magnetic resonance cholangiopancreatography showed a slightly increased pseudocyst of 9.2 cm in size. On endoscopic ultrasonography (EUS), a tubular structure was observed across the pseudocyst and this structure was the splenic artery. The splenic artery appeared to have passed through the pseudocyst (Figure 1). Because of the splenic artery penetrating the pseudocyst on EUS, The possibility of post-EUS guided drainage bleeding was thought to be high. Abdomen angiography computed tomography was performed to obtain accurate vascular anatomy. The splenic artery did not pass through the pseudocyst. It was bow-like, upwards displaced due to the mass effect of the pseudocyst (figure 2). We performed EUS-guided pseudocyst drainage using a fully covered self-expandable metal stent (Hanorostent® biliary flap, M.I. Tech Co., Ltd., Gyeonggi-do, South Korea). We punctured the pseudocyst with a 19-gauge needle while avoiding the splenic artery. In the cystic fluid analysis, the amylase level was 35906U/L, the lipase level was 146547 U/L, and the CEA level was 60 ng/mL. Cytology was negative for malignancy. After inserting guidewire, the tract was dilated with a cystotome (Wilson Cook, Winston-Salem, NC, USA) followed by placement of metal stent. One month later, the patient had no symptoms and follow-up APCT showed improvement in pseudocyst. The stent was removed without complications.

Keywords: Pancreatic pseudocyst, Splenic artery, Fully covered self-expandable metal stent, Complications, Bleeding



Endoscopic ultrasonography showing the splenic artery passing through the pseudocyst



Abdomen angiography computed tomography showing a bow-like, upward displaced splenic artery due to the mass effect of the pseudocyst

POT-12

Comparison of Eus Insertion Method: Standard Vs. Balloon-Inflated

Jinwoo Kang¹, Sang Hyub Lee², Woo Hyun Paik², Ji Kon Ryu² and Yong-Tae Kim²

¹Gastroenterology, SMG-SNU Boramae Medical Center, Seoul, Korea, ²Internal Medicine, Seoul National University College of Medicine, Seoul, Korea

Background/aims: Insertion of Endoscopic ultrasonography (EUS) is more difficult and patients may experience more severe discomfort. Endoscopic ultrasonography has a balloon inflated by water or air around the tip, so it may be inserted smoothly with balloon inflated. The purpose of this study was to investigate the effect of balloon inflation on the patient's subjective pain during insertion.

Methods: A prospective, randomized single-blinded study was conducted from October 2016 to September 2018. 484 patients who underwent radialEUS for pancreatobiliary disease were enrolled. After the procedure, the degree of neck pain was assessed by Numeric Rating Scale (NRS) and the difference in pain level according to the insertion method was compared.

Results: 213 patients in the standard insertion group and 216 in the balloon insertion group were analyzed. Mean value of the NRS was 1.68 in the standard insertion group and 1.54 in the balloon insertion group. ($p=0.466$) Patients with more than 5 points of NRS after the procedure were 28 (13%) in the standard insertion group and 17 (8%) in balloon insertion group, respectively. ($p=0.115$) Female sex (HR 3.152, 95% CI 1.451-6.847, $p=0.004$) and less than 3-month experience of endoscopist with EUS (HR 3.567, 95% CI 1.570-8.106, $p=0.002$) were statistically significant risk factors for the moderate-to-severe oropharyngeal pain. Balloon-inflated insertion was shown as the protective factor (HR 0.501, 95% CI 0.258-0.972, $p=0.041$) in the multivariate analysis. In the subgroup analysis according to the risk factors for pain, balloon inflating method reduced the proportion of patients with moderate-to-severe oropharyngeal pain compared with standard method in female patients. (20.3% vs. 8.5%, $p=0.011$)

Conclusions: Balloon inflating method did not reduce absolute degree of post-procedural pain with EUS, but it can reduce the proportion of patients with moderate-to-severe pain, especially in female patients.

Keywords: Eus, Insertion, Pain, Balloon

POT-13

Evaluation of Specimen Adequacy and Diagnostic Performances Using a Novel Needle in EUS-TS for Pancreatic Solid Lesions

Chang Min Cho¹, Seong Jae Yeo¹, An Na Seo³ and Han Ik Bae³

¹Department of Internal Medicine, School of Medicine, Kyungpook National University, Daegu, Korea, ²Center for Pancreatobiliary Tumors, Kyungpook National University Chilgok Hospital, Daegu, Korea, ³Department of Pathology, School of Medicine, Kyungpook National University, Daegu, Korea

Background/aims: Histologic confirmation is crucial in the evaluation of pancreatic solid lesions. We evaluated specimen adequacy and diagnostic performances of an improved novel needle in EUS-TS for pancreatic solid lesions comparing with the commercially available needles.

Methods: As a prospective randomized trial, a 22-gauge needle (22G, Clear-Tip, FINEMEDIX, Daegu, Korea) was compared to three commercially available 22G biopsy needles (control group) in patients who undergoing EUS-TS of pancreatic solid lesions. First two passes of EUS-TS were accomplished in a random order between two groups. The procured specimens were prepared and compared specimen adequacy and diagnostic accuracy among needles. Two blinded pathologists evaluated the specimens based on an already agreed diagnostic criteria for cytology and histology.

Results: Between July and November 2018, 24 patients (median 70.5 years, 16 females) with pancreatic solid lesions were enrolled. Mean size of mass lesion was 27.6 mm with 9.5 mm of standard deviation. Final diagnosis was pancreatic ductal adenocarcinoma in 18, neuroendocrine tumor in 3, metastasis in 1, and chronic pancreatitis in 2. There was no significant difference between test and control groups in terms of specimen adequacy (3.8 ± 1.3 vs. $4.0 \pm 1.5\%$, $p=0.605$) and diagnostic accuracy (87.5 vs. 83.3%, $p=1.000$). There were no adverse events in enrolled patients.

Conclusions: The new prototype needle showed similar specimen adequacy and diagnostic accuracy comparing commercially available ones. However, further study including large volume and for other lesions is needed to validate these results.

Keywords: Pancreas, Needle, Echosonography

POT-14

The Diagnostic Performance of New Torque Technique for EUS-Guided Tissue Acquisition in Solid Pancreatic Lesions

Gyeong Guk Kim and Se Woo Park

Department of Internal Medicine, Hallym University Dongtan Sacred Heart Hospital, Hallym University College of Medicine, Gyeonggi-Do, Korea

Background/aims: Although several techniques for improved outcomes in endoscopic ultrasound (EUS)-guided tissue acquisition have been reported, the reported diagnostic yield for pancreatic masses is not satisfactory. We compared the diagnostic yield of EUS-FNB for pancreatic masses using the torque and standard techniques.

Methods: From 20 April, 2017 to 16 March, 2018, 124 consecutive patients with solid pancreatic mass who underwent EUS-FNB using either the torque or standard technique were randomly assigned. Three passes were made with each technique, comprising 10 uniform to-and-fro movements on each pass with a 10-mL syringe suction.

Results: There were significant differences between the groups regarding the procurement rate of the histologic core and optimal quality core. The sensitivity, specificity, positive predictive value, and negative predictive values of EUS-FNB were 85.45%, 100%, 100%, and 46.67%, respectively, for the standard technique and 96.49%, 100%, 100%, and 71.43%, respectively, for the torque technique. The diagnostic accuracies of the standard and torque techniques were 87.10% and 96.77%.

Conclusions: The torque technique for EUS-FNB offered acceptable technical feasibility and superior diagnostic performance, including optimal histologic core procurement, compared with the standard technique.

Keywords: Endoscopic ultrasound, Torque, Histologic core, Tissue acquisition, Solid pancreatic lesion

Figure 1. Flow chart of patients throughout the randomized trial

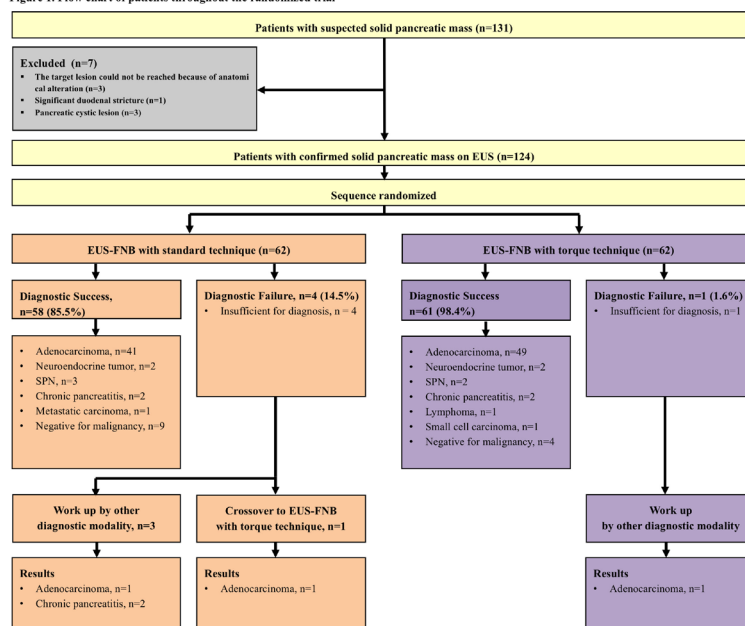


Table 4. Diagnostic performance of the standard and torque techniques the using diagnostic criteria (combining suggestive and diagnostic for malignancy)

	Standard	Torque	Total
	% (95% CI)	% (95% CI)	% (95% CI)
Sensitivity	85.45% (73.34-93.50)	96.49% (87.89-99.57)	91.07% (84.19-95.64)
Specificity	100.00% (59.04-100.00)	100.00% (47.82-100.00)	100.00% (73.54-100.00)
Accuracy	87.10% (76.15-94.26)	96.77% (88.83-99.61)	91.94% (85.67-96.06)
Negative predictive value	46.67% (31.56-62.41)	71.43% (39.05-90.70)	54.55% (39.91-68.43)
Positive predictive value	100.00%	100.00%	100.00%

CI, confidence interval

POT-15

Feasibility and Safety of Endoscopic Ultrasound-Guided Fine Needle Biopsy of Solid Liver Lesions

Yu-Ting Kuo¹, Shih-Jhe Chen², Ming-Lun Han¹, Chieh-Chang Chen², Tsu-Yao Cheng², Wei-Chih Liao² and Hsiu-Po Wang¹

¹Division of Endoscopy, Department of Integrated Diagnostics & Therapeutics, National Taiwan University Hospital, Taipei, ²Departments of Internal Medicine, National Taiwan University Hospital, National Taiwan University College of Medicine, Taipei, Taiwan

Background/aims: Endoscopic ultrasound-guided fine needle biopsy (EUS-FNB) sampling is a safe and effective technique for diagnosis of pancreatic lesions. However, data are limited in its role in solid liver lesions. In this study, we aim to compare the diagnostic accuracy and safety between EUS-FNB, EUS-guided fine needle aspiration (EUS-FNA) and trans-abdominal ultrasound (US)-guided percutaneous biopsy for solid liver lesions.

Methods: The patients who were underwent EUS-FNB, EUS-FNA or US-guided biopsy for diagnosis of solid liver lesions were prospectively enrolled and retrospectively analyzed. The primary outcome was the diagnostic accuracy. The secondary outcomes were the median numbers of passes required to establish a diagnosis and complication rate.

Results: Total ninety-five patients with solid liver lesions who visited National Taiwan University Hospital between December 2017 and April 2019 were prospectively recruited for this study. Thirty patients underwent EUS-FNB, 30 patients underwent EUS-FNA and 35 patients underwent US-guided biopsy. Patient characteristics, sampling accuracy and median numbers of passes were not significantly different between the three groups. Sensitivity, Specificity and diagnostic accuracy of EUS-FNB for solid liver lesions were 92.9%, 100% and 93.3%, respectively. The median number of needle passes was 2 (range, 1 to 4). No any complications were seen among the three groups.

Conclusions: Compared to EUS-FNA and US-guided biopsy, EUS-FNB can be a safe and efficient alternative method for diagnosis of solid liver lesions.

Keywords: Endoscopic ultrasound, Fine needle biopsy, Liver tumor

POT-16

Comparative Efficacy of Stents in Endoscopic Ultrasonography -Guided Peripancreatic Fluid Collection Drainage

Se Young Choi and Se Woo Park

Gastroenterology, Hallym University Dongtan Sacred Heart Hospital, Dongtan, Korea

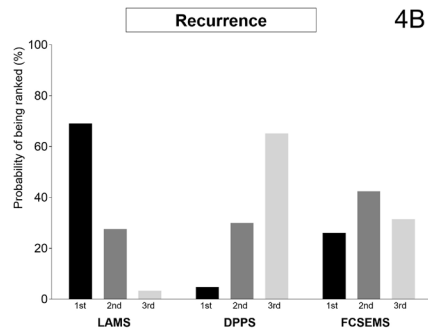
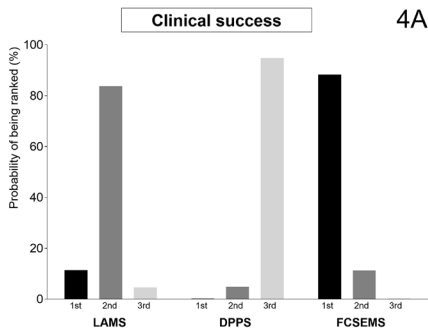
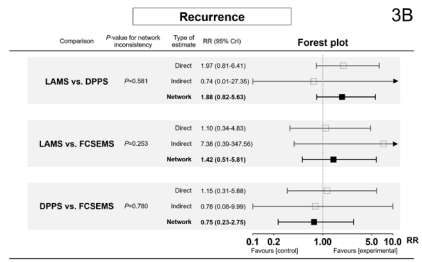
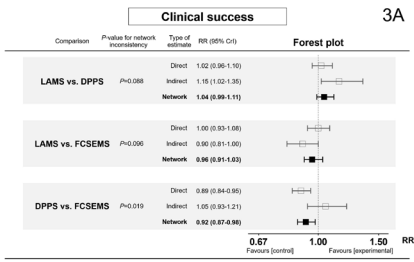
Background/aims: Although many studies have reported the efficacy of different stents for EUS-guided PFC drainage, they have not completely determined which stent is superior. This network meta-analysis comprehensively evaluated the comparative efficacy of stents used in EUS-guided PFC.

Methods: We searched all relevant studies published up to February 2019 examining the efficacy of DPPS, FCSEMS, and LAMS in EUS-guided PFC drainage. We performed a Bayesian network meta-analysis for clinical efficacy and adverse events.

Results: Fifteen studies comprising 1746 patients were included in the meta-analysis. In terms of clinical success, there was no significant difference between LAMS vs. DPPS or LAMS vs. FCSEMS. FCSEMS was superior in terms of clinical success to DPPS. There was no significant difference in recurrence of PFC among groups. Regarding adverse events, LAMS had higher bleeding risk than FCSEMS and tended to have higher risk of bleeding than DPPS. In terms of stent migration, there was no significant difference between any two groups compared.

Conclusions: FCSEMS had superior efficacy in terms of clinical success compared to DPPS stents. Significant superiority of LAMS to DPPS was not identified. Additionally, LAMS had the higher risk of bleeding than FCSEMS.

Keywords: Eus, Stent, Peripancreatic, Fluid, Drainage



POT-17

Lumen-Apposing Metal Stent and Antimigrating Tubular Self-Expandable Metal Stent for Eus-Guided Gallbladder Drainage

Sung Hyun Cho¹, Dongwook Oh², Tae Jun Song², Do Hyun Park², Dong-Wan Seo², Sung Koo Lee², Myung-Hwan Kim², Yun Nah Lee³, Jong Ho Moon³ and Sang Soo Lee²

¹Department of Internal Medicine, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea, ²Department of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Korea, ³Department of Gastroenterology, Soonchunhyang University School of Medicine, Bucheon, Korea

Background/aims: Endoscopic ultrasound-guided gallbladder drainage (EUS-GBD) using antimigrating tubular self-expandable metal stent (ATSEMS) has been performed as an alternative treatment for high surgical risk patients with acute cholecystitis. After introducing lumen-apposing metal stent (LAMS), it has been regarded that as it may minimize risk of tubular SEMS-related adverse events such as stent migration. To date, there was no comparative study between LAMS and ATSEMS for EUS-GBD. This study aimed to compare the clinical outcomes and adverse events of EUS-GBD with LAMS and ATSEMS.

Methods: Retrospective review of a prospectively collected EUS-GBD database at the Asan Medical Center and Bucheon Soonchunhyang hospital (between January 2015 and December 2017) was performed to identify consecutive patients with acute cholecystitis who underwent EUS-GBD. The technical, clinical success, adverse events, and cholecystitis recurrence were evaluated.

Results: A total of 71 patients (36 in the LAMS group and 35 in the ATSEMS group) were included in this study. There were no significant differences in the technical success rate (LAMS: 94%, 34/36 vs. ATSEMS: 100%, 35/35, $P=0.49$) and clinical success rate (94%, 34/36 vs. 100%, 35/35, $P=0.49$) between both groups. Procedure-related adverse events (LAMS: 0%, 0/34 vs. ATSEMS: 2.9%, 1/35, $P=0.99$) and stent-related late adverse events (LAMS: 11.8%, 4/34 [recurrent cholecystitis, $n=3$; asymptomatic stent migration, $n=1$] vs. ATSEMS: 5.78%, 2/35 [recurrent cholecystitis, $n=1$; asymptomatic stent migration, $n=1$], $P=0.428$) were similar between both groups. In the ATSEMS group, procedure-related adverse event was bile leakage (1/35, 2.9%).

Conclusions: In high surgical risk patients with acute cholecystitis, EUS-GBD with LAMS and ATSEMS showed similar results regarding technical success, clinical success, procedure-related adverse events, and cholecystitis recurrence. Further larger prospective studies are needed to confirm these results.

Keywords: Endoscopic ultrasound, Gallbladder drainage, Cholecystitis, High surgical risk, Metal stent

POT-18

Comparison of the Diagnostic Ability of Eus and Apct in the Diagnosis of Gastric Subepithelial Tumors

Sang Yoon Kim, Ki-Nam Shim, Ji Young Lim, Tae Oh Kim, A Reum Choe, Chung Hyun Tae, Hye-Kyung Jung, Chang Mo Moon, Seong-Eun Kim and Sung-Ae Jung

Internal Medicine, College of Medicine, Ewha Womans University, Seoul, Korea

Background/aims: Endoscopic ultrasonography (EUS) is the most efficient imaging modality for gastric subepithelial tumors (SETs). However, abdominopelvic computed tomography (APCT) has other advantages in evaluating SET's characterization, local extension, or invasion to adjacent organs. This study aimed to compare the diagnostic ability of EUS and APCT based on surgical histopathology results.

Methods: We retrospectively reviewed data from 53 patients who underwent both EUS and APCT before a laparoscopic wedge resection for gastric SET from January 2010 to December 2017 at a single institution. Based on their histopathology results, we assessed the diagnostic ability of both tests.

Results: The overall accuracy of EUS and APCT was 64.2% and 50.9%, respectively. In particular, the accuracy of EUS and APCT for the diagnosis of gastrointestinal stromal tumors (GISTs), leiomyoma, and ectopic pancreas was 83.9% vs. 74.2%, 37.5% vs. 0.0%, and 57.1% vs. 14.3%, respectively. Most of the incorrect diagnoses using EUS occurred with hypoechoic lesions originating in the fourth echolayer, with the most common misdiagnoses being GISTs mistaken for leiomyoma and vice versa.

Conclusions: APCT exhibited a lower overall accuracy than did EUS, but it remains a useful modality for malignant/malignant potential gastric SETs.

Keywords: Subepithelial tumor, Diagnosis, Endoscopic ultrasonography, Abdominopelvic computed tomography

Histopathology results	Accuracy of EUS, n/total (%)	Accuracy of APCT, n/total (%)	P value
Overall gastric SETs	34/53 (64.2)	27/53 (50.9)	0.238
Malignant/Malignant potential			0.762
GIST	26/31 (83.9)	23/31 (74.2)	
Lymphoma	0/1 (0.0)	1/1 (100.0)	
Benign			0.160
Leiomyoma	3/8 (37.5)	0/8 (0.0)	
Ectopic pancreas	4/7 (57.1)	1/7 (14.3)	
Schwannoma	0/3 (0.0)	0/3 (0.0)	
Lipoma	0/1 (0.0)	1/1 (100.0)	
Gastric duplication cyst	1/1 (100.0)	1/1 (100.0)	
Adenomyoma	0/1 (0.0)	0/1 (0.0)	

SET, subepithelial tumor; EUS, endoscopic ultrasonography; APCT, abdominopelvic computed tomography; GIST, gastrointestinal stromal tumor

Table 1 Accuracy of EUS and APCT in the diagnosis of gastric subepithelial tumors

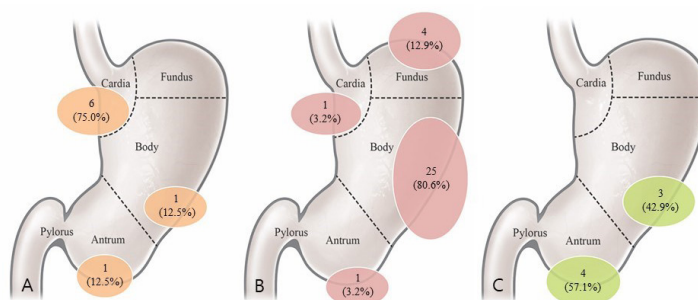


Fig. 1. Distribution of gastric subepithelial tumors (A) Leiomyoma. (B) Gastrointestinal stromal tumor. (C) Ectopic pancreas.

POT-19

EUS-Guided Gallbladder Drainage for Acute Cholecystitis after Metal Stent Placement in Malignant Biliary Strictures

Hyung-Ku Jeon and Tae-Hyeon Kim

Internal Medicine, Wonkwang University Hospital, Iksan, Korea

Background/aims: It is often difficult to manage acute cholecystitis after metal stent (MS) placement in unresectable malignant biliary strictures. The aim of this study was to evaluate the feasibility of endoscopic ultrasonography-guided gallbladder drainage (EUS-GBD) for acute cholecystitis.

Methods: The clinical outcomes of 24 patients who underwent EUS-GBD for acute cholecystitis after MS placement between January 2010 and Feb 2019 were retrospectively evaluated.

Results: The technical success and clinical effectiveness rates of EUS-GBD were 97% (23/24) and 89% (23/23), respectively. Severe bile leakage that required percutaneous treatment occurred in one case. EUS-GB stenting was performed at urgent setting in 19 patients, while 5 patients, who had undergone initial PTGBD, underwent EUS-GB stenting to remove PTGBD tube. The median procedure time was 15.5 (range 12.0-25.0) min. A late adverse event of stent occlusion not developed. Stent migration was observed in one case during follow-up (median 298.0 days, range 35.0-345.0 days).

Conclusions: EUS-GBD after MS placement may be a feasible method for treating acute cholecystitis in patients with malignant biliary strictures.

Keywords: Eus, Gallbladder, Drainage

POT-20

How Effective and Safe to Evaluate Esophageal and Gastric Cardia Mass Lesions by the Condom Method EUS is!

Yun Jae Shin, Dong Hoon Lee, Si Hyeong Lee, Tae Young Park, Soo Hyung Ryu, You Sun Kim and Jeong Seop Moon

Internal Medicine, Seoul Paik Hospital, Seoul, Korea

Background/aims: Endoscopic ultrasonography (EUS) is widely used to evaluate gastrointestinal mass lesion - particularly, its origin and depth of invasion. To overcome the disadvantages as aspiration and balloon rupture due to water filling and balloon, we used condom method EUS for esophageal and gastric cardia mass evaluation.

Methods: We investigated retrospectively thirty eight patients examined by condom method EUS using high frequency ultrasound probes after diagnosed as esophageal and gastric cardia mass lesions including submucosal tumor by standard endoscopy between January 2007 and April 2019 in Inje University Seoul Paik Hospital. We checked the originating layer, invasion depth and echogenicity of the tumor, and events complicated by procedure. If needed, we confirmed the histopathology by biopsy.

Results: Condom method EUS provided high quality images of well-defined five layers of esophagus through 360 degrees without aeration. In all segments of esophagus; upper, middle, lower esophagus (n=7, 11, 16) and cardia (n=4) showed high resolution images without difference. Diagnosis were squamous cell cancer (n=4), leiomyoma (n=7), squamous intraepithelial neoplasia (n=2), acanthosis (n=3), inflammatory fibrinoid polyp (n=1), tubular adenoma (n=1), duplication cyst (n=1) and extrinsic compression (n=2). Tumors were originated from mucosa (n=5), muscularis mucosa (n=17), submucosa (n=4), mucosa invading into submucosa (n=5), muscle propria (n=5). Size was divided into <5.0 mm (n=7), 5.1-10 mm (n=16) and >10 mm (n=14). No complications had occurred in all cases, aspiration from water filled EUS and balloon rupture from balloon EUS.

Conclusions: Condom method EUS is already known as a safe image diagnostic tool of high resolution. Simply to apply inexpensive latex condom filled with water can provide good EUS visual field and images of the esophageal and gastric cardia mass lesions without aspiration risk.

Keywords: Eus, Condom, Esophageal, Esophagus, Cardia

POT-21

Diagnostic Utility of Endoscopic Ultrasonography-Elastography in Gastric Submucosal Tumors: A Pilot Study

Eun Ji Kim, In Kyung Yoo, Sung Pyo Hong and Joo Young Cho

Digestive Disease Center, Bundang Cha Medical Center, Cha University, Seongnam, Korea

Background/aims: The etiology of gastric submucosal tumors is assessed by endoscopic ultrasound and EUS guided fine needle aspiration. However it is often difficult to obtain specimens because of the lesion size and mobility. Therefore we investigated the potential of EUS-EG using strain ratio to differentiate among gastric SMTs.

Methods: We prospectively registered 23 patients with gastric SMT diagnosed by esophagogastroduodenoscopy in Bundang Cha Medical Center between April 2018 and October 2018. The patients underwent EUS-EG and were assessed the strain ratio. Elastic scores of gastric SMT were compared to the histological diagnosis.

Results: Of the 23 patients with a confirmed diagnosis. With regard to the strain ratios, leiomyomas showed relatively low value ranging from 2.0 to 16.4. On the other hand, GIST and schwannoma showed higher strain ratio, 52.3 and 62.0, respectively. Among SMTs which were suspicious for Leiomyoma or GIST, higher strain ratio favored for GIST rather than leiomyoma.

Conclusions: Quantitative EUS-EG is a supplementary diagnostic method for identifying gastric SMT, in differentiating between leiomyoma and GIST. However, further studies with large sample size and inclusion of other subtypes of SMTs are necessary to set up the cut-off value of strain ratio in differential diagnosis of gastric SMTs.

Keywords: Endoscopic ultrasonography-elastography, Gastric submucosal tumors, Gastrointestinal stromal tumor, Leiomyoma

Table 1. Characteristic of patients

	Age	Sex	Location of SMT	Size (cm)	Pathology
1	75	M	angle	2.4	Lipoma
2	60	M	antrum	2.5	Lipoma
3	59	F	cardia	1.0	Leiomyoma
4	31	F	cardia	0.7	Leiomyoma
5	56	M	esophagus	2.8	Leiomyoma
6	53	F	body	0.7	Leiomyoma
7	37	F	cardia	0.7	Leiomyoma
8	51	M	body	2.0	Leiomyoma
9	76	F	esophagus	0.7	Leiomyoma
10	49	M	esophagus	0.9	Leiomyoma
11	44	F	cardia	2.0	Leiomyoma
12	51	M	esophagus	3.0	Leiomyoma
13	66	F	body	1.1	Leiomyoma
14	40	F	esophagus	1.0	Leiomyoma
15	34	M	cardia	2.0	Leiomyoma
16	60	M	body	2.3	Leiomyoma
17	42	M	cardia	2.5	Leiomyoma
18	44	M	antrum	1.5	Ectopic pancreas
19	38	F	antrum	1.1	Ectopic pancreas
20	50	F	antrum	1.5	Ectopic pancreas
21	38	M	duodenal bulb	1.0	Hamartoma
22	73	M	body	2.0	GIST
23	58	F	antrum	1.5	Schwannoma

Table 2. Pathology - Strain ratio Results

Pathology	Strain ratio
Lipoma	1.1
Leiomyoma	2.0-16.4
Ectopic pancreas	1.7-11.0
Hamartoma	26.4
GIST	52.3
Schwannoma	62.0

POT-22 

Endoscopic Submucosal Dissection Using an Detachable Robotic Device in a Live Porcine Model

Se Hyun Jang, Hyuk Soon Choi, Kang Won Lee, Sang Hyun Kim, Han Jo Jeon, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Eun Sun Kim, Bora Keum, Yoon Tae Jeen, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Institute of Gastrointestinal Medical Instrument Research, Korea University College of Medicine, Seoul, Korea

Background/aims: Endoscopic submucosal dissection (ESD) is a standard treatment treatment of intramucosal gastric neoplasms. However, still only highly skilled operators can perform ESD safe. One of those reason is that there is no proper counter-traction during procedure. Recently, our research team devised revolute joint-based auxiliary transluminal endoscopic robot (REXTER). In this study, we evaluated the clinical feasibility of our REXTER in a live porcine model and identify the safety and efficacy of unskilled operator performing ESD.

Methods: We perform ESD was performed to imaginary gastric lesions in live porcine models using our robotic assistive device. REXTER can be mounted on GIF-Q260 endoscope and can be passed through overtube to porcine stomach, making it possible for clinical use. We devided two groups, conducted by experts and novice. We measured the time required to complete the ESD and complications involving perforation and significant bleeding in each group.

Results: Total 16 cases of ESD were done. 6 cases were conducted by experienced endoscopist and 10 cases by unskilled endoscopist. Procedure time between operator groups was similar. There was no significant time difference between operator group. There was no incidence of perforation and significant bleeding.

Conclusions: Our endoscopic assistive robot showed feasibility and its safety. Our robotic device could be helpful, especially in unskilled endoscopicst.

Keywords: Endoscopic submucosal dissection, Robot, Notes

POT-23

Clinical Characteristics and Outcomes of Poem in Achalasia with Normal IRP Patients

Jongwoo Kim, Joo Young Cho and In Kyung Yoo

Digestive Disease Center, Cha Bundang Medical Center, Seongnam, Korea

Background/aims: Integrated relaxation pressure (IRP) is an important diagnostic criteria to define the achalasia. However, there are some cases with typical symptoms and signs of achalasia with normal IRP. The aim of this study was to evaluate the clinical characteristics and outcomes after peroral endoscopic myotomy (POEM) in patients with achalasia of normal IRP.

Methods: The cases of achalasia were collected that was performed POEM from November 2014 to April 2018 at CHA Bundang Medical Center. Achalasia with normal IRP was defined by Eckardt score, EGD, high-resolution manometry (HRM) and endoluminal functional lumen imaging probe (EndoFlip®), and timed esophagogram.

Results: POEM was done in 129 patients with achalasia and among them, 31 patients were achalasia with normal IRP. Achalasia patients with normal IRP were older, had longer symptom duration, and more tortuous esophagus. In EndoFlip, distensibility index (DI) and cross-sectional areas (CSA) were higher in patients with normal IRP. Therapeutic outcomes showed no statically significant differences. With correlation analysis, IRP and age, disease duration, or DI had negative correlation with statistical significance.

Conclusions: Achalasia patients with normal IRP was older, had longer disease duration and higher DI and CSA than patients with elevated IRP. In two groups, therapeutic outcomes were not different.

Keywords: Achalasia, Irp, Peroral endoscopic myotomy

POT-24

Peroral Endoscopic Myotomy Versus Pneumatic Balloon Dilatation for Achalasia Treatment: A Multicenter Comparative Study

Weonjin Ko¹, Jin Seok Jang², Joo Young Cho³, Hyung Gil Kim¹, In Kyung Yoo³, Seong Hwan Kim⁴, Young Kwan Jo⁴, Hee Seok Moon⁵, Sung Eun Kim⁶ and Su Jin Kim⁷

¹Department of Internal Medicine, Inha University, Incheon, Korea, ²Department of Internal Medicine, Dong-A University, Busan, Korea, ³Department of Internal Medicine, Cha University, Seongnam, Korea, ⁴Department of Internal Medicine, Eulji University, Seoul, Korea, ⁵Department of Internal Medicine, Chungnam National University, Daejeon, Korea, ⁶Department of Internal Medicine, Kosin University, Busan, Korea, ⁷ Department of Internal Medicine, Pusan National University, Pusan, Korea

Background/aims: Peroral endoscopic myotomy (POEM) has recently garnered attention in achalasia treatment. However, there is no long-term comparative study focusing on conventional therapy. We retrospectively compared the efficacy and safety of POEM with that of pneumatic balloon dilatation (PBD).

Methods: Hospital data of patients with achalasia who underwent PBD or POEM from 2005 to 2016 were retrospectively collected. All patients who underwent POEM or PBD at least 2 years previously were included. The primary outcome was the clinical success rate based on the Eckardt score and defined as the Eckardt score decreasing to <3 points. The secondary outcomes included lower esophageal sphincter (LES) pressure and complications. The short-term and long-term outcomes were based on the 6- and 24-month evaluations after the procedure, respectively.

Results: In total, 69 patients who underwent POEM and 52 patients who underwent PBD were enrolled in the study. Both groups did not differ in terms of sex and age, but the POEM group had more patients with type I achalasia. The POEM group had a higher symptom score before the procedure, but there was no difference in LES pressure between the two groups. There were no reports of serious side effects in both groups. At 6 months follow-up, both groups showed improvement of symptoms, with a significant decrease in LES pressure. The 2-year long-term follow-up results showed a significantly better clinical success rate in the POEM group than in the PBD group (90.2% vs 51.7%, $p < 0.001$). The number of esophagitis cases confirmed through follow-up endoscopy was higher in the POEM group, but there was no difference in the frequency of anti-acid medication use between both groups.

Conclusions: No differences were found between POEM and PBD in terms of safety or short-term outcome; however, POEM was associated with a better long-term outcome.

Keywords: Achalasia, Pneumatic balloon dilatation, Peroral endoscopic myotomy

POT-25



Safety Profile of Sedative Endoscopy Including Minimal Hepatic Encephalopathy in Liver Cirrhosis

Jeong-Ju Yoo¹, Hyeon Jeong Goong¹, Ji Eun Moon², Sun A Moon¹, Song Ah Jeong¹, A Ri Song¹, Sang Gyune Kim¹ and Young Seok Kim¹

¹Division of Gastroenterology and Hepatology, Department of Internal Medicine, Soonchunhyang University School of Medicine Bucheon Hospital, Bucheon, ²Department of Biostatistics, Clinical Trial Center, Soonchunhyang University Bucheon Hospital, Bucheon, Korea

Background/aims: The indiscriminate use of sedative drugs during endoscopy can pose multiple risks including minimal hepatic encephalopathy (MHE) in advanced liver cirrhosis. However, the data are scarce regarding which sedative drugs are safest in these populations. The aim of this study was to evaluate the safety profiles including MHE among midazolam, propofol, and combination therapy in advanced cirrhotic patients.

Methods: This double-blind randomized controlled study included 60 consecutive advanced cirrhotic patients who underwent upper gastrointestinal endoscopy. The Stroop application was used to screen for MHE. Patients were randomly assigned to one of 3 groups, midazolam, propofol, or the combination group, and underwent Stroop test before and two hours after the completion of endoscopy. Hemodynamic safety and the subjective satisfaction score were also evaluated.

Results: Patients did not show significant changes in on-time or off-time on the Stroop test before and two hours after sedatives, and there was no significant difference among the 3 treatment groups. Also, there were no significant vital sign changes after sedatives. Time-to-recovery was longest in midazolam group, and patient awakening and patient memory were highest in propofol group. However, all 3 groups showed no difference in patient satisfaction, but the combination group was more preferred in terms of subjective satisfaction by physicians. Factors affecting worsened Stroop speed after sedatives were older age, low education level and high MELD score.

Conclusions: All sedative methods using midazolam, propofol, or combination therapy showed similar safety profile in advanced cirrhosis, and were not associated with increased risk of MHE.

Keywords: Safety, Sedation, Minimal hepatic encephalopathy, Cirrhosis, Stroop

POT-26

Clinical Practice and Guidelines for Management of Antithrombotics before and after Endoscopy: A National Survey Study

Seong Woo Jeon¹, Su Jin Hong², Soo Teik Lee³, Hyungkil Kim⁴ and Hoon Jai Chun⁵

¹Internal Medicine, School of Medicine, Kyungpook National University, Daegu, Korea, ²Internal Medicine, Soonchunhyang University College of Medicine, Bucheon, Korea, ³Internal Medicine, Chonbuk National University Hospital, Jeonju, Korea, ⁴Internal Medicine, Inha University Hospital, Incheon, Korea, ⁵Internal Medicine, Institute of Gastrointestinal Medical Instrument Research, Korea University College of Medicine, Seoul, Korea

Background/aims: The proper handling of antithrombotics is critical and this study aimed to assess adherence to guidelines in the management of antithrombotics before and after endoscopy.

Methods: A survey questionnaire was developed. Respondents' demographic information was included, and the questionnaire was divided into one section for forceps biopsy, a second for polypectomy, and a third for endoscopic submucosal dissection (ESD) in which aspirin, clopidogrel, combination therapy (aspirin and clopidogrel), warfarin, and direct oral anticoagulants (apixaban) were prescribed to imaginary patients.

Results: A total of 415 endoscopists completed this survey (response rate 6.2%, 415/6673). Proceeding with biopsy for patients taking aspirin, clopidogrel, combination therapy, warfarin, or apixaban was chosen by 89.4%, 74.2%, 61.0%, 38.6%, and 50.4% of respondents, respectively. Most respondents answered to discontinue aspirin, clopidogrel, or both drugs for 5 days before polypectomy or ESD (69.4/76.9%, 83.6/83.9%, and 53.3/65.8%, respectively). Answers indicated that warfarin should be discontinued with heparin bridge therapy in high thromboembolic risk patients (polypectomy 70.1%, ESD 73.5%). Regarding apixaban use in polypectomy and ESD, 63.9% and 58.1% of respondents chose the correct answer.

Conclusions: The gap between the guidelines and clinical practice in the management of antithrombotics before and after endoscopy is considerable.

Keywords: Endoscopy, Guideline adherence, Antithrombotic agent

POT-27

Benefits of Capnographic Monitoring during ESD Procedures

Sang Hoon Kim, Bora Keum, Kang Won Lee, Sanghyun Kim, Han Jo Jeon, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Hong Sik Lee, Yoon Tae Jeon, Hoon Jai Chun and Chang Duck Kim

Division of Gastroenterology and Hepatology, Korea University College of Medicine, Seoul, Korea

Background/aims: Endoscopic submucosal dissection (ESD) requires deeper sedation than mucosal resection. This may lead to adverse ventilation problems. Capnography measures end-tidal CO₂ (EtCO₂) and it is known to detect depressed respiratory activity prior to hypoxic events. However, its usefulness during endoscopy has been disputed. Since absolute EtCO₂ value monitoring during endoscopy is not as effective as monitoring during general anesthesia due to frequent belching and body movements, we introduced a concept of 'EtCO₂ instability', and studied whether it can predict a higher chance of hypoxia. We also evaluated the efficacy of nasal high flow oxygenation (NHFO) therapy for hypoxic patients during ESD.

Methods: Between January 2017 and June 2018, 98 patients scheduled to ESD were enrolled. All patients received capnographic monitoring in addition to conventional monitoring. EtCO₂ was recorded every 1 minute. Sedation Index was assessed by M/OAAS score, tachypnea and spontaneous body movements. Patients were later grouped into 'Normal' and 'Hypoxia' groups according to intra-procedural presence of hypoxia and their demographic, procedural characteristics were comparatively analyzed. The efficacy of NHFO was analyzed by independent t-test with non-NHFO group.

Results: By multivariate logistic regression, we found several factors that influenced the incidence of hypoxic events, and EtCO₂ instability (OR 2.427, P-value 0.001) was among them. Hypoxia and EtCO₂ instability have been shown to share same causal factors such as high Mallampati score, intra-procedural oral respiration and lower baseline SpO₂.

Conclusions: EtCO₂ instability is related to incidence of hypoxic events during ESD. Therefore, monitoring EtCO₂ is helpful since increased instability of EtCO₂ on the monitor may indicate a potential hypoxic event, so that clinicians can respond more promptly. Nasal high-flow oxygenation is a safe and effective tool diminishing needs for awakening the patient or withholding propofol administration during ESD.

Keywords: Capnography, Etco₂ instability, Nasal high flow oxygenation, ESD

POT-28

Balanced Propofol Sedation with Midazolam during Endoscopy Could Worsen Hepatic Encephalopathy in Cirrhotic Patients

Joon Ho Jeong, Kwang Il Seo, Byung Cheol Yun, Sang Uk Lee, Byung Hoon Han, Eun Taek Park and Jin Wook Lee

Internal Medicine, Kosin University College of Medicine, Busan, Korea

Background/aims: There would be a risk of exacerbating hepatic encephalopathy (HE) in patients with liver cirrhosis after sedative endoscopy. The aim of this study is to find a sedation strategy during endoscopy, which can induce sufficient sedation and minimize worsening of HE after the procedure in cirrhotic patients.

Methods: Forty six patients with liver cirrhosis with or without compensation (whose MELD score was 8.85 ± 7.15) 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 $53.78 (\pm 9.84)$, the mean BMI was $24.21 \pm (5.03)$. 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 9 of midazolam only, respectively. The mean of MELD score in each group was $9.00 (\pm 7.15)$, $8.88 (\pm 8.48)$ and $8.44 (\pm 4.98)$ ($p=0.856$). In addition, there was no differences between groups regarding age, sex, BMI, and serum albumin ($p=0.098$, 0.484 , 0.626 and 0.783). In the patients who were administered propofol only, the mean time of NCT before and two hours after endoscopy were $52.28 (\pm 35.95)$ (seconds) and $48.51 (\pm 21.76)$ ($p=0.970$); in the patients who were given propofol with midazolam, the mean time of NCT before and two hours after endoscopy were $41.99 (\pm 15.75)$ and $51.42 (\pm 12.17)$ ($p=0.005$); in the patients with midazolam only, the mean time of NCT before and two hours after endoscopy were $57.27 (\pm 23.96)$ and $67.56 (\pm 37.81)$, respectively.

Conclusions: Moderate sedation during endoscopy with a combination of propofol and midazolam could exacerbate hepatic encephalopathy in patients with liver cirrhosis.

Keywords: Sedative endoscopy, Hepatic encephalopathy, Liver cirrhosis, Balanced propofol sedation

POT-29



Prediction of Hypoxemia during Endoscopic Retrograde Cholangiopancreatography with Anesthesiologist-Assisted Sedation

Huapyong Kang¹, Minju Lee², Eun Hwa Kim³, Kwang Jun Kim⁴, Hee Seung Lee⁵, Jeong Youp Park⁵, Seungmin Bang⁵, Seung Woo Park⁵, Si Young Song⁵, Bora Lee⁶ and Moon Jae Chung⁵

¹Division of Gastroenterology, Department of Internal Medicine, Eulji University Hospital, Eulji University College of Medicine, Daejeon, Korea, ²Medical Research Supporting Section, Yonsei University College of Medicine, Seoul, Korea, ³Biostatistics Collaboration Unit, Department of Biomedical Systems Informatics, Yonsei University College of Medicine, Seoul, Korea, ⁴Division of Geriatrics, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Korea, ⁵Division of Gastroenterology, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Korea, ⁶Department of Anesthesiology and Pain Medicine, Yonsei University College of Medicine, Seoul, Korea

Background/aims: While anesthesiologist-administered sedation can provide safer circumstance during endoscopic retrograde cholangiopancreatography (ERCP), sedation-related hypoxemia is still one of the major concerns of patient safety. However, there is no risk prediction model for hypoxemia during ERCP with anesthesiologist-administered sedation. The aim of this study was to evaluate pre-ERCP patient's and procedural factors for hypoxemia risk during ERCP under anesthesiologist-administered sedation.

Methods: We retrospectively identified 6114 cases of ERCP under anesthesiologist-administered sedation conducted in Severance Hospital (Korea) between May 2012 and September 2017. Pre-procedure characteristics data were collected. The population was randomly divided into the training (n=4280) and the validation (n=1834) sets at a ratio of 7:3, with same rates of patients with American Society of Anesthesiologists classification (ASA) ≥ 3 in both sets. Using logistic regression model in training set, we established hypoxemia (SpO₂<90%) risk prediction model, which was depicted in nomogram. We calculated the area under curve (AUC) for performance evaluation, and calibrated the model using calibration plots in both sets.

Results: We found eight statistically significant variables predicting risk of hypoxemia including age ≥ 74 , higher ASA, snoring during sleep, body mass index ≥ 25 , bile duct stone as indication for ERCP, pre-ERCP administration of inotropics, same-session sedation endoscopy before ERCP, and estimated glomerular filtration rate <30. AUCs to predict risk were 0.764 in the training set, and 0.693 in the validation set with these eight factors. Predicted risk was well-calibrated in calibration plot.

Conclusions: We established an easily-applicable, acceptably-accurate nomogram for predicting risk of hypoxemia during ERCP with anesthesiologist-administered sedation. This model can help endoscopists and anesthesiologists to prevent hypoxemia. Further larger-scale study for validation of this model is needed.

Keywords: Ercp, Anesthesiologist, Sedation, Hypoxemia, Prediction model

POT-30

Safety of Carbon Dioxide Insufflations during Endoscopic Submucosal Dissection for Gastric Epithelial Neoplasm

Shinhee Kim and Sujin Hong

Internal Medicine, Soonchunhyang University School of Medicine, Bucheon, Korea

Background/aims: Gastric endoscopic submucosal dissection (ESD) is time consuming procedure and patient complaint abdominal pain due to air accumulation during ESD. CO₂ insufflation can reduce abdominal pain after endoscopic procedure. The aim of this prospective, randomized, double-blinded and controlled trial is to assess safety of CO₂ insufflation via comparing end-tidal CO₂ (Et CO₂) level before and after procedure.

Methods: Between January 2016 and May 2017, a total of 74 consecutive patients were finally randomly assigned to CO₂ insufflation (CO₂ group, n=37) or air insufflation (Air group, n=37). Primary outcome was difference of Et CO₂ level before ESD and after endoscopic procedure between both groups. Secondary outcome measurements were hospital stay, abdominal pain, extent of residual gas in the digestive tract at 1 hour after ESD and one day after ESD, amount of sedatives prescribed, and use of analgesics.

Results: There are no differences between the groups about baseline characteristics and the mean procedure time. The EtCO₂ level was 36.62±2.29 in CO₂ group versus 36.32±2.35 in air group before ESD (p=.548), and 36.95±1.78 days in CO₂ group versus 36.59±2.06 days in air group after end of the endoscopy (p=.435). Hospital stay was 4.92±0.547 in CO₂ group and 5.46±1.406 in air group (p=.034). The rate of VAS score becoming to '0' at 24 hours after procedure was 56.8% in CO₂ group and 21.6% in air group (p=.002). Extent of residual gas in the digestive tract comparing between one hour after ESD and one day after ESD was more improved in CO₂ group (CO₂ group, 75.7% versus air group, 45.9%; p=.009). The air group required more analgesics than did the CO₂ group (CO₂ group, 35.1% versus air group, 67.6%; p=.005).

Conclusions: CO₂ insufflation during gastric ESD is as safe as air insufflation in aspect of CO₂ accumulation and significantly reduced hospital stay, abdominal pain and analgesic usage compared with air insufflation.

Keywords: Endoscopic mucosal resection, Early gastric cancer, Carbon dioxide, Safety

POT-31

Endoscopic Management of Iatrogenic Gastrointestinal Defects with the Over-The-Scope Clip System: A Systematic Review

Xiaowei Tang

Department of Gastroenterology, Affiliated Hospital of Southwest Medical University, Luzhou, China

Background/aims: Recently, a novel endoscopic device, called over-the-scope-clip system (OTSC) have been reported to be effective for gastrointestinal (GI) defects. So we aimed to conducted an updated systematic review to evaluate the clinical safety and efficacy of the OTSC system for management of iatrogenic GI defects.

Methods: Studies published in PubMed, Embase and Cochrane library from January 2006 to June 2018 were searched using the following terms, "defect OR perforation" AND "OTSC OR over the scope clip". The literature was selected independently by two reviewers according to inclusion and exclusion criteria. The statistical analysis was carried out using Comprehensive Meta Analysis software version 3.0.

Results: A total of 12 studies including 191 patients with iatrogenic GI defects were identified. All the studies were published in the Europe (n=7) and the United States (n=5). The major causes for iatrogenic GI defects were endoscopic submucosal dissection (n=79) and endoscopic mucosal resection (n=31). Pooled technical success was achieved in 182 patients (89.1%; 95% confidence interval (CI), 81.6%-93.8%), and the pooled clinical success was achieved in 170 patients (85.2%; 95% CI, 71.9%-92.8%). 2 patients (1%) occurred complications after OTSC system procedure.

Conclusions: Our study revealed that endoscopic closure of iatrogenic GI defects by OTSC system was a safe and effective approach. Further randomized controlled trials with large sample are warranted to compare OTSC system to others treatment modalities in future.

Keywords: Iatrogenic gastrointestinal defects, Over-the-scope clip system, Systematic review, Clinical outcomes

POT-32 

Comparative Study of Peroral Endoscopic Shorter Versus Longer Myotomy for the Treatment of Achalasia

Xiaowei Tang

Department of Gastroenterology, Affiliated Hospital of Southwest Medical University, Luzhou, China

Background/aims: We aimed to compare clinical efficacy and safety between peroral endoscopic shorter and longer myotomy for treating achalasia.

Methods: Between July 2011 and September 2017, 38 patients underwent peroral endoscopic shorter myotomy (myotomy length ≤ 7 cm) in our department (Figure 1). These patients were matched by age, gender, symptoms duration, Eckardt score and others with 59 patients who underwent longer myotomy (myotomy length > 7 cm). Procedure-related parameters, manometry outcomes and complications were compared between the two groups.

Results: There was no significant differences in baseline characteristics between the two groups. Mean myotomy length was 6.1 ± 0.5 cm in shorter myotomy group, and 11.7 ± 2.4 cm in longer myotomy group ($P=0.000$). The mean operation time was significantly less in shorter myotomy group than longer myotomy group (44.2 ± 16.3 min vs. 68.5 ± 23.2 min, $P < 0.01$). During a median follow-up period of 24 months (range 7-38.2 months), treatment success (Eckardt score ≤ 3) was achieved in 92.1% (35/38) of patients in shorter myotomy group and 91.5% (54/59) in longer myotomy group ($P > 0.01$). There was also no statistical difference in the incidence of intraoperative complications (7.4% vs. 9.2%, $P 0.01$) and GERD (17.2% vs. 18.5%, $P > 0.01$) between two groups.

Conclusions: POEM was effective and safe for treating achalasia, and shorter myotomy is comparable with longer myotomy for treating achalasia regarding to long-term clinical efficacy and safety, and have the advantage of shorter procedure time.

Keywords: Peroral endoscopic myotomy, Shorter myotomy, Achalasia, Comparative study, Clinical outcomes

POT-33



A Study on CLE in Comparison with Histopathology in Polypoidal Lesions of Gi Tract: A Prospective Single Centre Study

Parvez Ahmed Shah¹, Bhavik Shah¹, Vijay Rai¹, Enam Khan² and Mahesh Kumar Goenka¹

¹Gastrosciences and Liver, Apollo Gleneagles Hospitals, Kolkata, ²Pathology, Apollo Gleneagles Hospitals, Kolkata, India

Background/aims: CLE (confocal laser endomicroscopy) has a potential to make optical diagnosis of neoplastic polypoidal lesions and may replace traditional histology in the proposed “diagnose and discard approach.” Present study was planned to assess the accuracy of probe based CLE in predicting histology of polypoidal lesions of gastrointestinal (GI) tract in vivo before their removal.

Methods: In this prospective single centre study, patients with upper and/or lower GI polypoidal lesions were enrolled. After detection of polypoidal lesions with white light endoscopy, probe based CLE examination was done. Real time and off-line presumptive CLE diagnosis of polypoidal lesions was made as per Miami classification and was compared with histopathology as the gold standard.

Results: A total of 50 GI polyps from 50 patients (28 males) were assessed. The mean (\pm SD) size of polyps was 13.74 (\pm 8.47) mm while the median size was 10 mm. Most polyps were located at the cecum (24.0%) or stomach (24.0%). On histological examination hyperplastic polyp, adenomatous polyp, adenocarcinoma, and lipoma were seen in 54%, 26%, 18% and 2% of patients, respectively. On comparison of real time CLE examination with histopathology, 40 (83.3%) patients had concordant results and 8 patients (16.7%) had discordant results. Two polyps were inconclusively diagnosed on CLE. On offline examination, concordance with histopathology was observed in 85.4% (n=41) of polyps which was marginally better than online examination, though the difference was not statistically significant (p=0.45). On comparing the real time and offline findings of CLE, concordance was found in 91.7% of the cases. Accuracy, sensitivity, specificity, PPV and NPV on real time evaluation was 83.3%, 87.5%, 79.1%, 80.7% and 86.3% respectively.

Conclusions: CLE is a useful tool for prediction of histology to assess the polypoidal lesions of GI tract and it may avoid polypectomy at least in the some patients.

Keywords: Gastrointestinal polyps, Confocal laser endomicroscopy, Histopathology

POT-34

Outcome of Kumc Intra gastric Balloon Placement

Se Hyun Jang, Hoon Jai Chun, Sang Hyun Kim, Kang Won Lee, Han Jo Jeon, Sang Hoon Kim, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee and Chang Duck Kim

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Institute of Gastrointestinal Medical Instrument Research, Korea University College of Medicine, Seoul, Korea

Background/aims: Endoscopic bariatric therapy is an attractive treatment modalities for obesity. Particularly, intragastric balloon was proven to induce a significant weight reduction in obese patients. Regardless of many improvements in the material and design of intragastric balloon devices, there still remains a need for improved device which is safer, more convenient, and less expensive than before. In the current study, we evaluated long term safety and outcome of KUMC intragastric balloon.

Methods: We used a newly developed KUMC intragstric balloon for this study. The intragastric balloon was supplied as delicately rolled up inside a thin silicon sheath and mounted by surrounding the endoscope. Endoscopic intragastric balloon placement and positioning was simply performed with direct vision. 5 pigs were submitted to the KUMC intragastric balloon placement. We evaluated safety and effect of the KUMC intragastric balloon for 3 months.

Results: In all cases, the KUMC intragastric balloons were successfully placed under usual sedation of diagnostic endoscopy. The procedures were simple and fast. During follow-up, no serious damage, such as ulceration or bleeding, was found. Significant weight differences were found between intragastric balloon group and control group.

Conclusions: This study presented that the procedure with the KUMC intragatric balloon attain clinical efficacy during the maintenance period without severe adverse events.

Keywords: Bariatric, Intra gastric balloon

POT-35

Feasibility and Effectiveness of Irreversible Electroporation Applied by Endoscopic Catheters on Gastrointestinal Tract

Han Jo Jeon, Hyuk Soon Choi, Kang Won Lee, Sang Hyun Kim, Sang Hoon Kim, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Division of Gastroenterology and Hepatology, Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/aims: Irreversible Electroporation (IRE) is an ablation technique that induces apoptosis by applying an electric field. IRE has several advantages over other ablation techniques. Recently, ablation therapy studies have been performed on Barrett's esophagus and gastrointestinal tumors, and they are becoming popular as next ablation therapy in various cancers. The purpose of this study was to investigate the possibility of applying IRE therapy to gastrointestinal tract using newly designed endoscopic ablative catheters.

Methods: After a pig was anesthetized, the esophagogastroduodenoscope was approached into the stomach of the pig. We inserted the IRE catheters into the channel of the endoscope. Then the DC generator was connected to the IRE catheter and applied electrical stimulation to the target of duodenum, stomach, and esophagus. The conditions of electrical stimulation are as follows; amplitude ranged from 500 V to 2000 V, pulse number ranged from 20 to 60, pulse duration was 100 us, pulse length was 100 ms. Pigs were sacrificed after 24 hours later and ablated tissues were analyzed by H & E staining and TUNEL assay.

Results: Result from H & E staining, there was no damage at 500 V in all the organs. On the contrary, erosion and necrosis occurred in mucosa at 1000 V, and inflammation occurred in submucosa at 1500 V in both stomach and duodenum. At 2000 V, extensive hemorrhage and inflammation occurred in the submucosa. However, submucosal inflammation was also developed in pulse number 80. In the esophagus, epithelial separation occurred at 1000 V and epithelial erosion occurred at 1500 V. It was the 2000 V that inflammation of submucosa occurred. Secondly, TUNEL assay was used to confirm apoptosis, and as the voltage and pulse became larger, the area in which apoptosis was induced was wider.

Conclusions: Tissue apoptosis was successfully induced by using the IRE catheter. Our newly designed IRE catheters showed feasibility and effectiveness on GI tract.

Keywords: Irreversible electroporation, Endoscopic catheter, Upper gi tract, Apoptosis, TUNEL assay

POT-36

Early Experience of Endoscopic Intra-gastric Balloon Treatment for Obesity

Tungalag Byambadorj¹

¹Endoscopic, Intermed, Ulaanbaatar, ²Internal Medicine, Intermed, Ulaanbaatar, Mongolia

Background/aims: Obesity is complex metabolic disease that is associated with several comorbid disease. Current therapeutic approaches for obesity are lifestyle changes, pharmacologic, endoscopic treatment and bariatric surgery. Therefore obesity is common problems seen by the Gastroenterologist and Nutritionist, there is no golden standard technique in Mongolia. However intra-gastric balloon treatment has been changed over the last few years.

Methods: Here we present a 25 patients who underwent endoscopic intra-gastric balloon treatment. This retrospective study was performed in Endoscopic Center, Intermed Hospital of Mongolia, between 2017-2018. The clinical records of all patients reviewed.

Results: A Total of 25 IBT patients were performed over the study period. Mean body weight loss was 6.5 kg. No complication occurred during study period.

Conclusions: The role of IBT is taking increasingly important place and can be seen as an eminent technique to patients with obesity. The intra-gastric balloons offer nonsurgical, reversible weight management that has proven to be more effective than diet and lifestyle therapy. Therefore we believe that obesity patients should be treated with IBT. This is the first reported case study of this kind to our knowledge.

Keywords: lbt

POT-37

An Endoscopic Mapping Device for Gastrointestinal Slow Wave Propagation Patterns

Seung Han Kim, Hoon Jai Chun, Sanghyun Kim, Kang Won Lee, Sanghoon Kim, Han Jo Jeon, Sehyun Jang, Seong Ji Choi, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon, Hong Sik Lee and Chang Duck Kim

Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/aims: Gastric slow waves regulate peristalsis, and gastric dysrhythmias have been implicated in functional motility disorders. To accurately define slow wave patterns, it is currently necessary to collect recordings during open surgery, which is invasive and limit their application. We therefore developed a novel gastric slow wave mapping device for use during endoscopic procedures. We aimed to assess feasibility of the new device for acquisition of gastrointestinal slow wave.

Methods: The device consists of a spreading catheter constructed of a flexible core coated with Pebax. Acquisition of gastric electrical signals was performed on healthy fasted weaner pigs under general anesthesia. Once deployed with endoscopic guidewire, catheter arrays is revealed with 12 electrode at 5mm intervals. A multi-channel recorder (Acknowledge 4.4, MP150; Biopac Systems, Santa Barbara, CA) was used to record gastric myoelectrical activity throughout the study. We compared gastric electrical signals from gastric mucosal according to various lesions.

Results: Gastric slow wave activity was successfully recorded simultaneously via both the novel endoscopic probe and the serosal measurement. Recordings from the device and a reference array in pigs were identical in frequency, and activation patterns and velocities were consistent. Device and reference amplitudes were comparable.

Conclusions: In conclusion, the novel endoscopic device achieves high-quality mucosal slow wave recordings. It might be applied for endoscopic diagnostic studies to document slow wave patterns in patients with gastric motility disorders.

Keywords: Gastrointestinal slow wave, Gastric dysrhythmia, Functional motility disorder

POT-38

Durability Test of Endoscopic Successive Suturing Device: In Vitro Experiments

Kang Won Lee, Hoon Jai Chun, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee and Chang Duck Kim

Department of Internal Medicine, Korea University College of Medicine, Seoul, Korea

Background/aims: Natural orifice endoscopic surgery (NOTES) is a novel approach to perform surgical procedures using endoscope. To ensure success of NOTES, reliable suture device is essential. Our team developed an endoscopic successive suturing device (SSD). But our previous in vivo experiment, sutures were torn due to tissue rupture in a few days, and in vitro experiments torn due to disconnection of suture. In this study, we experimented loading conditions to design similar to in vivo, and under those conditions aimed to verify the durability according to the location and suture type.

Methods: The fundus and body specimens were prepared with stomach of 6-months-old porcine. Specimens were fixed on a circular bite and tested on an axial-torsion test machine. We designed our study in 2 steps. In the first experiment, we compared the results of static and cyclic loading to find in vitro conditions similar to in vivo by tensile test. The second experiment was to evaluate the durability according to the location of stomach and to suture type by applying cyclic loading.

Results: In the first experiment, with static load suture was torn in 4 of 5 cases and tissue rupture occurred in 1 case. In the second experiment, the load of max 8N for pre-loading phase, max 10N for the first phase and max 15N for the second phase at 3 rpm cycle were given. Full thickness suture to fundus, all 4 specimens entered the load phase 2, whereas full thickness sutures to body resulted in tissue rupture in the load phase 1 in all 3 cases. In partial thickness, both fundus and body underwent tissue rupture at an early phase than full thickness.

Conclusions: The durability of SSD differs according to location of stomach and suture type under cyclic load similar to in vivo condition. Full thickness suture of the fundus shows more stable durability.

Keywords: Notes, Endoscopic suture

POT-39

Preoperative Magnetic Marking Clip Makes Intraoperative Localization of Gastrointestinal Tumors Easier

Sang Hoon Kim, Yoon Tae Jeon, Kang Won Lee, Sanghyun Kim, Han Jo Jeon, Se Hyun Jang, Seong Ji Choi, Seung Han Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Hong Sik Lee, Hoon Jai Chun and Chang Duck Kim

Division of Gastroenterology and Hepatology, Korea University College of Medicine, Seoul, Korea

Background/aims: Laparoscopic surgery for gastrointestinal tumors requires fast and precise tumor localization. As tumor palpation is not possible during laparoscopic surgery, tumor identification is often difficult for some cases. Despite various methods, such as tattooing or endo-clipping, have been introduced for the localization of tumors, these methods own clear limitations. To overcome the drawbacks of these conventional marking methods, we designed a magnetic marking device linked to an endo-clip (MMC, Magnetic Marking Clip) for endoscopy. We performed preoperative endoscopic clipping with MMC and analyzed the intraoperative localization efficacy and safety during laparoscopic surgery.

Methods: Study enrolled 15 patients with gastric and colorectal neoplasms scheduled to undergo endoscopic clipping before laparoscopic surgery at the Korea University Medical Center, Korea, between August 2017 and June 2018. A silicone-coated high-power neodymium marking device (ring or rod type) was fixed together with an endo-clip and applied on the center of the lesion during preoperative endoscopy. During laparoscopic surgery, a detecting magnetic body was inserted through a laparoscopic trocar and was used to localize the tumor that is marked with MMC. The time needed for endoscopists to place MMC at the lesion, laparoscopic clip detection time and success rate were studied.

Results: Endoscopists placed MMCs within 30 seconds. It was possible to find MMC in all cases of laparoscopic surgery. Time needed to find the MMC laparoscopically was 16.5 seconds in average. It is much shorter than the time conventionally taken just with an endo-clip only. There was no reported dislodgement of the clip before the surgery or any other adverse events associated with the MMC procedure.

Conclusions: The MMC method enabled simple and fast tumor localization and showed excellent outcomes in efficacy of tumor localization. The MMC method may help surgeons localize GI tumor lesions easily and safely during laparoscopic surgery.

Keywords: Magnetic marking clip

POT-40

A Comparison of Endoluminal Bariatric Gastroplasty Method for Effective Weight Loss Using New Endoscopic Suture Device

Kang Won Lee¹, Bora Keum¹, Seung Han Kim¹, Jae Min Lee¹, Hyuk Soon Choi¹, Eun Sun Kim¹, Yoon Tae Jeen¹, Hong Sik Lee¹, Hoon Jai Chun¹, Chang Duck Kim¹, Yoonjin Kim², Byunggon Kim², Kyungnam Kim², Youngnam Song² and Daehie Hong²

¹Internal Medicine, Korea University, Seoul, Korea, ²Mechanical Engineering, Korea University, Seoul, Korea

Background/aims: Obesity is a major health problem worldwide. The primary treatment for obese patients is weight reduction, which can improve comorbidity. Procedure to reduce gastric volume has been widely used for surgical treatment of morbid obesity. Recently, it is reported that there is an effect on metabolic diseases such as diabetes. An endoscopic approach to treat obesity may be less invasive than laparoscopy or surgery. We made an endoscopic suture device with suction cap for reducing stomach volume. The objective of this study is to evaluate the feasibility and effectiveness of an endoscopic suturing procedure for weight loss in vivo.

Methods: A prototype suture device was created using needle, beads and suction cap. This novel device was used to suture wall of the fundus and body. After suturing, the thread was retracted to reduce the volume and was tied using the knotting device.

After the suture procedure, water was reinjected to check the volume of the stomach. And we performed pig studies to evaluate safety and feasibility of this method.

Results: We performed ten in vivo animal studies. Mean volume was 1873.5 ml before the experiment, but the volume reduced to 1304 ml after the end of experiment. We could confirm about 29.9% volume reduction. All of the stitches were securely sutured with full thickness. The study showed that suturing of full thickness using continuous closure device resulted in the decrease of volume. We performed 10 short term experiments in a porcine model. It is possible to reduce gastric volume in live porcine model, and pigs had been survived for 30 days before sacrifice without complication. There were no technical problems during the procedure. Endoscopic gastric reduction with our device is technically feasible on a live porcine model.

Conclusions: It is possible to achieve transoral endoscopic gastroplasty with an endoscopic continuous suture device.

Keywords: Obesity, Gastroplasty, Bariatric

POT-41

Intraprocedure Quality Indicators of Colonoscopy Performed by Fellows in Training in a Tertiary Hospital

Angela Salvana, Janus Ong and Jenis Emmanuel Camenforte

Department of Internal Medicine, Section of Gastroenterology, University of the Philippines - Philippine General Hospital, Manila, Philippines

Background/aims: To measure intraprocedural quality indicators of colonoscopy performed by fellows in training specifically the adenoma detection rate in which target of at least 25% is associated with decreased risk of interval cancer

Methods:

Study Design: Retrospective, cross-sectional, analytical.

Study Population: All adult patients age ≥ 18 years old who had colonoscopy at Philippine General Hospital - Gastrointestinal Clinic done by gastroenterology fellows in training from June 2016 to December 2017 were considered for the study.

Intervention: Colonoscopy reports were reviewed and data collected were patient's age, sex, indication, size and location of polyps. Adenoma detection rate (ADR), advanced adenoma detection rate (AADR), polyp detection rate (PDR) and cecal intubation rate (CIR) were calculated. Histologic classification of polyps were tabulated.

Statistical Analysis: Data were plotted and analyzed using Microsoft Excel 2016. Quantitative variables were described as mean and standard deviation (SD) while qualitative variables were described as frequency and percentage. Statistical significance on the presence of adenoma between gender and different age groups were calculated using chi square test. All p values less than 0.05 were considered significant.

Results: A total of 1579 colonoscopy reports were reviewed, majority were for diagnostic purposes (70.3%), followed by screening colonoscopy in 20.6% with mean age of 53.72. The most common histology of polyps removed was tubular adenoma present in 45.8% most often located distally. The overall polyp detection rate, cecal intubation rate, adenoma detection rate, advanced adenoma detection rate were 35.15%, 94.90%, 20%, and 6.27%, respectively.

Conclusions: The target ADR of colonoscopies performed by gastroenterology fellows in training in the University of the Philippines- Philippine General Hospital was not achieved. Measures to improve ADR among fellows in training should be sought.

Keywords: Adenoma detection rate, Fellows in training

POT-42

DIY Non-Biologic ERCP Model

Marjorie Antonette Cardenas Fragante and Evan Ong

Section of Gastroenterology, Metropolitan Medical Center, Sta Cruz, Manila, Philippines

Background/aims: The usual curriculum for teaching advanced endoscopy such as ERCP requires performance of the procedure in real patients to achieve expertise. The inherent risks and required technical skills contribute to the very steep learning curve. Simulators or endoscopic models are important tools in safe acquisition of skills. However, ex-vivo and live animal models are messy while computer-based simulators are expensive. This experiment aims to produce a low-cost, and reproducible model for acquisition of ERCP basic skills.

Methods: This simple ERCP model which can be used in early training for ERCP is made of polyvinyl chloride (PVC) tube which serves to hold the synthetic elements and will serve as the stomach and duodenal sweep. The papilla is made of feeding bottle nipple drilled into the PVC tube. The biliary ducts were comprised of different plastic tubes.

Results: The constructed ERCP model was used for practice in cannulation, wire exchange, stenting, stone extraction, balloon dilatation, and lithotripsy.

Conclusions: The DIY non-biologic ERCP model can be utilized by the trainee endoscopists and assists for honing skills and in familiarization on ERCP equipment and accessories. The real feel of the endoscopist doing the ERCP cannot be simulated in this model hence still subject for improvement.

Keywords: ERCP training, Ercp model, Experimental

POT-43

Upper Gastrointestinal Tract Involvement in Pediatric Crohn's Disease: A Single-Center Experience

Hyun Jin Kim¹ and Kyung Mo Kim²

¹Pediatrics, Chungnam National University Hospital, Daejeon, Korea, ²Pediatrics, Asan Medical Center Children's Hospital, Seoul, Korea

Background/aims: Crohn's disease (CD) may involve any part of the intestine, but the prevalence of upper gastrointestinal (UGI) lesions has greatly varied. This aim of this study was to evaluate the prevalence and associated factors of UGI involvement in pediatric CD.

Methods: We retrospectively analyzed 586 patients who were younger than 18 years of age at CD diagnosis between 1987 and 2013. They were classified according to the Paris classification. The frequency of UGI involvement and associations between risk factors and presence of UGI involvement were evaluated.

Results: Of 586 patients, 152 (25.9%) presented with UGI involvement at the time of diagnosis. The male-to-female ratio was 2.5:1. The median age at CD diagnosis was younger (14.3% vs. 15.0%, $p < 0.001$) in patients with UGI involvement. Isolated UGI involvement was seen in only 10 (1.7%) patients. Patients with UGI involvement were more likely to have growth failure (19.7% vs. 8.3%, $p < 0.001$) and complicated behavior (19.7 vs. 7.8, $p < 0.001$). In multivariate analysis, growth failure (HR: 2.44, CI: 1.42-4.16, $p=0.001$) and complicated behavior (HR: 2.60, CI: 1.51-4.47, $p=0.001$) were significant associated factors of UGI involvement.

Conclusions: UGI involvement was relatively common, although isolated UGI involvement was rare. Growth failure and complicated behavior at diagnosis were identified as the main predictive factors for such involvement at CD diagnosis.

Keywords: Pediatric, Crohn's disease, Upper gastrointestinal

POT-44

The Features of Upper Gastrointestinal Tract in Children with Choledochal Malformation

Makhmud Aliev², Rustam Yuldashev¹, Gulnora Adilova¹, Akmaljon Akhmadjonov²,
Shoilkhom Shakhaydarov¹ and Dilnoza Tursunova¹

¹Pediatric Surgery, Republican Specialized Scientific Practicalmedical Center of Pediatrics, Tashkent, ²Pediatric Surgery, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

Background/aims: To study the features of upper gastrointestinal tract in children with various types of choledochal malformations.

Methods: Thirteen children with various types of choledochal malformation included in this study. We analyzed results of pre- and postoperative upper gastrointestinal (UGI) endoscopy, abdominal US and MRI cholangiography. We used Todani classification (1977) to determine type of choledochal malformation (CM).

Results: According to abdominal US and MRI most children (n=6) had cystic dilatation of extrahepatic bile ducts (type I of CM), 4 had multiple cystic dilatation of the intrahepatic and extrahepatic bile ducts (type IVa), and three had Caroli syndrome (association of cystic dilatation of intrahepatic bile ducts - type V and associated liver fibrosis). Those patients with Caroli's syndrome had gastroesophageal varices on UGI endoscopy, and they were related to liver fibrosis and its complication of portal hypertension. Three patients underwent hepaticoduodenostomy (HD), seven hepaticojejunostomy (HJ), and three operations of gastroesophageal disconnection. The incidence of complication following choledochal cyst incision were more common after HD. According to upper GI endoscopy after HD bile reflux gastritis was observed in 67% of cases. Following HJ this late complication observed only in one patient (14.3%). None of the patients with Caroli syndrome has recurrent gastroesophageal bleeding episode.

Conclusions: Hepaticoduodenostomy has advantages of relative simplicity, shorter operative times, reduced adhesive obstructions and the potential physiologic superiority of bile drainage into the duodenum but may counter balance the bile reflux gastritis handicap.

Keywords: Choledochal cyst, Hepaticoduodenostomy, Hepaticojejunostomy, Bile reflux, Caroli's syndrome

POT-45

Portal Hypertensive Bile Reflux Gastroesophagopathy in Children with Extrahepatic Portal Vein Obstruction

Makhmud Aliev¹, Rustam Yuldashev², Emin Musaev³ and Shoilkhom Shakhaydarov²

¹Pediatric Surgery, Tashkent Pediatric Medical Institute, Tashkent, ²Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Tashkent, ³Pediatric Surgery, Tashkent Regional Pediatric Multifield Hospital, Tashkent Region, Uzbekistan

Background/aims: To define the role of portal hypertensive cholangiopathy in the development of bleeding from esophago gastric varices.

Methods: 95 children with extrahepatic portal vein obstruction aged from 1 year to 18 years included in this study. All the patients underwent routine clinical and biochemical studies, upper gastrointestinal (GI) endoscopy, abdominal Doppler ultrasound (US), multislice computed tomography. According to upper GI endoscopic findings patients were divided into two groups: first group without bile reflux esophagitis 81 (85%) and second group - 14 (15%) children with bile reflux esophagitis and gastritis.

Results: On upper GI endoscopy all children had mild to severe varices of esophagus. All children from second group had muddy bile in the lumen of the esophagus and stomach, with erosive esophagitis in distal part and gastritis of varying severity. Variceal hemorrhage occurred most commonly from the distal esophagus in second group. Second group also had moderate increased levels of alkaline phosphatase - 262,33 U/l ($p < 0,01$), while gammaglutamyl transferase levels were in normal ranges. According to Doppler US and MSCT angiography all patients except signs of extrahepatic portal hypertension revealed signs of portal hypertensive biliopathy, such as thickening of gallbladder wall, dilatation of common bile duct, varices in gallbladder wall. These symptoms were more pronounced in second group and most common in children above 7 years ($p < 0,01$).

Conclusions: Presence of muddy bile in the lumen of the stomach and sometimes in the esophagus is one of the signs of portal hypertensive biliopathy due to extrahepatic portal vein thrombosis. Bile reflux gastritis and esophagitis worsen the pathologic process in the mucosa, which leads to the development of erosion, thereby, increasing the risk of gastroesophageal hemorrhage.

Keywords: Portal hypertension, Biliopathy, Extrahepatic portal vein obstruction, Gallbladder varices, Bile reflux gastroesophagopathy

POT-46

Non-Invasive Assessment of Gastresophageal Varices in Children with Prehepatic Portal Hypertension

Rustam Yuldashev¹, Makhmud Aliev², Fozil Yuldosh Ogli Yuldosh², Shoilkhom Shakhaydarov¹ and Dilnoza Tursunova¹

¹Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Tashkent, ²Pediatric Surgery, Tashkent Pediatric Medical Institute, Tashkent, Uzbekistan

Background/aims: The purpose of the study was to test the feasibility of spleen stiffness measurement (SSM) by shear wave elastography (SWE) and compare data on its diagnostic use with upper gastrointestinal endoscopy in children with prehepatic portal hypertension before and after surgery.

Methods: We included 43 children in this study: 33 children with extrahepatic portal vein obstruction (EHPVO), mean age 10.93 ± 0.74 years and ten controls (mean age 7.57 ± 1.22 years) underwent SSM by SWE (Toshiba Aplio 500, Japan). All children with EHPVO underwent upper gastrointestinal endoscopy (UGIE). Assessment of the presence and severity of esophageal varices (EV) was performed according to Alvarez classification, and gastric varices (GV) by Sarin's classification. We compared data from 3 groups of patients: group A - patients with EHPVO and without large spontaneous portosystemic shunts (n=22), group B - patients with EHPVO and after surgical portosystemic shunts (n=11) and group C - normal subjects (n=10).

Results: Children in group A according to UGIE have significantly higher grade of EV (2.3 ± 0.14 , $p < 0.001$) and in 63% cases we observed GV. Spleen stiffness according to SWE in this group was also significantly higher (71.41 ± 4.18 kPa, $p < 0.001$) compared to groups B and C. After performing surgical shunting procedures (group B) grade of EV according to UGIE declined to 0.37 ± 0.14 . Spleen stiffness based on SWE in this group also decreased but remained elevated compared with controls (27.18 ± 2.74 vs 17.85 ± 1.3 kPa $p = 0.008$).

Conclusions: SSM by SWE is feasible in children and the results reflect the presence or degree of esophageal and gastric varices. A prospective follow-up study with larger patient numbers and performance of screening endoscopies appears justified and desirable.

Keywords: Esophageal varices, Gastric varices, Spleen stiffness, Shear-wave elastography, Portal hypertension

POT-47

Endoscopic Management of Colorectal Polyps in Children

Avaz Dekhkonboev¹, Temur Sultanov¹ and Shoilkhom Shakhaydarov¹

¹Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Tashkent, ²Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Tashkent, Uzbekistan

Background/aims: Purpose of the study to evaluate of the efficiency of endoscopic treatment of benign tumors of the colon and rectum in children.

Methods: The results of endoscopic treatment of colon polyps of 28 children for 2017 -2018 are analyzed. The average age was 5.2 ± 0.25 years, 12 boys (43%) and 16 girls (57%). In the preoperative stage, all patients underwent diagnostic colonoscopy with a multifocal biops.

Results: According to the results of colonoscopy, the most common localization of polyp was in the sigmoid colon - 18 (64%), in 7 (25%) children polyps were located in rectum, and 3 (11%) in the remaining sections of the colon. According to morphological studies, an adenomatous polyp was detected in all cases. During endoscopic treatment, complications were reported in 14% of cases. In 3 children, multiple polyps were detected, bleeding was noted during polypectomy. One patient had a perforation when a large polyp was removed (4.5 cm). Bleeding sites were clipped. Colon perforation was sutured laparoscopically. In the long-term period, one (3.5%) patient had a recurrent polyp.

Conclusions: Thus, according to the results of our study, polyps of the rectum often affect girls (57%), and in all cases of a benign character. They were more often localized in the sigmoid colon. Patients with multiple polyps have higher risk of bleeding during polypectomy.

Keywords: Colon, Endoscopic treatment, Polypectomy, Adenomatous polyp, Children

POT-48

A Case Report: Endoscopic Removal of a Large Trichobezoar in a Pediatric Patient

Woo-Jung Kim, Young-Ki Kim, Hyun-Ho Choi, Hyung-Keun Kim, Sang-Woo Kim, Sung-Soo Kim and Hiun-Suk Chae

Division of Gastroenterology, Department of Internal Medicine, Uijeongbu St. Mary's Hospital, College of Medicine, the Catholic University of Korea, Cheonbo-Ro 271, Uijeongbu-Si, Kyunggi-Do, Korea

Abstract: Trichobezoars are composed of hair and are more common in pediatric patients with psychiatric disorders. Small trichobezoars can be removed after endoscopic fragmentation. However, large trichobezoars are resistant to endoscopic fragmentation. Therefore, these masses must be surgically removed, despite the large scars that result. Here, we report the case of a large trichobezoar after endoscopic shrinkage, this mass was removed by endoscopic therapy.

Case Report: A 12-year-old girl visited our GI department with epigastric pain for 2 weeks. The patient had no past medical history or drug history. abdominal x-ray is not specific findings & Laboratory evaluations are within normal limits. An UGI endoscopy was performed. The inner cavity of the stomach was filled with a large trichobezoar composed of hair bundles. Endoscopic removal was not possible because of the size. But her parents didn't want to operative treatment. So we attempted endoscopic removal by cutting alligator over 8 hours. And then we could remove the fragmentation of a large trichobezoar by snare. Finally, the trichobezoar was removed successfully. The maximum diameter of the mass was 4 cm. The patient was treated with PPI & prokinetic medication. She was discharged without complications after 7 days.

Keywords: Trichobezoar, Endoscopic removal, Pediatric patient



POT-49

Can Endogenous Gastric Acid and Bile Facilitate Chemical Debridement of Walled Off Necrosis?

Surinder S Rana¹, Atul Rana¹, Ravi Sharma¹ and Rajesh Gupta²

¹Department of Gastroenterology, PGIMER, Chandigarh, ²Department of Surgery, PGIMER, Chandigarh, India

Background/aims: Aggressive endoscopic transmural drainage (ETD) is the preferred minimally invasive treatment modality for patients with walled off necrosis (WON). However, patients with large amounts of solid necrotic material may require additional direct endoscopic necrosectomy (DEN). A chemical lavage technique that reduces the need of DEN is the need of hour.

Objective: To retrospectively study role of endogenous gastric acid and bile in facilitating removal of necrotic material and reducing need of DEN.

Methods: The retrospective data of patients of WON treated by ETD over a period of last 2 years was analysed to identify patients of WON presenting with gastric outlet obstruction (GOO) as they have endogenous bile and gastric acid entering the necrotic cavity and the outcome of ETD in these patients may help in assessing efficacy of acid and bile in removing/digesting necrotic material. The outcome of these patients was compared with outcome of patients of WON without GOO.

Results: 11 patients (9 males) of WON having GOO were treated with ETD (Group A). The mean size of WON was 10.6 ± 2.9 cm with majority (n=8) having 10-40% solid necrotic debris. ETD was done using multiple plastic stents in 8 patients and metal stent in 3 patients. Additional percutaneous drainage was done in 2 patients. In both these patients, gastric as well as bilious contents were seen in the drainage catheter for 7 and 13 days following ETD respectively. During same period, 53 patients of WON without GOO underwent ETD (Group B). Baseline characters were same in both groups. However, time taken for resolution was significantly shorter in patients with GOO (19.1 vs. 27.7 days). Also, significantly fewer endoscopic procedures were required for resolution in group A (2.7 vs. 4.3). Moreover, 6 patients required DEN in group B in comparison to none in Group A.

Conclusions: Endogenous acid and bile can facilitate chemical debridement in WON and this potential role need to be further explored by future studies.

Keywords: Won, Bile acid, Gastric juice, Goo

POT-50

Comparison of N-Terminal Pro Brain Natriuretic Peptide in Patients with Child Pugh Class A, B and C

Muhammad Adnan Shahzad

Gastroenterology Department, Doctors Hospital and Medical Center, Lahore, Punjab, Pakistan

Background/aims: Cirrhotic cardiomyopathy is defined as chronic cardiac dysfunction in patients with cirrhosis characterized by blunted contractile responsiveness to stress and/or altered diastolic relaxation with electrophysiological abnormalities, in the absence of known cardiac disease and irrespective of the causes of cirrhosis, although some etiologies (e.g., iron overload and alcohol consumption) further impact on myocardial structure and function. N-Terminal- pro Brain natriuretic peptide (NT-Pro-BNP) is a member of structurally related neurohormones has recently gained a lot of popularity as a marker for diagnosis and management of heart failure.

Methods:

Study design: Cross Sectional Study

Study Settings: In Gastroenterology department of Lahore Doctors Hospital & Medical Centre Lahore

Study Duration: 6 months after approval of synopsis [July 4, 2016 till Jan 4, 2016]

DATA COLLECTION PROCEDURE

Using non probability consecutive 165 cirrhotic patients meeting inclusion criteria were included. First their Child Pugh Class was assessed followed by blood samples from all patients meeting inclusion criteria were collected from the peripheral vein of upper limb of patients for analysis of NT-ProBNP. NT-proBNP concentrations were determined using a novel processing independent assay recently developed in our laboratory. This assay quantitates total proBNP products in plasma using a preanalytical enzymatic step. Briefly, plasma is incubated with trypsin to cleave the proBNP forms at a monobasic cleavage site. The enzymatic reaction is then terminated and the released N terminal fragment (proBNP 1-21) subsequently measured by an N terminal specific proBNP radioimmunoassay. NT-proBNP was compared in all three subgroups of Child Pugh score as per operational definition. All data was collected by researcher himself and was recorded on prescribed proforma. All collected data was entered and analyzed using SPSS version 20.

Results: The mean age of patients was 53.24±11.83 years with age range of 38 (30 as minimum and 68 as maximum age). There were 86 (52.1%) male and 79 (47.9%) female cases with higher male to female ratio. According to child Pugh class, class A, B and C were diagnosed in 40 (24.2%) 56 (33.9%) and 69 (41.8%) respectively. The mean N-Terminal-Pro Brain Natriuretic Peptide in all cases was 177.16±160.06 with minimum and maximum level of 4 and 615. The mean N-Terminal-Pro Brain Na-

triuretic Peptide in child Pugh class A, B and C was 59.32 ± 35.09 , 137.03 ± 50.60 and 278.04 ± 197.96 respectively, the mean N-Terminal-Pro Brain Natriuretic Peptide was higher in child C when compared to class B and A, p-value < 0.005.

Conclusions: The mean NTproBNP levels in cirrhotic patients specifically in child Pugh class C is very high when compared to class A and B. So every patient diagnosed with liver chaotic should undergo Echocardiography for quantification of cardiac dysfunction so that early detection of cardiac dysfunction can be managed accordingly to reduce further morbidity and mortality.

Keywords: Liver cirrhosis, Heart failure, Diagnosis, Biomarkers, Brain natriuretic peptide

POT-51

A Case of Primary Omental Infarction in an Adult Female Presenting As Right Upper Quadrant Pain

Sujata May Mansukhani and Virgilio Banez

Section of Gastroenterology and Digestive Endoscopy, Manila Doctors Hospital, Manila, Philippines

A 55-year old obese, Filipino female presented with a 5-day history of epigastric pain radiating to the right upper quadrant. Physical examination revealed direct right upper quadrant tenderness and positive Murphy's sign. Laboratories showed leukocytosis, neutrophilia, mildly elevated TB and IB and urinary tract infection. MRI with MRCP of the upper abdomen revealed a 3.4×11.2×8.8 cm well-defined lobulated mass-like lesion with fatty and edematous signals in the right upper anterior peritoneal cavity which exhibits a thin enhancing rim located anterior to the left hepatic lobe and superior to the transverse colon with minimal ascites and inflammatory changes involving the right anterolateral abdominal wall with moderate edema; gallbladder showed mild layering within with no stones or evidence of inflammation. Findings are suggestive of omental infarction or panniculitis. Exploratory laparotomy with omentectomy was done which revealed a 3×4 cm concavity between the subcostal area and segment IV/V of the liver where the omentum was trapped. The omentum was hyperemic and caked with central fat necrosis and adherent to the anterior abdominal wall, greater omentum and proximal transverse colon. There was no area of torsion noted. Our patient was discharged stable after 3 days.

Keywords: Omental infarction, Omental torsion, Case report, Primary omental infarction

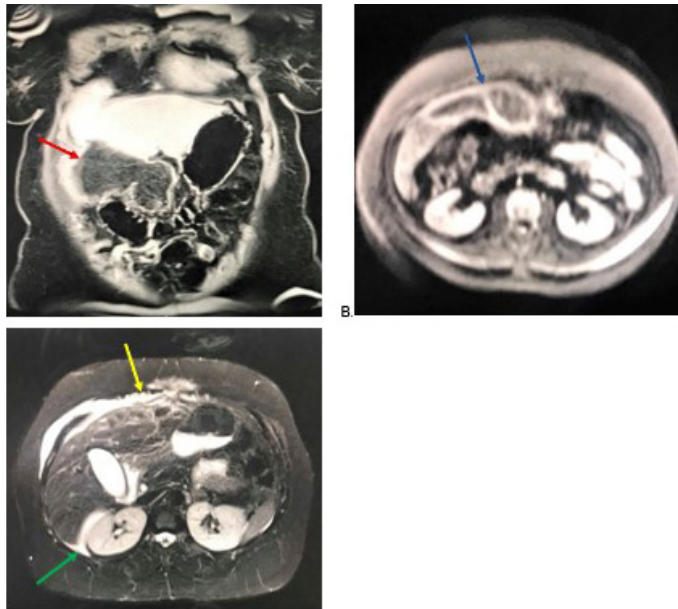
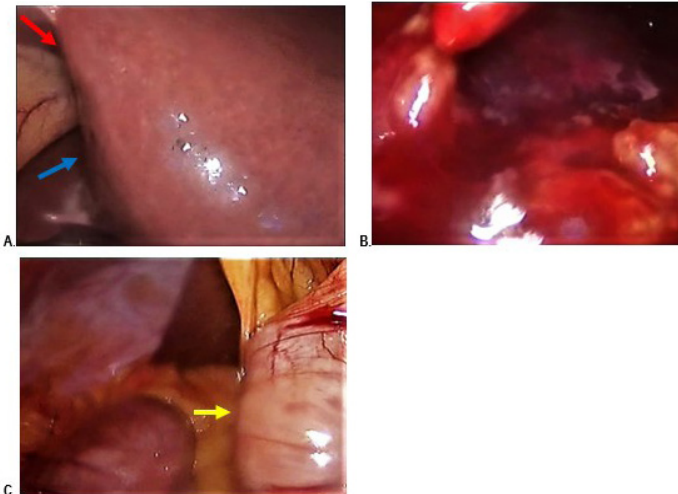


FIGURE 1. MRI with MRCP of the upper abdomen. A. T1 image. Well-defined lobulated mass-like lesion with lematous signals within the right upper anterior peritoneal cavity measuring 3.4 x 11.2 x 8.8 cm (red arrow). B. DWI image. Well-defined lobulated mass lesion exhibits a thin enhancing rim (blue arrow). It is located anterior to the left hepatic lobe and posterior to the transverse colon. C. T2 image. Minimal perihaptic and perisplenic fluid (green arrow), inflammation involving the right anterolateral abdominal wall with moderate edema of the overlying subcutaneous layer (yellow arrow).

MRI findings



Laparoscopic findings

POT-52

Evaluation of the Effect of Intraperitoneal Ghrelin Treatment in Acute Experimental Distal Colitis Model

Erdem Kocak¹ and Fatma Kılıç²

¹Gastroenterology, Istanbul Florence Nightingale Hospital, Istanbul, ²Internal Medicine, Kirsehir State Hospital, Kirsehir, Turkey

Background/aims: Ghrelin is a 28 amino acid acylated peptide, which is produced and secreted principally by enteroendocrine cells of the stomach. In this study we aimed to investigate the efficiency of intra-peritoneal ghrelin administration in the treatment of experimentally induced distal colitis.

Methods: Thirty male wistar-albino rats were divided into three groups: Sham control (Group 1), colitis induced by acetic acid and treated with saline (Group 2), colitis induced by acetic acid and treated with intraperitoneal ghrelin (Group 3). At end of 5th day laparotomy and total colectomy were performed. The distal colon segment was assessed macroscopically and microscopically. In addition total anti-oxidant capacity (TAOC) and malondialdehyde (MDA) levels of the colonic tissue and changes in body weight were measured.

Results: Microscopic and macroscopic damage scores were significantly higher in Group II compared to Group I and Group III. The MDA levels of the colonic tissues were significantly higher in Group II and Group III compared to Group I. The TAOC levels of the colonic tissues were not different between three groups.

Conclusions: Mucosal healing after intraperitoneal ghrelin treatment suggested that it might have anti-inflammatory effects on experimental distal colitis.

Keywords: Experimental colitis, Ghrelin, Malondialdehyde, total, Anti-oxidant capacity

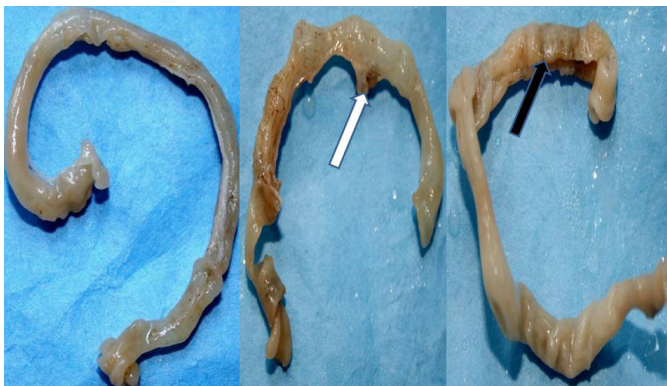


Figure: a) There was no macroscopic change in group 1 b) There are fibrotic and necrotic areas in 4% acetic acid introduced group (white arrow) c) There are hyperemic areas in 4% acetic acid introduced and intraperitoneal ghrelin treated group (black arrow)

POT-53

Determination Result of Colonic Lactobacillus on the *Helicobacter pylori* Infection

Bayarsaikhan Ochirchuulgan¹ and Amarjargal Batdelger²

¹Department of Gastroenterology and Hepatology, Mnums, Ulaanbaatar, ²Department of Gastroenterology and Hepatology, Mnums, Ulaanbaatar, Mongolia

Background/aims: Lactobacillus are a well-known component of human gastrointestinal and vaginal microflora. Lactobacillus spp. convert tryptophan to indole-3-aldehyde (I3A). Indole and I3A are agonists for the aryl hydrocarbon receptor (AhR), a transcription factor that regulates interleukin (IL)-22 expression, increases TH17-cell activity, and helps maintain intraepithelial lymphocytes.

Methods: The control group consists of 80 relatively healthy participants aged between 18 and 72 years. A quantitative method was used to analyze Lactobacillus, and the link between dairy consumption and the colony forming units of Lactobacillus was investigated.

The case group consists of 80 dyspeptic patients with *H. pylori* positive. The *H. pylori* infection was verified as positive by MON-HP urease test and stool antigen test. Subjects were divided into two groups.

Results: In total, 160 subjects participated in the study (33.3% male and 66.7% female) and the mean age was 33.6±12.4. The colony forming units of Lactobacillus were 1443.4×10⁴/CFU in the control group and 1213.7×10⁴/CFU in the case group respectively (P>0.05).

The colony forming units of Lactobacillus were 1330.8×10⁴/CFU in the group that consumed 0-50 ml servings of dairy each time and 3229.3×10⁴/CFU in the group that consumed >300 ml servings of dairy (P<0.001). In looking at milk specifically, it was 1378,9×10⁴/CFU in the group that consumed only milk and 2758,4×10⁴/CFU in the group that consumed sour dairy products (P<0.001).

Conclusions: 1. The colony forming units of Lactobacillus was positively associated with the amount of dairy consumption and types of dairy products in the healthy control group.

2. Our study shows no statistically significant differences in the colony forming units of Lactobacillus between the healthy control group and the case groups (with *H. pylori* infection).

Keywords: Lactobacillus, *Helicobacter pylori*

POT-54

A Quantitative Method to Justify the Quality of Current Reprocessing Guidance Based on Test Strips for Endoscopy Suites

Hsin-Yu Lin¹, Hsien-Chung Yu², Wei-Ling Chen¹, Li-Chun Jang², Da-Yuan Guo³, Yuan-Chung Lin³ and Yi-Song Fong³

¹Originals & Enterprises, Kaohsiung Veterans General Hospital, Kaohsiung City, ²Department of Internal Medicine, Kaohsiung Veterans General Hospital, Kaohsiung City, ³Institute of Environmental Engineering, National Sun Yat-Sen University, Kaohsiung City, Taiwan

Background/aims: Each year, ECRI Institute provides Top 10 list of health technology hazards to the public. There is one issue that has stayed in the list since 2011 and become Number 2 hazard in 2018: the endoscopes reprocessing failures. While flexible endoscopes are semi-critical devices in Spaulding classification, needing process from pre-clean, manual cleaning, to rinsing, we focus on the most important step: high level disinfection (HLD). We want to evaluate the disinfection process and help the staffs in hospitals to efficiently make sure that the reused endoscopes attain the minimum microorganisms.

Methods: The reprocessing failures typically arise due to dysfunction of automated endoscope reprocessor, associated products or human error. While the detergent solutions applied for manual cleaning should not be reused, the disinfectants (for example: CIDEX[®] OPA) may be reused, which suggests the disinfectants might play a major role in the reprocessing process. However, after reviewing the literatures, the available guidelines fail to clearly indicate when to validate the power of disinfectant. Moreover, the current method to verify the disinfectant concentration is by detect the color changes of test strips subjectively. According to the manufacturer brochure, the processes contain 1 second for submergence and 90 seconds for chemical reaction, both of which are difficult to be executed timely on a regular basis. After the two steps listed above, the test strip color will change with time, and the medical staffs need to recognize the color and the pattern, to determine if the disinfectant (CIDEX[®] OPA) concentration is lower than the minimal effect concentration (MEC) and need to be replaced. The whole procedure is subjective and is operator-dependent.

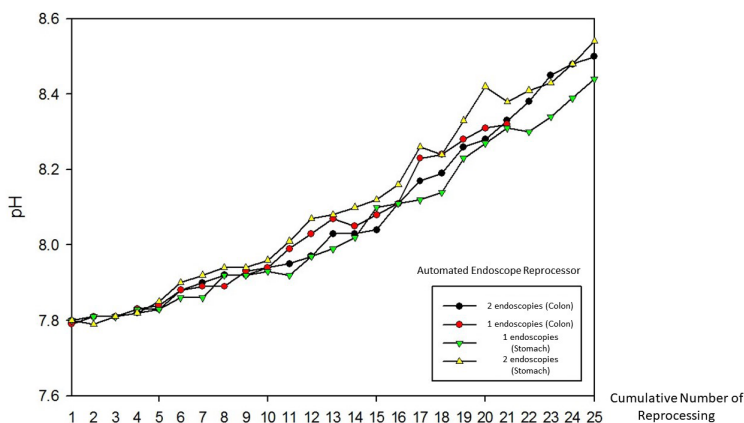
In May 2018, we took disinfectant samples from our four separate automated endoscope reprocessor units (OLYMPUS OER-AW), and instantly carried out test strips interpretation and acid-base concentration analysis, to find out a better way of justifying the concentration of the disinfectant. Our attempt not only avoids endoscopes reprocessing failures but also decreases medical burden by simplifying the operations. Based on the chemical compounds of the test strip, we chose the phthalaldehyde (o-phthalic acid, CIDEX[®] OPA) to react with the sodium sulphite to produce sodium hydroxide. After the reaction, the disinfectant (CIDEX[®] OPA) concentration can directly match the pH value. The design steps of the experimentation are as follows:

1. Prepare disinfectants of different concentrations (0.3%~0.5%) validated by HPLC. At this stage, the pH value change is difficult to find out.
2. Using the disinfectants prepared above to interact with sodium sulfite solutions (5%).
3. Find out the optimal volume of sodium sulfite solution for micro-titration in this experimentation (0.7 ml).
4. The hydrogen ion concentration of the solution was measured with a pH meter at the end of the titration, and the pH value spectra obtained were used to map the discoloration range of the strips.
5. The optimal addition amount of sodium sulfite solution was added to the disinfectants with different concentrations (0.1%~0.5%) from different time points of reprocessing, and the results of pH changes at different concentrations were investigated.

Results: We gradually added sulfuric acid solution to disinfectants (CIDEX® OPA) of different concentrations (0.2%~0.4%)(the volume interval is 0.1 mL, change to 0.5 mL after 2 mL), and read the pH value change sequentially. The greatest change was noted when the titration range is 0 mL~2 mL, especially between 0.5 mL and 0.9 mL. As we chose 0.7 mL as the cut point for micro titration, we found out that while the concentration of the disinfectant is 0.3%, the pH value will be >9, which meets the criterion of minimal effect concentration. Totally 100 disinfectant samples were taken from corresponding reprocessing processes, and the pH meter shows that their pH values ranged from 7.79 to 8.54. As compared with the strips that a staff may consider replacing the disinfectant subjectively due to evident color change, all the pH values fall between 8.3 and 8.54, which do not meet up to the pH value 9 (MEC=0.3%).

Conclusions: In this experimentation, we proved the MEC verifying process of disinfectants currently used by recognizing the color change subjectively is not accurate enough and our proposed method using micro-back-titration proves to be useful and might be able to replace the test strips method. Using our design process based on measurement with a pH meter can reduce the error of judgement and can accelerate the verifying process.

Keywords: Cidex, Opa, High level disinfection, Endoscopy, Reprocessing



POT-55

Safety of Endoscopic Procedures in Neutropenic Patients with Hematologic Diseases

Ga-Young Shin, Jae Myung Park, You-Jin Kim, Kyung Han Song, Yu Kyung Cho, Dong-Wook Kim and Myung-Gyu Choi

Internal Medicine, The Catholic University of Korea, Seoul, Korea

Background/aims: Neutropenic patients have an increased risk of infection. We assessed the safety of endoscopic procedures in neutropenic patients with hematologic diseases.

Methods: We studied consecutive neutropenic patients with hematologic diseases who underwent endoscopic procedures from 2009 through 2017. Neutropenia was defined as an absolute neutrophil count (ANC) <1,500 cells/mL and grouped into severe (<500), moderate (500-1000), or mild (1000-1500). Primary outcome was the presence of infectious events within a week after endoscopic procedure. We also investigate mortality within 1-month after procedure. Performance status was assessed using Eastern Cooperative Oncology Group (ECOG) score.

Results: We identified 463 patients who underwent 507 procedures (189 severe neutropenia, 144 moderate, and 174 mild). Patients with severe neutropenia showed higher ECOG score than other groups (both $P<0.01$), and underwent less high-risk procedures ($P<0.01$). Infectious complications were found in 166 patients (32.7%). Fever was observed in 31.2% ($n=158$) patients and bacteremia 10.5% ($n=31/296$). Incidence of fever and bacteremia was significantly higher according to the neutropenia severity ($P<0.01$). In the disease categories, myelodysplastic syndrome showed the highest risk of infectious complications. Patients with infectious complications showed higher ECOG score, lower ANC, lower frequency of use of colony-stimulating factor, and higher serum C-reactive protein (all $P<0.05$). On multivariate analysis, poor performance status (ECOG 3 or 4) and myelodysplastic syndrome was associated with increased risk of infectious complications ($P<0.01$). Mortality cases were found in 17 cases (3.4%), which was associated with higher ECOG and serum C-reactive protein.

Conclusions: Infectious complications were found in one thirds of neutropenic patients with hematologic diseases. The functional status of the patient should be considered when deciding whether to perform endoscopy in the absence of urgent need.

Keywords: Neutropenia, Endoscopy, Safety, Infection, Mortality

IDEN 2019

International Digestive Endoscopy Network

*Insights on Advanced GI Endoscopy
from World Leading Scholars*

Printed on June 10, 2019

Published on June 13, 2019

Publisher Sang Yong Seol

Editor in Chief Eun Young Kim

Published by International Digestive Endoscopy Network (IDEN)

Tel +82-2-336-1552

Fax +82-2-335-2690

E-mail admin@iden.or.kr

Homepage www.idenworld.org

Printed by CDMTheBig

Tel +82-2-857-1573

Fax +82-2-857-1574

E-mail dukykim@cdmthebig.com

Homepage www.cdmthebig.co.kr

This work was supported by the Korean Federation of Science and Technology Societies (KOFST) Grant funded by the Korean Government.