

IDEN 2023

International
Digestive
Endoscopy
Network
2023

June 8 Thu - 10 Sat, 2023
Grand Walkerhill Seoul, Korea

**IN-PERSON
CONFERENCE**

*Sharing
Our Global Future
of Endoscopy*



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www.iden.or.kr



Real-time Detection

High Accuracy

Improved Adenoma Detection Rate



Endoscopic Image Detection Support Software

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International
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Network
2023

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*Sharing
Our Global Future
of Endoscopy*



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WELCOME MESSAGE

Dear Colleagues and Friends,

We are delighted to welcome you to the International Digestive Endoscopy Network 2023 (IDEN 2023) from June 9 to 10, 2023, at the Grand Walkerhill Hotel in Seoul, Korea.

Since the launch of the first IDEN conference in 2011, we have been pioneers on the cutting edge of the endoscopy field and leading research in advanced endoscopic techniques. Thanks to our prominence, IDEN has achieved fruitful results, with last year's conference attracting 1,545 participants from 31 countries.

Under the theme "Sharing Our Global Future of Endoscopy," IDEN 2023 will be an exciting gathering for our participants, featuring world-renowned speakers and abundant social events. The scientific program will include live demonstrations and joint symposiums with JGES, WEO, and ESGE to share recent research findings and commemorate the long-standing cooperation among endoscopic associations worldwide. Your interest and participation will be sure to enhance the quality of our conference.

As you are aware, we have not been able to meet in person over the past three years. We are now delighted to offer IDEN 2023 in-person to reconnect and catch up with old friends, make new ones, and celebrate the achievements in our field.

We thank you for your participation and look forward to meeting you at IDEN 2023. We wish you a stimulating and productive conference, as well as an unforgettable stay. While you are here, we encourage you to explore the beautiful city of Seoul and discover the dynamic culture of Korea.

Oh Young Lee

President
International Digestive Endoscopy Network



Geun Am Song

Congress Chairman
International Digestive Endoscopy Network



ORGANIZATION

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	Soo-Jeong Cho	Seoul National University, Korea
	Kwang Hyuck Lee	Sungkyunkwan University, Korea
	Jae Young Jang	Kyung Hee University, Korea
	Byoung Kwan Son	Uijeongbu Eulji Medical Center, Korea
	Dong Il Park	Kangbuk Samsung Hospital, Korea
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	Jae Myung Cha	Kyung Hee University, Korea
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	Kim Do Hoon	Asan Medical Center, Korea
	Ki-Nam Shim	Ewha Womans University, Korea
	Kwang Bum Cho	Keimyung University Dongsan Hospital, Korea
	Sang Hyub Lee	Seoul National University Hospital, Korea
	Sang Pyo Lee	Hallym University Dongtan Sacred Heart Hospital, Korea
Auditor	In Kyung Sung	Konkuk University Medical Center, Korea
	Gwang Ho Baik	Hallym University Chuncheon Sacred Heart Hospital, Korea
Steering Members	Oh Young Lee	Hanyang University Medical Center, Korea
	Jong-Jae Park	Korea University Guro Hospital, Korea
	Moon Sung Lee	Soonchunhyang University Bucheon Hospital, Korea
	Myung Hwan Noh	Dong-A University Hospital, Korea
	Jeong-Sik Byeon	Asan Medical Center, Korea
Officer	Miwhie Bang	IDEN, Korea

ADVISORY COMMITTEE

Yong Bum Yoon	National Medical Center, Korea
Kyu Yong Choi	Gangnam Major Clinic, Korea
Joon Soo Hahm	Jungang Hospital, Korea
Chang Duck Kim	Korea University Anam Hospital, Korea
Myung-Hwan Kim	Changwon Hanmaeum Hospital, Korea
Myung-Gyu Choi	The Catholic University of Korea Seoul St. Mary's Hospital, Korea
Yong-Tae Kim	Seoul National University Hospital, Korea
Hoon Jai Chun	Korea University Anam Hospital, Korea
Sang Yong Seol	Inje University Busan Paik Hospital, Korea
Joo Young Cho	CHA University Gangnam Medical Center, Korea

ORGANIZATION

LOCAL SCIENTIFIC COMMITTEE

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Hang Lak Lee Hanyang University Medical Center, Korea

Secretary

Chan Hyuk Park Hanyang University Guri Hospital, Korea

Members

Upper GI

Ji Yong Ahn Asan Medical Center, Korea

Hyun Lim Hallym University Sacred Heart Hospital, Korea

Hee Seok Moon Chungnam National University Hospital, Korea

Joon Sung Kim The Catholic University of Korea Incheon St. Mary's Hospital, Korea

Chang Seok Bang Hallym University Chuncheon Sacred Heart Hospital, Korea

Bong Eun Lee Pusan National University Hospital, Korea

Hyo-Joon Yang Kangbuk Samsung Hospital, Korea

Eun Jeong Gong Hallym University Chuncheon Sacred Heart Hospital, Korea

Lower GI

Hyun Gun Kim Soonchunhyang University Seoul Hospital, Korea

Yunho Jung Soonchunhyang University Hospital Cheonan Hospital, Korea

Su Young Kim Wonju Severance Christian Hospital, Korea

Soo-Young Na The Catholic University of Korea Incheon St. Mary's Hospital, Korea

Eun Mi Song Ewha Womans University Seoul Hospital, Korea

Jun Lee Chosun University Hospital, Korea

Hyun Jung Lee Seoul National University Hospital, Korea

Sung Wook Hwang Asan Medical Center, Korea

Pancreatobiliary

Sang Myung Woo National Cancer Center, Korea

Seung Bae Yoon The Catholic University of Korea Eunpyeong St. Mary's Hospital, Korea

Jae Hee Cho Gangnam Severance Hospital, Korea

Taejun Song Asan Medical Center, Korea

Joo Kyung Park Samsung Medical Center, Korea

Seong-Hun Kim Jeonbuk National University Hospital, Korea

Jaihwon Kim Seoul National University Bundang Hospital, Korea

Min Kyu Jung Kyungpook National University Hospital, Korea



PROGRAM AT A GLANCE

June 8 Thu		June 9 Fri			
Room Time	IYEA	Room A	Room B	Room C	Room D
09:00-10:30		UGI 1	LGI 1	PB 1	
		Celebrating luminaries of gastroesophageal junction diseases	[KSGE-WEO] Overcoming difficulties of CRC screening in colonoscopy	Difficult ERCP: What are the solutions?	
10:30-11:00		Coffee Break			
11:00-12:30		UGI 2	LGI 2	PB 2	IDEN consensus: Clinical guidelines
		[KSGE-JGES] Innovation in therapeutic upper GI endoscopy	[KSGE-ESGE] Improving quality of colonoscopy in daily clinical practice	Strategies and cutting-edge technology in the management of biliary stricture in living donor liver transplantation	
12:30-13:30		Luncheon Symposium 1 DAEWOOONG	Luncheon Symposium 2 inno.N		
13:30-15:00	Young Endoscopist Forum +IYEA Participants Only	UGI 3	LGI 3	PB 3	Clinical Endoscopy editor session
		How can we use AI in upper GI neoplasia?	Innovative diagnostic & therapeutic endoscopy in IBD	[KSGE-ESGE] Role of digital SOC and pancreatoscopy	
15:00-15:20		Coffee Break			
15:20-16:50		UGI 4	LGI 4	PB 4	Satellite Symposium 1 15:20-16:20 OLYMPUS
		[KSGE-ESGE] Recent updates and trends in bariatric endoscopy	Optimal endoscopic resection techniques in various types of colorectal neoplasia	Recent updates on EUS-guided tissue acquisition	

Poster & Exhibition

June 10 Sat

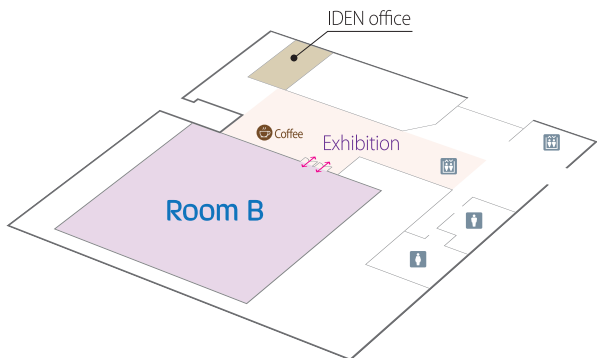
Time	Room	Room A	Room B	Room C	Room D
08:30-10:00		Live Demonstration 1 (Upper GI / Lower GI)			
10:00-10:30		Coffee Break			
10:30-12:00		Live Demonstration 2 (Pancreatobiliary)			Satellite Symposium 2 10:30-11:30 🐼 DAEWOONG
12:00-13:00		Luncheon Symposium 3 OLYMPUS			
13:00-13:30		General Assembly			
13:30-15:00		UGI 5	LGI 5	PB 5	SD 1
		Diagnostic endoscopy in the next generation	Colorectal ESD: Current status and future perspectives	[KSGE-JGES] EUS-guided drainage and beyond	Infection control in the endoscopy room and correct endoscope reprocessing *Korean
15:00-15:20		Coffee Break			
15:20-16:50		UGI 6	LGI 6	PB 6	SD 2
		Management of early gastric cancer: A to Z	Challenges and opportunities of AI applications in lower GI tract	Role of endoscopy in early detection and surveillance of pancreatobiliary neoplasm	Understanding and management of adverse events related with endoscopic sedation *Korean

Poster & Exhibition



FLOOR PLAN

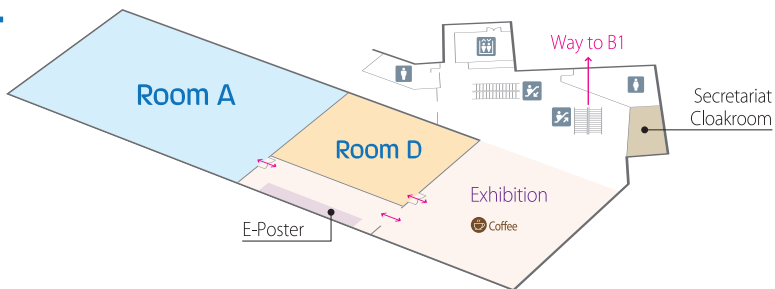
1F



B1



B2



CONFERENCE INFORMATION

REGISTRATION DESK

The registration desk will be open from June 9 to 10 in the B1 Lobby of Vista Hotel at the following times.

Operation Hours: June 9 (Fri) - 10 (Sat), 07:30-17:00

On-site Registration Fees

Category	Fees (* USD 1 = KRW 1,000)	
	IDEN member	Non-member
Participant	USD 200	USD 250
Trainee / Fellow	USD 100	USD 120
Nurse / Technician	-	USD 100

* Registration Fees Include:

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

ONSITE BADGE POLICY

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

COFFEE BREAKS

Coffee will be provided to participants at locations listed below.

Location	Room A & B Lobby	Exhibition Areas
Time	Morning & Afternoon Break	


SPONSORED SYMPOSIUM

Sponsor symposiums will be held according to the following schedule.


Take this opportunity to catch up on the latest industrial developments and see what's new in the digestive endoscopy field.



Luncheon Symposium

June 9 (Fri)		June 10 (Sat)
12:30-13:30	12:30-13:30	12:00-13:00
Luncheon Symposium 1	Luncheon Symposium 2	Luncheon Symposium 3
Room A	Room B	Room A
 DAEWOONG	inno.N	OLYMPUS
Fexuclue : The new wave of GERD treatment Chan Hyuk Park, Hanyang University, Korea	A novel, clinically validated P-CAB: Tegoprazan Gwang Ha Kim, Pusan National University, Korea	Latest advancement in UGI endoscopy Kohei Takizawa, Koyukai Shin-Sapporo Hospital, Japan

Satellite Symposium

June 9 (Fri)	June 10 (Sat)
15:20-16:20	10:30-11:30
Satellite Symposium 1	Satellite Symposium 2
Room D	Room D
OLYMPUS	 DAEWOONG
Latest advancement in LGI endoscopy Ting Leong Ang, Changi General Hospital, SingHealth, Singapore	The GERD treatment: A step forward with "Fexuclue" Ronnie Fass, Case Western Reserve University, USA

IDEN APP DOWNLOAD

TO DOWNLOAD

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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



CME CREDIT INFORMATION

***KOREAN PARTICIPANTS ONLY**

- * 대한소화기내시경학회에서는 아래와 같이 학회에서 부여하는 평점을 운영하고 있습니다.
(2023년에는 대한의사협회 평점은 없음을 참고 부탁드립니다.)
- * 모든 평점은 대회기간 중 매일 입실/퇴실 총 두 번의 시간이 확인되어야 평점을 받을 수 있습니다.
- * 누락 등 사후 반영은 불가합니다.
 - 출결 체크 위치: Vista 로비, 그랜드홀 로비, 워커히 로비
 - 문의처: 등록데스크(B1 비스타 호텔)

구분		6월 09일(금)	6월 10일(토)	비고
대한소화기 내시경학회	내시경 세부전문의	1	1	하루 3시간 이상 체류 시 일일 평점 부여
	소독	-	1	
	진정	-	2	
	질관리	1	1	

EVENTS

EXHIBITION STAMP EVENT

Surprising gifts await you! Collect all the exhibition stamps by visiting each company's booth. The drawing will be held after the last session each day. Be sure to be there to get amazing prizes!

- Dates & Times: June 9 & 10, 17:00
- Location: Room C (B1)

1st



BESPOKE Robot Vacuum
(1ea each day)

2nd



LG Cinebeam
(2ea each day)

3rd



AirPods 3
(2ea each day)

4th



BYREDO Handset
(3ea each day)



PRESENTATION & AWARDS

PREVIEW ROOM (B2)

June 9 (Fri) - June 10 (Sat), 07:30-17:00

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

E-POSTERS

IDEN 2023 will feature an E-Poster system with all posters available on the E-Poster area.

AWARDS

Please note that awardees will be announced on the IDEN 2023 website after the conference.



USD 300

BEST POSTER AWARDS
(5 Presenters)



USD 300

YOUNG INVESTIGATOR AWARDS
(5 Presenters)



USD 500

TRAVEL GRANT

International Young Endoscopist Award 2023

The IYEA program is intended to promote technical advancement and collaboration among young endoscopists. This program has been held annually since 2014, with 306 young international endoscopists from 32 countries having participated so far. The program enables them to acquire and develop new advanced knowledge and technical skills in GI endoscopy by clinical training at Korean high-volume centers, which in turn improve patient care in the applicant's home.

This year, 31 young endoscopists from 16 countries underwent a two-week training program in 18 institutes. Prior to the IDEN Conference, they also participated in a hands-on course, further enhancing their skills as below.

- **Date & Time:** June 7 (Wed), 14:00-18:00

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

[Hands-on] ESD

Basic techniques and know-how for upper GI ESD

Tae-Geun Gweon, Chul-Hyun Lim, Jongbeom Shin, Dong Jun Oh, Sang Pyo Lee I (Korea)

[Hands-on] EUS

[VOD lecture] How to perform radial EUS in the pancreatobiliary system

Eunae Cho I (Korea)

[VOD lecture] How to perform linear EUS in the pancreatobiliary system

Sang Hyub Lee I (Korea)

[VOD lecture] EUS-FNA/FNB using novel devices and new techniques

Dongwook Oh I (Korea)

[Hands-on] Radial EUS

Eui Joo Kim, Dong Kee Jang I (Korea)

[Hands-on] Linear EUS

Jae Hee Cho, Jin-Seok Park I (Korea)

[Hands-on] EUS-FNA/B

Jong Yul Lee, Dongwook Oh I (Korea)

[Hands-on] EMR/ERCP

precut EMR & colon stricture dilatation

Bo-In Lee, Han Hee Lee, Seung In Seo, Seung Han Kim I (Korea)

ERCP (scope insertion, cannulation, and EST using a 3D phantom model)

Chang-Il Kwon, Sung Ill Jang, Kyong Joo Lee, Jae Kook Yang I (Korea)



INVITED FACULTIES

Australia

David G. Hewett (University of Queensland)

Belgium

Hannah van Malenstein (University Hospitals Leuven)

Raf Bisschops (University Hospitals Leuven)

Vincent Huberty (Erasmus Hospital)

China

Honggang Yu (Renmin Hospital of Wuhan University)

Zhuan Liao (Changhai Hospital)

Czech Republic

Tomas Hucl (Institute for Clinical and Experimental Medicine)

France

Jean-François Rey (Institute Arnault Tzanck)

Germany

Alanna Ebigo (Augsburg University Hospital)

Hong Kong

Hon Chi Yip (The Chinese University of Hong Kong)

India

D. Nageshwar Reddy

(Asian Institute of Gastroenterology & AIG Hospitals)

Neeraj Singla (AIG Hospitals)

Rakesh Kalapala (AIG Hospitals)

Italy

Ivo Boskoski (Università Cattolica del Sacro Cuore di Roma)

Japan

Hironari Shiwaku (Fukuoka University)

Hironari Yamamoto (Jichi Medical University)

Hiroyuki Isayama (Juntendo University)

Hisao Tajiri (Jikei University)

Kazuo Hara (Aichi Cancer Center)

Keiji Hanada (Onomichi General Hospital)

Kohei Takizawa (Koyukai Shin-Sapporo hospital)

Masau Sekiguchi (National Cancer Center Hospital)

Masayuki Kitano (Wakayama Medical University)

Shinji Tanaka (Hiroshima University)

Takayoshi Tsuchiya (Tokyo Medical University)

Takeshi Ogura

(Osaka Medical and Pharmaceutical University Hospital)

Yosuke Nakai (The University of Tokyo)

Yutaka Saito (National Cancer Center Hospital)

Korea

Bo-In Lee (The Catholic University of Korea)

Bong Eun Lee (Pusan National University)

Byung Chang Kim (National Cancer Center)

Byung Ik Jang (Yeungnam University)

Byung-Wook Kim (The Catholic University of Korea)

Chan Hyuk Park (Hanyang University)

Chang Seok Bang (Hallym University)

Chang-Il Kwon (CHA University)

Chi Hyuk Oh (Kyung Hee University)

Chul-Hyun Lim (The Catholic University of Korea)

Chung Hyun Tae (Ewha Womans University)

Do Hoon Kim (University of Ulsan)

Don Haeng Lee (Inha University)

Dong Jun Oh (Dongguk University)

Dong Kee Jang (Seoul National University)

Dong Ki Lee (Yonsei University)

Dong Kyung Chang (Sungkyunkwan University)

Dong Soo Han (Hanyang University)

Dong Wan Seo (University of Ulsan)

Dong-Hoon Yang (University of Ulsan)

Dongwook Oh (University of Ulsan)

Duk Hwan Kim (CHA University)

Eui Joo Kim (Gachon University)

Eun Hyo Jin (Seoul National University)

Eun Soo Kim (Kyungpook National University)

- Eunae Cho** (Chonnam National University)
- Geun Am Song** (Pusan National University)
- Gwang Ha Kim** (Pusan National University)
- Gwang Ho Baik** (Hallym University)
- Haeryoung Kim** (Seoul National University)
- Han Hee Lee** (The Catholic University of Korea)
- Hong Sik Lee** (Korea University)
- Hoon Jai Chun** (Korea University)
- Hoon Sup Koo** (Konyang University)
- Huapyong Kang** (Gachon University)
- Hwi Jung Kim** (CHA Bundang Hospital)
- Hwoon-Yong Jung** (University of Ulsan)
- Hyo Jin Park** (Yonsei University)
- Hyun Gun Kim** (Soonchunhyang University)
- Hyun Ho Choi** (The Catholic University of Korea)
- Hyun Joo Song** (Jeju National University)
- Hyun Lim** (Hallym University)
- Hyun Yong Jeong** (Chungnam National University)
- Hyun-Soo Kim** (Chonnam National University)
- In Rae Cho** (Seoul National University)
- Ja Seol Koo** (Korea University)
- Jae Gyu Kim** (Chung-Ang University)
- Jae Hee Cho** (Yonsei University)
- Jae Jun Park** (Yonsei University)
- Jae Kook Yang** (Soonchunhyang University)
- Jae Myung Cha** (Kyung Hee University)
- Jae-Seon Kim** (Korea University)
- Jaeyoung Chun** (Yonsei University)
- Jae-Young Jang** (Kyung Hee University)
- Jeong-Sik Byeon** (University of Ulsan)
- Ji Yong Ahn** (University of Ulsan)
- Jimin Han** (Daegu Catholic University)
- Jin Lee** (Hallym University)
- Jin-Seok Park** (Inha University)
- Jinwoong Cho** (Presbyterian Medical Center)
- Jong Ho Moon** (Soonchunhyang University)
- Jong Kyun Lee** (Sungkyunkwan University)
- Jongbeom Shin** (Inha University)
- Jong Yul Lee** (The Catholic University of Korea)
- Joo Kyung Park** (Sungkyunkwan University)
- Joo Young Cho** (CHA University)
- Jun Kyu Lee** (Dongguk University)
- Jun Lee** (Chosun University)
- Jun-Won Chung** (Gachon University)
- Kang Nyeong Lee** (Hanyang University)
- Kee Don Choi** (University of Ulsan)
- Kee Wook Jung** (University of Ulsan)
- Keun Won Ryu** (National Cancer Center)
- Ki Bae Bang** (H Plus Yangji Hospital)
- Ki-Nam Shim** (Ewha Womans University)
- Kwang Hyuck Lee** (Sungkyunkwan University)
- Kwang Hyun Chung** (Soonchunhyang University)
- Kyong Joo Lee** (Hallym University)
- Min Jae Yang** (Ajou University)
- Moon Sung Lee** (Soonchunhyang University)
- Myung-Gyu Choi** (The Catholic University of Korea)
- Oh Young Lee** (Hanyang University)
- Sang Hoon Kim** (Dongguk University)
- Sang Hyub Lee** (Seoul National University)
- Sang Kil Lee** (Yonsei University)
- Sang Pyo Lee** (Hallym University)
- Seok Jeong** (Inha University)
- Seung-Hun Kim** (Jeonbuk National University)
- Seung Han Kim** (Korea University)
- Seung In Seo** (Hallym University)
- Seung Joo Kang** (Seoul National University)
- Seung-Joo Nam** (Kangwon National University)
- Se-Woo Park** (Hallym University)
- Soo-Heon Park** (The Catholic University of Korea)



Soo-Jeong Cho (Seoul National University)
Soon Man Yoon (Chungbuk National University)
Sun Hee Kim (CHA Bundang Hospital)
Sun Huh (Hallym University)
Sun Hyung Kang (Chungnam National University)
Sung Kwan Shin (Yonsei University)
Sung Noh Hong (Sungkyunkwan University)
Sung-Hoon Moon (Hallym University)
Tae Ho Kim (The Catholic University of Korea)
Tae Hoon Lee (Soonchunhyang University)
Tae Hyeon Kim (Wonkwang University)
Tae Il Kim (Yonsei University)
Tae Jun Kim (Sungkyunkwan University)
Tae Jun Song (University of Ulsan)
Tae-Geun Gweon (The Catholic University of Korea)
Wan-Sik Lee (Chonnam National University)
Won Jae Yoon (Ewha Womans University)
Won Moon (Kosin University)
Yehyun Park (Ewha Womans University)
Yong Tae Kim (Seoul National University)
Yongchan Lee (Yonsei University)
Yoon Jae Kim (Gachon University)
Yoon Tae Jeon (Korea University)
Young Koog Cheon (Konkuk University)
Young-Ho Kim (Sungkyunkwan University)
Young-Hoon Jeong (Chung-Ang University)
Yun Nah Lee (Soonchunhyang University)
Yunho Jung (Soonchunhyang University)

Norway

Lars Aabakken (University of Oslo)

Singapore

Christopher Jen Lock Khor (Singapore General Hospital)

Tiing Leong Ang (Changi General Hospital, Singhealth)

Taiwan

Han-Mo Chiu (National Taiwan University)
Hsiu-Po Wang (National Taiwan University)
Yu-Ting Kuo (National Taiwan University)

Thailand

Phonthep Angsuwatcharakon (Chulalongkorn University)
Pradermcha Kongkam (Chulalongkorn University)
Rungsun Rerknimitr (Chulalongkorn University)

UK

Noriko Suzuki (FJGES)

USA

Bo Shen (Columbia University)
David S. Weinberg (Fox Chase Cancer Center)
Joo Ha Hwang (Stanford University)
Ronnie Fass (Case Western Reserve University)
Sung Uk Jang (Cleveland Clinic)
Vanessa M. Shami (University of Virginia)

Vietnam

Vu Van Khien (108 Central Hospital)

EXHIBITION

EXHIBITION DATES & TIMES

- June 9 (Fri), 09:00-16:50
- June 10 (Sat), 08:30-16:50

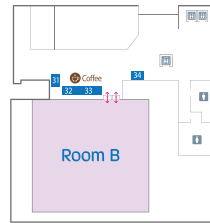
LOCATION

- Vista Hall Lobby (B2) & Grand Hall Lobby (B1) & Walker Hall Lobby (1F)

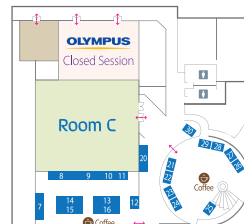
EXHIBITORS

* In alphabetical order

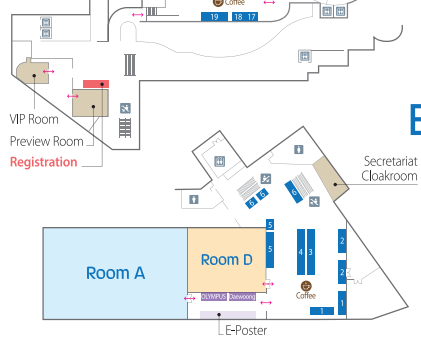
1F	Cook Medical Korea	34
	IL-YANG PHARM. CO., LTD.	33
	JJIN Commerce & Trading Co., Ltd	31
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B1	BMI KOREA	27
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	Hana Pharm Co.,Ltd.	24
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Taewoong Medical	30	
Takeda Pharmaceutical Company Limited.	26	
WAYCEN Inc.	20	
YUHAN	9	
B2	Chong Kun Dang Pharm.	5
	Daewoong Pharmaceutical CO., LTD.	4
	HK inno.N	2
	ILDONG	6
	Korea otsuka pharmaceutical CO.,LTD.	1
OLYMPUS KOREA CO., LTD.	3	



1F



B1



B2



ACKNOWLEDGEMENTS

Diamond OLYMPUS KOREA CO., LTD.

OLYMPUS

Address. 12, Seocho-daero 38-gil Seocho-gu, Seoul, 06655, Korea (Seocho-dong, Majestarcity Tower One) 3F
Tel. +82-2-1544-3200
Website. www.olympus.co.kr

Company or Product Information

Olympus Korea (OKR) was established in 2000 as the sixth overseas corporation of Olympus Group. After establishing, OKR has shared Olympus' brand value in the Korean market by providing various our products such as endoscope, Endo-therapy accessories and surgical products.

As a leading medical technology company, our Medical business uses innovative capabilities in medical technology, therapeutic intervention, and precision manufacturing to help healthcare professionals deliver diagnostic, therapeutic, and minimally invasive procedures to improve clinical outcomes, reduce overall costs, and enhance the quality of life for patients and their safety. Olympus' Medical portfolio includes endoscopes, laparoscopes, and video imaging systems, as well as surgical energy devices, system integration customer solutions, medical services, and a wide range of endotherapy instruments for endoscopic and therapeutic applications.

Diamond Daewoong Pharmaceutical CO., LTD.

DAEWOONG

Address. 12, Bongeunsa-ro 114-gil, Gangnam-gu, Seoul, Korea, 06170
Tel. +82-2-550-8800
Website. <https://www.daewoong.co.kr>

Company or Product Information

Since its foundation in 1945, Daewoong Pharmaceutical has grown into Korea's leading pharmaceutical firm through endless challenges and innovations in line with our corporate philosophy of 'developing quality medicine to safeguard the health of the people and contribute to a healthier society.'

Daewoong Pharmaceutical is consolidating its global competitiveness and R&D capabilities.

Daewoong Pharmaceutical has established itself as Korea's leading pharmaceutical company that researches, develops and manufactures medicines to compete in the global market by engaging in a wide range of partnerships with leading healthcare companies worldwide and building the most number of regional infrastructures compared to other Korean pharmaceutical firms.

In particular, we have obtained International Standard Certifications including the environmental management systems (ISO 14001), occupational health and safety systems (ISO 45001, KOSHA-MS), and quality management systems (ISO 9001). We have acquired GMP Certifications from regulatory agencies of developed countries such as the US Food and Drug Administration (FDA) and European Medicines Agency (EMA), demonstrating our highly developed quality management system.

We strive endlessly to fulfill our goal of producing the world's first-in-class and best-in-class new drug through continuous R&D investment and open collaboration. Our unceasing effort is channeled towards diversifying our new drug pipeline and platform technology to ultimately progress human health and quality of life.

Daewoong Pharmaceutical will leap beyond Korea and into the world.

Daewoong Pharmaceutical aspires to move beyond its title as Korea's leading pharmaceutical company to become a healthcare group of global reputation. We will promote sustainable future growth by strengthening internal stability through responsible management, and responding quickly and flexibly to external environmental changes.

Daewoong Pharmaceutical will devote itself to become a global healthcare group that creates new values to advance human health and quality of life based on continuous innovation.

Platinum **HK inno.N**

inno.N

Address. Pine Avenue tower A, 100, Eulji - ro, Jung-gu, Seoul, Korea

Tel. +82-2-6477-0000

Website. www.inno-n.com

Company or Product Information

Since its establishment in 1984, inno.N has gained competitiveness in the businesses of prescription drugs, active pharmaceutical ingredients, health supplements and beauty products.

Drawing on the company's experience and knowhow in developing novel drugs, inno.N succeeded in launching 'K - CAB', the 30th novel drug to be developed and registered in Korea, to great acclaim. Building on this success, inno.N remains committed to growing into a global bio health company built on outstanding products and technologies that bring us closer to a healthier future.

Gold **Korea otsuka pharmaceutical CO.,LTD.**

 **Otsuka** Korea Otsuka Pharm.

Address. Otsuka Vision Bldg., 226, Yeoksam-ro, Gangnam-gu, Seoul

Tel. +82-2-3287-9183

Website. https://www.otsuka.co.kr/introduction_en

Company or Product Information

Established in 1982, Korea Otsuka Pharmaceutical is a Japanese joint-stock corporation that provides, under the motto of "A Company That Contributes to the Healthy life of Koreans," excellent and innovative medicines and healthcare products to treat diseases, but also to maintain and improve the everyday health of Korean people.

Despite being a subsidiary of a multinational pharmaceutical company, Korea Otsuka Pharmaceutical runs a large-scale production facility in South Korea. Having acquired global production competitiveness through constant facility investment, we not only supply products in South Korea, but also continually expand our role as a production base for Otsuka Pharmaceutical, contributing to generating employment and advancing the national economy in South Korea with exports.

In addition, Korea Otsuka Pharmaceutical has taken the lead in improving South Korea's clinical capabilities and share of the medical market by engaging in global clinical research & development activities jointly conducted by South Korea, China, and Japan to introduce superior medicines promptly into the Korean market. Korea Otsuka Pharmaceutical has been named an innovative pharmaceutical company, a rare feat for a Korean subsidiary of a multinational pharmaceutical company, in recognition of excellence in terms of R&D investment, domestic production operations, and overseas expansion.

Going forward, Korea Otsuka Pharmaceutical will continue to grow as a total healthcare company that dedicates itself to promoting health and happiness by diligently fulfilling our corporate mission of contributing to the healthy life of Koreans.



Gold **ILDONG**

ILDONG PHARMACEUTICAL CO., LTD.

Address. 2, Baumoe-ro 27-gil, Seocho-gu, Seoul, Korea

Tel. 02-526-3114

Website. www.ildong.com

Company or Product Information

A global healthcare company dedicated to customer-centric values

As a leading pharmaceutical company in South Korea, we have been dedicated and committed to the development and supply of superior pharmaceutical products that contribute to the health and well-being of people around the world.

We are steadfast in our vision of continuously growing with our customers as a leading global company by providing solutions for disease prevention and developing new solutions for healthier and happier lives.

Ildong has earned the trust of our customers with our ethical drugs franchise for chronic disease and cancer therapies, antibiotics, and digestive and circulatory drugs, in addition to our well-known OTC brands such as Biovita (probiotics product) and Aronamin (multivitamin). We are on the road to reaching our vision of becoming a global total healthcare company with various new drug pipelines including Besivo (hepatitis B therapy), which is the 28th novel drug in South Korea, as well as new innovative drug pipelines and new businesses for health functional foods, medical devices, cosmetics, and beverages.

Gold **Chong Kun Dang Pharm.**



**Chong Kun Dang
Pharm.**
Seoul, Korea

Address. 8, Chungjeong-ro, Seodaemun-gu, Seoul 03742, Korea

Tel. +82-2-2149-0300

Website. <http://www.ckdpharm.com/home>

Company or Product Information

<OUR MISSION: Better Life through Better Medicine>

Contributing to improved quality of life and public welfare by developing quality medicines.

A company that has achieved numerous 'first', 'bests' and 'very bests'

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

M.I.Tech Co., Ltd.



Address. 174, Habuk 2-gil, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 17706, Korea

Tel. +82-70-4304-7407

Website. www.mitech.co.kr

Company or Product Information

M.I.Tech, based in South Korea and established in 1991, develops, manufactures and provides its own unique medical devices in the field of digestive endoscopy to improve patients' quality of life.

As a GI stent leading company, M.I.Tech proudly provides the metal stents to 98 countries.

Furthermore, we are continuing to expand our business to more than gastroenterology.

M.I.Tech manufactures all products under a strict quality management system by maintaining the global standard, ISO 13485:2003.

We try to consistently reinforce our R&D potential based on accumulated experience and knowledge to continue satisfying the quality demands from customers.

M.I.Tech will put customer satisfaction at our top priority with an affirmative and progressive mind.

For more information, visit our website, www.mitech.co.kr.

Bronze

Daewon Pharmaceutical Corp.



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

Escorten, the first PPI gastritis treatment that will open a new era of gastritis treatment in Korea, was born after phase 1 clinical trials at 27 general hospitals nationwide in the same year, starting with Daewon Pharmaceutical's independent drug development in 2019.

Escorten's excellent and continuous treatment effect, which will be released in March 2022, is expected to be a new treatment option to help patients and teachers complaining of upper gastrointestinal symptoms.

Bronze

Hanmi Pharm.



Address. 14, Wiryeseong-daero, Songpa-gu, Seoul, Korea

Tel. +82-2-410-9114

Website. <https://www.hanmi.co.kr/hanmi/handler/Home-Start>

Company or Product Information

Hanmi Pharm established in 1973 has a motto 'to develop better drugs for precious lives' and to advance to the global market as a representative of the Korean Pharmaceutical industry by focusing on R&D.

Hanmi Pharm has achieved the first and greatest new drug licensing deal since 1990's, and became a pioneer of developing first-in-class drugs in collaboration with global leading pharmaceutical companies.

Especially, Hanmi makes strenuous and enthusiastic efforts to develop treatments for diabetes, obesity, cancer, autoimmune and rare disease to keep everyone's health and improve their quality of life.

Hanmi has received GMP certifications from food and drugs authorities of developed countries and also strives to promote public health by exporting finished products to global pharmaceutical companies based upon differentiated quality management.

Hanmi has adopted the new slogan "Trust Based Management" to illustrate the company ethos of always being trustworthy and transparent in everything we do. Along with this, Hanmi will strive to become a world's innovative pharmaceutical company.

Hanmi pioneering a new way with spirit of creation and challenge will make every endeavor to lead continuous improvement in order for our nation to become a leading player in global pharmaceutical industry.

We believe our responsibility is to devote ourselves to discover global breakthrough drugs with the goal of repaying the love and support from you. We look forward to your continued partnership with us.



Bronze Dong-A ST



Address. 64, Cheonho-daero, Dongdaemun-gu, Seoul, Korea
Tel. +82-2-920-8778
Website. www.donga-st.com

Company or Product Information

Dong-A ST focuses on prescription drugs such as self-developed new drugs such as St illen, Zydena, Motiliton, Suganon/Sugamet, medical devices, diagnostics, and overseas business.

Based on an optimal research infrastructure, including a world-class state-of-the-art research center completed in 2011 and highly competent research personnel, we are striving to develop new global drugs.

Based on this, we plan to establish ourselves as a global pharmaceutical company beyond Korea by actively pioneering overseas markets and expanding overseas exports.

Bronze IL-YANG PHARM. CO., LTD.



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 world-wide 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, *H.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.

Sapphire SK Chemicals



Tel. +82-2-2008-2008
Website. <https://www.skchemicals.com>

Sapphire JEIL PHARMACEUTICAL CO.,LTD.



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Website. <https://www.jeilpharm.co.kr/english/>

Sapphire

WAYCEN Inc.



Tel. +82-2-568-0863
Website. www.waycen.com

Sapphire

FINEMEDIX.Co.Ltd



Tel. +82-2-785-8389
Website. www.finemedix.com

Sapphire

YUHAN



Tel. +82-2-828-0181
Website. www.yuhan.co.kr

RUBY

GK Pharm / GC Wellbeing



Tel. +82-80-777-1380 / +82-1557-5560
Website. <http://gkpharm.co.kr/>,
<https://www.greencrosswb.com/>

RUBY

Bukwang Pharmaceutical Co., Ltd.



Tel. +82-2-8288-114
Website. www.bukwang.co.kr



CRYSTAL

EZ FIX Co.,Ltd.



Tel. +82-2-975-0471
Website. <http://www.ez-fix.co.kr>

CRYSTAL

Takeda Pharmaceutical Company
Limited.



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CRYSTAL

Korea Pharma



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CRYSTAL

Pharmbio Korea Inc.



Tel. +82-2-587-2551
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CRYSTAL

Korea United Pharm. INC.



Tel. +82-2-512-9981
Website. www.kup.co.kr

CRYSTAL

Samil Pharm Co., Ltd.



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Website. www.samil-pharm.com

CRYSTAL

Medtronic Korea

Medtronic

Tel. +82-2-3404-3600
Website. <https://www.medtronic.com/kr-ko/index.html>

CRYSTAL

Erbe Medical Korea

erbe
power your performance.

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Website. Erbe-med.com

CRYSTAL

Standard Sci-Tech Inc.



Standard Sci-Tech Inc.

Tel. +82-2-922-3605
Website. <http://www.standard4u.com>

CRYSTAL

BMI KOREA

BMIKOREA

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Website. <http://www.bmikr.co.kr/>

CRYSTAL

JW Pharmaceutical Corp.

jw Pharmaceutical

Tel. +82-2-840-6777
Website. jw-pharma.co.kr

CRYSTAL

Hana Pharm Co., Ltd.



Hana Pharm Co., Ltd.

Tel. +82-2-577-7667
Website. www.hanaph.co.kr



CRYSTAL

Boston Scientific Korea

**Boston
Scientific**

Advancing science for life™

Tel. +82-2-3476-2121

Website. www.bostonscientific.com

CRYSTAL

JiIN Commerce & Trading Co., Ltd

JiIN
Commerce & Trading Co., Ltd

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CRYSTAL

TaeWoong Medical


TaeWoong
MEDICAL

Tel. +82-31-904-6153

Website. <http://www.taewoongmedical.com/in/>

CRYSTAL

Cook Medical Korea

COOK
MEDICAL

Tel. +82-2-6292-3500

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IDEN International
Digestive
Endoscopy
Network
2023

SCIENTIFIC PROGRAM

*Sharing
Our Global Future
of Endoscopy*



SESSION DESCRIPTION

Upper GI

UGI 1 Celebrating luminaries of gastroesophageal junction diseases

The gastroesophageal junction is of significant clinical interest due to its role in many disease processes. This session will explore recent trends in the diagnosis and treatment of various gastroesophageal junction diseases.

UGI 2 [KSGE-JGES] Innovation in therapeutic upper GI endoscopy

Recent endoscopic development has created highly innovative techniques for replacing surgical procedures. In this session with JGES, we will discuss how innovative techniques can be applied in treatment of upper GI diseases.

UGI 3 How can we use AI in upper GI neoplasia?

AI models in upper GI endoscopy have shown high diagnostic performance for the detection, characterization, and delineation of upper GI neoplasia. This session will discuss how AI can be used in the diagnosis and treatment of upper GI neoplasia.

UGI 4 [KSGE-ESGE] Recent updates and trends in bariatric endoscopy

Endoscopic bariatric therapies are currently on the rise as a new tool in the fight against the obesity. In this session with ESGE, we will discuss the evolution and current state of bariatric endoscopy in Korea and Western countries.

UGI 5 Diagnostic endoscopy in the next generation

Diagnostic endoscopy has evolved substantially over the past two decades, with optical improvements including high definition endoscopes with magnification capabilities and optical adjuncts such as narrow band imaging and confocal laser endomicroscopy, among others. This session will explore diagnostic endoscopy in the next generation.

UGI 6 Management of early gastric cancer: A to Z

Management of early gastric cancer have still been progressing even after the great success of endoscopic submucosal dissection. This session will give a basic summary of early gastric cancer, outline the current state of its treatment, and summarize the prospects for future management of the disease.



Lower GI

LGI 1 [KSGE-WEO] Overcoming difficulties of CRC screening in colonoscopy

Colonoscopy is essential for CRC screening. Nonetheless, there are still issues that must be resolved before colonoscopy may be utilized extensively for CRC screening. In this session, we hope to determine how to overcome these obstacles.

LGI 2 [KSGE-ESGE] Improving quality of colonoscopy in daily clinical practice

Improving quality of colonoscopy is mandatory for accurate endoscopic diagnosis and treatment. In this session, we will learn and discuss the optimal bowel preparation methods, endoscopic techniques/instruments, and roles of artificial intelligence to achieve the best quality of colonoscopy.

LGI 3 Innovative diagnostic & therapeutic endoscopy in IBD

During this session, the use of advanced endoscopic techniques for diagnosis and treatment of inflammatory bowel disease will be discussed, highlighting innovation in the field.

LGI 4 Optimal endoscopic resection techniques in various types of colorectal neoplasia

In this session, we will discuss the best therapeutic methods and techniques for various types of colorectal polyps.

LGI 5 Colorectal ESD: Current status and future perspectives

Techniques and methods for removing colorectal neoplasms have advanced remarkably. In this session, endoscopic resection methods for colorectal neoplasms in various situations are discussed and optimal resection methods are presented.

LGI 6 Challenges and opportunities of AI applications in lower GI tract

The development of AI in gastroenterology has increased dramatically in recent decades. In this session, we will discuss the clinical applications, current limitations and future directions of AI in lower GI tract.

Pancreatobiliary

PB 1 **Difficult ERCP: What are the solutions?**

A panel of experts will share their experience and insights on managing difficult cases, such as those with complex anatomical variations, post-surgical alterations, or challenging biliary strictures. The experts will also discuss the latest techniques, tools, and technologies available to tackle these complex cases and improve the success rates of ERCP.

PB 2 **Strategies and cutting-edge technology in the management of biliary stricture in living donor liver transplantation**

Through this debate session, participants will have the opportunity to learn from leading experts in the field, exchange ideas and experiences, and better understand the most effective strategies and cutting-edge technologies for managing biliary strictures in living donor liver transplantation.

PB 3 **[KSGE-ESGE] Role of digital SOC and pancreatoscopy**

This joint session between the Korean Society of Gastrointestinal Endoscopy and the European Society of Gastrointestinal Endoscopy will host a beneficial meeting for experts and beginners to share their knowledge and experience on using digital single-operator cholangioscopy (SOC) and pancreatoscopy in the diagnosis and management of pancreatic and biliary disorders.

PB 4 **Recent updates on EUS-guided tissue acquisition**

EUS-guided tissue acquisition has rapidly developed since its introduction in the early 1990s. This session will focus on the latest developments and updates in EUS-guided tissue acquisition.

PB 5 **[KSGE-JGES] EUS-guided drainage and beyond**

This joint session between the Korean Society of Gastrointestinal Endoscopy and the Japanese Society of Gastrointestinal Endoscopy will focus on the latest cutting-edge techniques and future perspectives to improve the use of novel devices and techniques to improve the safety and efficacy of EUS-guided drainage procedures.

PB 6 **Role of endoscopy in early detection and surveillance of pancreatobiliary neoplasm**

Endoscopy has emerged as a valuable tool for the early detection and surveillance of pancreatobiliary neoplasms, as it allows for detecting precancerous and early-stage cancers before they progress to more advanced stages. This session will focus on the role of endoscopy in the early detection and surveillance of pancreatobiliary neoplasms, including advanced imaging technologies, such as endoscopic ultrasound and cholangioscopy, to improve diagnostic accuracy.

IDEN International
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Network
2023

DAILY PROGRAM

June **08** *Thu*

*Sharing
Our Global Future
of Endoscopy*



DAILY PROGRAM | June 08 (Thu)

PROGRAM

- Date & Time:	June 8 (Thu), 13:00-17:00
- Place:	Grand 1, Grand Walkerhill Seoul, Korea
12:30-13:00	Registration
13:00-13:10	Welcoming Remarks
13:10-14:00	Session 1. Upper GI topic
	<i>Moderators: Tae Ho Kim (Korea), Ki Bae Bang (Korea), Sang Hoon Kim (Korea)</i>
S1-1 13:10-13:20	Endoscopic surveillance of chronic atrophic gastritis and intestinal metaplasia on a Latin American population Gonzalo Latorre, Pontificia Universidad Católica de Chile, Chile
S1-2 13:20-13:30	Diagnostic performance of Kyoto and modified Kyoto classification scores for <i>Helicobacter pylori</i> infection Dacio Hector Cabrera Hinojosa, Hospital Nacional Dos de Mayo, Peru
S1-3 13:30-13:40	A study of the intermediate to long-term outcome of corrosive ingestion Natee Faknak, Swanpracharak Hospital, Thailand
S1-4 13:40-13:50	The initial results of endoscopic management for upper gastrointestinal subepithelial lesions from Bach Mai Hospital Nam Thanh Nguyen, Bach Mai Hospital, Vietnam
14:00-14:40	Session 2. Lower GI topic
	<i>Moderators: Jeong-Sik Byeon (Korea), Ja Seol Koo (Korea), Jae Jun Park (Korea)</i>
S2-1 14:00-14:10	There is a lethal one. Don't miss it. Wai Phyo Lwin, Defense Services General Hospital, Myanmar
S2-2 14:10-14:20	Piecemeal polypectomy of large pedunculated polyp near dentate line: A case report Muhammad Firhat Idrus, Cipto Mangunkusumo National General Hospital, MD, Indonesia
S2-3 14:20-14:30	Endoscopic submucosal dissection: Results of 30 colorectal neoplastic lesions from the Bach Mai interventional endoscopy Chuong Van Hoang, Bach Mai Hospital, Vietnam
S2-4 14:30-14:40	EUS-guided colo-colostomy for the treatment of benign complete occlusion of colonic anastomosis: A case series Philip Boon Cheong Pang, Hospital Kuala Lumpur, Malaysia
14:40-15:00	Break
15:00-15:50	Session 3. PB topic



Moderators: Young Koog Cheon (Korea), Jimin Han (Korea), Won Jae Yoon (Korea)

S3-1	15:00-15:10	Positive cultures from bile sampled during ERCP for biliary plating stenting increase the risk of early cholangitis Andrei Mihai Voiosu, Colentina Clinical Hospital, Romania
S3-2	15:10-15:20	Comparative outcome of single versus two double-pigtail stents for endoscopic drainage of pancreatic pseudocysts Sumaswi Angadi, Nizam's Institute of Medical Sciences, India
S3-3	15:20-15:30	Incorporation of endoscopic ultrasound in decision making for elective ERCP in patients after gallstone pancreatitis Weng-Fai Wong, National Taiwan University Hospital, Taiwan
S3-4	15:30-15:40	Comparison of outcomes of EUS-guided choledochoduodenostomy and hepaticogastrostomy after a failed ERCP-A meta-analysis Vaneet Jearth, Post Graduate Institute of Medical Education & Research, Chandigarh, India
S3-5	15:40-15:50	Successful treatment of persistent post cholecystectomy cut of bile duct using single operator cholangioscopy and ERCP Enkhtuvshin Dorjpurev, UB Songdo Hospital, Mongolia

15:50-16:40 **Session 4. Other GI topic**

Moderators: Sung Noh Hong (Korea), Tae-Geun Gweon (Korea)

S4-1	15:50-16:00	Z-POEM in Izmir since 2018: A single center experience Levent Aktas Izmir Katip Celebi University Ataturk Training and Research Hospital, Türkiye
S4-2	16:00-16:10	Role of endosonography in the evaluation of suspected endoscopic subepithelial lesions of the upper digestive tract: Experience of 364 patients Felipe Sandoval Orrego, Pontificia Universidad Católica de Chile, Chile
S4-3	16:10-16:20	Single-incision needle knife biopsy and EUS in upper gastrointestinal subepithelial lesions Thi Huyen Thuong Nguyen, Hue University of Medicine and Pharmacy Hospital, Vietnam
S4-4	16:20-16:30	Forward viewing versus curved linear array echo-endoscopes for obliteration of gastric varices: A retrospective study Deepak Madhu, Lisie Hospital, India
S4-5	16:30-16:40	Endoscopic band ligation as primary and secondary prophylaxis of esophageal varices in children with portal hypertension Abdulaziz Tojiboev, Republican Specialized Scientific Practical Medical Center of Pediatrics, Uzbekistan

16:40-17:00 **Closing & Awards Ceremony**

IDEN International
Digestive
Endoscopy
Network
2023

DAILY PROGRAM

June **09** *Fri*

*Sharing
Our Global Future
of Endoscopy*



DAILY PROGRAM | June 09 (Fri)

Upper GI

Room A

09:00-10:30 UGI 1 Celebrating luminaries of gastroesophageal junction diseases

*Moderators: Oh Young Lee, Hanyang University, Korea
Ronnie Fass, Case Western Reserve University, USA*

- UGI 1-1 **Current issue in eosinophilic esophagitis**
Kee Wook Jung, University of Ulsan, Korea
- UGI 1-2 **GERD, reflux hypersensitivity or functional disorder?**
Ronnie Fass, Case Western Reserve University, USA
- UGI 1-3 **Endoscopic submucosal dissection (ESD) for Barrett's esophagus (BE)-related early neoplasia**
Joo Ha Hwang, Stanford University, USA
- UGI 1-4 **Improving diagnostic yields of gastrointestinal diseases arising in the gastroesophageal junctional zone**
Myung-Gyu Choi, The Catholic University of Korea, Korea

10:30-11:00 Break

11:00-12:30 UGI 2 [KSGE-JGES] Innovation in therapeutic upper GI endoscopy

*Moderators: Soo-Heon Park, The Catholic University of Korea, Korea
Hironori Yamamoto, Jichi Medical University, Japan*

- UGI 2-1 **Recent trends and studies about POEM**
Hironari Shiwaku, Fukuoka University, Japan
- UGI 2-2 **Endoscopic myotomy for upper esophageal diverticulum (Zenker diverticulum)**
Jae-Young Jang, Kyung Hee University, Korea
- UGI 2-3 **EUS-guided gastroenterostomy (EUS-GE) for malignant gastric outlet obstruction**
Takayoshi Tsuchiya, Tokyo Medical University, Japan
- UGI 2-4 **ESD in subepithelial tumors: Is it always possible?**
Jinwoong Cho, Presbyterian Medical Center, Korea

12:30-13:30 Luncheon Symposium 1 | sponsored by DAEWOONG

Moderator: Hyo Jin Park, Yonsei University, Korea

- LS 1 **Fexuclyue : The new wave of GERD treatment**
Chan Hyuk Park, Hanyang University, Korea



13:30-15:00 UGI 3 How can we use AI in upper GI neoplasia?

*Moderators: Hoon Jai Chun, Korea University, Korea
Jean-François Rey, Institute Arnault Tzanck, France*

- UGI 3-1** **Role of AI in Barrett's esophagus-related neoplasia**
Alanna Ebigo, Augsburg University Hospital, Germany
- UGI 3-2** **Role of AI in esophageal squamous cell neoplasia**
Jun-Won Chung, Gachon University, Korea
- UGI 3-3** **Real-time use of AI for diagnosing early gastric cancer by white-light endoscopy**
Chang Seok Bang, Hallym University, Korea
- UGI 3-4** **Real-time use of AI for diagnosing early gastric cancer by image-enhanced endoscopy**
Honggang Yu, Renmin Hospital of Wuhan University, China

15:00-15:20 Break

15:20-16:50 UGI 4 [KSGE-ESGE] Recent updates and trends in bariatric endoscopy

*Moderators: Hwoon-Yong Jung, University of Ulsan, Korea
Ivo Boskoski, Università Cattolica del Sacro Cuore di Roma, Italy*

- UGI 4-1** **Indications and techniques for bariatric endoscopy and their mechanisms of actions**
Sung Kwan Shin, Yonsei University, Korea
- UGI 4-2** **Complications following bariatric endoscopy and their management**
Vincent Huberty, Erasme Hospital, Belgium
- UGI 4-3** **The evolution and current state of bariatric endoscopy in Korea**
Seung-Joo Nam, Kangwon National University, Korea
- UGI 4-4** **The evolution and current state of bariatric endoscopy in Western countries**
Ivo Boskoski, Università Cattolica del Sacro Cuore di Roma, Italy

DAILY PROGRAM | June 09 (Fri)

Lower GI

Room B

09:00-10:30 **LGI 1 [KSGE-WEO] Overcoming difficulties of CRC screening in colonoscopy**

*Moderators: Yoon Tae Jeon, Korea University, Korea
Lars Aabakken, University of Oslo, Norway*

- LGI 1-1** **Getting ready for a high quality colonoscopy**
Byung Chang Kim, National Cancer Center, Korea
- LGI 1-2** **Dealing with post-colonoscopy colorectal cancer**
Yutaka Saito, National Cancer Center Hospital, Japan
- LGI 1-3** **The best time to start colorectal cancer screening for young ages**
Soon Man Yoon, Chungbuk National University, Korea
- LGI 1-4** **When should colorectal cancer screening in the elderly be discontinued?**
Han-Mo Chiu, National Taiwan University Hospital, Taiwan

10:30-11:00 Break

11:00-12:30 **LGI 2 [KSGE-ESGE] Improving quality of colonoscopy in daily clinical practice**

*Moderators: Dong Soo Han, Hanyang University, Korea
Raf Bisschops, University Hospitals Leuven, Belgium*

- LGI 2-1** **Best bowel preparation: Tailored choice of agent and protocol**
Hoon Sup Koo, Konyang University, Korea
- LGI 2-2** **Painless colonoscopy: Available techniques and instruments**
Raf Bisschops, University Hospitals Leuven, Belgium
- LGI 2-3** **Colonoscopy for increasing adenoma detection rates: Optimized withdrawal techniques and attachment devices**
Jae Myung Cha, Kyung Hee University, Korea
- LGI 2-4** **Artificial intelligence: Is it a brilliant assistant for colonoscopy quality improvement?**
Noriko Suzuki, FJGES, UK



12:30-13:30 Luncheon Symposium 2 | sponsored by **inno.N**

Moderators: Moon Sung Lee, Soonchunhyang University, Korea

- LS 2** **A novel, clinically validated P-CAB : Tegoprazan**
Gwang Ha Kim, Pusan National University, Korea

13:30-15:00 LGI 3 Innovative diagnostic & therapeutic endoscopy in IBD

*Moderators: Young-Ho Kim, Sungkyunkwan University, Korea
Bo Shen, Columbia University, USA*

- LGI 3-1** **Role of endoscopy in inflammatory bowel disease: From guidelines to daily practice**
Eun Soo Kim, Kyungpook National University, Korea
- LGI 3-2** **Optimal approach of ESD for colitis-associated dysplasia**
Dong-Hoon Yang, University of Ulsan, Korea
- LGI 3-3** **Cutting edge of endoscopic surveillance in IBD**
Won Moon, Kosin University, Korea
- LGI 3-4** **Cutting edge of endoscopic treatment for Crohn's disease**
Bo Shen, Columbia University, USA

15:00-15:20 Break

15:20-16:50 LGI 4 Optimal endoscopic resection techniques in various types of colorectal neoplasia

*Moderators: Geun Am Song, Pusan National University, Korea
David G. Hewett, University of Queensland, Australia*

- LGI 4-1** **Large SSL: What is the best resection technique - Cold vs hot? Piecemeal vs en bloc?**
Hyun Gun Kim, Soonchunhyang University, Korea
- LGI 4-2** **Malignant pedunculated polyps: Resection techniques and pathological interpretation**
David G. Hewett, University of Queensland, Australia
- LGI 4-3** **Laterally spreading tumors: Optical therapeutic strategies according to type**
Masau Sekiguchi, National Cancer Center Hospital, Japan
- LGI 4-4** **Management of remnant or recurrent lesions after endoscopic resection**
Duk Hwan Kim, CHA University, Korea

DAILY PROGRAM | June 09 (Fri)

Pancreatobiliary

Room C

09:00-10:30 PB 1 Difficult ERCP: What are the solutions?

*Moderators: Jin Lee, Hallym University, Korea
Yong Tae Kim, Seoul National University, Korea*

- PB 1-1** **Advanced ERCP techniques**
Seok Jeong, Inha University, Korea
- PB 1-2** **Enteroscopy assisted ERCP**
Min Jae Yang, Ajou University, Korea
- PB 1-3** **EUS-guided interventions for difficult ERCP cases**
Kazuo Hara, Aichi Cancer Center, Japan
- PB 1-4** **Case-based discussion**
In Rae Cho, Seoul National University, Korea

10:30-11:00 Break

11:00-12:30 PB 2 Strategies and cutting-edge technology in the management of biliary stricture in living donor liver transplantation: Pros and Cons of ERCP with SOC assisted techniques, PTBD with rendezvous technique and ERCP with magnetic compression anastomosis technique

*Moderators: Dong Ki Lee, Yonsei University, Korea
Jong Kyun Lee, Sungkyunkwan University, Korea*

- Case 1 presentation: ERCP with SOC assisted techniques**
Tae Jun Song, University of Ulsan, Korea
- Case 2 presentation: PTBD with rendezvous technique**
Joo Kyung Park, Sungkyunkwan University, Korea
- Case 3 presentation: ERCP with magnetic compression anastomosis technique**
Sung Ill Jang, Yonsei University, Korea
- PB 2-1** **ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: Pro ERCP with SOC**
Jong Ho Moon, Soonchunhyang University, Korea
- PB 2-2** **ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: Pro PTBD with rendezvous technique**
Hiroyuki Isayama, Juntendo University, Japan



PB 2-3 ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: Pro ERCP with magnetic compression anastomosis technique

Sung Uk Jang, Cleveland Clinic, USA

Discussion **Pro ERCP with SOC**

Jong Ho Moon, Soonchunhyang University, Korea

Pro ERCP with SOC

Tae Jun Song, University of Ulsan, Korea

Pro PTBD with the rendezvous technique

Hiroyuki Isayama, Juntendo University, Japan

Pro PTBD with the rendezvous technique

Joo Kyung Park, Sungkyunkwan University, Korea

Pro ERCP with the magnetic compression anastomosis technique

Sung Uk Jang, Cleveland Clinic, USA

Pro ERCP with the magnetic compression anastomosis technique

Sung Ill Jang, Yonsei University, Korea

13:30-15:00 **PB 3 [KSGE-ESGE] Role of digital SOC and pancreatoscopy**

Moderators: Jae-Seon Kim, Korea University, Korea

Tomas Hucl, Institute for Clinical and Experimental Medicine, Czech Republic

PB 3-1 Which one is better? Direct POC vs. Spyglass DS

Yun Nah Lee, Soonchunhyang University, Korea

PB 3-2 Removal of pancreaticobiliary stones

Chi Hyuk Oh, Kyung Hee University, Korea

PB 3-3 Mapping of pancreaticobiliary neoplasm

Tomas Hucl, Institute for Clinical and Experimental Medicine, Czech Republic

PB 3-4 Classification of biliary tumors according to image

Hannah van Malenstein, University Hospitals Leuven, Belgium

15:00-15:20 Break

15:20-16:50 **PB 4 Recent updates on EUS-guided tissue acquisition**

Moderators: Hong Sik Lee, Korea University, Korea

Vanessa M. Shami, University of Virginia, USA

DAILY PROGRAM | June 09 (Fri)

- PB 4-1** **The optimal choice of needles and accessories**
Christopher Jen Lock Khor, Singapore General Hospital, Singapore
- PB 4-2** **EUS-guided through the needle biopsy for pancreatic cysts**
Dong Wan Seo, University of Ulsan, Korea
- PB 4-3** **Advice from pathologists' perspectives**
Haeryoung Kim, Seoul National University, Korea
- PB 4-4** **Next generation sequencing and organoid cultures of samples acquired through EUS-guided methods**
Kwang Hyuck Lee, Sungkyunkwan University, Korea

IDEN Consensus: Clinical guidelines Room D

11:00-12:30 **IDEN consensus: 2023 IDEN consensus on the management of antithrombotic agents in patients undergoing gastrointestinal endoscopy and endoscopic procedures**

*Moderators: Joo Ha Hwang, Stanford University, USA
Ki-Nam Shim, Ewha Womans University, Korea*

- IC 1-1** **Introduction and methods**
Kee Don Choi, University of Ulsan, Korea
- IC 1-2** **Overview and recent trends in antithrombotics and cardiovascular risk stratification**
Young-Hoon Jeong, Chung-Ang University, Korea
- IC 1-3** **Recommendations of anti-platelet agents**
Chung Hyun Tae, Ewha Womans University, Korea
- IC 1-4** **Recommendations of anticoagulants**
Seung Joo Kang, Seoul National University, Korea
- Panelists** **Discussion**
Joo Ha Hwang, Stanford University, USA
Yutaka Saito, National Cancer Center Hospital, Japan
Hon Chi Yip, The Chinese University of Hong Kong, Hong Kong
Rungsun Rerknimitr, Chulalongkorn University, Thailand
Christopher Jen Lock Khor, Singapore General Hospital, Singapore
Vu Van Khien, 108 Central Hospital, Vietnam



Clinical Endoscopy editor session

Room D

13:30-15:00 Clinical Endoscopy editor session

*Moderators: Gwang Ha Kim, Pusan National University, Korea
Vanessa M. Shami, University of Virginia, USA*

- CE1-1** **Introducing the new journal evaluation system**
Sun Huh, Hallym University, Korea
- CE1-2** **Sharing experiences from the Journal of Gastric Cancer & collaborating with Clinical Endoscopy**
Keun Won Ryu, National Cancer Center, Korea
- CE1-3** **How-to in Clinical Endoscopy: From a domestic editor's view**
Tae Hoon Lee, Soonchunhyang University, Korea
- CE1-4** **How-to in Clinical Endoscopy: From a foreigner editor's view**
Rungsun Rerknimitr, Chulalongkorn University, Thailand
- Discussion**

15:00-15:20 Break

Satellite Symposium 1

Room D

15:20-16:20 Satellite Symposium 1 | sponsored by **OLYMPUS**

Moderator: Hyun Yong Jeong, Chungnam National University, Korea

- SS1** **Latest advancement in LGI endoscopy**
Tiing Leong Ang, Changi General Hospital, Singhealth, Singapore

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DAILY PROGRAM | June 10 (Sat)

Live Demonstration 1

Room A

08:30-10:00 LD 1 Live Demonstration 1: UGI/LGI Cases

*Moderators: Dong Kyung Chang, Sungkyunkwan University, Korea
Gwang Ho Baik, Hallym University, Korea*

Panelists Hyun Lim, Hallym University, Korea
Jae Jun Park, Yonsei University, Korea
Bo-In Lee, The Catholic University of Korea, Korea
Bong Eun Lee, Pusan National University, Korea

Demonstrators [UGI] Diverticular POEM for esophageal epiphrenic diverticulum

Do Hoon Kim, University of Ulsan, Korea

[LGI] Colorectal endoscopic submucosal dissection of laterally spreading tumor

Yunho Jung, Soonchunhyang University, Korea

[UGI] Gastroscopic diagnosis and resection of a small EGC

Kang Nyeong Lee, Hanyang University, Korea

10:00-10:30 Break

Live Demonstration 2

10:30-12:00 LD 2 Live Demonstration 2: PB Cases

*Moderators: Young Koog Cheon, Konkuk University, Korea
Tae Hyeon Kim, Wonkwang University, Korea*

Panelists Won Jae Yoon, Ewha Womans University, Korea
Sung-Hoon Moon, Hallym University, Korea
Huapyeong Kang, Gachon University, Korea

Demonstrators Pradermcha Kongkam, Chulalongkorn University, Thailand
Phonthep Angsuwatcharakon, Chulalongkorn University, Thailand
D. Nageshwar Reddy, Asian Institute of Gastroenterology & AIG Hospitals, India
Neeraj Singla, AIG Hospitals, India
Rakesh Kalapala, AIG Hospitals, India
Hsiu-Po Wang, National Taiwan University, Taiwan
Yu-Ting Kuo, National Taiwan University, Taiwan

12:00-13:00 Luncheon Symposium 3 | sponsored by **OLYMPUS**

Moderator: Myung-Gyu Choi, The Catholic University of Korea, Korea

LS 3 Latest advancement in UGI endoscopy

Kohei Takizawa, Koyukai Shin-Sapporo Hospital, Japan



13:00-13:30 General Assembly

Upper GI

Room A

13:30-15:00 **UGI 5 Diagnostic endoscopy in the next generation**

*Moderators: Yongchan Lee, Yonsei University, Korea
Hisao Tajiri, Jikei University, Japan*

- UGI 5-1** **How AI is revolutionizing endoscopy**
Jean-François Rey, Institute Arnault Tzanck, France
- UGI 5-2** **Best practices in endoscopic diagnosis of upper GI Neoplasia by endoscopy**
Hisao Tajiri, Jikei University, Japan
- UGI 5-3** **pCLE & endocytoscope systems in gastroesophageal neoplastic lesions**
Sang Kil Lee, Yonsei University, Korea
- UGI 5-4** **The clinical application of magnetically steerable gastric capsule endoscopy**
Zhuan Liao, Changhai Hospital, China

15:00-15:20 Break

15:20-16:50 **UGI 6 Management of early gastric cancer: A to Z**

*Moderators: Joo Young Cho, CHA University, Korea
Tiing Leong Ang, Changi General Hospital, Singhealth, Singapore*

- UGI 6-1** **Optimal handling and histological assessment of ESD specimens – A Japanese practice**
Kohei Takizawa, Koyukai Shin-Sapporo Hospital, Japan
- UGI 6-2** **New methods for safe and effective ESD**
Wan-Sik Lee, Chonnam National University, Korea
- UGI 6-3** **Endoluminal ablative therapy for early upper GI neoplasia**
Tiing Leong Ang, Changi General Hospital, Singhealth, Singapore
- UGI 6-4** **Management of special type EGCs: Undifferentiated or mixed histology**
Ji Yong Ahn, University of Ulsan, Korea

DAILY PROGRAM | June 10 (Sat)

Lower GI

Room B

13:30-15:00 LGI 5 Colorectal ESD: Current status and future perspectives

*Moderators: Hyun-Soo Kim, Chonnam National University, Korea
Shinji Tanaka, Hiroshima University, Japan*

- LGI 5-1** **Differentiation of superficial versus submucosal colorectal cancer: What's the best?**
Tae-Geun Gweon, The Catholic University of Korea, Korea
- LGI 5-2** **Knife, cap, and electrosurgical unit: Best choices and optimal use**
Jun Lee, Chosun University, Korea
- LGI 5-3** **Prediction and management of difficult situations: Strategies to overcome**
Bo-In Lee, The Catholic University of Korea, Korea
- LGI 5-4** **New techniques and device-assisted ESD: Current performance and future prospects**
Shinji Tanaka, Hiroshima University, Japan

15:00-15:20 Break

15:20-16:50 LGI 6 Challenges and opportunities of AI applications in lower GI tract

*Moderators: Tae Il Kim, Yonsei University, Korea
Yutaka Saito, National Cancer Center Hospital, Japan*

- LGI 6-1** **Application of AI in early colorectal cancer diagnosis**
Yoon Jae Kim, Gachon University, Korea
- LGI 6-2** **Role of AI in detection of colorectal polyps - Where are we now?**
Eun Hyo Jin, Seoul National University, Korea
- LGI 6-3** **Beyond polyp detection - AI application in characterization of polyps**
Yutaka Saito, National Cancer Center Hospital, Japan
- LGI 6-4** **AI development for application in capsule endoscopy**
Hyun Joo Song, Jeju National University, Korea



Pancreatobiliary

Room C

13:30-15:00 PB 5 [KSGE-JGES] EUS-guided drainage and beyond

*Moderators: Dong-Wan Seo, University of Ulsan, Korea
Masayuki Kitano, Wakayama Medical University, Japan*

- PB 5-1 Best stents and accessories for EUS-guided biliary drainage (HGS & CDS)**
Yosuke Nakai, The University of Tokyo, Japan
- PB 5-2 Best stents and accessories for EUS-guided gallbladder drainage**
Se-Woo Park, Hallym University, Korea
- PB 5-3 Best stents and accessories for EUS-guided pancreatic duct drainage**
Takeshi Ogura, Osaka Medical and Pharmaceutical University Hospital, Japan
- PB 5-4 Best stents and accessories for EUS-guided drainage of pseudocyst/WON**
Seong-Hun Kim, Jeonbuk National University, Korea

15:00-15:20 Break

15:20-16:50 PB 6 Role of endoscopy in early detection and surveillance of pancreatobiliary neoplasm


*Moderators: Don Haeng Lee, Inha University, Korea
Rungsun Rerknimitr, Chulalongkorn University, Thailand*

- PB 6-1 Early detection of pancreatic cancer by EUS**
Tae Jun Song, University of Ulsan, Korea
- PB 6-2 Early detection of pancreatic cancer by ERCP**
Keiji Hanada, Onomichi General Hospital, Japan
- PB 6-3 Surveillance of pancreatic cystic neoplasm**
David S. Weinberg, Fox Chase Cancer Center, USA
- PB 6-4 Evaluation of premalignant biliary lesions**
Jae Hee Cho, Yonsei University, Korea

DAILY PROGRAM | June 10 (Sat)

Satellite Symposium 2

Room D

10:30-11:30 **Satellite Symposium 2** | sponsored by  DAEWONG

Moderator: Jae Gyu Kim, Chung-Ang University, Korea

SS2 **The GERD treatment: A step forward with "Fexuclue"**

Ronnie Fass, Case Western Reserve University, USA

11:30-13:30 Break

Sedation/Disinfection 1

Room D

13:30-15:00 **내시경실에서의 감염관리와 올바른 내시경 재처리**
Infection control in the endoscopy room and correct endoscope reprocessing
***Korean**

*Moderators: Soo-Jeong Cho, Seoul National University, Korea
Sun Hee Kim, CHA Bundang Hospital, Korea*

SD 1-1 **감염 전파 사례로 알아보는 내시경 재처리의 중요성**
The importance of endoscopic reprocessing in the case of infection transmission
Kwang Hyun Chung, Soonchunhyang University, Korea

SD 1-2 **국내외 내시경 재처리 가이드라인 리뷰**
Review of domestic and foreign endoscopy reprocessing guidelines
Hyun Ho Choi, The Catholic University of Korea, Korea

SD 1-3 **고수준 소독제 최신 업데이트**
High-level disinfectant latest update
Jaeyoung Chun, Yonsei University, Korea

SD 1-4 **올바른 내시경 세척소독 및 관리**
Proper endoscope cleaning, disinfection and management
Hwi Jung Kim, CHA Bundang Hospital, Korea

질의응답

15:00-15:20 Break



Sedation/Disinfection 2

Room D

15:20-16:50

진정내시경 우발증의 이해 및 대처

Understanding and management of adverse events related with endoscopic sedation

***Korean**

*Moderators: Byung-Wook Kim, The Catholic University of Korea, Korea
Byung Ik Jang, Yeungnam University, Korea*

SD 2-1

심폐 우발증

Cardiopulmonary adverse events

Jun Kyu Lee, Dongguk University, Korea

SD 2-2

비심폐 우발증

Understanding and management of non-cardiopulmonary adverse events related with endoscopic sedation

Yehyun Park, Ewha Womans University, Korea

SD 2-3

진정 우발증 예방과 대처를 위한 내시경실 세팅

Setting of endoscopy room for preventing and managing sedative complication

Sun Hyung Kang, Chungnam National University, Korea

SD 2-3

위원회 주도 레미마졸람 임상시험

A randomized, investigator initiative trial of remimazolam versus midazolam for sedation in upper endoscopy

Tae Jun Kim, Sungkyunkwan University, Korea

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Upper GI

PUG-01 Differential diagnosis of thickened gastric fold between hypertrophic gastritis and B4 advanced gastric cancer

Jun-Young Seo, Do Hoon Kim, Ji Yong Ahn, Kee Don Choi (Korea)

PUG-02 Research hotspots and trend of peroral endoscopic myotomy from 2010 to 2022: A bibliometric analysis

Xiaowei Tang, Han Zhang (China)



PUG-03 Predictive models for peroral endoscopic myotomy treatment failure in achalasia based on machine learning algorithm

Xiaowei Tang, Ningli Chai, Enqiang Linghu (China)

PUG-04 Analysis of gastric cancer cases in Erdenet city

Oyu Erdene Yadamsuren, Shagdarsuren Gansukh, Javkhlan Tsengenbayar, Buyantogtokh Purevdorj, Enkh-Amar Ayush (Mongolia)

PUG-05 The initial results of endoscopic management for upper gastrointestinal subepithelial lesions from Bach Mai Hospital

Nam Thanh Nguyen, Long Nguyen Cong (Vietnam)

PUG-06 A study of correlation between nodular gastritis and *Helicobacter pylori* infection

Otgontuya Sambuudash (Mongolia)

PUG-07 Brunner's gland hyperplasia presenting as upper gastrointestinal bleeding seen endoscopically as a duodenal mass

Kenneth Vergel Tecson Aballe, Willy Alba, Mary Anne Go (Philippines)

PUG-08 Rapid identification of GI bleeding site by red dichromatic imaging, a novel image enhance endoscopy: Case series

Kenneth Vergel Tecson Aballe, Jonard Co, Mary Anne Go (Philippines)

PUG-09 Endoscopic ultrasound: A Safe and alternative way to biopsy mediastinal lesions

Kenneth Vergel Tecson Aballe, Keith Brian Enriquez, Jonard Co, Mary Anne Go (Philippines)

PUG-10 A rare case of clinical early gastric cancer presenting with multiple distant lymph node metastasis

Sung Hoon Chang, San Ha Kim, Jung Ho Lee, Ji Hyun Kim, Sang Hoon Lee, Sung Joon Lee, Sung Chul Park, Seung Joo Nam (Korea)



PUG-11 Early results of endoscopic sleeve gastropasty from a district hospital in Singapore

Baldwin Yeung, Bin Chet Toh, Koy Min Chue, Lester Ong, Jeremy Tan, Wai Keong Wong (Singapore)



- PUG-12 Duodenal inflammation and permeability in relation to individual gut microbiota and dietary nutrition**
Sang Hoon Kim, Yura Choi, Jihong Oh, Eui Yeon, Jung Eun Lee, Eun-Ji Song, Young-Do Nam, Hojun Kim (Korea)
- PUG-13 Role of peroral endoscopic myotomy in sigmoid-type achalasia**
 Chainarong Phalanusitthepha, Siwaree Maneesoi, Jirawat Watthanatham, Vitoon Chinswangwatanakul, Thawatchai Akaraviputh, Asada Methasate, Monthira Maneerattanaporn, Somchai Leelakusolvong (Thailand)
- PUG-14 Association of malignant dysphagia with multifactorial risk factors**
Tauqeer Shaikh, Shahid Karim, Laiba Imran Vohra (Pakistan)
- PUG-15 Endoscopic laser treatment of lower esophageal sphincter with balloon-equipped light diffuser in in vivo porcine model**
Seokjun Hwang, Boram Cha, Seok Jeong (Korea)
-  **PUG-16 The efficacy of a hemostatic powder in decreasing the rate of upper gastrointestinal re-bleeding**
Byungsuk Kim, Jongbeom Shin, Boram Cha, Kyesook Kwon, Hyungkil Kim (Korea)
- PUG-17 Review of additional endoscopic treatments with only positive lateral margin after endoscopic submucosal dissection**
Jihoon Kim, Boram Cha, Jongbeom Shin, Kyesook Kwon, Hyungkil Kim (Korea)
- PUG-18 Performance of linked color imaging compared to conventional white light imaging in endoscopic diagnosis of *Helicobacter pylori* infection: A systematic review and meta-analysis**
 Jae Gon Lee, In Kyung Yoo, Sang Pyo Lee (Korea)
- PUG-19 *Helicobacter pylori* coccoid form relates to treatment failure**
 Janyaporn Kotimanusvanij, Pathomphon Phasom, Teepakorn Tongtawee, Wongsaphat Leownorasate, Taweesak Tongtawee (Thailand)
- PUG-20 Morphology of *H. pylori* on the human gastric surface under scanning electron microscope**
 Thanakkhapon Piamuenwai, Suprawee Kamkratok, Pinyapach Piangkoontot, Taweesak Tongtawee (Thailand)
- PUG-21 Artificial Intelligence assisted interpretation of rapid urease test using convolutional neural networks**
Kwangbeom Park, Jeong Hwan Ko, Jun Su Lee, Su Bee Park, Jinyoung Choi, Ji Yong Ahn, Namkug Kim (Korea)
- PUG-22 Promotion of awareness of gastrointestinal endoscopy and *H. pylori* infection through application**
 Nattamon Manyum, Teepakorn Tongtawee, Phonathitthan Limpongsa, Rinrada Tungsiriwattanawong, Krittaya Kaleepat, Thanwarat Kongmanklang, Taweesak Tongtawee (Thailand)

- PUG-23** **Possible route of transmission of *Helicobacter pylori***
Wongsaphat Leownorasate, Teepakorn Tongtawee, Pannaporn Srisanpang, Boonruksa Sripho, Jeeranan Akkarawongoran, Piyapan Bumrungrpanich, Kritthameth Inthong, Tankhun Kongtong, Taweesak Tongtawee (Thailand)
- PUG-24** **Relationship between EBV(+) gastric cancer and multiple genes related to gastric carcinogenesis**
Ji Won Seo, Kyong Hwa Jun (Korea)
- PUG-25** **Diagnostic accuracy of probe-based confocal laser endomicroscopy and narrow band imaging in gastric neoplasia**
Ji Hoon Yoon, Sang Kil Lee (Korea)
- PUG-26** **Analysis of E-Cadherin in oesophageal squamous cell carcinoma – association with histological characteristics**
Muhammad Ali Soomro (Pakistan)
-  **PUG-27** **Timed barium esophagography can predict recurrent achalasia after peroral endoscopic myotomy**
Chainarong Phalanusitthea, Chatbadin Thongchuam, Tharathorn Suwatthanarak, Thawatchai Akaraviputh, Vitoon Chinswangwatanakul, Thikhamporn Tawantanakorn, Somchai Leelakusolvong, Monthira Maneerattanaporn, Piyaporn Apisarnthanarak, Jitladda Wasinrat (Thailand)
-  **PUG-28** **Preliminary report of non-exposure simple suturing-EFTR (NESS-EFTR) for EGC (SENORITA 3 phase 2 trial)**
Hyerin Lee, Chan Gyoo Kim, Myeong-Cherl Kook, Bang Wool Eom, Hong Man Yoon, Keun Won Ryu, Young-Woo Kim, Ji Yoon Rho, Young-Il Kim, Jong Yeul Lee, Il Ju Choi (Korea)
- PUG-29** **Bronchial obstruction by esophageal stent in advanced esophageal cancer patient**
Gyewon Park, Sanghyun Kim, Bora Keum, Hyuksoon Choi, Eunsun Kim, Yoontae Jeon, Hoonjai Chun, Hanjo Jeon (Korea)
- PUG-30** **Clinical outcomes of young early gastric cancer patients who underwent endoscopic submucosal dissection**
Won Shik Kim, Moon Kyung Joo, Jong-Jae Park, Beom Jae Lee, Seung Han Kim, Hoon Jai Chun (Korea)
- PUG-31** **Clinical outcomes of traction-assisted ESD for pyloric neoplasms: Propensity score matching**
Dong Chan Joo, Gwang Ha Kim, Seung Min Hong, Moon Won Lee, Bong Eun Lee, Geun Am Song (Korea)
- PUG-32** **Risk factors for rebleeding of non-variceal upper gastrointestinal bleeding when taking dual antiplatelet agents**
Moon Kyung Joo, Jong-Jae Park, Beom Jae Lee, Seung Han Kim, Won Shik Kim, Hoon Jai Chun (Korea)



- PUG-33** **Gastroparesis as a complication of stretta for gastroesophageal reflux disease: Three case reports**
Munyoung Cho, Donghoon Kang, Jaemyung Park, Yukyung Cho (Korea)
- PUG-34** **Prediction of *Helicobacter pylori* infection in endoscopic features**
Jun-Young Seo, Ji Yong Ahn, Seonok Kim (Korea)
- PUG-35** **Artificial intelligence detecting dysplastic lesions of ampulla of vater in conventional endoscopic image**
Jun-Young Seo, Junghoon Lee, Namkug Kim, Do Hoon Kim (Korea)
- PUG-36** **Comparative study of ESD and surgical resection for gastric sets originated from muscularispropria**
Chang Beom Ryu (Korea)
- PUG-37** **Study on endoscopically**
Zheng-Lei Xu, Min-Si Peng, Hao-Tian Zeng, Zhu-Liang Zhang, Ze-Ming Chen, Ting Long, Li-Sheng Wang (China)
- PUG-38** **A study of the intermediate- to long-term outcome of corrosive ingestion**
Natee Faknak, Anuch Signhattha (Thailand)
- PUG-39** **Acute phlegmonous esophagogastritis complicated with mediastinal abscess and esophageal perforation**
Hyung-Hoon Oh, Dae-Seong Myung, Wan-Sik Lee, Young-Eun Joo (Korea)
- PUG-40** **Comparison of a new hemostatic device for gastric ESD: Prospective, randomized trial for coajet® vs.hemograsper®**
Sang Un Kim, Seong Woo Jeon (Korea)
- PUG-41** **Risk factors associated with recurrence of gastric hyperplastic polyps: A single-center, long-term retrospective study**
Yuri Kim, Seokin Kang, Ji Yong Ahn, Hwoon-Yong Jung, Gin Hyug Lee, Ho June Song, Kee Don Choi, Do Hoon Kim, Kee Wook Jung, Jeong Hoon Lee, Hee Kyong Na (Korea)
- PUG-42** **Predictive factors for lymph node metastasis and clinical outcomes in undifferentiated early gastric cancer**
Hyun Ho Choi, Sung Soo Kim, Seung Ho Sin, Hyung-Keun Kim, Sang Woo Kim, Hiun-Suk Chae (Korea)
- PUG-43** **The outcomes of repeated radiofrequency ablation (Stretta) for the treatment of gastroesophageal reflux disease**
Selen Kim, Jae Myung Park, Donghoon Kang, Yu Kyung Cho (Korea)
- PUG-44** **Esophageal stricture and bezoar formation due to prolonged nasogastric tube placement**
Yujin Kim (Korea)

- PUG-45** Endoscopic & bronchoscopic management for tracheo-esophageal fistula in HIV with disseminated tuberculosis: Case report
Lea B Escabarte, Alanne Jill Tan, Virgilio Jr Lo, Mary Anne Go (Philippines)
- PUG-46** Decision of surgery or follow-up after non-curative ESD for gastric cancer based on the risk of lymph node metastasis
Seunghan Lee, Soo Jeong Cho (Korea)
- PUG-47** Development of an artificial intelligence algorithm detecting superficial esophageal cancer
Hannah Lee, Sungjin Park, Jie-Hyun Kim, Jae Young Jang, Jung-Wook Kim, Donghoon Kang, Joon Sung Kim, Seung-Joo Nam, Hyuk Soon Choi, Han Jo Jeon, Chang Seok Bang, Jun-Won Chung (Korea)
- PUG-48** A prospective comparative study of optimus and IT2 knife for endoscopic submucosal dissection of gastric tumor
Hannah Lee, Yoon Jae Kim, Young Hoon Yoon, Jun Chul Park (Korea)
- PUG-49** Validation of scratch sign in predicting *Helicobacter pylori* infection status as a novel endoscopic marker
Jun-Young Seo, Ah Young Lee, Hyo-Jin Cho, Sang-Jung Kim, Sang Jong Park (Korea)
- PUG-50** A case of anisakidosis co-infected to stomach and small bowel
Joonhee Han, Heung up Kim, Se Jin Kim, Yeon Namgung, Hyun Joo Song (Korea)
- PUG-51** Eosinophilic gastrointestinal diseases-uncommon entity on the rise
Amol Dahale, Debabrata Banerjee, Suhas Udgirkar (India)
- PUG-52** Prevalence of *H-pylori* infection among patients undergoing upper GI endoscopy
Soe Naung Win, Myo Kyi, Aung Moh Hlaing, Kyaw Htay Lwin, Win Myint (Myanmar)
- PUG-53** Clinical outcomes of argon plasma coagulation for the treatment of gastric neoplasm
Hoyoung Wang, Ji Yong Ahn, Hee Kyoung Na, Kee Wook Jung, Jeong Hoon Lee, Do Hoon Kim, Kee Don Choi, Ho June Song, Gin Hyug Lee, Hwoon-Yong Jung (Korea)
- PUG-54** A case of esophageal actinomycosis after endoscopic mucosal resection for a subepithelial tumor
Hang Thi Thu Nguyen, Jin Woong Cho, Gum Mo Jung (Vietnam)
- PUG-55** Comparison the efficacies of 7-day and 10-day PPI-containing triple therapy for *Helicobacter pylori* eradication
Dongsoo Lee, Seungwoo Lee, Saehee Kim, Sunghye Jung, Sunmoon Kim, Jaekyu Sung (Korea)
- PUG-56** Endoscopic surveillance of chronic atrophic gastritis and intestinal metaplasia on a Latin American population
Gonzalo Latorre, Felipe Silva, Miguel Bustamante, Eitan Dukes, Javier Uribe, Diego Reyes, Javiera Torres, Juan Carlos Roa, Sebastian Pizarro, Pablo Achurra, Ignacio Wichman, Alejandro H. Corvalan, Roberto Candia, Carlos Aguero, Robinson Gonzalez, Jose Ignacio Vargas, Alberto Espino, M. Constanza Camargo, Shailja C. Shah, Arnoldo Riquelme (Chile)



- PUG-57** **Incidence of esophageal varices in cirrhosis and evaluation of prophylaxis of esophageal variceal bleeding in orkhon**
Bolormaa Zorigt, Bolortungalag Sharavsambuu, Amarjargal Dashdorj, Oyu-Erdene Yadamsuren (Mongolia)
- PUG-58** **Combination of low-cost biomarkers yield excellent performance for the non-invasive detection of gastric neoplasia**
Gonzalo Latorre, David Rodriguez, Francisca Martínez, Victoria Binder, Felipe Silva, Javier Uribe, Margarita Pizarro, Alejandro H. Corvalan, Javiera Torres, Juan Carlos Roa, Pablo Achurra, Ana Maria Guzman, Shailja C. Shah, Arnoldo Riquelme (Chile)
- PUG-59** **Acute gastric necrosis after vascular embolization in patient with acute ulcer bleeding**
Seho Eun, Hanjoon Ryu, Hyunsoo Kim, Changgeun Park, Jaegwon Jeong, Daejin Kim, Jongmin Kim, Nayoung Jung, Hyukjin Kwon (Korea)
- PUG-60** **Epidemiology of eosinophilic esophagitis in Korea: A multicenter historical cohort study based on nationwide data**
Ga Hee Kim, Kee Wook Jung, Hye-Kyung Jung, Chung Hyun Tae, Do Hoon Kim, Cheol Min Shin, Yoon Jin Choi, Ji Taek Hong, Yu Kyung Cho, Joon Sung Kim, Ra Ri Cha, Seung in Seo, Jung-Wook Kim, Kyung Ho Song, Ki Bae Kim, Seung Young Kim (Korea)
- PUG-61** **Perioperative care in esophagectomy patients at Muhimbili National Hospital (MNH)**
Alexander Bartholomew Mwelange (Tanzania, United Republic of)
- PUG-62** **Prevalence of *Helicobacter pylori* infection and antimicrobial susceptibility pattern among dyspeptic patients**
Amani Kapinga, Ewaldo Komba, Majigo Mtebe, Tuzo Abdallah Lyuu (Tanzania, United Republic of)
- PUG-63** **Diagnostic performance of Kyoto and modified Kyoto classification scores for *Helicobacter pylori* infection**
Dacio Hector Cabrera Hinojosa, Milvia Garrido Millán, Harold Benites Goñi (Peru)
- PUG-64** **Gender differences of esophageal cancer in Korea**
Jin Hee Noh, Hyungchul Park, Do Hoon Kim, Hee Kyong Na, Ji Yong Ahn, Kee Wook Jung, Jeong Hoon Lee, Kee Don Choi, Ho June Song, Gin Hyug Lee, Hwoon-Yong Jung (Korea)
- PUG-65** **Recurrent respiratory arrest in achalasia patient**
Young-Eun Seo, Seon-Young Park, Hye-Su You, Seung-Hee Kim (Korea)
- PUG-66** **Pneumatic balloon dilation for management of achalasia: A 3-year single center experience**
Jiksa Dabessa Muleta, Makr Topazian, Abdulsemed Mohammed, Fisseha Tekle (Ethiopia)
- PUG-67** **Natural history of gastric leiomyoma**
Kwangbeom Park, Ji Yong Ahn, Hee Kyong Na, Kee Wook Jung, Jeong Hoon Lee, Do Hoon Kim, Kee Don Choi, Ho June Song, Gin Hyug Lee, Hwoon-yong Jung (Korea)

- PUG-68** POEM as a rescue therapy in patients with recurrence achalasia after laparoscopic Heller's myotomy (LHM)
Oleksandr Kiosov, Sergiy Hulevsky, Vladyslav Tkachov, Nikita Korobov (Ukraine)
- PUG-69** The role of small bowel capsule endoscopy in determining the treatment strategy for duodenal follicular lymphoma
Donghoon Kang, Gi-June Min, Yukyung Cho, Jae Myung Park, Myung-Gyu Choi (Korea)
- PUG-70** Non-mucin secreting intraductal papillary neoplasm of the bile duct: Presenting repeated episodes of acute cholangitis
Nutbordee Nalinthassanai, Keerati Kiattikunrat, Korrakot Soitong, Wallop Sangsanti, Phadet Noophun (Thailand)



Lower GI

- PLG-01 Endoscopic submucosal dissection: Results of 30 colorectal neoplastic lesions from the bach mai interventional endoscopy**
 Chuong Van Hoang, Long Nguyen Cong, Nam Nguyen Hoai, Nguyen Pham Binh, Phuong Nguyen the (Vietnam)
-  **PLG-02 Colorectal cancer incidence, single center data results**
 Munkhsaruul Bayaraa, Bayasgalan Luvsandagva (Mongolia)
- PLG-03 The study for the diagnosis of colon cancer and precancerous lesion**
 Buyantogtokh Purevdorj, Bayarmaa Bold, Javkhlan Tsengenbayar, Mashbat Udval, Oyu-Erdene Yadamsuren, Enkh-Amar Ayush (Mongolia)
-  **PLG-04 Association between the location of colon diverticular disease and irritable bowel syndrome**
 Bayarmaa Bold, Buyantogtokh Purevdorj, Javkhlan Tsengenbayar, Udval Mashbat, Enkh-Amar Ayush (Mongolia)
- PLG-05 There is a lethal one. Don't miss it**
 Wai Phyo Lwin, Aye MinSoe (Myanmar)
- PLG-06 Endoscopic submucosal dissection of colorectal neoplasm in high Charlson comorbidity index**
 Dong Hyun Kim, Hyun Soo Kim, Young Eun Joo, Hyoung Hoo Oh, Hyo Yeop Song, Geomseog Seo, Jun Lee, Seongjoong Kim, Daeseong Myung, Byungchul Jin, Sangwook Kim (Korea)
- PLG-07 Efficacy evaluation of hemostatic powder (UI-EWD) in patients with lower GI bleeding**
 Jongbeom Shin, Boram Cha, Jin-Seok Park, Kye Sook Kwon, Hyung Kil Kim (Korea)
- PLG-08 Barriers & willingness for colorectal cancer screening in a muslim population of South Asian country: Nationwide survey**
 Tauqeer Shaikh, Lubna Kamani, Khalid Ahmed Tareen, Miah Shah Yousaf, Talal Khurshheed Bhatti, Hifza Bashir, Jalpa Devi, Muhammad Akram (Pakistan)
- PLG-09 Adenoma detection rate as a quality indicator for colonoscopy: A prospective cross-sectional study from a tertiary care**
 Naik Muhammad, Tauqeer Shaikh, Mansoor-Ul- Haq, Atif Ali Hashmi (Pakistan)
- PLG-10 Artificial intelligence for automated bowel preparation scoring**
 Ji Young Lee, Jeong-Sik Byeon, Hyo Jeong Lee, Hana Park, Jooyoung Park, Dong-Hoon Yang, Sung-Wook Hong, Namkug Kim (Korea)
- PLG-11 Association between atherosclerosis and high-risk adenomas based on cardio-ankle vascular index and ankle-brachial index**
 Jung Ho Lee, Sang Hoon Lee, Sung Joon Lee, Chang Don Kang, Dae Hee Choi, Jin Myung Park, Seung-Joo Nam, Tae Suk Kim, Ji Hyun Kim, Hyunseok Cho, Sung Chul Park (Korea)
- PLG-12 Outcome of 1,000 colonoscopies performed in a community, South Korea: Experience of a single hospital**
 Jae-Jun Shim, Kwon Kee Kim (Korea)

- PLG-13** **Efficacy and safety of 1L PEG/ASC vs 2L PEG/ASC in the hematochezia patients: A prospective multicenter study**
Hyun Woo Park, Su Young Kim, Sang Hoon Lee, Jundeok Lee, Young Cheol Lee, Jong Wan Lim, Chang Hyun Kim, Hyeon Min Ahn, Dong Kyun Koh, Hyunil Kim, Hong Jun Park, Yongsoo Kwon, Byung Chul Lim, Giho Ko, Hyun-Soo Kim (Korea)
- PLG-14** **Eupatilin reduces the risk of small bowel bleeding in aspirin users**
Hyun Seok Lee, Ji Hyung Nam, Dong Jun Oh, Hyun Jung Ahn, Yun Jeong Lim (Korea)
- PLG-15** **Clinical course and prognosis of patients with fecal impaction: Multicenter study**
Rari Cha, Seong-Jung Kim, Jung-Wook Kim, Young Sin Cho, Sung Kyun Yim, Seung Joo Kang, Sun-Young Park (Korea)
- PLG-16** **A rare case of sigmoid colonic duplication in adult woman**
Soe Naung Win (Myanmar)
- PLG-17** **The incidence of acute gastric mucosal of oral sulfate tablet versus 1L polyethylene glycol plus ascorbic acid**
Su Bee Park, Jin Young Yoon, Min Seob Kwak, Jae Myung Cha (Korea)
- PLG-18** **The efficacy and safety of oral sulfate tablet versus 1L polyethylene glycol for bowel preparation in elderly population**
Su Bee Park, Jin Young Yoon, Min Seob Kwak, Jae Myung Cha (Korea)
- PLG-19** **Unleashing the mystery of mckittrick wheelock syndrome: A fascinating case of GI symptoms in a young female**
Seung Hee Kim, Seonyoung Park (Korea)
- PLG-20** **Efficacy and safety of 1L polyethylene glycol plus ascorbic acid in elderly: Comparison with oral sulfate solution**
Ki Young Lim, Kyeong Ok Kim, Eun Young Kim, Yoo Jin Lee, Byung Ik Jang, Sung Kook Kim, Chang Heon Yang (Korea)
- PLG-21** **Primary eosinophilic gastroenteritis in a 28-year old female with persistent diarrhea and vomiting: A case report**
Jericho Allain Kyle Benigno Vidad, Felinor William Antonio (Philippines)
- PLG-22** **Tuberculosis ileocolitis: A case report**
Tiroy Sari Bumi Simanjuntak (Indonesia)
-  **PLG-23** **Clinical usefulness of traction method in colon submucosal dissection: A multicenter randomized controlled study**
Seong-Jung Kim, Dong-Hoon Yang, Jae-Young Chun, Tae-Geun Gweon, Yun-Ho Jung, Chang-Kyun Choi, Chan-Muk Im, Dae-Seong Myung (Korea)
- PLG-24** **Clinical outcomes of endoscopic resection for large colorectal neoplasms in difficult locations: Propensity score matching analysis**
Seung Min Hong, Dong Hoon Baek, Geun Am Song, Gwang Ha Kim, Taein Kim, Dong Chan Joo, Jonghyun Lee, Kiyoun Yi, Hye Young Lee (Korea)



- PLG-25** **A case report: Colonic obstruction in ulcerative colitis patient treated with self-expandable metallic stent**
Yongwook Jung, Donghyun Kim, Hyunsoo Kim (Korea)
- PLG-26** **Endoscopic submucosal dissection versus trans-anal endoscopic microsurgery for rectal submucosal tumor**
Soomin Lee, Seongjung Kim, Jun Lee (Korea)
- PLG-27** **The extent of the disease affects the availability of fecal calprotectin in ulcerative colitis**
Hyeseon Park, Jun Lee (Korea)
- PLG-28** **Effect of position on cecal intubation rate for colonoscopy trainees: Rt. lateral vs Lt. lateral decubitus**
Hyo Suk Kim, Chang Whan Kim, Tae Ho Kim, Jae Hyuck Chang, Tae-Geun Gweon (Korea)
- PLG-29** **Predictors of clinical outcomes of stent treatment for left-sided malignant colorectal obstruction**
Keon-Young Ma, Hyung-Hoon Oh, Chan-Muk Im, Hyun-Soo Kim, Young-Eun Joo (Korea)
- PLG-30** **A case of dasatinib induced hemorrhagic colitis diagnosed by colonoscopy**
Chan-Muk Im, Young-Eun Joo, Hyung-Hoon Oh, Bora Han, Yoon-Jin Seo, Keon-Young Ma, Ga-Ram You (Korea)
- PLG-31** **Is peri-appendiceal inflammation of clinical significance in patients with ulcerative colitis?**
Eunjeong Kim, Seungjung Kim, Jun Lee (Korea)
- PLG-32** **An uncommon case of recto-sigmoid leiomyosarcoma confirmed by surgery**
Nayoung Jung, Daejin Kim, Kyungrak Son, Hyunsoo Kim, Changgeun Park, Jaekwon Jung, Hanjoon Ryu, Jongmin Kim, Seho Eun, Hyukjin Kwon (Korea)
- PLG-33** **Relationship between diameter, depth of infiltration, lymphovascular invasion and prognosis of rNETs**
Jingxue Ran, Liangbi Xu (China)
- PLG-34** **The efficacy of a hemostatic powder (UI-EWD) in decreasing the incidence of PCES: A case series**
Jongbeom Shin, Boram Cha, Jitaek Hong, Kye Sook Kwon, Hyung Kil Kim (Korea)
- PLG-35** **Comparisons of efficacy and safety between 1L and 2L water intake during bowel preparation with 1L-PEG for colonoscopy**
Dongwoo Kim, Ja Seol Koo, Ho Suk Kang, Bum Jae Lee, Yoon Tae Jin (Korea)
- PLG-36** **Comparison of cold EMR and conventional EMR for small colorectal polyps: Multicenter randomized controlled trials**
Chang Kyo Oh, Young Wook Cho, Young-Seok Cho (Korea)

- PLG-37** **Piecemeal polypectomy of large pedunculated polyp near dentate line:
A case report**
Muhammad Firhat Idrus, Hasan Maulahela, Murdani Abdullah (Indonesia)
- PLG-38** **Risk factors for colorectal cancer in a fecal immunochemical test-positive group:
The National Health Insurance database**
Joo Hyun Park, Kyung Hee Cho, Junho Choi, Sungyoun Chun, Jae Kwang Lee, Hyunsoon Cho,
Bun Kim (Korea)
- PLG-39** **Impact of perforation following self-expandable metal stent as a bridge to surgery
for malignant colorectal obstruction**
Han Hee Lee, Dong Hyun Kim, Hyun Lim, Jung-Wook Kim, Yunho Jung, Hyun-Soo Kim,
Dae-Seong Myung, Jin Won Kim, Kwang Bum Cho, Young-Eun Joo, Bo-In Lee (Korea)
- PLG-40** **A case of small intestinal epithelioid angiosarcoma presenting as melena**
Jiwon Kim, Dongwoo Kim, Jaseol Koo, Seungku Kim, Yoosuk Suh, Gyuhyun Park, Daekyu Choi,
Haegwang Shin (Korea)
-  **PLG-41** **Efficacy of small bowel polyp removal with balloon-assisted enteroscopy in patients
with Peutz-Jeghers syndrome**
Yuna Kim, Jihye Park, Soo Jung Park, Jae Hee Cheon, Tae Il Kim, Sang Pyo Lee, Kyungok Kim,
Eun Ran Kim, Jae Jun Park (Korea)



Pancreatobiliary



PPB-01 A case report on biliary ascariasis presenting as acute pancreatitis in a 36-year old Filipino

Maria Frances Noreen De Leon, Michael Chu, Lovell Gatchalian, Gerby Coronel, Marilyn Te, Sarah Preza (Philippines)

PPB-02 The role of endoscopic hemostasis for hemobilia from above papilla during endoscopic retrograde cholangiopancreatography

Junyeol Kim, Sang Hyub Lee, Jin Ho Choi, Min Woo Lee, Myoeng Hwan Lee, In Rae Cho, Woo Hyun Paik, Ji Kon Ryu, Yong-Tae Kim (Korea)

PPB-03 Successful endoscopic management of acute pancreatitis caused by an ingested toothpick: A case report

Hyesu You, Seon-Young Park, Chang Hwan Park, Hyun-Soo Kim (Korea)

PPB-04 Prediction factor for recurrency of ampullary neoplastic lesion after endoscopic papillectomy

Yi-Chung Chan, Sung-Yin Wang, Yu-Ting Kuo, Weng-Fai Wong, Ming-Lun Han, Chieh-Chang Chan, Wei-Chih Liao, Hsiu-Po Wang (Taiwan)



PPB-05 Moving echoendoscope technique improves technical success rate of device insertion during EUS-guided hepaticogastrostomy

Masanori Yamada, Takeshi Ogura, Atsushi Okuda, Hiroki Nishikawa (Japan)

PPB-06 Safety and challenges of endoscopic retrograde cholangiopancreatography among elderly patients (interim analysis)

Nosherwan Shahwani, Tauqeer Shaikh, Lubna Kamani (Pakistan)



PPB-07 Safety and efficacy comparison of endobiliary laser ablation with balloon dilation vs radiofrequency ablation in a swine

Trung-Hyun Lim, Seok Jeong, Van Gia Truong, Hyun Wook Kang, Jungnam Lee, Jin-Seok Park, Don Haeng Lee (Korea)



PPB-08 Technical and clinical success of EUS-directed transgastric ERCP (EDGE) in Roux-en-Y gastric bypass (RYGB) patients

Javad Alizargar (Iran, Islamic Republic of)

PPB-09 Comparison of conventional smear cytology and liquid based cytology according to EUS-FNA location for pancreatic cancer

Jung-Hyun Lim, Jin-Seok Park, Jungnam Lee, Seok Jeong, Don Haeng Lee (Korea)

PPB-10 Silent gallbladder stone in kidney transplantation recipients: Should it be treated preventively?

Myeong Hwan Lee, Yong-Tae Kim, Ji Kon Ryu, Sang Hyub Lee, In Rae Cho, Jun Yeol Kim, Woo Hyun Paik (Korea)

PPB-11 Clinical profile of patients with obstructive jaundice

Annisa Zahra Mufida, Budi Widodo, Husin Thamrin, Rusdiyana Ekawati, Nurike Sm, Arianti Arianti (Indonesia)

- PPB-12** Gut microbiome predicts UDCA/CDCA response in gallstone patients: Responder vs. non-responder comparison
Jungnam Lee, Jin-Seok Park (Korea)
- PPB-13** Remimazolam and propofol for ERCP sedation: A non-inferiority trial
Jungnam Lee, Jin-Seok Park (Korea)
- PPB-14** Positive cultures from bile sampled during ERCP for biliary plating stenting increase the risk of early cholangitis
Andrei Mihai Voiosu, Bianca Doamna, Georgiana Bajdechi, Cristiana Popp, Andreea Bengus, Theodor Voiosu, Radu Bogdan Mateescu, Radu Voiosu (Romania)
- PPB-15** A feasibility study of double pigtail plastic stent insertion with supra-papillary method in Klatskin's tumor
Kang Won Lee, Hong Sik Lee, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeen, Hoon Jai Chun (Korea)
-  **PPB-16** Utility of D-dimer, antithrombin-III, protein C in prediction of severity and prognosis of acute pancreatitis
Ravichandra Ns, Vineet Chaudary, Sumaswi Angadi, Bhushan Chopade, Sukanya Bhrugumalla (India)
- PPB-17** The role of single operator cholangioscopy for the management of intraductal papillary neoplasm of the bil
Won Myung Lee, Jong Ho Moon, Yun Nah Lee, Il Sang Shin, Jun Ho Myeong, Hee Kyung Kim, Jun Chul Chung, Tae Hoon Lee, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-18** Endoscopic classification of intraductal neoplasms of bile duct using peroral cholangioscopy with narrow-band imaging
Il Sang Shin, Jong Ho Moon, Yun Nah Lee, Hee Kyung Kim, Jun Chul Chung, Tae Hoon Lee, Jae Kook Yang, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-19** Long-term outcomes of a modified non-flared FCSEMS for refractory anastomotic biliary strictures after LDLT
Jae Woo Park, Jong Ho Moon, Yun Nah Lee, Il Sang Shin, Jun Ho Myeong, Jae Kook Yang, Tae Hoon Lee, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-20** Comparison of disposable D-SOC versus D-POC for the management of ISL-BS
Seon Ah Maeng, Jong Ho Moon, Yun Nah Lee, Il Sang Shin, Tae Hoon Lee, Jae Kook Yang, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-21** Long-term efficacy of a modified non-flared fully covered metal stent for benign main pancreatic duct strictures
Jun Ho Myeong, Jong Ho Moon, Yun Nah Lee, Il Sang Shin, Jae Kook Yang, Tae Hoon Lee, Sang-Woo Cha, Young Deok Cho, Sang-Heum Park (Korea)
- PPB-22** Correlation of the duodenal major papilla morphology on the difficulty of biliary cannulation during ERCP
Leonico Gonzales, Ryge Albert Molina, Dennis Fernandez, Ismael Lapus (Philippines)
- PPB-23** Successful treatment of persistent post cholecystectomy cut of bile duct using single operator cholangioscopy and ERCP
Enkhtuvshin Dorjpurev, Narantsatsralt Jalbuu, Bayasgalan Luvsandagva, Gantulga Vanchinsuren (Mongolia)



- PPB-24** **A case of small solid pseudopapillary neoplasms of pancreas in male diagnosed after EUS-FNA**
Eun Kwang Choi (Korea)
- PPB-25** **Prediction of ERCP success using the asge grading system in adults who underwent ERCP: A retrospective cohort study**
Franz Jeryl Tan Liangco, Nicole Allyson Chua, Leonico Gonzales, Ismael Lapus (Philippines)
- PPB-26** **The association between pancreatic exocrine insufficiency and CT-based morphological severity in chronic pancreatitis**
Jae Min Lee, Sang Hyub Lee, Young Hoon Choi, Sung Yong Han, Jung Hyun Jo, Jung Wan Choe, Eui Joo Kim, Dong Kee Jang, Min Kyu Jung (Korea)
- PPB-27** **The association between alcohol drinking status, changes in heavy drinking habit, and acute pancreatitis**
Jae Min Lee, Sang Hyub Lee, Namyong Park, Jin Myung Park, Kyung Do Han, Ji Kon Ryu, Yong-Tae Kim (Korea)
- PPB-28** **Experience of endoscopic ultrasound-guided biliary, pancreatic and gallbladder drainage at a secondary care hospital**
Seung Goun Hong (Korea)
- PPB-29** **Opening window fistulotomy: A novel method of biliary cannulation to prevent post ERCP pancreatitis**
Shin Haba, Kazuo Hara, Nozomi Okuno (Japan)
-  **PPB-30** **Evaluation of arterial lactate levels as a predictive marker of pancreatic necrosis and outcome in acute pancreatitis**
Vikrant Panwar, Pawan Rawal, Abhinandan Mishra, Atul Rana (India)
- PPB-31** **Partially versus fully covered sems in patients with unresectable distal malignant biliary obstruction**
Hwehoon Chung, Jae Keun Park, Jong Kyun Lee, Joo Kyung Park, Kwang Hyuck Lee, Kyu Taek Lee (Korea)
- PPB-32** **Prevalence of ascariasis among cases of biliary system obstruction in northern area of Pakistan**
Waheed Ullah Khan, Zaffar Shah, Nimat Ullah, Noorul Amin, Gawhar Khan, Daud Khan (Pakistan)
-  **PPB-33** **Result of endoscopic retrograde cholangiopancreatography procedure performed at second state central hospital of Mongolia**
Tsendsuren Tumur, Altanchimeg Nyamgarav, Uyanga Tsogtbaatar, Battsetseg Sukhbaatar, Manduul Enkhjargal, Binderiya Tumennasan, Buyantogtokh Tumenbayar, Byambadolgor Dagviikhorol, Tursaikhan Bishsuren, Khishigbat Namshir, Bolor Khurelbaatar (Mongolia)

Others

- POT-01** **The role of endoscopic ultrasound in evaluation subepithelial lesions of GI tract at intermed hospital, Mongolia**
Munkhzul Tsetseglen, Enkhjargal Batmunkh, Byambajav Tsogt-Ochir (Mongolia)
- POT-02** **Comparative outcome of single versus two double-pigtail stents for endoscopic drainage of pancreatic pseudocysts**
Sumaswi Angadi, Suprabhat Giri, Sagar Gangadhar, Sunil Kumar Nanjegowda, Sukanya Bhrugumalla (India)
- POT-03** **Endoscopic ultrasound guided liver biopsy: A single centre experience from Malaysia**
Thevaraajan Jayaraman, Muhammad Ilham Abdul Hafidz, Rafiz Abdul Rani, Khairil Khuzaini Zulkifli, Annamalai Chandramalai (Malaysia)
- POT-04** **Long-term outcomes of EUS-guided CDS are better than HGS for malignant biliary obstruction**
Se Woo Park (Korea)
- POT-05** **The important role of liver impaction technique during EUS-HGS**
Atsushi Okuda, Takeshi Ogura, Masanori Yamada, Hiroki Nishikawa (Japan)
- POT-06** **Simultaneous establishment of pancreatic cancer organoid and cancer-associated fibroblast using a single-pass EUS-FNB**
Min Jae Yang, Seokhwi Kim, Jin Hong Kim, Dakeun Lee (Korea)
-  **POT-07** **Experience-related factors in the success of beginner endoscopic ultrasound-guided biliary drainage: A multicenter study**
Ryota Sagami, Kazuhiro Mizukami, Kazunari Murakami (Japan)
-  **POT-08** **The risk factors of malignant potential in pancreatic cystic lesions diagnosed by EUS-guided fine-needle aspiration**
Ching-Tang Tseng, Szu-Chia Liao, Yi-Chun Liao, Hui-Chun Chang, Sheng-Shun Yang, Hong-Zen Yeh (Taiwan)
- POT-09** **Diagnostic performance of endoscopic ultrasound elastography for differential diagnosis of gallbladder polyp**
In Rae Cho, Sang Hyub Lee, Myeong Hwan Lee, Junyeol Kim, Woo Hyun Paik, Ji Kon Ryu, Yong-Tae Kim (Korea)
- POT-10** **Diagnostic accuracy and safety of endoscopic ultrasound-guided cytologic and histologic evaluation of solid liver lesion**
Yohan Lee, Eunae Cho, Chan Hwan Park, Young Eun Seo, Won Jae Lee, Keon Young Ma (Korea)
- POT-11** **Role of endosonography in the evaluation of suspected endoscopic subepithelial lesions of the upper digestive tract: Experience of 364 patients**
Felipe Sandoval Orrego (Chile)



- POT-12** **Incorporation of endoscopic ultrasound in decision making for elective ERCP in patients after gallstone pancreatitis**
Weng-Fai Wong, Ming-Lun Han, Yu-Ting Kuo, Hsiu-Po Wang (Taiwan)
- POT-13** **Comparison of outcomes of EUS-guided choledochoduodenostomy and hepaticogastrostomy after a failed ERCP: A meta-analysis**
Vaneet Jearth, Suprabhat Giri, Sridhar Sundaram (India)
- POT-14** **Device malfunctions with use of endoscopic ultrasound-guided fine-needle biopsy devices: Analysis of the maude database**
Deepak Madhu, Achintya Singh, Mythili Pathiyil, Daryl Ramai, Babu Mohan, Bhavesh Shah, Douglas Adler (India)
- POT-15** **Single-incision needle knife biopsy and EUS in upper gastrointestinal subepithelial lesions**
Thi Huyen Thuong Nguyen (Vietnam)
- POT-16** **Forward viewing versus curved linear array echo-endoscopes for obliteration of gastric varices: A Retrospective Study**
Deepak Madhu, Sissmol Davis, Prakash Zacharias, Vishnu Nair, Hasim Ahamed, Bilal Mohmed, Kiran Josy, Mathew Philip (India)
- POT-17** **Assessment of histologic scoring and safety of optimal endoscopic irreversible electroproton energy in the stomach**
Han Jo Jeon, Hoon Jai Chun, Sang Hyun Kim, Jae Min Lee, Hyuk Soon Choi, Eun Sun Kim, Bora Keum, Yoon Tae Jeon (Korea)
- POT-18** **The impact of sedation on cardio-cerebrovascular adverse events after upper endoscopy in patients with gastric cancer**
Sang Yoon Kim, Jun Kyu Lee, Kwang Hyuck Lee, Jae-Young Jang, Byung-Wook Kim (Korea)
- POT-19** **Safety and efficacy of remimazolam-based sedation compared with propofol-based sedation in patients undergoing ERCP**
Sung Bum Kim, Kye Whon Kim, Kook Hyun Kim (Korea)
- POT-20** **EUS-guided colo-colostomy for the treatment of benign complete occlusion of colonic anastomosis: A case series**
Philip Boon Cheong Pang, Ashvina Chouhan, Heman M. N. Joshi, James M. D. Wheeler, Gareth D. Corbett, Sibu Varghese, Edmund M Godfrey (Malaysia)
-  **POT-21** **Utilization of platelet count/spleen diameter ratio in predicting the presence of esophageal varices in Filipinos**
Maria Frances Noreen De Leon, Michael Chu, Lovell Gatchalian, Marilyn Talingdan-Te, Sarah Preza (Philippines)
-  **POT-22** **Computer-assisted detection with or without endocuff on detection of colorectal adenoma: A randomized controlled trial**
Ka Luen Thomas Lui, Carla Lam, Wai Man Vivien Tsui, Siu Yin Wong, Sze Hang Kevin Liu, Cynthia Hui, Wai Pan Elvis To, Kwan Lung Michael Ko, Ka Shing Cheung, Wai Kay Seto, Wai Keung Leung (Hong Kong)

- POT-23** Detection of gastritis related to *Helicobacter pylori* infection and premalignant gastric mucosa using high resolution NBI endoscopy (H-NBI)
Taweesak Tongtawe (Thailand)
- POT-24** Clinical usefulness of tube-assisted biopsy for indeterminate pancreaticobiliary strictures
Gunn Huh, Yun Je Song, Sang Soo Lee (Korea)
-  **POT-25** An intelligent-c endoscopy module (iideas) for detection of colonic lesions - A prospective, non-randomized, study
Hardik Rughwani (India)
-  **POT-26** To evaluate the safety and efficacy of the Resolv® endoscopic hemostat system in achieving acute hemostasis
Hardik Rughwani (India)
- POT-27** Gastric cancer screening by transnasal endoscopy at a factory - Diagnosis of *H. pylori* infected gastritis by LCI
Satoshi Ikeda, Masatoshi Iino, Hirofumi Okamura, Makoto Ikeda, Chikai Ubukata (Japan)
- POT-28** Development of new endoscopic suture machine: The study of applicability to endoscopic therapy
Youngcheon Ra, Bora Keum, Dokwan Lee, Yoonjin Kim, Yongnam Song, Bomee Lee, Sanghyun Kim, Kangwon Lee, Hanjo Jeon, Jaemin Lee, Hyuksoon Choi, Eunsun Kim, Yoontae Jeon, Hoonjai Chun, Hongsik Lee (Korea)
- POT-29** Forecasting of lymph node metastasis in early gastric cancer with deep learning based approach
Bomee Lee, Bora Keum, Sangjeong Ahn, Eunsu Kim, Hyeseong Lee, Sung Hak Lee, Sanghyun Kim, Han Jo Jeon, Yoon Tae Jeon, Hoon Jai Chun (Korea)
-  **POT-30** Hemostatic ability of spray coagulation in gastric endoscopic submucosal dissection: A multi-center study protocol
Mitsuru Esaki, Yorinobu Sumida, Kosuke Maehara, Taisuke Inada, Yusuke Suzuki, Kazuo Shiotsuki, Daisuke Yamaguchi, Kei Nishioka, Tsutomu Iwasa, Yosuke Minoda, Haruei Ogino, Eikichi Ihara, Yoshihiro Ogawa (Japan)
- POT-31** Differential diagnosis of gastritis, gastric dysplasia and gastric cancer using endoscopic Raman spectroscopy
Hyunsoo Chung, Nuraini Zailani, Juin Shin Wee, Derrick Yong, Guowei Kim, Jimmy So, Khok-Yu Ho (Korea)
- POT-32** Proteomic and lipidomic analysis of gastric cancer for in vivo, real-time diagnosis using endoscopic Raman spectroscopy
Hyunsoo Chung, Nuraini Zailani, Juin Shin Wee, Derrick Yong, Federico Torta, Qifeng Lin, Qingsong Lin (Korea)
- POT-33** Z-POEM in Izmir since 2018: A single center experience
Levent Aktas, Ozgur Deger, Suleyman Gunay, Firdes Topal (Türkiye)



- POT-34** **Development and preclinical evaluation of novel half-pigtail plastic biliary stents**
Cheong Ran Je, Eun Kyoung Kim, See Young Lee, Sung Ill Jang, Jae Hee Cho (Korea)
- POT-35** **Clinical outcome of endoscopic hemostatic powder in gastrointestinal bleeding: A multicenter retrospective study**
Zie Hae Lim, Seung in Seo, Dae-Seong Myung, Seung Han Kim, Han Hee Lee, Selen Kim, Bo in Lee (Korea)
- POT-36** **Systematic review of self-assembling peptides as topical agents in gastrointestinal bleeding**
Andrei Mihai Voiosu, Monica State, Victor Dragan, Sergiu Vaduva, Paul Balanescu, Radu Bogdan Mateescu, Theodor Voiosu (Romania)
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Seung Han Kim, Hoon Jai Chun, Jiho Kim, Kungwon Rhie (Korea)
- POT-38** **Artificial intelligence assisted gastric lesion detection and diagnosis system for atypia and dysplasias**
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Yuna Kim, Sung Hwan Yoo, Jie-Hyun Kim, Young Hoon Youn, Hyojin Park (Korea)
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Andrei Mihai Voiosu, Andreea Bengus, Theodor Voiosu, (Romania)
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Abdulaziz Tojiboev, Makhmud Aliev, Rustam Yuldashev, Shoilkhom Shokhaydarov (Uzbekistan)

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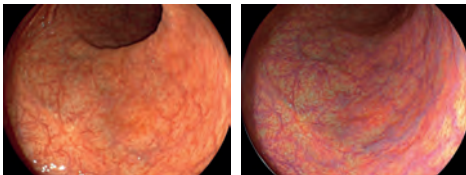
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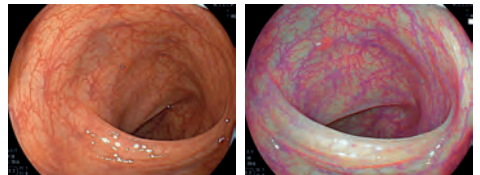
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* Fukuda, Hisashi, et al. "Linked color imaging can enhance recognition of early gastric cancer by high color contrast to surrounding gastric intestinal metaplasia." Journal of gastroenterology 54.5 (2019): 396-406.

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* UBIST Data: 국내 PPI 시장 2022년 누적 현유처방금액 199,181,817 원, UBIST ATC코드: A282 위산분비억제제 중 PPI 기준
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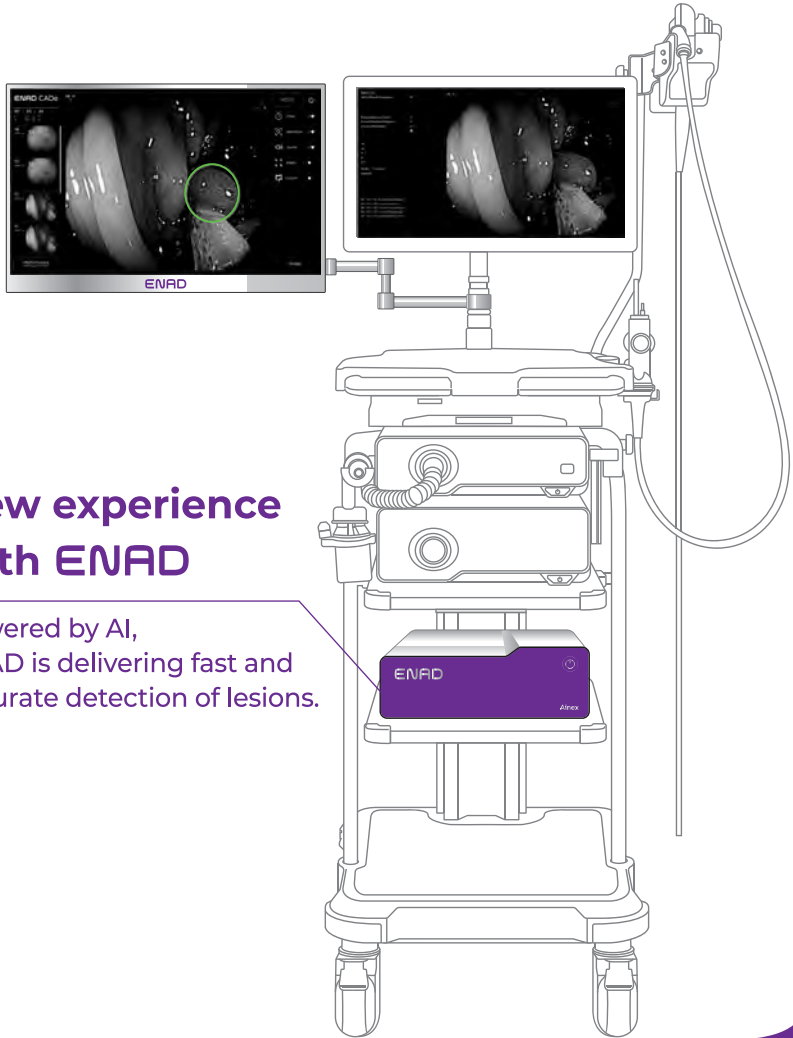
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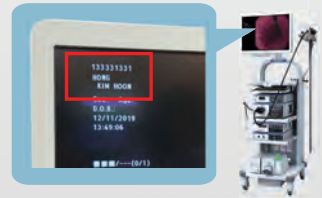


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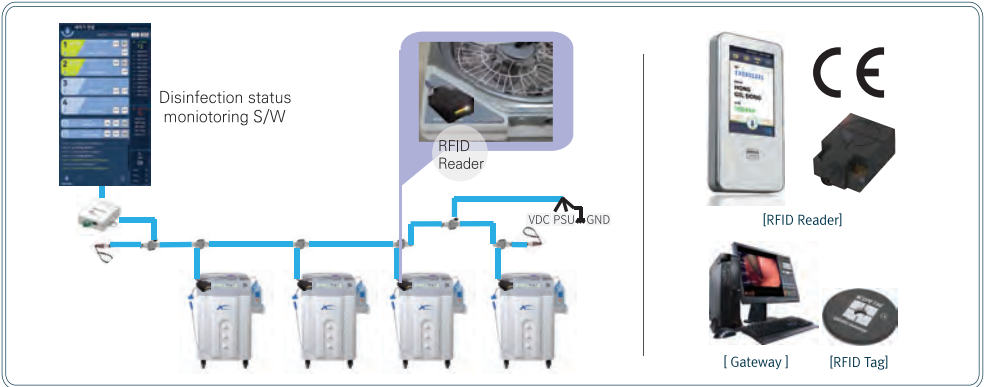
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UGI 1-1

Current issue in eosinophilic esophagitis

Kee Wook Jung

University of Ulsan, Korea

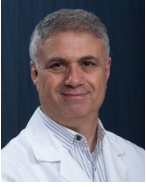
Eosinophilic esophagitis (EoE) is a chronic immune-mediated disease involves inflammation of the esophagus and highly prevalence in Western countries.¹⁻³ However, its prevalence and incidence in Asian countries remain poorly defined. We have published several reports on EoE in Korea.^{4,5} The number of esophageal biopsies appeared to have increased only slightly over the duration of our study period from 2006 to 2016. However, the number of patients diagnosed with EoE seemed to have significantly increased over the 12 years ($P < 0.001$).⁵

The diagnosis of EoE has evolved over the last few decades.⁶ The first consensus in 2007 suggested that patients with esophageal symptoms should have ≥ 15 eosinophils per high-power field (HPF) on esophageal biopsy and there should be no evidence of pathologic gastroesophageal reflux disease (GERD).⁷ However, the second consensus in 2011 introduced a new condition called PPI-responsive esophageal eosinophilia (PPI-REE).⁸ However, subsequent studies showed that clinical, endoscopic, histologic, immunologic, and molecular features at baseline did not predict who may respond to PPIs, and there were no clinical or endoscopic features that distinguished PPI-REE from EoE before the PPI trial.⁹ Moreover, potential non-acid-mediated mechanisms of PPIs were found including suppression Th2-mediated eotaxin-3 secretion of PPIs and improving esophageal barrier function.¹⁰ Therefore, the third consensus in 2018 removed PPI trial from the diagnostic guideline for EoE diagnosis.¹¹ The American Society for Gastrointestinal Endoscopy consensus recommends taking at least six biopsy samples for EoE diagnosis, with samples taken from the distal, mid, or proximal esophagus, regardless of endoscopic appearance in patients suspected to have EoE.¹²

EoE can be managed through non-pharmacologic and pharmacologic approaches.¹³ Dietary elimination could be an option for some patients, with a targeted elimination diet of six food showing promising histologic and clinical efficacy.¹⁴ PPI showed good histologic and clinical efficacy (response rate of up to 42% in a recent meta-analysis).¹⁵ Swallowed topical steroids, such as fluticasone and budesonide, are effective with meta-analyses responding an overall response rate of 68% (0.50–0.82) and 77% (0.63–0.87), respectively.¹⁶ Biologic medications could be a pharmacologic option for patients unresponsive to PPI and swallowed topical corticosteroids.¹⁷ In 2022, the Food and Drug Administration approved dupilumab, a monoclonal antibody that blocks interleukins 4 and 13, as the first treatment for EoE.¹⁸ Endoscopic dilation could be attempted in patients with esophageal strictures.¹³ Over the last few decades, the guidelines for EoE diagnosis and treatment have evolved rapidly.¹³ EoE diagnoses are increasing worldwide, including in Korea, and clinicians should be aware of the updated EoE diagnosis and treatment guidelines to provide optimal patient care.

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UGI 1-2

GERD, reflux hypersensitivity or functional disorder?

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Heartburn patients with normal endoscopy may have Nonerosive reflux disease (NERD), functional heartburn or reflux hypersensitivity. The latter, formerly termed hypersensitive esophagus, has been introduced as a new functional esophageal disorder by Rome IV. It has been estimated that about 50% of those with normal endoscopy have NERD, 30% functional heartburn and 20% reflux hypersensitivity. There are no unique clinical characteristics that can help separate among these 3 disorders. Empirical therapy or the PPI test can separate between NERD and functional heartburn, but they do not perform well in separating between NERD and reflux hypersensitivity.

Several diagnostic tools are needed to separate between the 3 disorders, upper endoscopy, wireless pH capsule and esophageal manometry. In the case of reflux hypersensitivity, one has to demonstrate evidence of triggering of symptoms by reflux events despite normal esophageal acid exposure on pH or pH-impedance monitoring. Response to anti-secretory therapy does not exclude the diagnosis. Overlap may exist between reflux hypersensitivity or functional heartburn and GERD. This is usually identified by performing impedance +pH on PPI treatment in patients with documented history of GERD. While anti-reflux treatment is an option for both NERD and reflux hypersensitivity patients, those with reflux hypersensitivity and functional heartburn may also benefit from neuromodulators and a variety of psychological interventions. A recent study demonstrated the value of baclofen, a TLESR reducer, in patients with reflux hypersensitivity. Endoscopic treatment of GERD and anti-reflux surgery have been used in patients with NERD, but their role in those with reflux hypersensitivity remains to be elucidated.



UGI 1-3

Endoscopic submucosal dissection (ESD) for Barrett's esophagus (BE)-related early neoplasia

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Barrett's esophagus (BE) and its related early neoplasia is relatively uncommon in Korea; however, the incidence is increasing and will likely continue to increase in the foreseeable future. The opportunity to identify BE-related early neoplasia is high in countries such as Korea and Japan due to their national gastric cancer screening programs. The options for therapy of BE-related early neoplasia depends on the size and morphology of the lesion. For high-grade dysplasia lesions that are flat, ablation has been demonstrated to be an effective modality of therapy. However, if there is any raised component to the neoplastic lesion, endoscopic resection is recommended. In the West, the favored method for endoscopic resection remains EMR since expertise in ESD remains limited. However, several studies from the West have demonstrated that resection of BE-related neoplasia (nodular HGD and early cancer) by ESD results in higher R0 en bloc resection rates and less pathologic uncertainty with no difference in complication rates compared to EMR. The argument against ESD in the West is that there does not appear to be a significant difference in clinical outcomes for survival when comparing ESD versus EMR and that ESD is much more difficult to learn. However, clinical management is significantly impacted when an en bloc R0 resection is not achieved, leading to unnecessary additional procedures, therapy, and/or surgery. In Asia, where expertise in ESD is widely available, ESD for BE-related neoplasia should be considered standard of care.

Keywords: ESD, Esophagus, Barrett's, Neoplasia, Cancer



UGI 1-4

Improving diagnostic yields of gastrointestinal diseases arising in the gastroesophageal junctional zone

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Diseases of the gastro-esophageal junction zone (GEJZ) associated with acid reflux are on the rise. In addition to the complications of GERD and Barrett's esophagus (BE), recent epidemiologic studies showed that cancer of GEJZ is also increasing. However, classification of cancers arising from the GEJZ are ill-defined or confusing. The definition of BE also varies from country to country. This confusion can be improved with an accurate diagnosis of GEJ. The proximal margin is widely used in the West as the GEJ definition. However, this can be changed by air insufflation volume. In addition, the GEJ becomes indistinct in patients with severe atrophy which is commonly observed in gastric adenocarcinoma patients in the East. The GEJ was defined as the distal end of the palisade vessel (DEPV) during endoscopic observation, which has been regarded as an optimal landmark for GEJ compared to the proximal end of gastric folds. Use of unified endoscopic landmark (DEPV) observed under proper methodology will reduce the diagnostic inconsistencies of the short (including ultra-short) segment BE. Also, its use can clearly define GEJZ. A new concept of gastro-esophageal zone (GEJZ), defined as an area straddling 1 cm proximal and 1 cm distal to the GEJ, is proposed for practical purposes. Cancers arising in the GEJZ as defined above is proposed as a substitute of the Siewert's type II cancer in the GEJZ.

For successful treatment of GEJZ disorders, it is necessary to evaluate the physiologic alteration of the GEJZ as well as detailed anatomical observation of the GEJZ. Anatomical changes of the Anti-Reflux Barrier are crucial factors influencing the severity and long-term outcome of GERD. Anti-Reflux Barrier consists of LES including gastric sling and diaphragmatic crura. The EGJ sphincter includes gastric sling fibers that prevent gastroesophageal reflux by maintaining the function of the flap valve. The right crus acts like a sling on the GEJ. Crura is crucial even absence of Hernia. Therefore, Hill grading based on the GE flap valve concept is a good endoscopic method for evaluating EGJ disruption. During endoscopic observation of GERD patients, GEJ, the LES and flap valves should be observed in detail. The presence or absence of esophagitis (LA CLASS), hiatal hernia length, and the width of the diaphragmatic hiatus in Hills grade III or greater should be described. Patient with Hill grade 4 are not candidates for an endoscopic approach. Anything over 2 cm should be considered a risk failure. High resolution manometry and EndoFLIP® clarified functional and anatomical abnormalities of GEJZ in cases with GERD, eosinophilic esophagitis, achalasia, and other esophageal motor diseases. It should not be forgotten that endoscopic/laparoscopic treatment of GERD has the best results in patients with proven GERD.

Keywords: Gastroesophageal junction, Gastroesophageal junctional zone, Endoscopic treatment of GERD, Hiatal hernia, Gastroesophageal reflux disease



UGI 2-1

Recent trends and studies about POEM

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Introduction

Per-oral endoscopic myotomy (POEM) is a groundbreaking endoscopic treatment for esophageal achalasia, reported by Inoue et al. in 2010. More than 10 years have passed since its development, and it is now performed worldwide as one of the standard treatments for achalasia. Our hospital began POEM in 2011 and has successfully completed over 450 cases in the past decade. In this presentation, we will report on the current status of POEM and new insights gained over the past 10 years.

Results

The efficacy of POEM was 98% (defined as Eckardt score of 3 or less) at 3 months, and the treatment effect did not change even in cases with long-term follow-up. In the early stages of implementation, incomplete myotomy of the lower esophageal sphincter (LES) occurred in 4 cases, requiring a second POEM. However, in cases (total of 350) that double-scope method was routinely used, no cases of incomplete myotomy LES requiring a second POEM have been observed. Regarding gastroesophageal reflux disease (GERD) after POEM, we did not observe refractory GERD that was difficult to manage with acid secretion inhibitors. It was found that reducing the proportion of severe erosive esophagitis (Los Angeles classification grade C or higher) could be achieved by preserving the sling fibers and control the length of myotomy on the esophageal side less than 10 cm during POEM.

Conclusion

It is anticipated that POEM will be performed at more facilities in the future, but for standardization of treatment, routine use of double-scope method, preservation of the sling fibers, and appropriate selection of the length of myotomy (especially in esophageal side) according to the type of achalasia are desirable.

Keywords: POEM, Achalasia, Double scope, Sling fiber, GERD



UGI 2-2

Endoscopic myotomy for upper esophageal diverticulum (Zenker diverticulum)

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Introduction

Zenker's diverticulum (ZD) is a pulsion diverticulum deriving from the herniation of both the mucosa and the submucosa of the posterior pharyngeal wall through Killian's triangle. The pathogenesis of ZD is not completely understood; however, it appears to be related to impaired upper esophageal sphincter (UES) compliance.¹ ZD is the most common hypopharyngeal diverticulum, with an estimated prevalence of 0.01-0.11%. Since the number of asymptomatic patients is unknown,² the true prevalence is likely to be significantly higher. It is more frequently diagnosed in the western world, with a prevalence in males in the 7th and 8th decades of life, while it is a very rarely reported finding in Eastern countries. The major symptom is dysphagia, which occurs in 80-90% of patients. Other reported symptoms are regurgitation, foreign body sensation, halitosis, chronic cough and systemic complications such as weight loss, and aspiration pneumonia. Treatment is indicated for symptomatic ZD.³ The treatment of ZD aims to transect the cricopharyngeal muscle (CM) to eliminate the septum between the diverticulum and the upper esophagus, thus relieving the dysfunctional condition. Currently there are 3 main therapeutic approaches for dealing with symptomatic ZD: open trans-cervical diverticulectomy, and cricopharyngeal septotomy using either a rigid or a flexible endoscope. Transcervical diverticulectomy is an effective option, however, septotomy performed through a rigid endoscope has been shown to achieve comparable efficacy outcomes, resulting in quicker diet resumption, lower adverse event rates and a shorter inpatient stay. Nevertheless, approaches using rigid endoscopy have several limitations, such as inadequate jaw opening and restricted neck mobility are the main causes of technical failure. During the last few decades, in an effort to overcome such limitations, flexible endoscopic approaches have been established as safe and effective alternatives to both open surgery and the rigid endoscopic treatments. This lecture aims to provide a comprehensive point of view on flexible endoscopic therapies for ZD, from the "classic" flexible endoscopic septum division (FESD), to the most cutting-edge third space approaches.

Flexible endoscopic septum division

FESD was first described by Mulder and Ishioka more than 20 years ago.⁴ It shares the same principles and rationale as rigid endoscopy: it involves a full thickness incision of the mucosa, submucosa and the muscular fibers that form the diverticular septum. By cutting the entire septum and creating a common cavity between the esophagus and diverticulum, a myotomy is automatically performed.

1. Procedures

- 1) General anesthesia or propofol-based deep sedation
- 2) No prophylactic antibiotic therapy
- 3) Suction of any retained material from the diverticulum
- 4) A distal attachment, such as short transparent cap, is used to enhance visualization, improve endoscope stability, and gently stretch the septum at the time of its incision.
- 5) Cutting septum using devices (needle-knife, hook-knife, monopolar forceps, argon plasma coagulation)
- 6) After septotomy, one or more endoclips (usually up to 3 clips) are routinely placed to close the incision to reduce the likelihood of delayed perforation or bleeding.

2. Outcomes

Ishaq et al⁵ investigated outcomes of FESD by pooling data from the available series, reporting a success rate of 91% with a recurrence rate of 11.6%. In terms of safety, a pooled adverse event rate of 13%, mainly due to perforation (7%) and bleeding (5%), was reported by a more recent meta-analysis.⁶ The need for general anesthesia and the high rate of intraoperative abandonment owing to restricted neck mobility, combined with comparable success and adverse events rates have led the European Society of Gastrointestinal Endoscopy (ESGE) to recommend the use of FESD as the first-line therapy for ZD.³

Zenker's peroral endoscopic myotomy

Recently, Li et al described a novel endoscopic technique to treat ZD, named "submucosal tunneling endoscopic septum division", inspired by the peroral endoscopic myotomy (POEM) procedure developed for achalasia.⁷

1. Procedures

- 1) No prophylactic antibiotic therapy
- 2) Submucosal injection and subsequent longitudinal mucosotomy are performed 3 cm proximal to the septum as the tunnel entry.
- 3) A submucosal tunnel is then created along both sides of the septum, ending 1–2 cm distal to the bottom of the diverticulum.
- 4) The CM fibers of the septum are then transected down to the bottom of the diverticulum and further into the normal esophageal muscle.
- 5) The mucosal incision site is finally sealed with up to 3 clips.

2. Outcomes

Yang et al⁸ collected data from an international multicenter cohort showing a promising clinical success rate of 92% with a perforation rate of 5.5%. Even if a direct comparison with standard FESD is lacking, a mean procedural time of around 50 min is undoubtedly longer compared to the standard approach.

Peroral endoscopic septotomy in Zenker's diverticulum

More recently, Repici et al⁹ conceived of an alternative third space approach, called peroral endoscopic septotomy (POES), to overcome the technical challenges of the Z-POEM technique. In the "standard" Z-POEM approach, In ZPOEM's opening area, muscular spasm as well as anatomical limitations may reduce the ability to properly open and close the mucosal incision. Hence, in order to gain direct access to the ZD muscular septum without the need of long tunneling starting at pharyngeal level, they proposed to perform the mucosal cut alongside the long axis of the septum, and directly on top of it. Unlike the "classic" Z-POEM, a procedural time of 13.8±5.1 min seems to be comparable with standard FESD. Further, a clinical success rate of 95% with no intra- or postprocedural adverse events and only 4 instances of mild asymptomatic subcutaneous emphysema were reported. Overall, the mean hospital stay was 1.2±0.4 days.

Conclusions

Flexible endoscopic approaches are effective and safe options for managing ZD. Data on third space techniques are promising as regards the further improvement in patient outcomes; however, further studies are required to define which patients could benefit the most from such an approach.

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UGI 2-3

EUS-guided gastroenterostomy (EUS-GE) for malignant gastric outlet obstruction

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Introduction

Endoscopic ultrasonography-guided gastroenterostomy (EUS-GE) is emerging as a new and minimally invasive endoscopic treatment method for gastric outlet obstruction (GOO). In EUS-GE, it is important that stents can be safely and reliably deployed and that there is no stent migration. The most suitable stent is the lumen-apposing metal stent (LAMS) because it has short length, large saddle, and large stent diameter.

What is the EUS-GE

1. Current status of EUS-GE

EUS-GE can be technically classified as the following three methods: direct gastroenterostomy, balloon-assisted gastroenterostomy, and EUS-guided balloon-occluded gastrojejunostomy bypass. Previous reports of EUS-GJ with LAMS showed a technical success rate of 87%-100% and clinical success rate of 84%-96% suggesting fair results despite its technical difficulty.^{1,2}

2. Result from the recent report

A multicenter retrospective observational study in Spain, EUS-GE vs duodenal stenting for malignant gastric outlet obstruction, showed EUS-GE was superior to duodenal stent in terms of stent patency at 6 months.³ In an international multi center propensity score-matched comparison, clinical success rates for EUS-GE and duodenal stenting were 91% vs 75%, significant difference was found ($p=0.008$). Stent dysfunction occurred in 1% vs. 26% of patients, statistically significant differences were observed ($p<0.001$). Thus, EUS-GE had higher clinical success and lower stent dysfunction, with similar safety, compared with duodenal stenting, suggesting that EUS-GE may be preferred over duodenal stenting in patients with malignant GOO.⁴ From a comprehensive review and meta-analysis to compare the effectiveness and safety of EUS-GE compared to surgical-GE (SGE),⁴ the pooled OR of technical success with EUS-GE vs SGE was 0.19, SGE was superior. Among the technically successful cases, EUS-GE was superior in terms of clinical success. And EUS-GE has lower overall AE, shorter procedure time, shorter post-procedure length of stay, and rates of severe AE and recurrence were comparable. This study's results suggest EUS-GE is a promising alternative to SGE due to its superior clinical success, overall safety, and efficiency. With further evolution EUS-GE could become the intervention of choice in GOO.⁵

EUS-guided balloon-occluded gastrojejunostomy bypass (EPASS)

I introduce for EUS-guided balloon-occluded gastrojejunostomy bypass so called EPASS.⁶ We developed a new EUS-GJ technique with a dedicated double-balloon enteric tube for EPASS to distend the jejunum for safe puncture.² We also use the LAMS (Hot AXIOS system). This type of balloon, the saline can be delivered in the drainage lumen of the enteric tube between the two balloons. This double-balloon tube allows for clear visualization of the jejunum to be punctured on EUS. Why is EPASS more useful than other methods?

This is the most important factor for successful procedure. Theoretically, in case of non-distended jejunum, it may be difficult even for LAMS with cautery-enhanced tip to penetrate the jejunal wall because the saline easily flows away, resulting in shrinking of the bowel. In contrast, in cases of distended jejunum, the needle easily goes into the jejunum because the jejunal wall has tension. It is very useful to use two balloons to dam up the water.⁷

Conclusions

EUS-GE is a useful method for malignant GOO caused by pancreatic or gastric cancer, benign GOO after severe pancreatitis, and afferent loop syndrome, suggesting that it may become a new treatment method.

Keywords: EUS-GE, Endoscopic ultrasonography-guided gastroenterostomy, GOO, Gastric outlet obstruction, EPASS

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UGI 2-4

ESD in subepithelial tumors: Is it always possible?

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Most subepithelial tumors are asymptomatic and clinically insignificant. However, carcinoid tumors, lymphomas, and gastrointestinal stromal tumors (GISTs) are malignant. Even with developed endoscopic facilities, subepithelial tumors are still very difficult to diagnose with noninvasive methods, such as endoscopy or endoscopic ultrasonography (EUS). There are various methods available for histological diagnosis of the tumor, including a bite-on-bite biopsy, EUS guided fine-needle aspiration, endoscopic mucosal resection, endoscopic submucosal dissection (ESD), and submucosal tunneling with endoscopic resection.

Asymptomatic subepithelial lesions smaller than 2 cm is recommended a periodic surveillance using endoscopy or EUS. Gastric subepithelial lesions with lesion-specific symptoms or those increasing in size may have malignant potential or active inflammation. Also, malignant features on endoscopy or high-risk features on EUS means a high probability of a clinically malignant condition. Biopsy or resection of the mass is needed for accurate determination of the long-term prognosis.

GISTs, leiomyomas, and schwannomas are located in the fourth layer on EUS. GISTs are most common subepithelial tumor in the stomach. If the GIST was >2 cm or <2 cm with symptoms, it should be removed. Standard treatment is laparoscopic wedge resection which has risk of incomplete resection in tumor with endoluminal growing and postoperative complication such as gastroparesis and stenosis.

Endoscopic resection for gastric subepithelial tumor has not been standardized and is based on ESD technique. ESD is the best method for resection of the lesions confined to mucosa, and can give histologic complete resection for subepithelial tumors located in mucosa and submucosa. Endoscopic muscularis dissection should be added to ESD for complete removal of the tumors originated from muscularis propria layer. Many studies showed that microscopic incomplete resection for endoscopic treatment of gastric GISTs is not associated with high risk of local recurrence.

Endoscopic resection can be used for treatment of gastric GISTs with endoluminal growing as an alternative to laparoscopic wedge resection. Tumor location and degree of muscularis propria involvement are important factors for en bloc resection of tumor. Anterior wall of upper body is difficult site for endoscopic approach, and risk of perforation has been reported. Extensive muscular involvement of tumor is needed a dissection of wide muscularis propria which may lead to large perforation. Endoscopic full-thickness resection has risk of peritoneal seeding, and should be limited to selected cases.

Until now, tumor with subserosal growing has been resected by surgery. Recently, endoscopic subserosal dissection (ESSD) was introduced. ESSD is expected to be useful for the lesions with extraluminal growing, located in esophagogastric junction, cardia, or some part of upper body and lesser curvature.

Keywords: Endoscopic resection, Subepithelial tumor

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UGI 3-1

Role of AI in Barrett's esophagus-related neoplasia

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Barrett's esophagus (BE) is associated with an increased risk of adenocarcinoma. Thorough screening during endoscopic surveillance is crucial to improve patient prognosis. Detecting and characterizing dysplastic or neoplastic BE during routine endoscopy can be challenging, even for expert endoscopists. Using imaging techniques such as narrow-band imaging (NBI) with standardized classification systems for BE and BERN can help improve the diagnostic performance of endoscopists. Additionally, advanced imaging techniques such as chromoendoscopy with indigo carmine or acetic acid are valuable options recommended for high-quality BE assessment. However, implementing advanced imaging techniques in daily practice requires extensive experience. Recently, several research groups have developed Artificial Intelligence (AI) algorithms with deep learning to improve the detection and characterization of BERN. AI-based clinical decision support systems may have the capacity to improve the detection and characterization of early dysplastic lesions, especially in the hands of non-expert endoscopists in the outpatient setting.

Keywords: Artificial intelligence, Barrett's, Dysplasia



UGI 3-2

Role of AI in esophageal squamous cell neoplasia

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A. Epidemiology

Esophageal cancer is the 8th most common cancer worldwide, with 456,000 new cases each year. It is also known as the sixth-highest cancer-related mortality rate, with 400,000 deaths per year. Esophageal squamous cell carcinoma (ESCC) remains the predominant histologic type of esophageal cancer in some regions of Asia and sub-Saharan Africa. When looking at the incidence trend according to histological subtype, esophageal squamous cell carcinoma accounted for the majority from 92.5% in 1999 to 96.0% in 2013. (Cancer Res Treat 2018;50:303–316.)

In the summary staging classification using the criteria for surveillance, epidemiology, and end results of esophageal cancer, the localized stage was 30.1% in 2006–2009, 33.0% in 2010–2013, and the regional stage was 2006–2009. This means that the proportion of patients with distant stage and undiagnosed esophageal cancer among all esophageal cancers decreased and the number of treatable locally or locally advanced esophageal cancer increased.

(Shin A et al. Trends in incidence and survival of esophageal cancer in Korea: analysis of Korea, Central Cancer Registry Database. J Gastroenterol Hepatol 2018;33:1961–1968.)

B. Clinical implication and artificial intelligence

Squamous cell carcinoma is the most common type of cancer, and the prognosis is relatively poor as it occurs in most advanced cases. Therefore, the importance of early diagnosis cannot be overemphasized.

Initial diagnosis using white light is not easy and iodine staining was used in high-risk patients, but there are problems such as the risk of inhalation, esophageal pain, and an increase in diagnosis time.

In the case of an inexperienced endoscopist, even if a narrowband endoscope is used, the sensitivity is not 53% in the early diagnosis of squamous esophageal cancer. Recently, artificial intelligence based on convolutional neural networks has been widely applied to all medical fields, especially medical imaging. On the other hand, research results show that the use of AI algorithms improves diagnostic performance and reduces medical expenses.

In order to realize this, high-quality early esophageal cancer images are needed, but it is not easy to build such a database with a single institution. In this lecture, we intend to review an artificial intelligence diagnosis system that can be used for early esophageal cancer database construction and real-time implementation.

Keywords: Esophagus, Neoplasia, Artificial intelligence, Detection



UGI 3-3

Real-time use of AI for diagnosing early gastric cancer by white-light endoscopy

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Suspicion of the lesions, early detection and differentiating malignant/pre-malignant and benign lesions through meticulous inspection of gastric mucosa in gastrointestinal endoscopy is the important virtue of endoscopists.^{1,2} The accurate prediction of invasion depth for gastric neoplasms is also an important ability because gastric neoplasms confined to the mucosa or superficial submucosa are potential candidates for endoscopic resection.³ However, these virtues are influenced by the experience or expertise of the endoscopists. Image-enhanced endoscopy, such as digital chromoendoscopy enabled characterization of the lesion through the magnification of the microvascular or cellular structures of the surface mucosa.⁴ This can help to assess the edge or depth of gastrointestinal neoplasms for delineation of resection boundaries and prediction of the possibility of lymph node metastasis.⁴ However, subjective interpretability, inter-observer or intra-observer variability, and learning curve tempered the widespread implementation and only studies of experienced endoscopists with high level of confidence showed benefit with this technique.⁵

Studies on the deep-learning based computer aided diagnosis (CAD) models in gastrointestinal endoscopy have been published.^{6,7} These models aimed to provide an automated image recognition, classification of the lesions, and segmentation tasks in the field of unmet need area of gastroenterology.⁸⁻¹⁰ The most important benefit in these CAD models are not only to augment clinical performance with this technology, but also to reduce the burden of endoscopists from the repetitive procedures and to facilitate the concentration of professional activities.⁸ These models also provide consistent and robust answers to physicians, irrespective of the fatigue level of users.¹¹

Application of CAD models to endoscopy is non-invasive and can further facilitate in detecting hidden or hard-to-detect lesions. Moreover, automated determination of the optimum classification, providing additional information, such as invasion depth, would be helpful to physicians, especially for novice endoscopists.¹² Providing real-time clinical decision support system (CDSS) in endoscopy can help the appropriate selection of high-risk patients who need additional diagnostic workup or treatment. However, current established CAD models are in the research-based format, which tend to have limited value in real practice. Because of the unique characteristics of patients in each institution, CAD models developed from a single institution usually have limitations for widespread implementation indicating the importance of the external-test.¹³

The advancement of artificial intelligence model in medicine has progressed from traditional machine learning (learning about the association between input data and output labeled data) or deep learning (convolutional neural network-based local feature selection and task solving through the optimization of the hypothetical model) to the models with functionality (Transformer with self-attention; i.e., ChatGPT, Stable diffusion). The studies on the CAD models with functionality will

increase and clinical application will be more widely available.

This lecture summarizes the studies on the application of CAD of gastric neoplasms. Current limitations and perspectives on future development are also discussed.

Keywords: Early gastric cancer, AI, CAD, Endoscopy

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UGI 3-4

Real-time use of AI for diagnosing early gastric cancer by image-enhanced endoscopy

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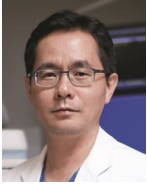
It is well acknowledged that Gastric cancer (GC) is the third leading cause of cancer-related mortality globally. Early detection and curative treatment are key strategies for reducing GC-related mortality. However, EGCs are difficult to recognize because of their subtle mucosa changes.

In recent decades, magnifying image-enhanced endoscopy (M-IEE) clearly present mucosal microvessel and microstructural changes, have been developed and widely applied to improve EGC diagnosis. However, the diagnosis of M-IEE is complex and requires endoscopists to have ample experience and thorough knowledge. As a result, the ability of endoscopist to identify EGC varies greatly.

Remarkable progress has been made in the application of deep learning in medical image analysis in recent years. The AI has the potential to be a powerful tool assisting endoscopists in EGC diagnosis under M-IEE.

In this lecture, I will show the advanced artificial intelligence (AI) researches related to the M-IEE and early gastric cancer (EGC), and introduce a series of AI systems aimed at assisting in detecting precancerous conditions and diagnosing EGC using M-IEE techniques in real-time. The systems were proved to have great performance in detecting precancerous conditions, diagnosing gastric neoplasms and EGC, delineating the margin of EGC, distinguishing the differentiation of EGC, etc. Furthermore, explainable systems based on feature extraction and quantitative analysis were constructed to further fulfill the clinical needs.

Keywords: Artificial intelligence, Early gastric cancer, Image-enhanced endoscopy



UGI 4-1

Indications and techniques for bariatric endoscopy and their mechanisms of actions

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FDA approved the first endoscopic device for bariatric treatment, “intra-gastric balloon” in 1985.¹ Since then a variety of endoscopic techniques and devices have been introduced to the clinical field and reported to play roles as treatment options for obesity.² In 2015, the documents by ASGE bariatric endoscopy task force identifies criteria that must be met in order for an intraluminal weight loss device to be considered successful.³ Several studies have demonstrated that certain types of endoscopic bariatric treatment meet these criteria.^{3,4,5} Herein, the endoscopic management for obesity has been considered as a treatment option, other than bariatric surgery. These include intra-gastric balloons, endoscopic sleeve gastropasty, and aspiration therapy.^{3,4,5} The indications for endoluminal approaches are moderate obesity not responding to non-surgical treatment but ineligible to surgery, severely obese patients who do not want surgery, and bridge therapy to reduce surgical complications and improve operability in patients scheduled for bariatric surgery.⁶ This lecture will introduce the current implications of bariatric endoscopies and their relevant mechanisms of action.

Keywords: Obesity, Bariatric endoscopy

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UGI 4-2

Complications following bariatric endoscopy and their management

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Bariatric endoscopy is performed worldwide. Complications need to be recognized and appropriately treated. Complications are less frequent but more severe for endoscopic sleeve gastroplasty (1 to 3%) than Intragastric Balloon (up to 34%). A review of major complications following bariatric endoscopy and their management will be done.

Keywords: Complications, Bariatric endoscopy, Therapeutic endoscopy



UGI 4-3

The evolution and current state of bariatric endoscopy in Korea

Seung-Joo Nam

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Obesity treatments can be classified into four categories which are lifestyle modification, pharmacotherapy, endoscopic bariatric and metabolic therapies (EBMT), and bariatric surgery. While lifestyle modification and pharmacotherapy can be applied to a large number of patients, they have limited efficacy. Bariatric surgery has shown the most significant and durable weight-loss efficacy, but only a small percentage of patients who qualify undergo surgery due to the fear of complications and poor accessibility. EBMTs are currently gaining attention because they are less invasive and have better accessibility than surgery, with superior efficacy to pharmacotherapy. EBMTs have also been reported to improve obesity-related metabolic conditions such as hypertension, diabetes, and non-alcoholic fatty liver disease. Several FDA-approved EBMTs are available in the United States, including intragastric balloons (IGBs), endoscopic sleeve gastroplasty, and aspiration therapy (although the AspireAssiste System is no longer marketed in the U.S. due to company decisions, not safety issues).

In Korea, IGBs are the only available EBMT, and this technique is currently under review for insurance coverage. In this lecture, we will briefly overview the evolution and current state of bariatric endoscopy in Korea and review the efficacy and safety of IGB in the Korean population. We will also check the efficacy and safety of IGB for the overweight population.

Keywords: Obesity, Bariatric endoscopy, Intragastric balloon, Korea, Overweight



UGI 4-4

The evolution and current state of bariatric endoscopy in Western countries

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Obesity, or globesity, is the pandemic of today. Bariatric Endoscopy is rapidly evolving in western countries, and new devices for treatment are available. Here we present the current devices for endoscopic treatment of obesity.

Keywords: Endoscopy, Obesity, Bariatric, Endoscopic sleeve gastroplasty

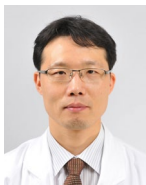


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LGI 1-1

Getting ready for a high-quality colonoscopy

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Colonoscopy is considered the gold standard of colorectal cancer screening methods for its ability to view the entire colon and both detect and remove polyps during the same procedure.

A high-quality colonoscopy meets specific quality indicators that provide better outcomes. However, the quality of colonoscopy can vary depending on several factors, such as the skill and experience of the endoscopist, the preparation and cooperation of the patient, and the equipment and facilities used. Therefore, it is essential to monitor and improve the quality of colonoscopy by using some key quality indicators.

To ensure a high-quality colonoscopy, there are several factors that need to be considered.

The preparation: The patient needs to follow the instructions given by the doctor to provide clear instructions and education on how to perform an adequate bowel preparation before the colonoscopy. This may involve taking laxatives, drinking clear liquids, or using enemas. A good preparation is essential for allowing the doctor to see the entire colon clearly and avoid missing any abnormalities. Split-dose method had better bowel preparation than the same day regimen. The bowel preparation quality (BPQ) is a measure of how well the colon is cleansed of stool during a colonoscopy. A higher BPQ improves the visibility and accuracy of the colonoscopy and reduces the need for repeat procedures. ASGE guideline recommends that the time of last intake dose is 4–5 hours before colonoscopy. ESGE also recommend that the time of completion of laxatives intake should be less than 4 hours. The laxatives of bowel preparation should be taken at least 2 hours prior to the start of the test.

The sedation: The patient may receive sedation or anesthesia to make them comfortable and relaxed during the procedure. The type and level of sedation may vary depending on the patient's preference, medical history, and the doctor's recommendation. The patient should discuss the risks and benefits of sedation with the doctor before the procedure.

The technique: The doctor should perform the procedure with skill and care, following the established guidelines and standards for colonoscopy. This includes inserting and advancing the colonoscope gently and slowly, inspecting every part of the colon thoroughly, taking biopsies or removing polyps as needed, and withdrawing the colonoscope carefully. The doctor should also document and report the findings and recommendations clearly and accurately.

The quality indicators: There are several measures that can be used to assess the quality of a colonoscopy, such as the cecal intubation rate (CIR, the percentage of procedures that reach the end of

the colon), the adenoma detection rate (ADR, the percentage of procedures that find at least one precancerous polyp), the withdrawal time (WT, the time spent examining the colon while withdrawing the colonoscope), and the complication rate (the frequency of adverse events such as bleeding or perforation). These indicators can help monitor and improve the performance and outcomes of colonoscopy.

The ADR is the percentage of patients who have one or more adenomas detected and removed during colonoscopy. A higher ADR is associated with lower rates of cancer incidence and mortality among patients. Overall ADR (ADR in a male/female population aged ≥ 50 years undergoing screening colonoscopy) of at least 25%. ADR target of 30% is recommended for men and 20% for women. Recently, AGA recommended that the goal adenoma detection rate for an individual endoscopist should be $\geq 30\%$ (aspirational target $\geq 35\%$). Endoscopists not meeting these thresholds may consider extending withdrawal times, self-learning regarding mucosal inspection and polyp identification, peer feedback, and other educational interventions.

The CIR is a measure of how often a gastroenterologist reaches the cecum during a colonoscopy. It means the completion of colonoscopy. The endoscopist should document the caecal intubation rate. A higher CIR ensures a complete examination of the colon and reduces the risk of missing lesions. CIR should be maintained at least 90% in all colonoscopy and at least 95% in colonoscopy for screening purposes.

The WT is the time spent by the endoscopist to examine the mucosa of the colon during withdrawal of the colonoscope after reaching the caecum. A longer withdrawal time allows for a more careful inspection and increases the chance of finding polyps or other abnormalities. The recommended minimum withdrawal time is 6 minutes for screening or surveillance colonoscopies (aspirational target ≥ 9 minutes).

Complication rate: Complications are rare but serious events that can occur during or after colonoscopy, such as bleeding, perforation, infection, or cardiopulmonary problems. The complication rate is the percentage of patients who experience a complication related to colonoscopy. A low complication rate indicates a safe and effective procedure that minimizes harm to patients.

Documentation: The endoscopist should provide a comprehensive and accurate report of each colonoscopy, including relevant information such as indication, consent, preparation, findings, interventions, complications, recommendations, and images. A good documentation facilitates communication, follow-up, quality assessment, and research.

These are some of the important quality indicators of colonoscopy that can help ensure a high-quality procedure that benefits patients and reduces colorectal cancer burden. If limited resources are available, measurement of cecal intubation rates, bowel preparation quality, and ADR should be prioritized.

Keywords: Colonoscopy, Quality indicators, Adenoma detection rate, Cecal intubation rate, Bowel preparation

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LGI 1-2

Dealing with post-colonoscopy colorectal cancer

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A statement was proposed by the World Endoscopy Organization (WEO) in 2018 aiming to unify the definition and calculation methods of post-colonoscopy colorectal cancer (PCCRC).

The term PCCRC is recommended to be used for “colorectal cancer diagnosed after colonoscopy in which no such cancer was found” and to subclassify PCCRC into interval cancers and non-interval cancers. As adenoma detection rate (ADR) increases, PCCRC is reported to decrease, making it important for endoscopists to maintain adequate ADR.

The JGES guideline 1 that we published also describes PCCRC in background knowledge (BK) and the statement is as follows.

The possible causes of PCCRC are: (1) Missed lesion/adequate examination, (2) Missed lesion/inadequate examination, (3) Detected lesion/not resected, (4) Likely incomplete resection of previously identified lesion, and (5) Likely new colorectal cancer.

Of these¹ flat or depressed lesions would be candidates for missed lesion. Although it has been reported in the West that many of these lesions are SSLs, the JPS data² showed that 52% of the missed lesions and 70% of the right-side colon lesions were laterally spreading tumors -nongranular types (LST-NG). In addition, there is no invasive cancer thought to have originated from SSL was found.

In Japan, many AI systems have been developed and marketed, including NEC's Wise Vision. We hope that many 0-IIc and LST-NG tumors, which are difficult to detect, will be detected in the future in the West, and that the number of PCCRC cases will be reduced in the future.

Keywords: Post-colonoscopy colorectal cancer (PCCRC), Laterally spreading tumors -nongranular types (LST-NG), Adenoma detection rate (ADR)

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LGI 1-3

The best time to start colorectal cancer screening for young ages

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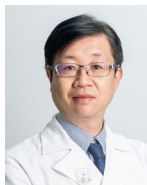
Colorectal cancer (CRC) is one of the most common types of cancer with high cancer mortality worldwide. CRC screening is associated with a significant reduction in CRC incidence through the detection and removal of adenomatous polyps and other precancerous lesions and with a reduction in mortality through early detection of CRC.

Recently, CRC occurrence has been on the rise in patients younger than age 50, referred to as early-onset CRC. Young patients with CRC are more often diagnosed at an advanced stage and most commonly detected in the rectum, and they have other unique challenges across the cancer management.

Increasing with incidence and mortality of early-onset CRC, recent guidelines recommend to lower the screening age in average-risk individuals. In 2018, the American Cancer Society recommended lowering the average-risk CRC screening initiation age from 50 to 45 years.

This topic will be reviewed regarding the best time to start of CRC screening for young ages.

Keywords: Colorectal cancer, Screening, Early-onset, Incidence, Mortality



LGI 1-4

When should colorectal cancer screening in the elderly be discontinued?

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While colorectal cancer (CRC) screening is being demonstrated as effective in reducing CRC mortality, when to stop screening is an emerging issue alongside the aging population in developed countries. The main purpose of screening is to detect early-stage cancer or non-cancerous precursors thereby reducing CRC mortality and incidence and increasing the life-year gain.

The elderly population has more comorbidities which not only increase the risk of screening, especially sedation and colonoscopy-related but also limit the benefit of CRC screening owing to the competing risk of death and expected low life-year gain by screening. As such, several issues should be carefully considered. First, how to select a subset of the population that is still likely to be benefited from screening is crucial. Second, screening modalities are associated with the funding needed, resource utilization, and the harm that may be caused by screening. Careful assessment of cost-effectiveness based on the willingness to pay level of individual regions or countries is mandatory.

Currently in the Asia-Pacific, the upper age limit for CRC screening is 75 in Australia, New Zealand, and Taiwan but there is no such recommendation in Japan, Korea, and Singapore. While there is an emerging discussion on lowering the age of initiating CRC screening in many countries, considering the upper age limit is important as well for optimization of the effectiveness and cost-effectiveness of population CRC screening.

Keywords: Colorectal cancer, Screening, Age



LGI 2-1

Best bowel preparation: Tailored choice of agent and protocol

Hoon Sup Koo

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Colorectal cancer (CRC) is the third most common cancer worldwide with regard to frequency and mortality¹ and is accurately diagnosed through colonoscopic examination.² High quality colonoscopy can reduce the CRC mortality rate by 53% and incidence by 76%.³ Data regarding the adenoma detection rate (ADR), adenoma miss rate, cecal intubation rate, and bowel preparation are required for high-quality colonoscopy.⁴ Bowel preparation is important because optimal bowel preparation determines the accuracy, speed, and rates of successful cecal intubation during colonoscopy. Incomplete bowel preparation is associated with a 3-fold reduction in ADR, high complication rates, and the additional costs of a repeat procedure.⁵⁻⁹ an optimal bowel preparation method improves patient compliance and minimizes adverse events, such as electrolyte imbalance and intestinal tract injury.¹⁰

The most commonly used bowel cleansers are classified into the following 3 categories: isosmotic agents, osmotic laxatives, and irritant laxatives.¹¹ Isosmotic preparations that contain PEG are osmotically balanced with nonfermentable electrolyte solutions. Significant fluid and electrolyte shifts are theoretically minimized by the use of balanced electrolytes. PEG-based lavage solution without sodium sulfate was developed to improve the smell and taste of PEG-ELS. The improved taste was the result of a decrease in potassium concentration, increase in chloride concentration, and complete absence of sodium sulfate. Oral sodium sulfate (OSS) preparations have not been associated with significant fluid and electrolyte shifts, likely because sulfate is a poorly absorbed anion. Magnesium citrate is a saline solution laxative containing magnesium cations that acts osmotically and also stimulates the release of cholecystokinin, resulting in intraluminal accumulation of fluid and electrolytes promoting small intestinal and possibly colonic transit. Sodium picosulfate/magnesium citrate preparation acts locally in the colon as a combination of a stimulant laxative to increase the frequency and force of peristalsis (sodium picosulfate component) and an osmotic laxative to retain fluid in the colon (magnesium citrate component).¹²

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LGI 2-2

Painless colonoscopy: Available techniques and instruments

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Colonoscopy is one of the most important and frequently performed technical procedures in gastroenterological practices. Quality of colonoscopy is determined by bowel preparation, caecal intubation rate and polyp/adenoma detection. Patient (dis)comfort however is a pivotal key performance indicators, especially relating to per- and postprocedural pain that directly affects the aforementioned quality indicators and the willingness to repeat the procedure.

A painless and more tolerable endoscopy depends mainly on 1) the correct use of sedation and/or analgesia and 2) a proper insertion technique. Paradoxically, an inverse relation has been described between the need for sedation and good technical skills. Significant discomfort is related to a decreased cecal intubation rate of an endoscopist and directly relates to adenoma and polyp detection. This underpins the importance of good patient tolerance during the procedure to ascertain the quality of the procedure.

In addition certain techniques exist to reduce pain during colonoscopy and are widely available. The use of CO₂ instead of air insufflation is associated with a lower patient discomfort, both for diagnostic and therapeutic colonoscopies. CO₂ is rapidly absorbed and causes therefore less distension. Water exchange colonoscopy also reduces patient discomfort and the need for sedation significantly, but is associated with a longer insertion time. A variable stiffness scope has the advantage of allowing more flexibility and reducing the tension on the colonic wall, whilst when needed the stiffer can be used to promote insertion without the need of extensive external abdominal pressure that may cause discomfort. The use of scope guide systems may also help the endoscopist to prevent looping, that are known to be responsible to cause pain. Even the use of a simple distal attachment cap is associated with less discomfort because it facilitates to passages of the scope when impacted onto folds. Finally, more advanced robotic devices have been described that could facilitate painless colonoscopy even without sedation, however so far, none of these have really made it into daily practice.

Keywords: Colonoscopy, Quality, Patient satisfaction, Safety



LGI 2-3

Colonoscopy for increasing adenoma detection rates: Optimized withdrawal techniques and attachment devices

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Optimal withdrawal time is matter, and monitoring withdrawal time may increase ADR. Optimal withdrawal technique, including fold examination, cleansing and distension, is also essential. Although new withdrawal technologies seem promising, most technologies are not powered to detect a difference in ADR. But, CAD ranked as the superior technique for ADR.

Keywords: Colonoscopy, Quality, Adenoma detection rate, Withdrawal, Computer-aided detection



LGI 2-4

Artificial intelligence: Is it a brilliant assistant for colonoscopy quality improvement?

Noriko Suzuki

FJGES, UK

The use of artificial intelligence in colonoscopy has been eagerly researched and developed. Computer-aided detection (CADe) increases adenoma detection rate (ADR) more than any other modalities like traditional/digital chromoendoscopy or use of adjunct mucosal exposure devices¹. CADe enhances ADR in the less experienced² but not always in high-performing colonoscopists.³

Maximizing ADR, by combining AI and adjunct devices to enhance mucosal exposure has been suggested. Not surprisingly AI assists in maintaining high-quality colonoscopy performance and avoids, for example, human fatigue⁴ with a recent study reporting a lower ADR in later colonoscopy sessions.

There are potential clinical problems. In a multi-center pilot study, CADe did not enhance the overall detection of neoplastic polyps compared to conventional colonoscopy but did significantly increase the detection of non-neoplastic polyps⁵. This undoubtedly contributed to the longer procedure time which highlights a need for additional training to help CAD systems better differentiate neoplastic from non-neoplastic lesions instantly.

Advanced polyp characterization to determine appropriate removal strategy including resect-and-discard⁶, advanced endoscopic resection or surgery will emerge in the near future.

Currently, AI proves most effective for less experienced colonoscopists and low detectors. AI will also be a great training tool for new endoscopists. It will also help eliminate poor-quality colonoscopy which is associated with increased rates of interval cancers⁷.

Keywords: Artificial intelligence, Colonoscopy, Quality

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LGI 3-1

Role of endoscopy in inflammatory bowel disease: From guidelines to daily practice

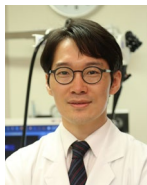
Eun Soo Kim

Kyungpook National University, Korea

Inflammatory bowel disease (IBD) is a chronic inflammatory condition with mucosal or transmural involvement in the gastrointestinal tract. The diagnosis is often challenging for physicians as there is no single gold standard method to diagnose IBD. IBD requires a life-long management, and the treatment should be adjusted based on tight disease activity monitoring. Patients with long-standing IBD need surveillance strategy for colorectal cancer because chronic inflammation in the colon may cause colitis-associated tumorigenesis. In this complicated context of IBD management, endoscopy plays a central role providing crucial data for diagnostic and therapeutic decisions, monitoring disease activity, and early detection of dysplasia.

Although endoscopic evaluation is critical in the diagnosis of IBD, we need other information such as thorough history of patient's symptoms, and laboratory/radiologic/histological findings for correct diagnosis. With the emergence of novel and effective therapies, the goal of IBD treatment has been evolving from only symptom control to altering the course of the disease and improving patient's quality of life. To that goal, obtaining reliable and reproducible assessments of endoscopic disease activity has become an issue of great importance. In this lecture, I will review updated version of guidelines on endoscopy in the management of IBD and discuss controversial issues on the implementation of endoscopy as the diagnosis and monitoring tool in daily practice.

Keywords: Endoscopy, Inflammatory bowel disease



LGI 3-2

Optimal approach of ESD for colitis associated dysplasia

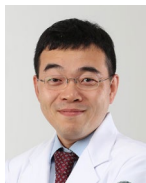
Dong-Hoon Yang

University of Ulsan, Korea

The risk of colorectal cancer is increased in long-standing ulcerative colitis and Crohn's colitis. Dysplasia or colitis-associated dysplasia is a precancerous lesion of colitis-associated colorectal cancer and can be categorized as visible and invisible dysplasia. Paris classification for gastrointestinal early neoplasia has been adopted to describe visible dysplasia. Therefore, visible dysplasia can be divided into polypoid and non-polypoid dysplasia. Compared with polypoid dysplasia, endoscopic resection of non-polypoid dysplasia is more difficult and endoscopic submucosal dissection (ESD) is required to achieve en bloc resection of a large non-polypoid dysplasia in inflammatory bowel disease (IBD) patients. However, several things are to be considered when applying ESD for the endoscopic treatment of non-polypoid dysplasia in IBD. First, the demarcation of non-polypoid dysplasia is occasionally obliterated due to inflammatory or post-inflammatory mucosal changes of the surrounding mucosa. In general, colorectal epithelial neoplasia, such as adenoma or early colorectal cancer shows sharp demarcation under white-light endoscopy. Therefore, perilesional diathermic marking is not an essential step for colorectal ESD in non-colitic patients. On the other hand, obliterated demarcation of non-polypoid dysplasia in the colitic segment may confuse the endoscopist while performing mucosal incision and submucosal dissection. So, circumferential diathermic marking is required to achieve adequate safety lateral margins in case of ESD for non-polypoid dysplasia, especially when its distinction is less clear. Second, diffuse submucosal fibrosis is present in most colitis-associated dysplasia cases. Submucosal fibrosis is one of the most significant hurdles to performing colorectal ESD. The probability of submucosal fibrosis has been reported from 60% to 100% according to previously published studies regarding non-polypoid, colitis-associated dysplasia. Therefore, endoscopists should understand how to overcome submucosal fibrosis during ESD. A narrow caliber transparent cap, such as a short ST hood or ST hood is useful to manage ESD for lesions containing submucosal fibrosis. Traction-assisted ESD can be applied to treat submucosal fibrosis and underwater ESD may help to expose the submucosal layer in case of submucosal fibrosis. Pocket-creation method has been introduced to overcome severe submucosal fibrosis in the center of large, protrude-type colorectal neoplasia. However, its efficacy on colitis-associated dysplasia is not established. Third, even in case of well-demarcated non-polypoid dysplasia, the possibility of invisible dysplasia foci at the surrounding mucosa should be considered. Although routine perilesional biopsy for visible dysplasia detected during surveillance colonoscopy is not recommended, perilesional biopsy should be considered after removing non-polypoid dysplasia. IBD patients who have a previous history of dysplasia are considered at high risk of future development of dysplasia or colitis-associated cancer. Therefore, all patients who underwent ESD for colitis-associated dysplasia need meticulous surveillance endoscopy, even if curative resection has been achieved. Unfortunately, evidence

regarding adequate surveillance strategy after ESD of colitis-associated dysplasia is lacking. Experts recommend a more intensive surveillance protocol after ESD of non-polypoid dysplasia than after endoscopic resection of polypoid dysplasia.

Keywords: Endoscopic submucosal dissection, Dysplasia, Ulcerative colitis, Crohn's disease, Colorectum



LGI 3-3

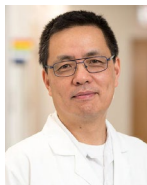
Cutting edge of endoscopic surveillance in IBD

Won Moon

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Patients with inflammatory bowel disease are at increased risk of colorectal cancer. Surveillance is needed for early detection and treatment of colorectal dysplasia and cancer. Frequent surveillance colonoscopies are recommended for patients with at least left-sided ulcerative colitis, or Crohn's disease involving more than 30% of the colon by current guidelines. The first colonoscopy should be performed 8 to 10 years after onset of disease-related symptoms. The American guidelines recommend to perform surveillance every 1 to 3 years based on the risk factors whereas European and British guidelines use a risk-stratification algorithm that assigns patients to intervals of 1, 3 or 5 years. Patients with concomitant primary sclerosing cholangitis (PSC) should undergo annual surveillance starting at the diagnosis. Present guidelines recommend to perform surveillance colonoscopies with chromoendoscopy. But white light endoscopy using high definition endoscopes is a good alternative. The yield of random biopsies is quite low but higher in patients with PSC, prior dysplasia, or a tubular colon.

Keywords: Inflammatory bowel disease, Colorectal cancer, Surveillance, Colorectal dysplasia, Colonoscopy



LGI 3-4

Cutting edge of endoscopic treatment for Crohn's disease

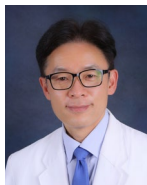
Bo Shen

Columbia University, USA

The natural history of Crohn's disease (CD) determines that the majority of the patients will develop structural complications, such as strictures, fistulas, abscesses, or neoplasia. Medical therapy offers limited efficacy for these structural complications. Surgical intervention, however, suffers from frequent postoperative complications and disease recurrence.

Interventional (or therapeutic) inflammatory bowel disease (IBD) endoscopy has an expanding role in the treatment of complications from CD as well as ulcerative colitis. Currently, the role of therapeutic endoscopy in CD is categorized into five areas: 1) strictures- endoscopic balloon dilation, endoscopic stricturotomy, endoscopic strictureplasty, and stenting; 2) abscesses and fistulas- endoscopic fistulotomy, endoscopic incision and drainage, and endoscopy-guided seton placement; 3) endoscopic intraluminal lesions and materials- such as removal of pedunculated polyps, bezoar, and prolapse; 4) CD or IBD surgery-associated complications- endoscopic stricturotomy, endoscopic removal staples, endoscopic sinusotomy, and endoscopic clipping; and 5) colitis-associated neoplasia- polypectomy, EMR, and ESD. Prevention and management of endoscopy-associated complications are discussed. Endoscopic therapy provides more effective than medical treatment and less invasive than surgery for the structural complications related to IBD or IBD surgery. Effective and safe performance of endoscopic therapy in patients with immunosuppressive-loaded IBD requires careful planning, preparation, and technical skills. With a better understanding of the disease course of IBD, improved long-term impact of medical therapy, and advances in endoscopic technology, we can foresee interventional IBD will become an integrated part of the multidisciplinary approach for patients with complex IBD.

Keywords: Crohn's disease, Interventional, Stricturotomy, Stricture, Dilation



LGI 4-1

Large SSL: What is the best resection technique - Cold vs hot? Piecemeal vs en bloc?

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Sessile serrated lesions (SSLs) are a type of precancerous lesion found in the colon that can be difficult to detect and remove. Large SSLs risk malignant transformation more than smaller SSLs. Therefore, complete resection of these lesions is important to prevent future development of colorectal cancer. Different techniques are available for removing large SSLs, including cold and hot resection methods and piecemeal and en bloc resection. The optimal resection technique for large SSLs is a matter of debate and requires consideration of multiple factors, including lesion size, location, and morphology.

Regarding the resection technique for SSLs, en bloc resection is generally preferred over piecemeal resection due to its higher complete resection rate and lower risk of residual or recurrent adenoma and complications. However, there is no clear preference for cold vs hot resection, and the choice of technique may depend on factors such as the size and location of the lesion, the expertise of the endoscopist, and the availability of equipment. Additionally, the choice of resection technique should consider the patient's comorbidities and preferences and the risk of complications associated with each technique. The optimal resection technique for large SSLs depends on multiple factors and should be individualized based on the patient and lesion characteristics. There has yet to be a clear consensus on whether cold snare polypectomy (CSP) or hot snare polypectomy (HSP) is the superior method for removing large SSLs. However, some evidence suggests that CSP may be a safer and more effective method for removing these lesions. Recently, CSP with injection method, cold EMR (C-EMR) is getting popular to remove the large polyp size, especially for large SSLs.

Most of the studies about C-EMR for removing large-sized SSLs have reported the outcomes of piecemeal resection, but the complete resection rates have been reported as up to 99% with the recurrence range as 0–5%. In addition, recent meta-analyses have found that the C-EMR showed excellent outcomes for removing large-sized SSLs compared to other methods regarding residual lesion rate, technical success, and adverse events. Regarding safety, the cold resection technique can be the best option for removing large-sized SSLs with no report of delayed bleeding and perforation.

Based on the available evidence, CSP with or without injection may be the preferred method for removing large SSLs. However, it is important to note that the optimal method may depend on the lesion's specific characteristics and the endoscopist's expertise. Therefore, a case-by-case approach is necessary to determine the best method for each individual patient. More randomized trials should be needed to evaluate this topic.

Keywords: Sessile serrated lesion, Cold resection, Hot resection, En bloc, Piecemeal resection



LGI 4-2

Malignant pedunculated polyps: Resection techniques and pathological interpretation

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Polypectomy is fundamental to the practice of colonoscopy and protection against colorectal cancer¹. A malignant colorectal polyp (also termed a submucosally invasive lesion) is a colorectal lesion in which neoplastic cells invade through the muscularis mucosa into the submucosa but not the muscularis propria, classified as pT1 in the TNM classification system². The prevalence of cancer in large pedunculated polyps is substantial (up to 10%), and these lesions are relatively common in fecal immunochemical test-based screening programs.

Before endoscopic resection, every colorectal lesion detected at colonoscopy should undergo a complete assessment of the lesion morphology, surface, and vessel pattern, to identify lesions with endoscopic features of deep submucosal invasion of cancer. However, in contrast to non-pedunculated polyps, pedunculated polyps with features of deep submucosal invasion remain candidates for endoscopic resection, as the overall histological features may still be favorable and endoscopic resection may be curative. The same features in a nonpedunculated polyp contraindicate endoscopic resection.

All pedunculated colon polyps should be resected en bloc for accurate histopathological evaluation. The conventional technique for endoscopic resection of pedunculated polyps is snare transection through and toward the base of the stalk^{3,4}. However, maneuvering a snare around the large head of a pedunculated polyp with a long, wide stalk can be technically challenging, or even impossible. Emerging data from Asia suggest a role for endoscopic submucosal dissection (ESD) to achieve en bloc resection of very large pedunculated polyps while securing hemostasis.

After resection, the lesion should be retrieved through the suction channel or using a net or snare with instrument withdrawal. Large pedunculated lesions resected en bloc should not be cut to facilitate removal through the suction channel. Pathologic assessment involves bisection so that sections are cut through the entire polyp head and stalk. This orientation allows the location of any cancer in relation to the stalk and the resection line to be evaluated. An accurate histologic diagnosis is key to accurate staging and management.

Pathologic assessment of the resected lesion identifies the histologic features that are associated with residual cancer in the colorectal wall or lymph nodes, and therefore which patients should undergo surgery. These histologic features are poor differentiation, lymphovascular invasion, tumor budding, a resection margin of 1-2 mm, and Haggitt level 4. The Haggitt classification is used for measuring depth of invasion in a pedunculated malignant polyp, where level 4 (invasion into the submucosa below the stalk) is associated with high risk of lymph node involvement⁵. However, the most relevant risk factor is the resection margin, indicating a possible incomplete resection⁴.

Complications following resection of pedunculated colorectal polyps include hemorrhage (immediate, delayed); thermal mural injury (perforation, post-coagulation syndrome); and piecemeal resection of a malignant polyp requiring adjuvant surgical resection. Large pedunculated polyps have an increased risk of bleeding because of the presence of a large feeding vessel/s within the stalk. Polyp-related risk factors for bleeding include polyp head size > 10 mm, stalk diameter > 5 mm, location in the right colon, and the presence of malignancy. Both the U.S. Multi-Society Task Force on Colorectal Cancer^{6,7} and the European Society of Gastrointestinal Endoscopy⁸ recommend prophylactic treatment of the polyp stalk when there is a large polyp head or a thick stalk. Treatment options include adrenaline injection, placement of detachable nylon loops and clips. Endoscopic band ligation has also been used to manage delayed bleeding in cases of pedunculated or semi-pedunculated polyps. The ESGE recommends against pure cutting current for pedunculated polypectomy because of an increased risk of intraprocedural bleeding. However, there are limited data on the optimal type of electrosurgical current for pedunculated polyps. Perforation and post-coagulation syndrome are rare but can occur presumably from very large lesions pulling the muscularis propria into the stalk.

In summary, optimizing clinical outcomes in the management of malignant pedunculated polyps requires safe and effective endoscopic en bloc resection to avoid unnecessary surgery, while identifying those patients who require surgical resection for definitive staging and further therapy.

Keywords: Colorectal polyp, Colorectal cancer, Colonoscopy, Pedunculated, Malignant

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LGI 4-3

Laterally spreading tumors: Optical therapeutic strategies according to type

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Colorectal laterally spreading tumors (LSTs) that are defined as superficial neoplastic lesions sized ≥ 1 cm, typically extending laterally along the colonic wall, are known as an important target for endoscopic resection. LSTs are classified into two subtypes based on their morphology: the granular (LST-G) and non-granular types (LST-NG), and LST-Gs are further grouped into the homogeneous type (LST-GH) and nodular mixed types (LST-GM).

Regardless of LST subtypes, when an LST demonstrates endoscopic findings of deep submucosal invasive cancer, a radical surgery (colectomy with lymphadenectomy) is recommended as a standard treatment due to the risk of metastasis. Currently, endoscopic diagnosis of deep submucosal invasive cancer can be accurately performed using magnifying image-enhanced endoscopy.

When an LST is diagnosed as an intramucosal tumor or cT1a cancer, it is indicated for endoscopic resection. Endoscopic resection procedures are selected based on the necessity and feasibility of en bloc resection. Among LSTs, LST-NGs sized ≥ 2 cm and LST-GMs sized ≥ 3 cm reportedly have a relatively high risk of submucosal invasive cancer. Furthermore, it is known that these LSTs tend to show a multifocal invasion pattern which is difficult to predict endoscopically before treatment. Therefore, these LSTs are indicated for endoscopic submucosal dissection (ESD) which enables en bloc resection. For smaller LSTs, endoscopic mucosal resection (EMR) is selected. In addition to conventional EMR, modified EMR techniques, such as underwater EMR and tip-in EMR, are available, and recently, favorable outcomes have been reported with these modified EMR procedures. For lesions with little risk of submucosal invasion such as LST-GH, piecemeal resection can also be selected.

Excellent long-term clinical outcomes of colorectal ESD has been increasingly reported.¹ Furthermore, our recent simulation model study has indicated the potential benefit of ESD for LST-NGs sized ≥ 2 cm and LST-GMs sized ≥ 3 cm in terms of cost-effectiveness.² Despite these benefits of ESD, there are concerns over its technical difficulty, time-consuming nature, and complication risk particularly in the Western countries, and consequently, piecemeal EMR remains preferable even for LSTs indicated for ESD. However, the progress in ESD devices and techniques has lowered the hurdle associated with colorectal ESD. Recently, an increasing number of institutions in the Western countries have introduced colorectal ESD and gradually reported favorable outcomes.

In this lecture, I will explain and discuss the optical therapeutic strategies for colorectal LST.

Keywords: Laterally spreading tumor, Endoscopic submucosal dissection, Endoscopic mucosal resection

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LGI 4-4

Management of remnant or recurrent lesions after endoscopic resection

Duk Hwan Kim

CHA University, Korea

Incomplete colonoscopic resection (ICR) of colon polyps is a known risk factor for the development of recurrent polyps and colorectal cancer. Polyps that are not completely removed during a colonoscopy can potentially harbor cancerous or precancerous cells, which may continue to grow and pose a threat to the patient's health. Therefore, it is essential to prevent incomplete colonoscopic polyp resection to ensure that patients receive appropriate treatment and care. The risks associated with ICR include proximal location, sessile serrated histology, and insufficient experience of the endoscopist. The management of remnant or recurrent polyps after ICR involves a variety of techniques, including endoscopic re-resection, surgical resection, and surveillance colonoscopy. The choice of treatment depends on various factors, such as the size and location of the remnant or recurrent polyp, patient's overall health, and the risk of complications associated with each approach.

In this lecture, we will discuss the various strategies and techniques that can be used to prevent incomplete colonoscopic polyp resection. We will start by reviewing the different types of polyps and their associated risks. Then, we will explore the importance of careful inspection of the colon and the use of advanced imaging techniques, such as chromoendoscopy, to identify and characterize polyps.

Next, we will discuss the various methods for removing polyps, including snare resection, cold biopsy, and hot biopsy. We will examine the pros and cons of each technique and explore how combining these techniques can improve the likelihood of complete polyp resection. We will also discuss the importance of adequate training and experience for endoscopists and the role of quality assurance programs in reducing the risk of incomplete polyp resection. And we will review the latest guidelines and recommendations for the prevention of incomplete colonoscopic polyp resection.

Overall, this lecture aims to provide gastroenterologists with the knowledge and skills necessary to prevent incomplete colonoscopic polyp resection and ultimately reduce the risk of colorectal cancer.

Keywords: Colon polyp, Colonoscopy, Recurrence



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PB 1-1

Advanced ERCP techniques

Seok Jeong

Inha University, Korea

Endoscopic retrograde cholangiopancreatography (ERCP) is a primary and essential procedure for the diagnosis and treatment of pancreato-biliary diseases. So far, numerous various advanced techniques have been developed around the world to solve the difficult ERCP. As the main technique of ERCP, selective biliary cannulation and bile duct stone removal can be difficult or unsuccessful in some patients. Therefore, many advanced ERCP techniques for difficult biliary cannulation (DBC) or difficult CBD stone cases have been widely developed.

Precut methods have been developed as alternatives for the DBC. All precut methods fall into 3 types regardless of the type of instrument used; precut papillotomy (PP), precut fistulotomy (PF), and trans-pancreatic precut sphincterotomy (TPS). Among them, PP and PF have recently been used to increase the success rate of biliary access, while reducing the risk of post-ERCP pancreatitis (PEP) in the clinical field. In the case of DBC, when precut methods are performed as a rescue procedure, recent clinical studies have reported that the incidence of PEP is rather increased due to papilla trauma and pancreatic duct orifice injury due to persistent papilla attempt for biliary cannulation through the papilla orifice. Therefore, recently early conversion to the precut method has been preferred during the conventional cannulation method. In experienced hands, the early precut and persistent cannulation attempts have been reported to have similar overall cannulation rates, and early precut methods may reduce post-ERCP pancreatitis risk but not the overall complication rate based on meta-analyses of randomized trials. PEP is the most common and serious complication of ERCP, and many investigators have made efforts to reduce its occurrence. In particular, the use of rectal NSAID as a method to reduce the occurrence of PEP in high-risk group of PEP has been confirmed to have a preventive effect through large-scale RCTs. Besides, it has been reported that aggressive intravenous fluid resuscitation (IVFR) and prophylactic pancreatic stenting (PPS) can reduce the PEP rate in the average risk of the PEP cohort. However, despite these methods, PEP is not completely prevented, and the PEP rate is still high, especially in high-risk cohort. Therefore, as a method to overcome this problem, several clinical studies on primary needle knife fistulotomy (P-NKF) and primary needle knife sphincterotomy (P-NKS) can access the bile duct while theoretically not irritating the pancreatic duct at all or minimizing irritation in the average-risk of PEP or high-risk of PEP cohort lately have been conducted. And in fact, some clinical studies have derived the result that the incidence of PEP converges to 0%. However, since relevant clinical data are still lacking and most of the clinical studies have been performed by expert endoscopists, it is necessary to accumulate clinical data to be verified as a safe and effective procedure regardless of the difference in their experience and proficiency. In addition, as rescue procedures for DBC, double-guidewire technique, cannulation or NKS over the pancreatic plastic stent, and two-devices-in-one-channel method.

Endoscopic sphincterotomy (EST) is a standard procedure to widen the major duodenal papilla orifice for diagnosis and treatment of bile duct disease after biliary cannulation. However endoscopic papillary balloon dilation (EPBD) is appropriate for patients with coagulopathy such as taking anti-thrombotic agents, Child-Pugh class C of liver cirrhosis, and end-stage renal disease on hemodialysis. And minor EST+endoscopic papillary large balloon dilation (EPLBD) could be performed in case of a large CBD stone. For patients with peri-ampullary diverticulum, minor EST+EPBD, EPBD, minor EST+EPLBD, or EPLBD can be performed.

For the bile duct stone, managing biliary stones become difficult in 10% of the patients primarily due to challenges in altered periampullary anatomy, stone size, number, shape, location or hardness, the bile duct angle, or ratio of stone/bile duct diameter. For such a difficult biliary stone patient, EPLBD with or without EST, endoscopic mechanical lithotripsy (EML), emergency lithotripsy, Spyglass single operator cholangioscopy (SOC) with either electrohydraulic lithotripsy (EHL) or Laser lithotripsy (LL), endoscopic balloon dilation lithotripsy (EBDL), temporary biliary stenting with plastic stent or metal stent, and endoscopic retrograde gallbladder drainage (ERGBD).

In conclusion, currently, numerous therapeutic options have been developed all over the world as advanced ERCP techniques for DBC and difficult CBD stone cases in the world. And the best method of procedure should be individualized according to the endoscopist's skill level and experience, patient condition, anatomical characteristics of the ampulla of Vater and its periphery, and procedure environment.

Keywords: Difficult biliary cannulation, Difficult biliary stone, Needle knife fistulotomy, Needle knife sphincterotomy, Endoscopic papillary balloon dilation



PB 1-2

Enteroscopy assisted ERCP

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Endoscopic retrograde cholangiopancreatography (ERCP) is the current standard of care for the management of pancreaticobiliary diseases, but there still remains a challenge in patients with surgically altered anatomy (SAA).^{1,2} Common surgical interventions performed for these diseases include Billroth II, Whipple operation, and Roux-en-Y reconstructions. The three main challenges in performing ERCP in patients with SAA are how to access the afferent limb and reach the papilla or biliopancreatoenteric anastomosis, how to cannulate the targeted duct in the new anatomical orientation after surgery, and how to perform therapeutic interventions.

Balloon enteroscopy-assisted ERCP was first successfully performed in a patient with Roux-en-Y reconstruction in 2005. However, it was still a troublesome procedure because only limited ERCP accessories are available for these 200-cm long enteroscopes.⁷ Since short-type balloon enteroscopy was introduced into clinical practice for ERCP performance, it has been considered the first-line policy for diagnosis and therapeutic intervention of biliopancreatic disorders in patients with problematic SAA.^{3,4} The currently available short-type single-balloon enteroscope (SBE) has a 3.2-mm enlarged diameter for the working channel and a 152-shortened working length, which can accommodate most conventional ERCP accessories and stent assemblies. However, Roux-en-Y reconstruction anatomy is still challenging for the pancreaticobiliary physicians with regard to ERCP, owing to the long length of the Roux and pancreaticobiliary limb and bowel angulations around the jejunojejunal anastomosis.^{5,6} Currently, many pancreaticobiliary endoscopists have not undergone balloon enteroscopy training. Hence, some have overcome the learning curve by performing the procedure themselves or with the help of a colleague specializing in the gastrointestinal tract in the same institution, while others have given up the procedure.

Based on these circumstances, we attempted to provide the reproducible formulaic principles for bowel loop reduction and prevention for short-type balloon enteroscopy-assisted ERCP in patients with Roux-en-Y reconstruction anatomy.⁷

Keywords: Balloon enteroscopy, ERCP

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PB 1-3

EUS-guided interventions for difficult ERCP cases

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The usefulness of EUS-based procedures is clear and EUS interventions is now becoming widespread. The usefulness of EUS interventions after failed ERCP has been widely reported for obstructive jaundice with duodenal stenosis, postoperative biliopancreatic anastomotic stricture, bile duct stones with a big diverticulum, pancreatic stone cases and so on. Percutaneous approach to the biliary system can also be selected instead of EUS guided approach, but percutaneous approach to the pancreas is usually very difficult and dangerous, so EUS guided pancreatic approach is very important and useful. In particular, the approach to the remnant pancreas after pancreaticoduodenectomy.

In my lecture, I would like to explain the methods and tips of EUS interventions for difficult ERCP cases with videos.

Keywords: EUS-BD, Interventional EUS, EUS Interventions, EUS-HGS, EUS-PD



PB 1-4

Case-based discussion

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Curriculum Vitae

Educational Background

Mar. 2002-Feb. 200	Bachelor's Degree, M.D., Yonsei University, College of Medicine, Seoul, Korea
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PB 2-1

ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: Pro ERCP with SOC

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Anastomotic biliary stricture (ABS) after living donor liver transplantation (LDLT) is most problematic benign biliary stricture because the location of the stricture is on the most proximal bile duct with the anastomotic complexity. Proper management of ABS after LDLT remains a clinical challenge, often requiring a multidisciplinary approach. Generally, endoscopic intervention provides initial decompression for biliary obstruction. Single operative cholangioscopy (SOC) guided endoscopic drainage can be performed, especially for patients need a selective guide wire access or failed cases of guide wire insertion on fluoroscopic guidance during ERCP. Endoscopic stenting is presently the mainstay of endoscopic palliation. Stricture was treated with endoscopic sphincterotomy followed by insertion of one or two plastic biliary stents, as an initial attempt. However, the long-term efficacy is not satisfactory with this treatment. Multiple biliary stenting using plastic stents can be a promising for better long-term outcome. Beyond palliative drainage in patients with malignant biliary obstructions, the use of endoscopic metal stenting has broadened into various biliary conditions, including benign strictures. Endoscopic placement of a fully covered self-expandable metal stent (FCSEMS) has been attempted to manage benign biliary strictures. However, currently available placement of FCSEMSs may be associated with unintended complications. The strictured segment is usually relatively short in a benign stricture, and the remaining bile duct is normal. The flared ends of a stent can cause a de novo stricture caused by tissue hyperplasia. Stenting across to the papilla allows for easy reflux of duodenal contents. It can be difficult to locate center of stent within the strictured bile duct segment. Many developments and improvements in stent technology have been made to overcome these problems, and innovative and modified biliary stents have been introduced. Intraductal placement of biliary stents above the duodenal papilla ("inside stenting") may be associated with longer stent patency and a lower occlusion rate by reducing duodenobiliary reflux. The non-flared, convex ends of FCSEMS may minimize stent-induced tissue responses and ductal injury. In conclusion, endoscopic metal stenting for ABS after LDLT biliary stricture is effective, can be repeated, generally safe and minimally invasive therapy. SOC can facilitate the effectiveness of endoscopic stenting.

Keywords: Single operator cholangioscopy, Biliary stricture, ERCP



PB 2-2

ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: Pro PTBD with rendezvous technique

Hiroyuki Isayama

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Introduction

Endoscopic management of post living donor liver transplantation (LDLT) biliary stricture was still challenging. Difficulties were caused not only a tight stricture, but combination with acutely angulation due to hypertrophic change of implanted liver lobe.

Initial & next step Endoscopic procedures

Initially, we employ hydrophilic guidewire which is essential for difficult stricture passage. Changing the scope position, catheter location and using angle changeable catheter were also standard ways when in such difficult situation. From our experience, biliary stricture after LDLT was most and extremely difficult biliary stricture.

There are some candidates for resolve his situation. Using per-oral cholangioscopy (POCS), rendezvous technique with percutaneous transhepatic biliary drainage (PTBD) and magnet compression technique. POCS was most easy to use and low invasive technique and GW insertion from the small hole which was obtained by endoscopic view. However, manipulation was still not so good. Then, we failed many times though time-consuming preparation. For performance of magnet compression technique, creating percutaneous routes are crucial and dilate the established route to insert big component. Further step was surgical management but operation want to be a final weapon after all procedures which gastroenterologist can perform.

PTBD assisted rendezvous technique

PTBD assisted RV technique was required percutaneous procedure which is relatively high invasive compare with endoscopic procedures. However, there are some advantages; success rate is relatively high, management of biliary events are easy if the passage procedure was failed and possible to repeated procedure.

After recurrent cholangitis or jaundice, the function of implanted live lobe may reduce because of the liver damage and parenchymal fibrotic change due to inflammation. We should stop this advancing by effective biliary drainage. Then, after failure of initial endoscopic salvage procedures including,

PTBD should be done. Performance of POCS during initial session, we should avoid POCS if the cholangitis was unresolved. Cholangitis may worsen due to increasing of biliary pressure. If the cholangitis was improved after failed of the initial endoscopic procedure to pass the stricture, we can perform POCS. Most important thing was management of cholangitis to reserve the remaining liver function, then, PTBD was the good choice in this situation.

After improvement of cholangitis by PTBD, we can perform trial of passage the stricture. There are some reasons for high success rate of PTBD assisted RV technique; improve the tightness of the stricture, easy to manipulate the GW and PTCS (percutaneous transhepatic cholangioscopy) can use after dilation of PTBD route. Magnetic compression method was also possible to perform using dilated PTBD route.

Ideal strategies for considering about the reserve the live function

To select the kinds of procedures, safety is highest priority. Then, we should think about the management of cholangitis/jaundice to reserve the live function which influenced on the patients' long-term prognosis. Then, after failure of initial endoscopic procedures, POCS can perform without cholangitis, but PTBD should be selected when the patient suffering from the cholangitis. After improvement of cholangitis, percutaneous procedures were favorable because of non-sedated procedure and expected high success rate. After failed of PTCS procedure, we can move to next step with magnet compression technique.

Conclusions

Biliary stricture after LDLT was one of the most difficult procedures in biliary endoscopic interventions. Firstly, we should think about the patient safety and reserve the liver function. All 3 salvage procedures is effective and has each advantages. We should know the correct indication, advantage/disadvantage, and technique to resolve the difficult situation.



PB 2-3

ERCP with SOC assisted techniques vs. PTBD with rendezvous technique vs. ERCP with magnetic compression anastomosis technique: ERCP with magnetic compression anastomosis technique

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Introduction/Magnitude

Strictures of the bile duct after liver transplant (LT) account for more than 50% of all biliary complications. Broadly divided into two categories – anastomotic and non-anastomotic – post LT biliary strictures are often recalcitrant to endoscopic management. After living donor liver transplant (LDLT), biliary stricture occurs up to 40% of the patients, which is substantially higher than those who undergo orthotopic liver transplant (OLT) which is reported to be 20%. Biliary strictures can occur months to years after liver transplant, but most commonly present within the first year (between 5 to 8 months). Some of the known factors for stricture formation after LT includes surgical technique, use of surgical T-tube, hepatic artery thrombosis and cold ischemia time (for OLT).

Therapeutic Challenges

Biliary anastomotic strictures (BAS) are defined as segmental or focal narrowing around a surgical anastomotic site and are thought to result primarily from fibrotic healing. A non-anastomotic stricture is defined as focal areas of narrowing of the bile ducts proximal to a biliary anastomosis. Often ischemic in etiology, they tend to be multiple in number, they occur later (often after 6 months after LDLT) and longer in length, hence the difficulty of early detection and successful symptomatic resolution. The known risk factors for ischemic strictures include hepatic artery thrombosis, chronic ductopenic rejection, ABO incompatibility, and a diagnosis of primary sclerosing cholangitis before transplant.

The management of biliary strictures after liver transplant can be divided into 3 therapeutic strategies: ERC-guided therapy, PTC-guided therapy, and surgical revision, including retransplant. The gold standard of treatment for BAS is Endoscopic Retrograde Cholangiopancreatography (ERCP) with progressive balloon dilation and the placement of increasing numbers. Often requiring multiple procedures, initial stricture resolution rate for BAS is reported above 80% but suffers rather a high recurrence rate. For LDLT, the endoscopic management of strictures can be particularly challenging because of multi-focal nature of the strictures, and the technical challenges stemming from small bile duct sizes. For LDLT patients with non-anastomotic strictures can pose significant and unique challenges. The overall (both OLT and LDLT patients) success rates of endoscopic therapy for non-anastomotic strictures reported to be between 50% to 75%. The rate of sustained patency of non-

anastomotic strictures after endoscopic therapy in LDLT was 25% to 33%, compared with a rate of 50% to 75% in DDLT.

Augmenting Endoscopic Treatment of LDLT Related Stricture

As the success rate and longevity of bile duct patency are much more muted in LDLT related biliary stricture, augmentative tools during endoscopic managements can be sought. The main purposes of such tools are 1) improving in success rates of bile duct access and clinically meaningful drainage, and 2) reconstitution of bile duct canal to provide a sustained, organic (non-prostheses requiring) bile drainage that will prevent from surgical re-intervention.

Single Operator Cholangioscope (SOC) augments bile duct access of a duodenoscope by providing direct visualization and directional guidance. Furthermore, direct visualization of biliary stricture helps distinguishing a type of stricture from another, hence enabling surgeons of potential need for more aggressive approach – i.e. surgical revision. Due to technical advancement, SOC can navigate up to primary biliary branches without much difficulty, allowing multiple access and multiple interventions, if needed. The downside of SOC is its cost, need for operational proficiency and inability to impact long-term outcome of biliary luminal patency.

When endoscopic approach alone does not provide biliary drainage, interventional radiology-assisted biliary access can be helpful. Percutaneous Transhepatic (PTH) drainage requires adequately dilated intra-hepatic duct to gain access. So called Rendezvous procedure has shown benefit in cases where trans-papillary access failed to gain access. The patient discomfort and risk for infection and bile leak are higher with percutaneous approach, as well as logistic challenges.

There has been several studies, mostly from Far East, that reported a potential benefit of magnet assisted compressive bile duct access with subsequent successful drainage of bile duct. The technique requires bi-directional (ante-grade and retrograde) access of target bile duct at the site of narrowing, and deployment of magnets on both sides. Over time, two magnets will exert compressive force with tissue/stricture ischemia and iatrogenic fistulous tract creation that serves as a conduit of bile drainage. Although further validation would be helpful in Western GI communities, the technique and technology certainly hold a great promise.

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PB 3-1

Which one is better? Direct POC vs. Spyglass DS

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Peroral cholangioscopy (POC) is traditionally only conducted using a mother-baby scope system. However, they are not used popularly in clinical practice because the classic mother-baby POCs require coordination of two endoscopists, are fragile, have poor functionality, and are expensive. Subsequently, a single-operator fiberoptic cholangioscope (SpyGlass; Boston Scientific, Natick, Mass) system was developed, which resolved many of the logistical difficulties inherent in requiring two endoscopists. A further development has been that of direct POC that uses ultra-slim upper endoscopes capable of digital imaging.¹ The recent introductions of a digital imaging version of single-operator cholangioscopy (SOC) and direct POC using a multibending (MB) ultra-slim endoscope have been led to expand and evolve the indications of POC.²

SpyGlass direct visualization system (Boston Scientific Corp, Marlborough, Mass, USA) is a dedicated, single-operator cholangioscopy which is advanced into the bile duct through the working channel of therapeutic duodenoscope. A recent digital version of SpyGlass direct visualization system (SpyGlass DS) provides much improved image quality, integrated an optical probe in the catheter, channels for separate irrigation and suction and easy set-up and function.

Direct POC using an ultra-slim endoscope has been proposed as a single-operator system for direct endoscopic examination of the biliary tree. Direct POC offers high-quality endoscopic imaging with image-enhanced technology and ability to complete more procedures using a larger 2-mm working channels because of the standard endoscopy equipment and set-up. However, direct POC is limited by low and inconsistent success rates. Although several specialized accessories have improved the success rate of direct POC, it is time-consuming and difficult for novice endoscopists to perform. Recently, a MB ultra-slim endoscope has been developed as a dedicated cholangioscope to overcome the technical difficulties of direct POC. Free-hand biliary insertion of a MB endoscope for direct POC showed a high technical success rate without severe adverse events in a recent study.

When it comes to imaging diagnosis, direct POC is far superior to SpyGlass DS due to the high quality of images and combination use of image-enhanced function systems. However, advancement of an ultra-slim endoscope into the biliary tree is still technically challenging during a direct POC. In addition, direct POC can be performed only after a previous endoscopic sphincterotomy and/or sphincteroplasty, because the outer diameters are 5 to 6 mm, and the diameter of the CBD is usually >8 mm. For interventional purposes, both maneuverability and the diameter of the working channel are key components of a successful procedure. With regard to maneuverability, SpyGlass DS is good to its four-way deflected steering and delivery catheter system. These features enable easy insertion, stable scope positioning, and easy aiming at a target within the bile duct. In direct POC, ultra-slim endoscopes have working channels ranging from 2.0 to 2.2 mm which allow to extend interventional procedures,

including for tissue sampling, and it permits the use of 5-Fr instruments.

Direct POC and SpyGlass DS have advantages and disadvantages. Therefore, it is important to understand their features and to use different systems as the purpose or situation demands. If the advancements are continuing in specialized endoscopes and available dedicated accessories, SOC seems to be an important test as much as ERCP in diagnosis and treatment of pancreatobiliary diseases in the near future.

Keywords: Cholangioscopy

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PB 3-2

Removal of pancreaticobiliary stones

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The most effective and standard treatment for bile duct stone (BDS) is endoscopic retrograde cholangiopancreatography (ERCP). In 10%–15% of the cases, conventional methods for removing BDS by ERCP/balloon-basket extraction fail. Some of the established techniques such as the use of endoscopic papillary large balloon dilatation and mechanical lithotripsy were a good option for “difficult bile duct stones”. Along with advances in cholangioscopy, as direct visualization for intraductal stone became possible, it became a good weapon to fight against these difficult cases. The use of cholangioscopy-guided lithotripsy (electrohydraulic or laser) is an effective and safe treatment of difficult BDS. The focus of this lecture is to describe endoscopic techniques using single-operator cholangioscopy in the management of “difficult bile duct stones.”

Keywords: Spyglass, Single-operator cholangioscopy, Difficult bile duct stones



PB 3-3

Mapping of pancreaticobiliary neoplasm

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Single operator cholangiopancreaticoscopy is an established method for diagnosis of pancreatobiliary strictures and management of difficult pancreatobiliary stones. It has also been suggested as a method to for mapping of pancreatobiliary neoplasm. Pancreatobiliary surgery is associated with significant morbidity and even mortality and thus requires proper indication, ensuring that surgical resection for a malignant tumor is extensive enough to provide an R0 resection and at the same time least invasive to limit morbidity or even avoided provided that curative resection cannot be achieved. Digital cholangiopancreaticoscopy may allow to identify the borders of disease to optimize the surgical resection plane. Some data show that preoperative cholangiopancreaticoscopy may alter the original surgical plan in up to a third of patients. On the other hand, it is a time consuming, costly and invasive procedure associated with a risk of complications such as pancreatitis or cholangitis. Further, histological diagnosis still has low sensitivity and visual diagnosis still lacks standardized diagnostic criteria of malignancy and is associated with the risk of missing malignant disease extending along the walls and sparing the surface mucosa. In summary, mapping of pancreatobiliary neoplasm is a promising new application of digital cholangioscopy, however further prospective studies specifically aimed at evaluating this outcome are required to better define its role in this indication.

Keywords: Cholangiopancreaticoscopy, Spyglass, Stricture, Mapping, Surgery



PB 3-4

Classification of biliary tumors according to image

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The prognosis of cholangiocarcinoma (CC) depends on the stage at diagnosis. Curative treatment is only possible in resectable CC. However, staging of hilar CC is a challenge.

Modalities such as MRCP and ERCP, with or without cholangioscopy, are the tools to classify these tumors and optimize treatment. Historically the Bismuth-Corlette classification is used, although it does not always accurately assesses resectability. Therefore a multidisciplinary approach, including an interventional endoscopist, radiologist, surgeon and oncologist, is advocated to evaluate these patients on a case-by-case basis.

Keywords: Cholangiocarcinoma, Classification, ERCP, MRCP, Biliary tumors



PB 4-1

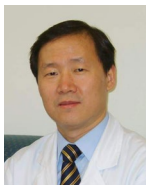
The optimal choice of needles and accessories

Christopher Jen Lock Khor

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This talk will trace the development of EUS FNA needle design, and its recent evolution as a tool to reliably obtain core biopsies for histopathology and beyond. The various fine needle biopsy targets and the expected yields for these tissue targets will be explored. Needle actuation and negative pressure techniques will be reviewed in brief. With the consistently high yields now obtainable with core biopsy needles, we will also review recent evidence for the adjunctive role of ROSE and MOSE in EUS FNB.

Keywords: Endoscopic ultrasound, Fine needle biopsy



PB 4-2

EUS-guided through the needle biopsy for pancreatic cysts

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Background and aims: EUS-guided through-the-needle biopsy sampling (EUS-TTNB) using microbiopsy forceps is performed for the accurate diagnosis of pancreatic cystic lesions (PCLs). However, there are no standardized protocols for this procedure, and the amount of data on its efficacy is limited. Here, we evaluated the feasibility, efficacy, and safety of EUS-TTNB in categorizing the types of PCLs and identified the factors associated with diagnostic failure.

Methods: The prospectively collected and maintained EUS-TTNB database at Asan Medical Center was reviewed to identify patients with PCLs who underwent EUS-TTNB between January 2019 and January 2021. The primary outcomes were technical success, diagnostic yield, and adverse events. Factors contributing to diagnostic failure and the discrepancies in the diagnosis made by conventional modalities (ie, EUS morphology, cross-sectional imaging, and cystic fluid analysis) were also evaluated.

Results: Forty-five patients were analyzed. EUS-TTNB was successfully performed in all patients (technical success, 100%). Histologic diagnosis of PCLs was made in 37 patients (diagnostic yield, 82%). When comparing EUS-TTNB with a presumptive diagnosis, EUS-TTNB changed the diagnosis in 10 patients in terms of the categorization of the types of PCLs. The diagnostic yield was significantly higher in those who had 4 or more visible biopsy specimens per session (93%) than in those with fewer than 4 visible biopsy specimens per session (67%; $P=.045$). During follow-up, 3 patients (7%) experienced adverse events (2 acute pancreatitis, 1 intracystic bleeding), and no life-threatening adverse event occurred.

Conclusions: EUS-TTNB showed high technical feasibility, diagnostic yield, and good safety profile. EUS-TTNB may improve the categorization of the types of PCLs. Studies with standardized procedure protocols are needed to reduce the diagnostic failure for the types of PCLs.

Keywords: EUS, EUS-TTNB, Pancreas cyst, Moray forcep



PB 4-3

Advice from pathologists' perspectives

Haeryoung Kim

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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 (PDACs). For gastroenterologists, the major issue is obtaining adequate specimens for an optimal diagnostic yield. For pathologists, the important issues in EUS-FNA material interpretation include specimen adequacy, recognizing contaminants (e.g. gastrointestinal epithelium, mesothelial cells), and discriminating between well-differentiated PDACs 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. Clinico-radio-pathological correlation is also extremely important in reaching an informative diagnosis or interpretation.

Recently, the WHO Reporting System for Pancreaticobiliary Cytology was released, with the aim of providing a framework for pathologists in which pancreaticobiliary lesions can be consistently categorized, and resulting in clear and consistent language that can be understood by pathologists and clinicians from all around the world.

This talk will consist of an overview of pancreatic EUS-FNA cytology and different preparation methods, followed by an introduction to the new WHO reporting system.

Keywords: Pancreas, Cytopathology, Aspiration, Adequacy, Diagnosis



PB 4-4

Next generation sequencing and organoid cultures of samples acquired through EUS-guided methods

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Pancreatic cancer is a tumor with a very poor prognosis. More than 70% of cases are inoperable, and recurrence is common even after complete surgical resection. To decrease postoperative recurrence, adjuvant chemotherapy has been proven to be effective. In initially unresectable or borderline resectable cases, chemotherapy is usually the first line of treatment. With the introduction of FOLFIRINOX and Gemcitabine plus Nab-Paclitaxel, not only has the survival of inoperable pancreatic cancer been prolonged, but improvements in the conversion rate of inoperable cancer to operable cancer and in the 5-year survival rate after complete resection have also been reported. In addition to these non-specific cytotoxic chemotherapies, the efficacy of immunotherapy and targeted therapy has recently been demonstrated in the presence of appropriate molecular biological markers.

Previously difficult to diagnose cases of unresectable pancreatic cancer are now almost always diagnosed pathologically by endoscopic ultrasound guided biopsy. Various studies have been conducted to select the appropriate treatment using the tissue remaining after pathological diagnosis. These studies using EUS-FNA aspirates have been combined with various studies on the molecular biological mechanisms of pancreatic cancer to identify patients who are susceptible to various treatments currently available and to apply new targets and agents.

In this lecture, I will discuss studies on the clinical utilization of molecular analysis with EUS-FNA aspirates, focusing on studies conducted by the author's research team, in which the results of whole genome sequencing, whole exome sequencing, and transcriptome analysis using next generation sequencing methods were analyzed by integrating the results of the patient's clinical observations after treatment and the tissues obtained by EUS-FNA were amplified through organoid culture and analyzed by combining the results of various analyses and drug susceptibility tests with clinical observations.

Keywords: Pancreatic cancer, Next generation sequencing, Endoscopic ultrasound guided fine needle aspiration, Organoid culture



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IC 1-1

Introduction and methods

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The Korean Society of Gastrointestinal Endoscopy (KSGE) and the International Digestive Endoscopy Network (IDEN) have been developing the '2023 IDEN Consensus on Guidelines for the Management of Antithrombotic Agents in Gastrointestinal Endoscopy' to support the scientific decision-making process in clinics.

This clinical practice guideline (CPG) aimed to provide information on the management of antithrombotic agents during the peri-endoscopic period, based on a comprehensive review of current evidence and CPGs regarding bleeding and thromboembolic adverse events associated with endoscopic procedures in patients receiving antithrombotic agents. This CPG refers to adult patients taking antithrombotic agents for primary or secondary prevention of cardio-cerebrovascular disease and undergoing diagnostic or elective therapeutic endoscopic procedures, excluding emergency endoscopic procedures such as endoscopic hemostasis. The target readers of this CPG are gastroenterologists who perform endoscopic procedures in primary, secondary, and tertiary care institutions. The CPG is intended to assist gastroenterologists in making decisions for appropriate treatments regarding the use of antithrombotic agents before and after endoscopic procedures. In addition, it aims to serve as a guide for resident physicians and healthcare workers and to provide practical information for patients and the general public.

Since February 2022, a working group centering on the Task Force on CPG has been gathering, and clinical guidelines for the Management of Antithrombotic Agents have been developed using a systematic review for each clinical key question and the primary draft guidelines for the management of antithrombotic agent including aspirin, thienopyridine, dual antiplatelet therapy, warfarin, and direct oral anticoagulant was made. The CPG committee reviewed it to ensure the completeness of the guideline. For the consensus on recommendation by experts, online voting by e-mail was performed to local and international experts, the members of the development committee and CPG committee, neurologists, and cardiologists. Revision of the draft according to first-round voting will be presented at "IDEN 2023", where international gastroenterologists from across the country gathered on 9 June 2023. The final guideline draft will be revised and made based on the discussions during this meeting.

Keywords: Clinical practice guideline, Antithrombotics



IC 1-2

Overview and recent trends in antithrombotics and cardiovascular risk stratification

Young-Hoon Jeong

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Endoscopic procedures hold a basal risk of bleeding that depends on the type of procedure and patients' comorbidities. Moreover, they are often performed in patients taking antiplatelet and anticoagulants agents, increasing the potential risk of intraprocedural and delayed bleeding. Even if the interruption of antithrombotic therapies is undoubtedly effective in reducing the risk of bleeding, the thromboembolic risk that follows their suspension should not be underestimated. Therefore, it is fundamental for each endoscopist to be aware of the bleeding risk for every procedure, in order to measure the risk-benefit ratio for each patient. Moreover, knowledge of the proper management of antithrombotic agents before endoscopy, as well as the adequate timing for their resumption is essential. This review aims to analyze current evidence from literature assessing, for each procedure, the basal risk of bleeding and the risk of bleeding in patients taking antithrombotic therapy, as well as to review the recommendation of American society for gastrointestinal endoscopy, European society of gastrointestinal endoscopy, British society of gastroenterology, Asian pacific association of gastroenterology and Asian pacific society for digestive endoscopy guidelines for the management of antithrombotic agents in urgent and elective endoscopic procedures.

Keywords: Antithrombotics, CV risk, Endoscopy



IC 1-3

Recommendations of anti-platelet agents

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Ewha Womans University, Korea

Patients taking antiplatelet agents inevitably undergo endoscopic procedures from diagnostic endoscopy to invasive endoscopic procedures. In this topic, we reviewed relevant articles and presented guidelines for patients with antiplatelet agents needing endoscopy.

The risk of bleeding associated with diagnostic endoscopy including mucosal biopsy is reported to be less than 0.5% even taking antiplatelet agents. Therefore, we do not recommend discontinuation of aspirin before the endoscopic procedure in patients taking aspirin.

However, for ultra-high-risk endoscopic procedures such as endoscopic submucosal dissection, endoscopic mucosal resection of large colon polyp of more than 2 cm, and endoscopic papillectomy, withholding aspirin before the procedures could be considered in patients with low thrombotic risk.

In patients taking thienopyridine such as clopidogrel (Plavix), prasugrel (Effient), and ticlopidine for the low-risk endoscopic procedure, we recommend taking thienopyridine. Meanwhile, we suggest withholding thienopyridine 5-7 days before a high-risk endoscopic procedure. We suggest resuming thienopyridine after adequate hemostasis considering the onset time of medication.

In patients on dual antiplatelet therapy, we suggest continuing both antiplatelet agents before a low-risk endoscopic procedure. However, before a high-risk endoscopic procedure, we recommend withholding thienopyridine for 5-7 days while continuing aspirin during the procedure. We suggest resuming thienopyridine after adequate hemostasis considering the onset time of medication.

Studies concerning these topics were limited. So the level of evidence was low or very low in nearly most statements.

Keywords: Anti-platelet agents, Aspirin, Thienopyridine, Dual antiplatelet therapy, Bleeding risk



IC 1-4

Recommendations of anticoagulants

Seung Joo Kang

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This revision of guidelines aimed to provide information on the management of antithrombotic agents during the peri-endoscopic period, based on a comprehensive review of current evidence and CPGs regarding bleeding and thromboembolic adverse events associated with endoscopic procedures in patients receiving antithrombotic agents. In August 2022, a literature search according to the key questions was performed using Ovid MEDLINE, Embase, Cochrane library, and KoreaMed. The summary of evidence was determined using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) method. The grade of recommendation was classified as strong or conditional depending on the balance between benefit and harm of the recommendation, quality of evidence, values and preferences. These recommendations are draft and can be changed after consensus voting from experts.

1) Recommendations of warfarin

Statement 1

We do not recommend withholding warfarin before low-risk endoscopic procedure. (Strength of recommendation: Conditional, Level of evidence: Low)

Statement 2

We suggest withholding warfarin 3–5 days before high-risk endoscopic procedure. Heparin bridging therapy is recommended only in patients with high thromboembolic risk. (Strength of recommendation: Conditional, Level of evidence: Low)

Statement 3

We suggest resuming warfarin as soon as possible once adequate hemostasis has been achieved. (Strength of recommendation: Conditional, Level of evidence: Low)

All the included studies commonly indicated that overall rate of early or delayed hemorrhage was not differ between warfarin interruption group and non-interruption group. However, temporary interruption of anti-thrombotic therapy during procedure was associated with significantly higher risks of thromboembolic events.

Considering temporary interruption of anti-thrombotic therapy during procedure was associated with significantly higher risks of thromboembolic events, but continuing anti-thrombotic therapy was associated with significant higher risks of procedure-related bleeding, we still need to stratify the patient's thromboembolic risk and heparin bridging therapy is recommended only in patients with high thromboembolic risk

Table 1. High thromboembolic risk category for patients receiving anticoagulant therapy

Risk	Indication for anticoagulation		
	Mechanical valve	Atrial fibrillation	Venous thromboembolism
High	Recent (<3 months) stroke or TIA Mitral valve prosthesis Any caged-ball or tilting aortic valve prosthesis	Recent (<3 months) stroke or TIA Rheumatic valvular heart disease CHA2DS2-VASc score ≥6	Recent (<3 months) VTE Severe thrombophilia (e.g., deficiency of protein C, protein S, or antithrombin, antiphospholipid syndrome)

* ATE, arterial thromboembolism; TIA, transient ischemic attack; VTE, venous thromboembolism

** CHA2DS2-VASc score: Congestive heart failure (1), Hypertension (1), Age ≥75 (2), Diabetes (1), Stroke/TIA/thromboembolism (2), Vascular disease (1), Age 65-74 (1), Sex (female) (1)

2) Recommendations of direct oral anticoagulants (DOACs)

Statement 1

We suggest omitting the morning dose of DOACs on the day of low-risk endoscopic procedure. (Strength of recommendation: Conditional, Level of evidence: Very low)

Statement 2

We suggest resuming DOACs once adequate hemostasis has been achieved after low-risk endoscopic procedure. (Strength of recommendation: Conditional, Level of evidence: Very low)

Statement 3

We recommend that the last dose of DOACs be taken 3 days before high-risk endoscopic procedure. (Strength of recommendation: Strong, Level of evidence: Low)

Statement 4

We suggest resuming DOACs two or three days after high-risk endoscopic procedures. (Strength of recommendation: Conditional, Level of evidence: Very low)

Direct oral anticoagulants (DOACs) are inhibitors of thrombin (dabigatran) and factor Xa (rivaroxaban, apixaban and edoxaban). Unlike warfarin, they have a rapid onset of action and full anticoagulant activity is established within 3 hours of the first dose. In a low-risk procedure, omitting the morning dose of DOAC is suggested because it can reduce bleeding, and it is recommended to restart as soon as possible after the procedure. Decision about resumption should be based on the risk of procedure and adequate hemostasis. DOACs have a rapid onset of action, with a peak effect occurring 1 to 3 hours after intake. In PAUSE study, DOAC was resumed 1 day after a low-bleeding risk procedure, provided that hemostasis was achieved. Discontinuation of DOACs 1-2 day before procedure decreases post-procedural bleeding in high-risk procedures. In the PAUSE study, a protocol of taking the last DOAC dose 3 days before the high-risk procedure and restarting 1-2 days after the procedure was adopted. There is no evidence to support heparin bridging therapy in patients taking DOAC.

Table 2. Suggested protocol of perioperative direct oral anticoagulant (DOAC) management

DOAC	Procedure Risk	DOAC interruption schedule					Procedure Day (Restart ≥6 hrs)	DOAC resumption schedule		
		D-5	D-4	D-3	D-2	D-1		D+1	D+2	D+3
Apixaban	Low	● ●	● ●	● ●	● ●	● ●	(●)	● ●	● ●	● ●
	High	● ●	● ●	● ●					(●) (●)	● ●
Dabigatran (CrCl ≥50ml/min)	Low	○ ○	○ ○	○ ○	○ ○	○ ○	(○)	○ ○	○ ○	○ ○
	High	○ ○	○ ○	○ ○					(○) (○)	○ ○
Dabigatran (CrCl <50ml/min)	Low	○ ○	○ ○	○ ○				○ ○	○ ○	○ ○
	High	○ ○							(○) (○)	○ ○
Rivaroxaban /Edoxaban (AM intake)	Low	●	●	●	●	●	(●)	●	●	●
	High	●	●	●					(●)	●
Rivaroxaban /Edoxaban (PM intake)	Low	●	●	●	●	●	(●)	●	●	●
	High	●	●	●					(●)	●



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CE 1-1

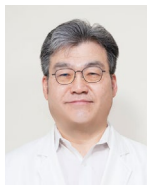
Introducing the new journal evaluation system

Sun Huh

Hallym University, Korea

Clinica Endoscopy, a journal listed in various international indexing databases, is introducing the new CiteScore and CiteScore Tracker metrics to show the journal's citation status over the last four years. Scopus CiteScore 2021 is 3.5, and CiteScoreTracker 2022 is 3.8, placing the journal at the 50% level in the Gastroenterology category. The Journal Impact Factor (JIF) is below the median at 4.095 but still excellent. The Journal Citation Indicator (JCI), a new metric in SCIE Journal Evaluation Metrics, provides a single set of bibliometric information for a journal, allowing for straightforward interpretation and comparison across disciplines. The main difference between JCI and JIF is the denominator and numerator's timeframes, with JCI considering a more extended period. The 2022 JCR, scheduled for publication in June 2023, will include ESCI journals showing the same JIF value as SCIE journals. This inclusion makes it easier to see citation numbers and a journal's standing in the international market. To improve Clinica Endoscopy's chances of entering the SCIE review process and ensure long-term survival, follows can be executed: focusing on maintaining high editorial quality, partnering with other gastrointestinal endoscopy societies, providing graphic abstracts for more articles, and continuing efforts to be listed on MEDLINE. By implementing the suggested improvements and strategies, the journal can increase its citation rate and secure a stronger position in the international journal market.

Keywords: Journal evaluation, Scopus, SCIE, JCI, Journal impact factor



CE 1-2

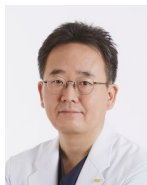
Sharing experiences from the Journal of Gastric Cancer & collaborating with Clinical Endoscopy

Keun Won Ryu

National Cancer Center, Korea

“Journal of Gastric Cancer (JGC)” is the official journal of “Korean Gastric Cancer Association (KGCA)” and continued from the “Journal of the Korean Gastric Cancer Association (JKGCA) (대한위암학회지)”. The first issue of JKGCA was published in 2001 March quarterly in a year. The journal of JKGCA was changed to “JGC” from the issue of 2010 June with abstract only English. From the 2010 December, “JGC” was published with full text English version. “JGC” was registered as the SCI-E from 2017 with impact factor 1.400. After then the impact factor was increase gradually and reached 3.720 in 2020 and currently 3.306 of 5 year impact factor. “JGC” is still published quarterly in a year but changed the issue months from “March, June, September, December” to “January, April, July, October” from 2022 April. The aim and scope of “Clinical Endoscopy (CE)” was overlapped partially with “JGC”. The collaboration between “JGC and “CE” might synergistic effect on both journals. The detailed suggestion about it will be presented at the IDEN 2023 CE session.

Keywords: JGC, CE



CE 1-3

How-to in Clinical Endoscopy: From a domestic editor's view

Tae Hoon Lee

Soonchunhyang University, Korea

Curriculum Vitae

Educational Background

Mar.1993~Feb.1999	Medical Degree, Soonchunhyang University College of Medicine, Asan
Sep.2001~Aug.2003	Master's degree of Medicine, Graduate School, Soonchunhyang University, Asan
Sep.2009~Feb.2012	Doctorate degree of Medicine, Graduate School, Soonchunhyang University, Asan

Professional Experience

Mar.1999~Feb.2004	Intern & Resident in Internal Medicine, Soonchunhyang University Hospital Cheonan & Seoul
Mar.2004~Apr.2007	The Head Physician, The Armed Forces Military Gangneung Hospital, Gangneung
May.2007~Feb.2008	Research Fellow in Gastroenterology, Soonchunhyang University Hospital, Cheonan
Mar.2008~Feb.2009	Instructor in Gastroenterology, Soonchunhyang University Hospital, Cheonan
Mar.2009~Feb.2018	Assistant, Associate Professor, Soonchunhyang University Hospital, Cheonan
Aug.2016~July.2017	Visiting Scholar, University of Washington College of Medicine, WA, USA
Mar.2018 ~	Professor, Soonchunhyang University Hospital, Cheonan

Professional Organizations

Member, Korean Society of Internal Medicine
 Member, Korean Society of Gastrointestinal Endoscopy
 Member, Korean Society of Gastroenterology
 Member, Korean Pancreatobiliary Association
 Member, Korean Association for the Study of the Liver
 Member, American Society of Gastrointestinal Endoscopy
 Section Editor, Clinical Endoscopy



CE 1-4

How-to in Clinical Endoscopy: From a foreigner editor's view

Rungsun Rerknimitr

Chulalongkorn University, Thailand

Background/aims: Clinical Endoscopy (CE) is one of the GI endoscopy journals based in Asia. CE is a fast-growing journal and today, there is a lot of need for the authors to land their GI endoscopy manuscripts.

Methods: There is still room for improvement in certain areas such as going for higher impact factor, more visibility to readership, and users' friendly submission system.

Results: My suggestion to the CE are to stimulate more case series of innovation, consensus, and RCT, to invite big names authors to submit their manuscript, and to avoid just a case report submission. However, cases series as video format are welcome.

Conclusions: CE is a promising GI endoscopy related journal. My prediction is that CE will become the top five listed journal in this field soon.

Keywords: Clinical endoscopy, Improvement, Foreigner editor

How-to in clinical endoscopy:
From a foreigner editor's view

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Chulalongkorn University Bangkok, Thailand

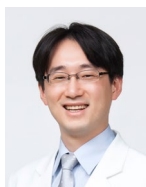


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LS 1

Fexuclue : The new wave of GERD treatment

Chan Hyuk Park

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Curriculum Vitae

Educational Background

1999-2005	Bachelor Degree, Yonsei University College of Medicine, Seoul, Korea
2010-2018	Doctoral Degree, Department of Medicine, The Graduate School, Yonsei University, Seoul, Korea

Professional Experience

2005 - 2006	Internship Severance Hospital, Seoul, Korea
2006 - 2009	Medical Officer in the Navy
2009 - 2013	Residency in Internal Medicine Severance Hospital, Seoul, Korea
2010 - 2018	Doctoral Degree, Department of Medicine, The Graduate School, Yonsei University, Seoul, Korea
2013 - 2015	Clinical Fellowship Division of Gastroenterology, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Korea
2015 - 2016	Clinical Assistant Professor Department of Internal Medicine, Hanyang University Guri Hospital, Hanyang University College of Medicine, Guri, Korea
2016 - 2020	Assistant Professor Department of Internal Medicine, Hanyang University Guri Hospital, Hanyang University College of Medicine, Guri, Korea
2020 - 2021	Visiting Scholar Lerner Research Institute, Cleveland Clinic, Ohio, USA
2020 -	Associate Professor Department of Internal Medicine, Hanyang University Guri Hospital, Hanyang University College of Medicine, Guri, Korea

Professional Organizations

Scientific Committee, Korean Society of Gastrointestinal Endoscopy
 Scientific Committee, Korean Society of Gastroenterology
 Scientific Committee, Korean College of *Helicobacter* and Upper Gastrointestinal Research
 Scientific Committee, Korean Society of Neurogastroenterology and Motility



LS 2

A novel, clinically validated P-CAB :Tegoprazan

Gwang Ha Kim

Pusan National University, Korea

Potassium-competitive acid blockers (P-CABs) are a novel acid-reducing drugs for acid-related diseases such as gastroesophageal reflux disease and peptic ulcer disease, and, currently, tegoprazan, vonoprazan, and fexuprazan are commercially available. By producing more profound acid inhibition than proton pump inhibitors (PPIs) due to prolonged t1/2 and reversible inhibition of H⁺/K⁺ ATPase, P-CABs are substituting the position of PPIs in the treatment of acid related diseases in Japan and Korea.

Tegoprazan is a newly developed P-CAB approved for the treatment of erosive reflux disease, non-erosive reflux disease, maintenance therapy of healed erosive reflux esophagitis, gastric ulcer, and *Helicobacter pylori* eradication in Korea. Tegoprazan is a fast, potent and safe P-CAB. It can reach intragastric pH 4 within 0.5~1 hour, has bioavailability that is not limited by food intake, may improve nocturnal acid breakthrough control, has low drug-to-drug interaction potential with clinical drugs metabolized by cytochrome in the liver, and has low risk of hypergastrinemia. Tegoprazan did not induce higher hepatotoxicity compared to six conventional PPIs in recent study using real-world data in Korea.



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SS 1

Latest advancement in LGI endoscopy

Tiing Leong Ang

Changi General Hospital, Singhealth, Singapore

Advances in image enhancement technology has enhanced our diagnostic and therapeutic capability during colonoscopy. Initially only dye-based chromoendoscopy was available. Over the last 2 decades, Narrow Band Imaging (NBI), with or without magnifying endoscopy, has clearly established its importance in the characterization and diagnosis of colonic polyps. The NICE and JNET classifications are now routinely used in clinical practice to guide therapeutic decision making, and the type of and feasibility for curative endoscopic resection¹. In recent years, artificial intelligence (AI)-assisted colonoscopy also entered routine clinical practice, and it has been shown to increase adenoma detection rate and reduce adenoma miss rates across a spectrum of size and morphological lesion characteristics². Newer technologies such as Extended Depth of Field (EDOF), Texture and Colour Enhancement Imaging (TXI) technology, and Red Dichromatic Imaging (RDI), are now available, with the launch of the EVIS X1 system by Olympus Medical Systems (Tokyo, Japan). EDOF combines two images at different focus distances into one single perfect image with an extremely wide depth of field and this has the potential to improve detection and diagnosis. TXI supports better endoscopic visibility through enhancing texture, brightness and colour to define subtle tissue differences more clearly. TXI has been shown to improve endoscopic visibility of both polypoid and non-polypoid as well as serrated colorectal lesions when compared to white light endoscopy³⁻⁵. A multicentre cohort study revealed that TXI was a significant factor affecting mean number of adenomas detected per procedure and adenoma detection rate, when compared to white light imaging (WLI)⁶. RDI enhances the visibility of deep blood vessels and bleeding points, and thus can facilitate endoscopic haemostasis of bleeding lesions and ESD. A retrospective study of ESD performed by a single expert endoscopist showed a significantly faster dissection speed when performing ESD under the RDI mode compared to WLI mode⁷. Although an open label RCT of RDI vs WLI during ESD did not demonstrate a shorter endoscopic haemostasis time with the RDI mode, RDI reduced the psychological stress experienced by endoscopists when they perform haemostatic treatment during ESD.⁸ These early studies on the utility of TXI and RDI are very promising and further definitive trials are anticipated.

Keywords: Image enhanced endoscopy, Artificial intelligence, Colonic polyps, Endoscopic haemostasis

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UGI 5-1

How AI is revolutionizing endoscopy

Jean-François Rey

Institute Arnault Tzanck, France

With the incessant advances in information technology and its implications in all domains of our life, Artificial Intelligence (AI) started to emerge as a need for better machine performance. How it can help endoscopists and what are the areas of interest in improving both diagnostic and therapeutic endoscopy in each part of the GI tract. What are the recent benefits and clinical usefulness of this new technology in daily endoscopic practice.

The two main AI systems categories are Computer-assisted detection “CADe” for lesion detection and computer-assisted diagnosis “CADx” for optical biopsy and lesion characterization. Quality assurance is the coming step with complete monitoring of high quality colonoscopy. In all cases it is a computer-aid endoscopy as the overall result rely on the physician. Video Capsule Endoscopy is the unique example where the computer conduct the device, store multiple images and perform accurate diagnosis.

Future expectations are numerous, but we need standardization and assessment of various software. It is important that healthcare providers finance this new development but also make obligation to use it in daily clinical practice

In summary, AI is a breakthrough in digestive endoscopy. Screening gastric and colonic cancer detection should be improved especially outside of expert’s centers. Prospective and multicenter trials are mandatory before introducing new software in clinical practice.

Keywords: Artificial intelligence, Digestive endoscopy



UGI 5-2

Best practices in endoscopic diagnosis of upper GI Neoplasia by endoscopy

Hisao Tajiri

Jikei University, Japan

I proposed a consensus for terminology in endoscopy (Tajiri H. Endoscopy 2007). Major categories of endoscopic imaging are classified into white light endoscopy, image-enhanced endoscopy (IEE), magnified, microscopic, and tomographic endoscopy. Chromoendoscopy identified as one of IEE. In 2020, we published "A Guideline for endoscopic diagnosis for early gastric cancer" (Yao K, Tajiri H. DEN 2020). The algorithm of gastric cancer diagnosis we proposed is now widely used in practice (Muto M. Tajiri H. DEN 2016). Magnifying endoscopy (ME) using IEE is useful for the qualitative diagnosis of early gastric cancer, and as an optical biopsy method, it is expected to reduce the implementation of biopsy. Therefore, the guideline development panel concluded as level of evidence A, that is strong evidence. A multicenter RCT using Linked Color Imaging (LCI) was conducted in 19 institutions in Japan (Ono S. Annals of Internal Medicine 2020). The results of this study showed detection rate of neoplasms by White light imaging (WLI) mode is 4.8% and those by LCI is 8%. Surprisingly, overlooking rates of neoplasms are 41% by WLI and 7% by LCI.

Lugol Chromoendoscopy (LCE) has been the gold standard for detecting superficial esophageal squamous cell carcinoma (SESCC) before the development of IEE. But LCE can occasionally bring patient chest pain and nausea as well as a risk for an allergic reaction. Dr. Morita reported a systematic review of Narrow band imaging (NBI) vs LCE (BMC cancer 2017).

In the differentiation of those, NBI was shown to be superior to LCE. In addition, prospective study showed that the sensitivity rates of ME-NBI for SESCO in an experienced endoscopist group were significantly higher than those in a less experienced endoscopist group. LCE is still recommended for detecting SESCO, especially for less experienced endoscopists (Ishihara R. Dig Esophagus 2010).

Conclusion: Chromoendoscopy is still useful to detect and diagnose early stage of the upper GI neoplasms, although IEE such as NBI, BLI, LCI has shown a great contribution in this field.

Keywords: Image-enhanced endoscopy, Magnifying endoscopy, Linked color imaging, Lugol chromoendoscopy, Narrow band imaging



UGI 5-3

pCLE & endocytoscope systems in gastroesophageal neoplastic lesions

Sang Kil Lee

Yonsei University, Korea

Endoscopy is the essential procedure for the diagnosis of esophagogastric 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 probe-based system known as probe-based confocal laser endomicroscopy (PCLE) (Cellvizio; Mauna Kea Technologies, Paris, France). 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 . 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. As part of this effort, I conducted several studies on the usefulness of biopsy using pCLE in gastric cancer. In this lecture, I would like to introduce the results and outline of our research.

Keywords: PCLE, Endocytoscope, Gastroesophageal neoplastic lesions



UGI 5-4

The clinical application of magnetically steerable gastric capsule endoscopy

Zhuan Liao

Changhai Hospital, China

Magnetically controlled capsule gastroscopy (MCCG) offers an alternative choice for upper GI examination. This talk will focus on the application of MCCG in the stomach, including its diagnostic accuracy and in areas such as gastric cancer screening, in elderly and young patients. The invention of detachable string enables MCCG to examine the esophagus completely. Some novel techniques in MCCG includes 5G and AI.

Keywords: Magnetically steerable gastric capsule endoscopy, Clinical application



UGI 6-1

Optimal handling and histological assessment of ESD specimens – A Japanese practice

Kohei Takizawa

Koyukai Shin-Sapporo Hospital, Japan

The ultimate goal of ESD is not simply to achieve en bloc resection of the lesion but to cure the cancer. Unfortunately, preoperative diagnosis by endoscopy is not 100% accurate, making proper handling and histological evaluation of specimens obtained through ESD crucial. First and foremost, it is important to extract clean specimens with minimal damage during ESD. After pinning the resected specimen onto a board with appropriate tension, it is fixed in formalin solution for 24–48 hours. In the case of early gastric cancer ESD specimens, the whole specimen is sectioned at intervals of 2–3mm. Care should be taken regarding the orientation of the specimen and areas close to the cut margins. Information that should be included in the pathological report for early gastric cancer ESD includes the location, macroscopic type, size of resected specimen, size of lesion, histological type, depth of invasion, extent of invasion, lymphatic invasion (Ly), venous invasion (V), undifferentiated components in invasion part, horizontal margins (HM), vertical margins (VM), presence or absence of ulcer finding (UL), and endoscopic curability (eCura). Immunostaining using D2–40 for Ly and EVG for V can be effective for evaluating vessel invasion. Mapping is also essential, particularly in the assessment of mixed histology, as the determination of cure may not be possible without distinguishing between differentiated and undifferentiated types. Proper pathological evaluation, as described above, is highly important for determining cure or non-cure of cancer and deciding on subsequent additional treatments. Furthermore, providing accurate pathological feedback to endoscopists can contribute to improving their diagnostic abilities.



UGI 6-2

New methods for safe and effective ESD

Wan-Sik Lee

Chonnam National University, Korea

Introduction:

Gastric endoscopic submucosal dissection (ESD) is a minimally invasive procedure used to remove early gastric cancer or precancerous lesion. However, ESD can cause complications such as perforation or hemorrhage, and limitations may be encountered in the case of lesions in difficult-to-reach or presence of fibrosis. In recent years, several new methods have been developed to reduce complications and overcome these limitations. In this review, we will focus on some modified and added method to facilitate the safe and efficient ESD.

1. Traction-assisted gastric ESD

In contrast surgical procedures, the conventional ESD technique typically relies on gravity to secure a view of the dissection site, as opposed to the use of an opposite hand to pull the dissected tissue. To overcome this limitation, traction-assisted ESD was developed to allow for the use of an opposite hand to grip and pull the dissected tissue.

The most commonly used technique for this purpose is the clip with thread method, which involves placing a clip through the endoscope and tying a thread around it to prevent it from unraveling. The clip is then inserted back through the endoscope to the target site, where the thread can be pulled to provide traction.

According to a multicenter randomized controlled trial, there was no significant difference in mean procedure time between conventional gastric ESD and traction-assisted gastric ESD (58.1 minutes vs 60.7 minutes, $P=0.45$). However, when the lesion was located in the upper or middle part of the great curvature of the stomach, the traction-assisted gastric ESD group had a significantly shorter procedure time compared to the conventional gastric ESD group (57.2 minutes vs 104.1 minutes, $P=0.01$). Furthermore, while there was no statistically significant difference in the R0 resection rate between the two groups (96.8% vs 97.8%, $P=0.45$), the perforation rate was significantly lower in the traction-assisted gastric ESD group (0.3% vs 2.2%, $P=0.04$).

2. Gastric ESD using the pocket creation method

In general, when performing gastric ESD, mucosal incision is usually made around the lesion and then submucosal dissection is carried out. However, after dissection, the tension of the surrounding mucosa and submucosal layer disappears, making it difficult to access the endoscope under the mucosal flap. In consideration of this issue, the pocket creation method (PCM) utilizes the tension of the mucosa and submucosal layer without performing mucosal incision around the lesion. A C-shaped or inverted C-shaped mucosal incision maintains tension in the remaining mucosa, facilitating access

to the submucosal layer beneath the lesion. Finally, the mucosa around the lesion is circularly incised, and the remaining part is resected.

The advantages of PCM include well-preserved resected tissue within the pocket, stable maintenance of the endoscope shaft, and the ability to position the endoscope horizontally on the resection surface and muscular layer.

There are few studies comparing PCM to the conventional method (CM) in gastric ESD. However, one retrospective study in Japan comparing PCM and CM showed no significant difference in complication rates, but the resection speed was significantly faster in the PCM group (20 mm²/min vs 14 mm²/min, P=0.001), and the incidence of perforation was significantly lower in the PCM group (P=0.182).

A systematic review and meta-analysis, which included studies on gastric duodenal, and colorectal ESD showed that, although there were limitations, the en bloc resection rate was significantly higher in the PCM group than in the non-PCM group (OR 3.87, 95%CI 1.24-12.10, P=0.020), and R0 resection rate was also higher in the PCM group (OR 2.46, 95%CI 1.14-5.30, P=0.020). The resection speed was faster in the PCM group (mean difference 3.13, 95%CI 1.35-4.91, P < 0.001), and the incidence of perforations was significantly lower in the PCM group (OR 0.34, 95%CI 0.15-0.76, P=0.009).

Conclusion

ESD is now an established procedure and its wide spread use in the treatment of early gastric cancer makes significant change in clinical practice. But still, ESD is time consuming, and has non-negligible complication risks. Furthermore, due to lack of dedicated procedural secured station, ESD is dependent on the endoscopist's skill and lesion characteristics. Such lesions which has severe fibrosis, and located with upper body area including cardia, fundus, anterior wall, greater curvature side especially pose great difficulty in performing ESD with R0 resection. Therefore, it is reasonable to devise every possible way to overcome these difficulties. In this context, the methods described above will help to expand ESD competency. Moreover, development of more efficient ESD accessories and dedicate ESD platform which is less dependent on endoscopist's maneuver would be next step of improvement in the near future.

Keywords: ESD, Gastric cancer, New method

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UGI 6-3

Endoluminal ablative therapy for early upper GI neoplasia

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Endoscopic resection (ER) is the cornerstone for successful curative treatment of early upper GI neoplasia as it provides objective histopathological criteria of curative resection. Endoluminal ablative therapy has a complementary role (ER), such as in the context of endoscopic eradication therapy in Barrett's oesophagus (BE), and in situations when endoscopic resection not possible or has high rate of adverse events, and when surgery is considered over-treatment. It is applicable only when local treatment is considered curative ie mucosal lesions. Options for endoluminal ablative therapy includes radiofrequency ablation (RFA), photodynamic therapy (PDT), argon plasma coagulation (APC) and cryotherapy. An important concept when applying ablative therapy is an adequate depth of ablation, with insufficient ablation depth leading to undertreatment, and excessive depth resulting in stricture formation and other adverse events. Ablative therapy, in particular with RFA, of all BE in the presence of invisible dysplasia and after resection of visible dysplasia is now considered standard of care. RFA has been applied in the case of superficial oesophageal squamous cell neoplasia and short term outcome data from retrospective series are promising. On the other hand, the limited outcome data of the use of ablative therapy for gastric dysplasia is suboptimal. Endoluminal ablative therapy is well established as part of the overall treatment strategy for management of BE with dysplasia. Focal EMR/ ESD to resect visible dysplasia combined with RFA to eradicate all Barrett's mucosa is now regarded as first-line treatment. Alternative ablative techniques include cryotherapy and hybrid APC. Endoscopic resection is still regarded as first line treatment for other early UGI neoplasia in view of limited efficacy and outcome data for ablative therapy.

Keywords: Endoluminal ablation, Barrett's oesophagus, Dysplasia



UGI 6-4

Management of special type EGCs: Undifferentiated or mixed histology

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Introduction

Endoscopic resection is an established treatment approach for early gastric cancer (EGC) that meet standard guidelines and extended criteria, including demonstrating a low risk of lymph node metastasis (LNM).¹⁻³ The expanded indications for endoscopic submucosal dissection (ESD) consist of three discrete criteria that have been used for EGC: I, intramucosal tumor, differentiated type, without ulcerative findings, and >2 cm in size; II, intramucosal tumor, differentiated type, with ulcerative findings, and ≤3 cm in size; and III, intramucosal tumor, undifferentiated type, without ulcerative findings, and ≤2 cm in size.⁴ Notably however, there are still concerns among clinicians regarding the results of ESD for undifferentiated type EGC (UD EGC) within the expanded criteria due to the risk of LNM.^{4,6} There have been several case reports of lymph node or distant metastases arising after curative ESD in UD EGC patients meeting the expanded indications, and this treatment is therefore still under investigation with regard to these widened criteria.^{5,7} In addition, the issues of mixed-type EGC is arising due to the risk of LNM. In this article, we tried to review the outcomes of ESD of UD EGC and debates about mixed histology.

Gastric cancer recurrence after ESD compared to those of surgery in the treatment of UD EGC

Gastric cancer recurrences after an ESD can arise in the remaining stomach, leading to a higher risk of these occurring in this treatment group compared to a surgically-treated group. The overall recurrence rate after ESD has been reported to be as high as 10% in some previous studies and can be reduced incomplete resected cases to around 4%.^{6,8} Metachronous recurrences in UD EGC patients are more frequent than synchronous or local recurrences.^{6,9} and can thus be more readily treated by an additional ESD procedure because the chance of another recurrence at the ESD scar will be decreased. Recent nationwide Korean study showed that the total recurrence rate was 6.7% among the curative resected ESD cases and metachronous recurrences represented more than half of these (3.7%).¹⁰ Theoretically, local recurrent can not be happened in case with curative R0 resection, however, it often happened in clinical situation. We think that this local recurrence can be happened because the recurred tumor is located very near the ESD site coincidentally. Unlike recurrences of this nature, a distant metastatic recurrence is very difficult to cure and will typically lead to a fatal outcome. In addition, notably however, some cases of a fatal distant metastasis after curative ESD and LNM within the expanded indications were reported in some reports.^{6,9,10} Care should be taken therefore in selecting

UD EGC patients for an ESD treatment, even with the expanded criteria.

Survival rate of ESD compared to those of surgery in the treatment of UD EGC

Previous studies have reported a 90–95% 5-year survival rate for UD EGC after ESD with no statistically significant differences from the surgical outcomes for this cancer, although a tendency toward a better overall survival (OS) was evident in surgery cases.^{6,9} One of these prior reports found that the OS differed according to the histologic type with PDA patients showing a poorer OS than signet ring cell carcinoma (SRC) cases.⁹ Current study series in Korea showed that the OS was better in the surgery group among the total patient cohort, but no significant difference was observed after propensity score matching. The reason for this discrepancy is quite likely to be patient age, which was revealed as a risk factor for death and was higher in the ESD group before matching.^{6,9,10} Previous reports have explained this trend by histologic type differences as poorly differentiated adenocarcinoma lesions are typically highly associated with vertical cut-end positivity compared to SRC, which can lead to poorer survival.⁹

Relationship between mixed-type early gastric cancer and lymph node metastasis

There is no separate indication exists for the mixed-type early gastric cancer and mixed histological specimen with predominant differentiated component is classified as differentiated cancer. Instead, predominantly undifferentiated cancer is defined as UD EGC. Recent reports showed that LNM in mixed-type EGC patients was higher than pure-type EGC even in dominantly differentiated mixed-type EGC.^{11,12} Therefore, we should consider that current indication of ESD which treat dominantly differentiated mixed-type EGC as same with pure differentiated EGC is proper or not.

Conclusion

Although the outcomes of ESD are not inferior to surgery for the curative resection of UD EGC within expanded indications, the possibility of a lymph node metastasis after ESD remains. The decision to perform ESD in these patients should therefore be made carefully and this procedure should always be followed by regular closed monitoring with endoscopy and computed tomography. In addition, further study will be needed to know the clinical outcomes between mixed-type histology and pure-type histology.

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LGI 5-1

Differentiation of superficial versus submucosal colorectal cancer. What's the best?

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Endoscopic submucosal dissection (ESD) is an advanced therapeutic procedure for removing a large but superficial colorectal neoplasia such as laterally spreading tumors and early colorectal cancer (CRC) including intramucosal cancer and submucosal CRC. According to AJCC 8th, CRC Tis and T1. Japanese Society for Cancer of the Colon and Rectum divided T1 CRC into T1a and T1b, according to depth of invasion. Superficial submucosal invasion, defined as invasion < 1000 μm of submucosal layer,¹ is indicated for ESD because of low risk of lymph node metastasis. Before resecting CRC, it is important to estimate the degree of submucosal invasion. The depth of invasion can be predicted by observation of tumor morphology and image-enhanced endoscopy such as dye-based chromoendoscopy and virtual chromoendoscopy.

Gross morphology

Tumor morphology with fullness, erosion/ulceration on tumor surface, stalk swelling, fold convergence, deformity, and rigidity were known risk factors for deep submucosal invasion.^{2,5} For LST type, LST-NG morphology with sessile shape or depression, and LST-G with a dominant nodule predict a higher risk of superficial submucosal invasion.⁶

Kudo's classification

Pit patterns of colonic mucosa differ histology of colorectal tumors. Kudo's classification categorizes the pit pattern into six patterns (Table 1).⁷ Type V is classified as a cancerous lesion and is divided into Type V_I (irregular) and Type V_N (non-structural). Type V_N represents deep submucosal invasive cancer. Pit-pattern is well characterized using magnifying endoscopy after spraying dye (indigo carmine or crystal violet). Without magnifying colonoscope, pit pattern can be well observed using near focus of a recently developed high-definition colonoscope.

Table 1. Kudo's classification⁷

	Type I	Type II	Type IIIs	Type IIIL	Type IV	Type VI	Type VN
Description	Round pits	Stellar or papillary pits	Small tubular or round pits that are smaller than the normal pit	Tubular or roundish pits that are larger than the normal pits	Branch-like or gyrus-like pits	Irregularly arranged pits with type IIIs, IIIL, IV type pit pattern	Non-structural pits

Suggested pathology	Normal	Hyperplastic or sessile serrated lesion	Adenoma	Adenoma	Tubulovillous adenoma	High grade dysplasia, intramucosal cancer	Deep submucosal cancer
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Narrow band imaging

Using narrow band imaging (NBI) pit and vessel on the surface of tumor can be clearly seen. One study reported that irregular and sparse vascular pattern observed by NBI represented deep invasive submucosal cancer. The sensitivity, specificity, and the accuracy rate was 100%, 95.8%, and 96.1%, respectively.⁵

Several classifications were developed to date. Recently, the Japan NBI Expert Team classification was proposed in 2014 after selected NBI specialists reached a consensus on establishing a universal NBI magnifying endoscopic classification (Table 2).⁸

Table 2. Japan Narrow-Band Imaging Expert Team classification⁸

	Type I	Type IIA	Type IIB	Type III
Vessel pattern	Invisible	Regular caliber Regular distribution	Variable caliber Irregular distribution	Loose vessel areas Interruption of thick vessels
Surface pattern	Regular dark or white spots Similar to surrounding normal mucosa	Regular (tubular/ branched/papillary)	Irregular or obscure	Amorphous areas
Suggested pathology	Normal	Low grade adenoma	High grade intramucosal neoplasia/shallow invasive cancer	Deep submucosal invasive cancer

Artificial Intelligence

Artificial Intelligence has been applied to colonoscopy for various purposes, including adenoma detection and discrimination between neoplastic lesion and non-neoplastic lesion. Artificial Intelligence was applied to estimate the depth of invasion during colonoscopy in patients with CRC.

One study reported the accuracy for discrimination of endoscopically treatable tumor and untreatable tumor using a computer-aided diagnostic (CAD) system. The accuracy of CAD system was comparable to that of expert and superior to that of trainee. When trainee was assisted by CAD system, the rate of accuracy was comparable to that of CAD alone and expert.⁹

CAD developed with endoscopic white light images showed excellent per lesion specificity and accuracy for T1b lesion diagnosis, equivalent to experts and superior to trainees.¹⁰

Keywords: Colorectal cancer; image enhanced endoscopy; endoscopic submucosal dissection

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LGI 5-2

Knife, cap, and electro-surgical unit: Best choices and optimal use

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Introduction

Endoscopic submucosal dissection (ESD) enables complete resection of lesions that cannot be removed by endoscopic mucosal resection (EMR).¹ Currently most guidelines recommend ESD for the treatment of benign colorectal lesions >2 cm in size and submucosal colorectal cancer without deep invasion.^{2,3} With the development of devices and techniques has helped reduce the rate of surgery and improve the quality of life.⁴ In this lecture, the proper selection and optimal use of the optimal knife, cap, and electro-surgical unit for perfect ESD procedure will be discussed.

Main Body & Conclusion⁵⁻⁷

A variety of knives are available for submucosal dissection of colorectal lesions. Depending on the knife, marking, injection, mucosal incision and hemostasis can be performed with a single knife, or a different endoscopic device must be used. In general, it can be largely divided into insulated-tip type, needle type, and scissor type according to the shape. Depending on the endoscopist's preference, cost, and insurance standards, various knives are used in actual clinical practice. The cap, a distal attachment, is an essential device for properly exposing the endoscopic field obscured by the mucosa and maintaining a stable view during ESD. There are several types of caps depending on the diameter of the endoscope, and generally a cap with a side hole that is useful for securing a field of view through fluid discharge is used. An endoscopist should be well aware of the characteristics of the electro-surgical unit (ESU) because ESD procedure performs incision and dissection by applying electrocoagulation current to the tissue. Several ESUs are actually used in the market, and each ESU provides various modes to help with incision, dissection, and hemostasis.

There is no right answer when it comes to choosing a knife, cap and electro-surgical unit. Endoscopists should be aware of the pros and cons of each and choose wisely for a perfect ESD procedure.

Keywords: Endoscopic submucosal dissection, Knife, Distal attachment, Electro-surgical unit

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LGI 5-3

Prediction and management of difficult situations: Strategies to overcome

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Colorectal endoscopic submucosal dissection (ESD) is more challenging in case of specific locations, severe fibrosis, and poor endoscopic maneuverability.

ESD of lesions involving the ileocecal valve is not easy due to poor endoscopic maneuverability, abundant submucosal fat, and its distinctive anatomical structure. An endoscope with a short bending radius is preferred to dissect the inferior lip of the ileocecal valve. ESD of lesions at the anal canal is also challenging because of hemorrhoidal plexus, presence of sensory nerves near the squamous epithelium. In addition, discrimination of submucosal layer from muscularis propria because of submucosal muscle fibers which are derived from longitudinal muscle of the rectum. However, complete dissection of the submucosal muscle can allow to access the submucosal layer just above the muscularis propria.

Hooking submucosal tissue with endoscopic knives is one of the most important techniques in ESD of colorectal lesions with severe fibrosis. Water pressure endoscopic submucosal dissection can be useful for treatment of colorectal lesions with severe fibrosis or poor endoscopic maneuverability.

Recent analyses reported that deep submucosal invasion is associated with low rates of lymph node metastasis (1.3%–2.5%) when other risk factors (high grade tumor budding, lymphovascular invasion, and poor differentiation) are absent. However, R0 resection rate is decreased significantly when deep submucosal invasion is present. Recent studies showed endoscopic intermuscular dissection between inner circular and outer longitudinal layers of muscularis propria can be a breakthrough for treatment of deep invasive T1 rectal cancers.

Keywords: Endoscopic submucosal dissection, Fibrosis, Submucosal invasion



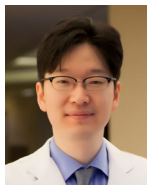
LGI 5-4

New techniques and device-assisted ESD: Current performance and future prospects

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Colorectal endoscopic submucosal dissection (ESD) has been standardized in Japan based on the establishment of techniques and various devices. We have reported that factors that increase the difficulty of colorectal ESD are poor endoscopic manoeuvrability and severe fibrosis. As for scope manipulation, development of special thin colonoscope for colorectal ESD (Olympus) and single-use splinting tube (single balloon overtube, Olympus) has made it remarkably easier to do colorectal ESD in such situation. Regarding the severe fibrosis, there are several countermeasures such as the use of ST hood, counter traction techniques (clip with string, SO-clip [Zeon Medical]), "Pocket creation method" proposed by Yamamoto, etc. In this lecture, I introduce several important techniques to reduce the difficulty of colorectal ESD in addition to above mentioned specific countermeasures. (1) use of the knife with water-jet function, (2) Needle-in technique of Dual knife (Olympus), (3) use of ITknife-nano (Olympus) or SB knife Jr (scissors type knife: Sumitomo Bakelite) in the situation of poor scope manipulation, (4) use of ITknife-nano for speedy dissection, (5) Dual red imaging (DLI: Olympus), etc. It is very important to have several favorite knives for ESD and to use the most adequate one according to the situation of the lesion. On the other hand, the indications for colorectal ESD are expanding as conditions for non-metastatic T1 cancer are explored in more detail. In order to determine the indication for ESD for T1 carcinomas, not only image-enhanced or magnifying observation but also EUS is essential. I will talk about this issue.



LGI 6-1

Application of AI in early colorectal cancer diagnosis

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Colorectal cancer (CRC) is the third most common cancer in Korea. Risk factors for CRC include age, family history, certain genetic mutations, obesity and overweight, diet, and physical inactivity. Early detection of CRC is essential for improving survival. Colorectal cancer is a type of cancer that usually occurs sporadically following the adenoma-carcinoma sequence. Early detection and treatment are crucial for this cancer type. The current standard screening test for CRC is colonoscopy, which involves examining the colon and rectum for polyps or cancer. There have been significant advancements in the field of colonoscopy with the extensive research and development of artificial intelligence. In this lecture, I will discuss the role of artificial intelligence in colonoscopy for the detection of colorectal cancer.

Artificial intelligence (AI) has been gaining attention in recent years as a potential tool for early detection of CRC. AI is a field of computer science that can be used to analyze data and identify patterns. AI has been used to identify polyps and cancer in colonoscopy images, and to predict the risk of CRC.

AI has the potential to improve the accuracy and efficiency of CRC detection. For example, a 2020 study found that an AI-based model was more accurate than doctors at detecting polyps in colonoscopy images. A study comparing conventional colonoscopy with virtual colonoscopy indicated that approximately 11% of the polyps found, of which nearly 4% were adenomas larger than 6 mm. Recently, a series of randomized controlled trials have translated the benefit of deep learning in a clinical setting, resulting in a pooled relative increase of 44% of adenoma detection rate (ADR). Also, the use of AI was associated with a statistically significant reduction, with respect to non-AI colonoscopy, in the false negative rate (6.8% vs 29.6%).

However, AI is still in its early stages of development and more research is needed before it can be used as a standard treatment for CRC. For example, the accuracy of AI-based models may vary depending on the data set, and it is not clear whether the models can be generalized to new patients. However, research is ongoing to improve the accuracy and generalizability of AI-based models.

Overall, AI is a promising tool for early detection of CRC, but more research is needed. Research is needed to improve the accuracy and generalizability of AI-based models. Additionally, research is needed to confirm that AI-based models are effective and safe in a clinical setting.

Keywords: Artificial intelligence, Colorectal cancer, Diagnosis

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LGI 6-2

Role of AI in detection of colorectal polyps – Where are we now?

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Colorectal cancer (CRC) is the third most common cancer and the second leading cause of cancer-related mortality worldwide¹. Colonoscopy is a method proven effective in preventing colorectal cancer through the detection and removal of neoplastic lesions². However, the success rate of detecting neoplastic polyps via colonoscopy varies depending on the endoscopist's skill and experience³. Medical costs have increased relative to the increased detection of diminutive polyps with high-definition endoscopes, including that of pathological analysis². Artificial intelligence (AI) has recently emerged as a method to improve colonoscopy quality by detecting neoplastic polyps.

The use of AI has become widespread throughout the field of medicine following the integration of deep learning methodologies. This is readily apparent in endoscopy, which makes use of a computer-aided system for gastrointestinal lesions⁴. Incorporating AI into colonoscopy may improve the quality of the procedure through computer-aided detection (CADe) and increase the adenoma detection rate (ADR). Clinical trials testing the performance of CADe systems in real-life clinical practice have been published recently, all of which demonstrated increased ADRs in the CADe group⁵⁻⁷. A meta-analysis of five randomized controlled trials revealed that the overall ADR of the CADe group was significantly higher than that of the control group⁸.

The application of AI systems in clinical practice holds immense promise, but it also presents several hurdles that need to be addressed. While CADe systems offer valuable assistance to endoscopists, there are notable concerns that warrant attention. One challenge is the potential increase in endoscopists' workload due to the resection of additional polyps detected by the CADe system. Although this feature aims to enhance polyp detection rates, it may also lead to a higher number of unnecessary procedures, adding to the burden on endoscopists. Furthermore, the occurrence of false-positive activations can impact the duration of the procedure. These false alarms can delay the workflow as endoscopists investigate and evaluate each detected area. The presence of frequent false positives may also lead to visual fatigue caused by the continuous display of segmentation boxes, potentially distracting physicians during the examination. The regulatory landscape and reimbursement policies further complicate the integration of CADe systems into clinical practice. Varying regulatory approvals across countries and the lack of consensus on reimbursement to endoscopists pose significant barriers to widespread implementation. This lack of standardization hampers the seamless adoption of AI systems, creating discrepancies in access and utilization. While CAD systems are expected to be particularly beneficial for non-expert endoscopists, over-reliance on AI systems can become problematic. The need for proper training and education to strike a balance between human expertise and AI assistance is crucial. Endoscopists should view AI systems as tools that complement their skills and knowledge, rather than relying solely on automated interpretations.

In conclusion, the integration of AI systems, specifically CAde systems, into clinical practice faces several challenges. These include increased workload, false-positive activations impacting procedure duration, regulatory hurdles, reimbursement disparities, and the risk of over-reliance on AI. Addressing these obstacles through collaborative efforts between healthcare professionals, regulatory bodies, and technology developers is essential for the successful implementation and utilization of AI in endoscopy.

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LGI 6-3

Beyond polyp detection – AI application in characterization of polyps

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It has been proven that early detection, resection, and treatment of pre-cancerous adenomas and early-stage cancers can reduce not only the morbidity but also mortality of colorectal cancer (CRC). Because of the inverse correlation between the incidence of post-colonoscopy CRC (PCCRC) and adenoma detection rate (ADR), it is desirable to use artificial intelligence (AI) to aid in endoscopy without missing flat-type precancerous tumors such as laterally spreading tumor, non-granular type (LST-NG).

At present, three types of AI, ENDOBRAIN, CAD-EYE, WISE-VISION, and EIRL, have been approved by the PMDA in Japan and can detect colorectal tumors (CADE) and assisting in their characterization (CADx).

Although CADE¹ may lead to cost reduction in the long term by reducing PCCRC,² there is concern that in the short term, costs will increase with increased polypectomy and shorter endoscopic surveillance intervals.

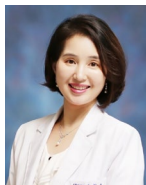
On the other hand, for CADx,³ it is possible to diagnose non-neoplastic lesions as non-neoplastic with high accuracy, and for non-expert physicians, it is possible to reduce unnecessary polypectomies. In the future, it is expected to be able to diagnose the depth of early cancer and even predict metastasis.

In this presentation, I would like to discuss the process of AI development in Japan, its usefulness in clinical practice, and future challenges.

Keywords: Adenoma detection rate (ADR), Post colonoscopy colorectal cancer (PCCRC), Detection, Characterization, Artificial intelligence (AI)

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LGI 6-4

AI development for application in capsule endoscopy

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Introduction

Capsule endoscopy (CE) is a preferred diagnostic method for analyzing small bowel disease. CE requires tedious review time and to increase the accuracy of medical examinations, artificial intelligence (AI) for computer-aided diagnosis has been developed.¹ Therefore, there is growing interest regarding the application of AI in CE. The computational analysis of CE images can help detect lesions more accurately within a shorter time. Deep learning-based approaches have been applied to many areas, showing greatly improved performance, especially for image-based recognition and classification. Here, we review deep learning-based applications for CE and illustrate state of the art AI in the field of CE.

Deep learning-based computer-aided diagnosis

The computer-aided decision support system (CADSS) has been researched extensively and the endoscopes have been able to take digital pictures since the early 2000s.² CADSS has been designed to improve diagnostic accuracy by classifying abnormalities. Based on AI, specifically computer vision and machine learning methodologies, various computational methods are used including algorithms for detecting hemorrhage and lesions, reducing review time, localizing capsules or lesions, and enhancing video quality. It has been proposed to improve efficiency and diagnostic accuracy.³ Most computer vision and machine learning problems have been approached using deep learning.

Lesion detection and classification for CE

Deep learning-based lesion detection and classification methods for screening colonoscopy were presented in 2018.⁴ Several methods based on deep learning have been proposed for CE including localization, scene classification, bleeding, polyp, and various lesions.¹ For detecting bleeding or hemorrhaging, deep learning-based approaches have demonstrated 99.9% accuracy for 2,850 positive images⁵ and 100% accuracy for 390 positive images.⁶ The sensitivity is over 99%. Because the color cue of hemorrhages is obvious, the accuracy and sensitivity are much higher than those for classifying problems of digestive organs.⁷ Although recent applications based on deep learning have shown better performance than previous applications based on handcrafted features,^{7,8} there are contrary cases in which the method of handcrafted features was better for other problems.⁹

Conclusions

Here, we reviewed recent deep learning-based approaches for CE that have been applied to various problems such as scene classification and the detection of bleeding/hemorrhage, polyp, and so on. The introduction of deep learning to computer vision has resulted in the outstanding improvement of lesion recognition.¹⁰ Because collecting databases for CE is difficult, more effective and generalized methods with the cooperation of many physicians and AI engineers are needed. Several research topics for CE remain, such as capsule localization, image enhancement, and reducing review time.

Keywords: Artificial intelligence, Capsule endoscopy

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PB 5-1

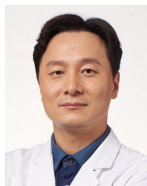
Best stents and accessories for EUS-guided biliary drainage (HGS & CDS)

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EUS-guided biliary drainage (EUS-BD) is increasingly utilized as primary or rescue biliary drainage technique both for malignant and benign biliary processes. However, dedicated devices are still lacking for EUS-BD, and technical failure or serious adverse event can occur. The common steps for EUS-BD are pre-procedure planning, visualization, puncture, guidewire insertion, tract dilation and drainage placement. There is a possibility of technical failure at each step, and in addition to the expertise and experiences of endosonographers, appropriate device selection is essential for successful EUS-BD without adverse events. Ideal device and stent selection may differ according to the indication and goal of EUS-BD. In this lecture, technical tips and pitfalls of EUS-BD using currently available devices will be discussed, as well as stent selection for EUS-BD.

Keywords: Endoscopic ultrasound, Biliary drainage, Stents



PB 5-2

Best stents and accessories for EUS-guided gallbladder drainage

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Introduction

Endoscopic ultrasound (EUS)-guided gallbladder (GB) drainage is potentially disruptive technologies as the alternatives to invasive surgery; thus, the therapeutic strategies are undoubtedly undergoing a paradigm shift toward the minimally invasive treatments, although a number of devices and techniques are being developed for easier and safer procedures. In fact, recent innovations such as the lumen-apposing metal stents (LAMSs) designed specifically for an EUS-guided intervention with bidirectional anchoring flanges have improved results in patients who need drainage.^{1,2} Furthermore, EUS-guided GB drainage using the LAMS or dedicated SEMs with bidirectional anti-migratory flanges is not only safe and reliable for acute cholecystitis, but it also improves the quality of life in patients who are barely suitable for surgical treatment.³⁻⁵ The field of dedicated stents for interventional EUS is rapidly advancing with an increasing number of innovative and refined techniques. This review focuses on the advantages and disadvantages of the currently available stents and suitable selection of a specific stent including plastic stent (**Figure 1**), SEMs (**Figure 2**), and LAMS (**Figure 3**) for EUS-guided GB drainage.

Stent for EUS-guided GB drainage

EUS-guided GB drainage can be performed using either a transgastric or transduodenal approach. It is important to identify an approach achieving close anatomical apposition between the GB neck as the target point and the gastrointestinal tract (stomach or duodenum) and maintain a stable echoendoscope position for the safe placement of the stent.^{6,7} To date, there is a lack of evidence to support the advantages and disadvantages of either approach. In general, the duodenum is a suitable puncture site because it is located in the retroperitoneum and has close proximity to the GB neck for stable tract formation, while the stomach has a long distance from the GB neck and frequent peristaltic movements that can lead to outward or inward stent migration into the GB with subsequent bleeding and recurrent cholecystitis.^{8,9} Only in cases of potential candidates for subsequent cholecystectomy, the transgastric approach can be the preferable option because of the easier closure of the gastric wall defect by surgeons during cholecystectomy than duodenal closure despite a higher rate of AEs.¹⁰

1. Use of the plastic stent

In the early days, EUS-guided GB drainage was performed using plastic stents, similar to EUS-guided PFC or BD drainage (**Figure 4**).¹¹ However, a tamponade effect by the hepatic parenchyma cannot be

expected with EUS-guided GB drainage, which is seen with EUS-guided HGS, because the interspace between the GB and stomach/duodenum is the free space of the peritoneum. Therefore, bile leakage can occur along the fistula beside the plastic stent.¹² However, Jang et al. reported that no bile leakage or peritonitis occurred in patients who underwent EUS-guided GB drainage using a 5-Fr naso-biliary drainage tube. They assumed that bile leakage through the puncture site can be prevented by the adherence of an inflamed GB wall to adjacent structures. In addition, the patency of the plastic stent is relatively shorter than that of the SEMS. Despite several limitations, the use of a plastic stent can be a reasonable option if the patient is likely to consider potentially sequential cholecystectomy in the future. In the same study³, they demonstrated that laparoscopic cholecystectomy was successfully conducted in 23 (79.3%) of 29 patients who underwent EUS-guided GB drainage and only two patients required conversion to open cholecystectomy. The authors concluded that EUS-guided GB drainage does not result in significant adhesions or inflammation impedimental for cholecystectomy between the GB and duodenum. Therefore, laparoscopic cholecystectomy can be safely performed even in patients undergoing EUS-guided GB drainage without technical difficulty.

2. Use of the SEMS

As mentioned earlier in EUS-guided PFC drainage, the SEMS has the theoretical advantage of a larger diameter even in EUS-guided GB drainage compared with plastic stents for patients unfit for surgical cholecystectomy. First, it can prevent bile leakage between the stent and fistula tract of the GB wall by self-expanding radial force, although small amounts of bile juice can leak during tract dilation before stent deployment. Clinically, therefore, the risk of bile peritonitis can be decreased.¹³ With the same mechanism, the use of the SEMS provides a tamponade effect enabling spontaneous hemostasis by the stent itself.³ Second, the SEMS can be withdrawn and recaptured if the outer sheath of the delivery system is not pulled until the red marker as the maximal limit point permitting reconfiguration. Thus, the endoscopist can easily readjust the stent position when stent mispositioning is expected before full deployment. Third, it has a larger diameter, which can prevent frequent clogging by food materials or sludge in the GB and thus promote longer stent patency. However, the conventional tubular SEMS without anti-migratory flanges is associated with a higher risk of stent migration and even bile leakage/peritonitis due to technical difficulty in achieving appropriate positioning during deployment.³ To overcome stent migration, the modified tubular SEMS with anti-migratory flanges was introduced by Lee et al.⁵ This stent (BONA-AL Stent; Standard Sci Tech Inc., Seoul, Korea) was a PCSEMS containing a nitinol wire covered with a silicone membrane (**Figure 5**). The stents were 10 mm in diameter and 4–7 cm in length with enlarging the flares (22-mm external diameter), building 90° angulation. In previous studies^{14,15}, no patient actually experienced bile leakage and peritonitis. As another technique for preventing stent migration, several studies recommended the combination insertion of the DPPS within the SEMS because the DPPS remains in the GB if the SEMS is migrated and the maintained fistula can allow revision.^{3,16} In a recent systematic review¹² regarding clinical outcomes according to the stent type in EUS-guided GB drainage, the overall rate of AEs was lower in the SEMS than in the plastic stent; thus, it can be preferable for preventing procedure-related AEs in patients who are not likely to undergo future cholecystectomy.

3. Use of the LAMS

As mentioned earlier, the LAMS has been specially designed for procedures such as drainage or

fistula formation, including PFC drainage¹⁷, BD drainage (especially in EUS-guided CDS)¹⁸, and creation of entero-enteric anastomosis¹⁹. In terms of EUS-guided GB drainage, the theoretical advantage of the LAMS over the plastic stent or tubular SEMS is the ability to appose the GB wall tightly to the intestinal wall, which can prevent potential bile leakage by the sealing-off effect and inner or outer stent migration (**Figure 6**).²⁰ Furthermore, it has a larger diameter, which can allow better efficacy of drainage. In a recent report²¹, the LAMS can be used for various transluminal interventions for intra-cholecystic pathologies such as peroral cholecystoscopy using a magnifying endoscope or confocal endomicroscopy. In addition, interventional cholecystoscopy can be useful for GB stone removal with holmium laser lithotripsy.

In stent selection, physicians determine the diameter and length of the LAMS based on the anatomical position of the GB related to the duodenum/stomach, GB wall thickness or stiffness, or size of GB stones.⁶ Despite the improvement and increasing use of the LAMS, several studies demonstrated that the additional insertion of the plastic stent or tubular SEMS within the LAMS could be useful for the prevention of stent occlusion or migration^{22, 23}, particularly in patients in whom it is intended to remain in situ indefinitely. A recent systematic review reported that the pooled technical and clinical success rates of the LAMS were 95.2% and 96.7%, respectively. In terms of AEs, the rates of recurrence of cholecystitis, bleeding, and stent migration were acceptable as 5.1%, 2.6%, and 1.1%, respectively. **Table 1** showed a summary for an overview of the possibilities, pros and cons of each stent for EUS-guided GB drainage.

Conclusion

The EUS-guided intervention, including the drainage procedure as a minimally invasive treatment modality, has been better utilized in an extended variety of clinical situations beyond its traditional application in simple PFC drainage. Despite the improvements made to various stents, selecting the optimal stent in a specific intervention for adequate drainage remains clinically challenging. Therefore, when performing EUS-guided drainage, it is important to consider the stent's characteristics, anatomical properties of the target lesions, and potential stent-related AEs. Moreover, the stents available on the market have shown great adaptability; however, further research on the new developments of dedicated stents are needed, which can increase the scope of their utilization and maximize the suitability for customized strategies of specific EUS-guided drainage.

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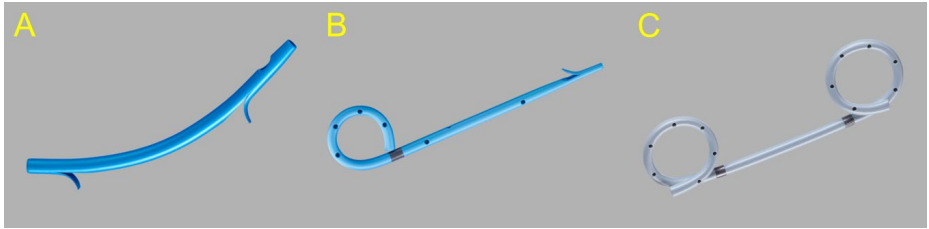


Figure 1. Plastic stents are made of polyethylene or Teflon and are available in varying size, shapes and length for endoscopic ultrasound-guided drainage (A) Straight “Amsterdam” type stent. (B) Double pigtail configurations help anchor the stent to prevent bidirectional migration. (C) Single pigtail configurations help anchor the stent to prevent inward migration.

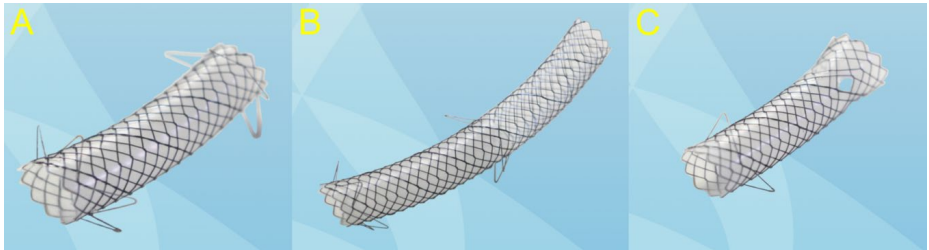


Figure 2. Various metal stents are available in varying size, shapes and length for endoscopic ultrasound (EUS)-guided drainage (A) Fully covered self-expandable metal stent with bidirectional antimigrating flanges for transmural cyst drainage. (B) Partially covered self-expandable metal stent with bidirectional antimigrating flanges for EUS-guided bile duct drainage. (C) Fully covered self-expandable metal stent with unidirectional antimigrating flanges for transmural cyst drainage.

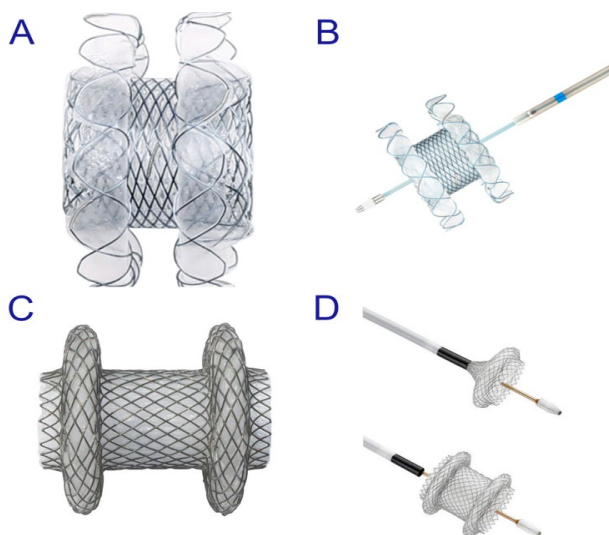


Figure 3. Lumen-apposing metal stents (LAMs) are large in diameter facilitating both drainage and access to extraluminal structures and can appose two nonadherent structures, likely minimizing the risk of migration and leakage. Hot SPAXUS™ fully deployed (A) and with electrocautery enhanced delivery system (B). Hot AXIOS™ fully deployed (C) and with electrocautery enhanced delivery system (D).

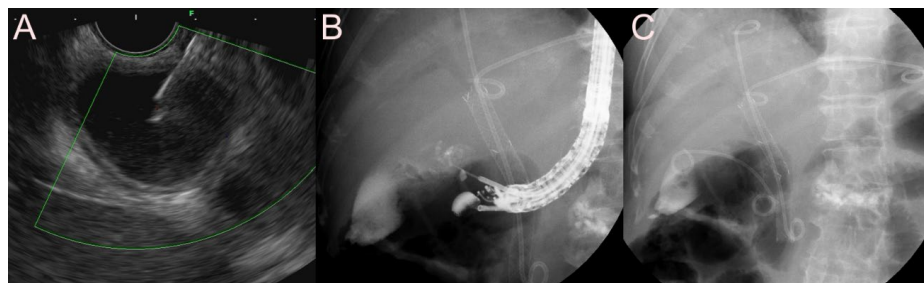


Figure 4. Endoscopic ultrasound-guided gallbladder (GB) drainage using the 7-Fr double-pigtail plastic stent (DPPS) for obstructive cholecystitis after biliary stent placement. (A) Endosonographic images showing a markedly dilated GB with large amounts of sludge and heterogeneous debris. (B) Fluoroscopic images showing a 19-gauge needle puncture into the GB neck portion. (C) Fluoroscopic images showing the 7-Fr DPPS placed between the duodenum and GB.

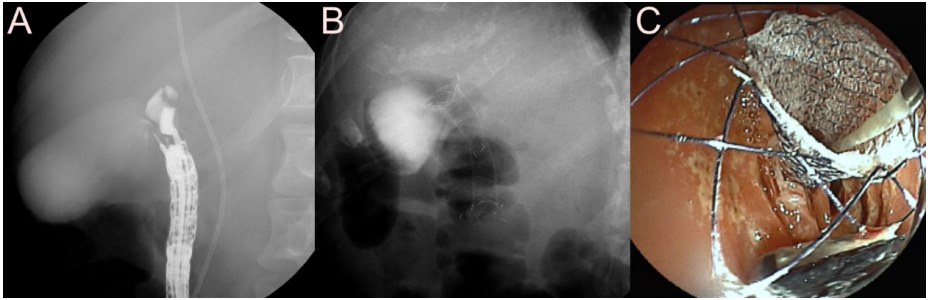


Figure 5. Endoscopic ultrasound-guided gallbladder (GB) drainage using the dedicated bi-flanged fully covered self-expandable metal stent (FCSEMS) (BONA-AL Stent; Standard Sci Tech Inc., Seoul, Korea) for cholecystitis. (A) The GB is punctured using a 19-gauge needle, and the contrast medium is injected. (B) Fluoroscopic images showing the dedicated bi-flanged FCSEMS placed between the duodenum and GB. (C) Endoscopic images showing the drainage of pus-like materials through the dedicated bi-flanged FCSEMS.

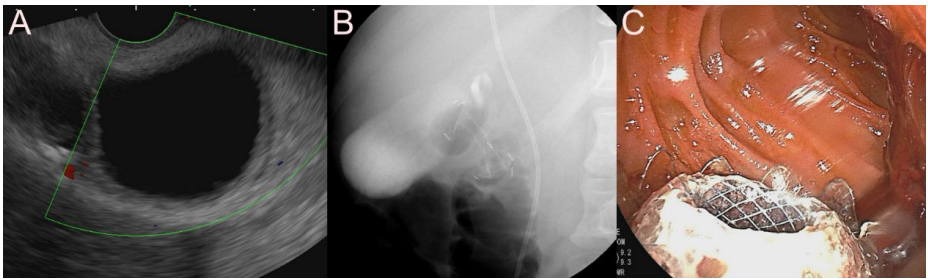


Figure 6. Endoscopic ultrasound-guided gallbladder (GB) drainage using the dedicated bi-flanged lumen-apposing metal stent (LAMS) (Niti-S SPAXUS; Taewoong Medical Co., Ltd, Ilsan, South Korea) for cholecystitis. (A) Endosonographic images showing a markedly dilated GB with large amounts of sludge and heterogeneous debris. (B) Fluoroscopic images showing the dedicated bi-flanged LAMS between the duodenum and GB (distal flange of the LAMS deployed within the GB lumen). (C) Endoscopic images showing the drainage of pus-like materials through the dedicated bi-flanged LAMS in EUS-guided GB drainage (proximal flange of the LAMS in the duodenal bulb).

Table 1. Comparisons for characteristics of each stent for EUS-guided GB drainage

	Possible subtype	Advantages	Disadvantages
Plastic stent	- Double-pigtail configuration	- Cheap - Easy to revision - Free from stent shortening	- Frequent stent occlusion - Rare but possible leakage
FCSEMS	- FCSEMS with anti-migrating flanges (bidirectional)	- Longer stent patency than plastic stent - Theoretically less leakage	- Expensive - Stent malposition or migration
LAMS	- LAMS with bidirectional anchoring flanges - LAMS with or without electrocautery enhanced tip	- Largest diameter - Longer stent patency - Possible for creation of fistula - Rare adverse events of migration	- Too expensive - Rare adverse events of bleeding or buried LAMS syndrome



PB 5-3

Best stents and accessories for EUS-guided pancreatic duct drainage

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Pancreatic duct drainage (PD) is mainly indicated for pancreatic duct obstruction, stricture, or disruption such as that caused by symptomatic chronic pancreatitis. Most of these conditions can be treated under endoscopic retrograde cholangiopancreatography (ERCP) guidance. Among them, however, ERCP sometimes fails due to various factors. Alternative approaches such as surgery or percutaneous pancreatic duct drainage can be considered. However, surgery is too invasive for patients who have other organs that have failed or advanced malignant tumors. Also, percutaneous access has several disadvantages such as external drainage, risk of pancreatic juice leakage, and cosmetic issues. Recently, endoscopic ultrasound (EUS)-guided pancreatic access has emerged as an alternative method. According to recent studies, rates of technical and clinical success ranged from 63% to 100% and from 76% to 100%, respectively. In contrast, the rate of procedure-related adverse events was high at 26.7% (89/334). The most frequent adverse events comprised abdominal pain (n=38), acute pancreatitis (n=15), bleeding (n=9), and issues associated with pancreatic juice leakage such as perigastric fluid, pancreatic fluid collection, or pancreatic juice leaks (n=8). However, various devices and techniques are improved, therefore, technical success rate of each steps such as pancreatic duct puncture, guidewire insertion, tract dilation, and stent deployment, may be improved. In this lecture, I would like to described techniques and device selection.

Keywords: EUS-PD, EUS, EUS-guided pancreatic duct drainage, Pancreas, Drainage



PB 5-4

Best stents and accessories for EUS-guided drainage of pseudocyst/WON

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Effective management of acute pancreatitis (AP) is crucial due to its high mortality rate, which can reach up to 30% in severe cases. The 2012 revision of the Atlanta Classification of acute pancreatitis has highlighted the importance of pancreatic fluid collections (PFCs), which are classified into four categories: acute peripancreatic fluid collection, pancreatic pseudocyst, acute necrotic collection, and walled-off necrosis (WON), depending on the period and pattern of PFCs associated with AP.

Guidelines recommend drainage of all infected pseudocysts that fail to respond to conservative management alone. Recommendations for intervention include symptomatic PFCs, PFC-related infection, bleeding, luminal obstruction, fistulization, biliary obstruction, rapid fluid accumulation or pseudocyst on serial imaging, new onset of symptoms in pseudocysts of any size, and WON. In patients with proven or suspected infected necrotizing pancreatitis, invasive intervention should be delayed by at least four weeks after initial presentation to allow the collection to become walled-off.

EUS-guided drainage has become the most essential treatment method for pseudocysts/WON. The selection of appropriate devices and stents is crucial for successful EUS-guided drainage, and the technical steps are divided into four stages: puncture of the GI lumen and pseudocyst/WON, insertion of a guided guidewire, dilatation of the fistula tract, and insertion of a stent. While plastic stents and FCSEMS were primarily used in the past, the introduction of a lumen-apposing metal stent mounted on a cautery-tipped delivery system has significantly shortened the technical process of EUS-guided drainage.

In this lecture, I will introduce and summarize the best stents and accessories for EUS-guided drainage of pseudocyst/WON.

Keywords: Endosonography-guided drainage, Devices, Stenting, Pseudocyst, Walled-off necrosis



PB 6-1

Early detection of pancreatic cancer by EUS

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Endoscopic ultrasound (EUS) has a high resolution and is superior to CT in the diagnosis of small pancreatic ductal adenocarcinoma (PDAC). As a result, the use of EUS for the early detection of PDAC has attracted attention. This study aimed to identify the clinical and radiological characteristics of patients with PDAC diagnosed by EUS but not found on CT.

From January 2003 to April 2019, we reviewed the medical records of patients diagnosed with PDAC in 12 tertiary referral centers in Korea. This study included patients with pancreatic masses not clearly observed on CT but identified on EUS. We analyzed the clinical characteristics and radiological features of the patients, and survival analysis was performed.

A total of 83 patients were enrolled. The most common abnormal CT findings other than definite mass was pancreatic duct dilatation, which was identified in 61 patients (73.5%). All but 4 patients underwent surgery. The final pathologic stages were as follows: IA (n=31, 39.2%), IB (n=8, 10.1%), IIA (n=20, 25.3%), IIB (n=17, 21.5%), III (n=2, 2.5%), and IV (n=1, 1.4%). The 5-year survival rate of these patients was 50.6% (95% CI: 38.2–66.9%). Elevated liver function test and R1 resection emerged as significant predictor of mortality in the multivariable Cox regression analysis.

This multicenter study demonstrated the favorable long-term prognosis of patients with PDAC diagnosed by EUS but indeterminate on CT. EUS should be considered for patients with suspected PDAC but with indeterminate CT findings.

Keywords: Pancreas cancer, Endoscopic ultrasound, Diagnosis



PB 6-2

Early detection of pancreatic cancer by ERCP

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Early diagnosis of pancreatic ductal adenocarcinoma (PDAC) is essential for improving prognosis; however, diagnosing PDAC at an early stage is challenging. In patients with localized high-grade pancreatic intraepithelial neoplasia (HG-PanIN), whose tumorous lesion is undetectable on cross-sectional images such as computed tomography or magnetic resonance image, longterm survival is expected. Pancreatic cystic lesions or main pancreatic duct (MPD) dilatation are important indirect findings for the initial diagnosis of HG-PanIN. Magnetic resonance cholangiopancreatography (MRCP) and endoscopic ultrasound (EUS) should play important roles in detecting abnormal image findings, such as local irregular MPD stenosis, caliber MPD changes, small cystic lesions, or branch duct dilatation.

Additionally, EUS could detect hypoechoic areas around the MPD stenosis in some patients with HG-PanIN. Subsequently, endoscopic retrograde cholangiopancreatography (ERCP) and its associated pancreatic juice cytology, including serial pancreatic juice aspiration cytologic examination (SPACE) after placement of an endoscopic nasopancreatic drainage (ENPD) tube, may have high diagnostic accuracy for confirming the malignancy in HG-PanIN. Although ERCP and its associated pancreatic cytology, including SPACE, may be associated with post-ERCP pancreatitis (PEP), a recent randomized trial suggested that a 4-Fr ENPD tube may reduce the incidence of PEP. In the future, further prospective multicenter studies are required to establish a standard method of SPACE. Additionally, further studies for novel biomarkers could help to establish evolutionary methods with duodenal fluid and pancreatic juice for the early and accurate diagnosis of early-stage PDAC.

Keywords: ERCP, Early diagnosis, Pancreatic cancer, Space, Cytology



PB 6-3

Surveillance of pancreatic cystic neoplasm

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Pancreatic cystic lesions with neoplastic potential, primarily intraductal papillary mucinous neoplasms (IPMNs), are found in more than 15% of the adult population. Despite the clinical impact of pancreatic adenocarcinoma (PDAC), screening the average risk population for this cancer is not recommended. However, surveillance of patients with pancreatic cysts is usually pursued given the unique opportunity to either prevent, or at least detect PDAC at an earlier more treatable stage.

Although many surveillance strategies have been proposed, the optimal method is not known. At present all rely primarily on cross sectional imaging and endoscopic ultrasound of the pancreas. Research studies, while numerous, are usually of low quality. It is generally agreed that no current strategy is clearly more clinically and/or cost-effective than another. There is hope that new molecular diagnostic tests, either blood or cyst fluid based may hold more promise. It is also possible that AI-driven radiomic assessment may contribute to better risk stratification in the future.

Recognizing these challenges, the National Cancer Institute (USA) has launched EA2185, a prospective trial that randomizes a total of 4500 participants (ages 18–75y with one or more 1cm or greater pancreatic cysts) to one of two accepted surveillance strategies. Two centers in Korea are currently enrolling participants. All participants will provide biosamples and radiology results. It is hoped that this large trial will identify some combination of clinical, biomarker and radiomic factors that accurately predict malignant transformation so that treatment can be targeted more effectively for this common clinical problem.



PB 6-4

Evaluation of premalignant biliary lesions

Jae Hee Cho

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Introduction

Early detection and diagnosis are essential for timely intervention and improved patient outcomes of biliary tract cancers (BTCs). However, endoscopy plays a limited role in evaluating premalignant biliary lesions that can progress to BTCs such as cholangiocarcinoma (CCA) and gallbladder cancers.

To date, endoscopic retrograde cholangiopancreatography (ERCP) with cholangioscopy, brush cytology, and fluorescent in situ hybridization (FISH) are commonly used tools in the early diagnosis of BTC, especially in patients with primary sclerosing cholangitis (PSC). Recent advances in endoscopy include peroral cholangioscopy, such as “Spyglass®,” which allows biopsies to be performed by visualizing and directly viewing the bile ducts.

MRI and EUS are currently preferred modalities for pancreatobiliary disease due to their high sensitivity for detecting pancreas lesions and low risk profile. In terms of EUS, it is considered the most sensitive method for detecting early neoplasia in the pancreatobiliary tract. EUS can detect lesions as small as 2-3mm and differentiate between solid vs. cystic nature of lesions. Furthermore, EUS-guided fine-needle aspiration/biopsy may play an important role in further defining detected lesions. However, imaging of premalignant lesions such as biliary intraepithelial neoplasia (BillIN) is practically impossible. It can be used to identify papillary lesions of IPN-B. Therefore, endoscopy for screening purposes of premalignant lesions is very limited, and it is necessary to apply selective imaging evaluations targeting high-risk groups such as congenital anomalies of the bile duct, gallbladder polyp, and PSC.

Cholangiocarcinoma (CCA)

There are three known precursors to invasive CCA: Intraductal papillary neoplasm of bile duct (IPNB), the rare intraductal tubulopapillary neoplasm of bile duct (ITPN), and the much more common biliary intraepithelial neoplasia (BillIN). Conversion from normal to malignant bile epithelium through one of these precursor lesions probably requires a stepwise accumulation of successive genetic abnormalities. The term BillIN applies to microscopic flat or low-papillary dysplastic epithelium and occurs more often in hepatolithiasis, choledochal cysts, and primary sclerosing cholangitis. BillIN is classified into three grades based on the degree of cytologic and structural atypia: BillIN-1 (low-grade dysplasia), BillIN-2 (intermediate-grade dysplasia), and BillIN-3 (high-grade dysplasia). However, because BillIN can be flat, micropapillary or pseudopapillary, endoscopic diagnosis is very limited. On the other hand, IPNB is characterized by a markedly dilated and cystic biliary system and multifocal papillary

epithelial lesions with or without mucin production. Because IPNB can be differentiated by imaging, it is possible to diagnose using EUS and ERCP/spyglass. But it is not easy to find precancerous lesions because IPNB has a relatively low incidence compared to BillIN.

Gallbladder cancer (GBC)

The fifth edition of the World Health Organization's tumor classification indicates three types of premalignant lesions of the gallbladder: pyloric gland adenoma (PGA), biliary intraepithelial neoplasia (BillIN), and intracholecystic papillary neoplasm (ICPN). Especially, anomalous pancreatobiliary duct union (APBDU) poses a markedly high risk for GBC and CCA. Interestingly, EUS is the most accurate test to delineate GB and predict existing neoplastic GB polypoid lesions. Unlike other CCA, EUS can be useful for diagnosing precancerous lesions of GBC.

Primary sclerosing cholangitis (PSC)

PSC is a chronic immune-mediated liver disease characterized by multifocal inflammatory and fibrotic strictures of the large intra- and extrahepatic bile ducts. In the absence of any effective medical treatment, progressive bile duct disruption leads to cholestasis and hepatic injury with liver transplantation representing the only curative intervention. Because of the high possibility of malignancy in PSC, regular surveillance is necessary. According to the EASL 2022 guideline recommends that surveillance with ultrasound and/or MRI/MRCP for CCA and gallbladder malignancy is proposed at least yearly in patients with large duct disease regardless of disease stage. In terms of endoscopy, ERCP is not recommended for cancer surveillance purposes in people with PSC due to its invasiveness and procedural risks. However, data from Finland suggest that ERCP, especially in advanced extrahepatic PSC, may be beneficial for detecting premalignant or malignant lesions regardless of symptoms. In order to be beneficial, surveillance strategies with ERCP require liver transplantation to be an option in case of dysplasia.

Summary

Early diagnosis of BTCs is very difficult because those seldom exhibit disease-specific symptoms until late in the course of the disease. Furthermore, diagnostic imaging has the shortcoming that it could not accurately find premalignant lesions such as microscopic BillIN during surveillance. However, it is important to identify and develop strategies for early detection of asymptomatic BTCs. Since many efforts are being made to overcome these limitations of BTC early detection, recent advances in understanding pathogenesis and development of diagnosis, including novel endoscopic imaging modality and biomarkers, will help to make BTC early detection a reality.



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SS 2

The GERD treatment: A step forward with “Fexuclue”

Ronnie Fass

Case Western Reserve University, USA

Despite marked improvement in the therapeutic options for GERD during the last 50 years, there are still many areas of unmet need. P-CABs (Potassium – competitive acid blockers), a novel class of anti-secretory drugs, has been shown to have a rapid onset of action, prolonged half-life, and profound acid inhibitory effect as compared with PPIs. Specifically, PCABs reach maximum effect on intra-gastric pH after administration of a single dose. This unique pharmacodynamic characteristic explains many of the observed clinical advantages of P-CABs over PPIs. In addition, it may provide clinical opportunities in areas where PPIs have not performed very well. Regardless, the introduction of -PCABs ushers in a new era which will likely reshape the therapeutic landscape of acid-peptic disorders.

Fexuprazan is a potassium-competitive acid blocker that inhibits acid secretion in a dose-dependent manner. The drug can suppress acid production similar or to a greater extent than vonoprazan. In a phase 1 clinical trial, Fuxaprazan showed rapid and sustained suppression of gastric acid secretion with intragastric pH maintained above 4 for 24 h after single and multiple dosing. The gastric holding time pH > 4 after 80 mg and 160 mg of Fuxaprazan was $80.5 \pm 8.4\%$ and $91.3 \pm 4.1\%$, respectively. The drug reached Cmax after 1–4 h, AUC > 1000 $\mu\text{g}\cdot\text{h}/\text{L}$ and half-life (T_{1/2}) of 9 h. The drug was safe and well tolerated. The serum gastrin level was lower than that of vonoprazan and returned to normal range 48 hours after drug cessation. No hepatotoxicity was observed. Fexuprazan administration is independent of a meal, the drug is primarily metabolized by CYP3A4 and thus demonstrates very little drug to drug interactions.

Clinically, fexuprazan has been shown to be effective in GERD. In a randomized, active-controlled, double-blind study, fexuprazan 40mg was compared to esomeprazole 40mg once daily in patients with erosive esophagitis. Fexuprazan was non-inferior to esomeprazole regarding the healing rate at week 8 (99.1% vs 99.1%, respectively). There were no between-group differences in the Erosive esophagitis healing rate at week 4 (90.3% vs 88.5%, respectively), symptom responses, and quality of life assessments. Additionally, serum gastrin levels at weeks 4 and 8 and drug-related side effects did not significantly differ between the groups.

In addition to the traditional indications for GERD, P-CABs may be considered for non-continuous therapies of GERD, as a test to diagnose GERD (P-CAB test), nighttime GERD and atypical/extra esophageal manifestations of GERD

Keywords:



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LS 3

Latest advancement in UGI endoscopy

Kohei Takizawa

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Introduction

Gastrointestinal endoscopy plays a crucial role in the detection, characterization, and treatment of gastrointestinal disorders. In this presentation, we will explore the groundbreaking advancements offered by the Olympus EVIS X1 endoscopy system, which aims to revolutionize the field of UGI endoscopy.

1. Texture and Color Enhancement Imaging (TXI):

Early detection is vital for cancer prevention, but precursor lesions can be easily overlooked. TXI technology enhances the visibility of potentially suspicious tissue, including inflammations, flat or depressed lesions. By utilizing a white-light imaging effect, TXI improves color, structure, and brightness by splitting and enhancing the incoming image before merging it back together. Additional color enhancements define subtle tissue differences. The goal of TXI is to improve lesion visibility, particularly for challenging lesions, and contribute to higher detection rates.

2. Red Dichromatic Imaging (RDI):

Gastrointestinal bleeding presents a serious challenge with significant mortality rates and high management costs. Preventing complications is of utmost importance. RDI enhances the visibility of deep blood vessels and bleeding sources. It employs specific green, amber, and red wavelengths. The red and amber wavelengths penetrate deep into the mucosa, allowing visualization of deep blood vessels. In cases of acute bleeding, RDI increases the contrast between concentrated and diluted blood, providing a clear visualization of the bleeding point. RDI facilitates fast and accurate identification and localization of bleeding sites, enabling speedier and more reliable hemostasis, thus reducing stress for physicians.

Conclusion

The introduction of the Olympus EVIS X1 brings a range of new, user-friendly technologies to UGI endoscopy, with the aim of improving detection, diagnosis, and treatment outcomes. With features such as TXI and RDI, this cutting-edge system has the potential to revolutionize the field and enhance patient care.

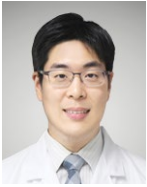


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SD 1-1

감염 전파 사례로 알아보는 내시경 재처리의 중요성
The importance of endoscopic reprocessing in the case of infection transmission

Kwang Hyun Chung

Soonchunhyang University, Korea

Introduction

Endoscopy is a crucial diagnostic and therapeutic tool for digestive diseases. Nevertheless, the gastrointestinal tract harbors numerous microorganisms, which pose a constant risk of infection to both patients and medical personnel performing endoscopic procedures. Therefore, the use of appropriate infection control measures during endoscopy is imperative to prevent infection transmission.

Transmission of infection in endoscopy room

Transmission of infections in the endoscopy room may occur through various way. Contaminated endoscopic equipment, intravenous fluids, injection drugs, and the general environment of the examination room can be a source of infection to both patients and medical staffs. The frequency of endoscopy-related infections is estimated to be 1 case per 270,000 to 1.8 million of endoscopic procedure, but it is difficult to estimate true incidence of endoscopy related infection because the actual frequency is very low, and even with infection, symptoms often do not appear within a short period of time, and it is not easy to prove a correlation with endoscopy even if overt infection is present. Various bacteria, such as *Salmonella* spp. and *Pseudomonas aeruginosa*, as well as viruses, fungi, parasites, and prion diseases, can be transmitted with endoscopy. Since the *Bacillus* and *Clostridium* species that form spores can survive for a long time in the endoscopy room, not only reprocessing but also environmental disinfection are important. In recently published papers, drug-resistant bacteria such as carbapenem-resistant *Klebsiella pneumoniae*, Extended-spectrum beta-lactamases producing *Klebsiella pneumoniae*, and AmpC beta-lactamase-producing *E.coli* are the main pathogens.

Reprocessing of endoscope

Endoscope-related transmission of infection is mostly associated with inappropriate endoscope reprocessing and can be prevented through a thorough reprocessing process. It is necessary to comply with the endoscope reprocessing guidelines and thoroughly educate and manage endoscope reprocessing personnels, and especially perform the manual cleaning process well. In addition, when an endoscope device is regularly inspected and when an automatic endoscope reprocessor is used, disinfection and maintenance of the automatic endoscope reprocessor are also important.

Summary

In endoscopic procedures and endoscopy room environments, there is always a risk of transmission of infection, and infections caused by various microorganisms have been reported. To prevent this, proper environmental management and endoscope reprocessing are essential.

Keywords: Endoscope reprocessing, Infection transmission, Micro-organism, Prevention



SD 1-2

국내외 내시경 재처리 가이드라인 리뷰

Review of domestic and foreign endoscopy reprocessing guidelines

Hyun Ho Choi

The Catholic University of Korea, Korea

Endoscopy is a widely used procedure worldwide for the diagnosis, treatment, and screening of gastrointestinal diseases, which allows for early detection and treatment of malignant gastrointestinal diseases. However, incompletely cleaned and disinfected endoscope retains pathogens occasionally transmitted to other patients during endoscopic procedures. Therefore, a reliable endoscope reprocessing procedure is crucial for safe gastrointestinal endoscopy. Practical guidelines for reprocessing gastrointestinal endoscopes should be universally applicable and effective in preventing the spread of pathogens when followed.

Several countries have established guidelines for endoscope reprocessing to prevent infections, which have been continuously revised over time. In Korea, the Korean Society of Gastrointestinal Endoscopy (KSGE) first presented endoscope reprocessing guidelines in 1995 and recently published the fourth revised edition in 2020. This revision was intended to be a comprehensive guideline. It reflects changes in the medical environment and incorporates the expertise of relevant academic societies and working groups. It covers not only cleaning and disinfection but also the management of in-hospital infections and endoscope-transmitted infectious diseases. The guideline encompasses healthcare personnel education, knowledge related to reprocessing and infections, as well as practical skills and instructions in the field.

The reprocessing procedure involves six stages: pre-cleaning, cleaning, disinfection, rinsing, drying, and storage. Different organizational guidelines for reprocessing GI endoscopes are similar but may include subtle differences. It is essential to follow the recommendations for each step of the reprocessing process to minimize the risk of endoscopy-related infection transmission.

Keywords: Endoscopy, Reprocessing, Guideline



SD 1-3

고수준 소독제 최신 업데이트 High-level disinfectant latest update

Jaeyoung Chun

Yonsei University, Korea

소화관 내시경은 재사용 의료 기구로서 환자에게 사용하기 전에 적절한 내시경 재처리 과정을 거쳐야 한다. 소화관 내시경 재처리 과정에서는 높은 수준의 소독이 권장된다. 고수준 소독이란, 물체의 표면에 있는 모든 미생물(결핵균을 포함한 세균과 바이러스)과 일부 세균의 아포를 사멸하는 것이다.

고수준 소독제는 화학적 살균제의 일종으로 내시경의 표면에서 모든 병원성 미생물을 불활성화하는 역할을 한다. 고수준 소독제는 식품의약품안전처에서 소화기내시경 소독용으로 신고·허가 받은 것과 보건복지부의 고시기준에 합당한 것을 사용해야 한다. 재사용하는 소독제는 유효 농도가 적정하게 유지되는지 확인해야 한다. 식약처 신고 및 허가 여부는 식품의약품안전처에서 운영하는 의약품 통합정보시스템 '의약품안전나라' 누리집 (<https://nedrug.mfds.go.kr>)에서 확인할 수 있다. 현재 2% 이상의 글루탈데하이드, 0.55% 이상의 올소-프탈데하이드, 7.5% 이상의 과산화수소, 0.2% 이상의 과초산 (또는 과산화수소와 과초산 혼합물), 그리고 전해살균수 등이 일반적으로 사용되고 있다.

의료기관마다 검사 환경이 다르므로, 고수준 소독제의 특성을 고려하여 선택하고 제조사의 사용 방법을 준수하면서 반드시 적절한 보호장구와 환기 시설 하에 안전하게 취급해야 한다.

Keywords: Disinfectant, Disinfection, Reprocessing



SD 1-4

올바른 내시경 세척소독 및 관리
Proper endoscope cleaning, disinfection and management

Hwi Jung Kim

CHA Bundang Hospital, Korea

1. 내시경의 구조
2. 내시경의 기능과 원리
3. 세척 소독 전 준비
4. 내시경 세척 소독
5. 내시경 부속 기구 소독

Keywords: Endoscope cleaning, Disinfection, Management



SD 2-1

심폐 유발증

Cardiopulmonary adverse events

Jun Kyu Lee

Dongguk University, Korea

Sedation, defined as the depressed level of consciousness induced by administration of drugs, is used widely for gastrointestinal endoscopy to relieve a patient's anxiety and discomfort. In addition, a successful procedure is anticipated with control of unintended movement. Endoscopic sedation, however, cannot be free from the risk of serious adverse events (AEs), e.g. cardiopulmonary compromise or cerebrovascular accident. Therefore, principles for personnel, facility and equipment, as well as performance itself, should be followed to minimize risks. In this lecture, the clinical characteristics of those AEs in South Korea would be described and proper measures for prevention and management would be discussed.

Keywords: Endoscopic sedation, Adverse event, Cardiopulmonary

Table 1. Types of cardiopulmonary adverse events related with endoscopic sedation (adapted from Vargo JJ 2nd. Sedation-related complications in gastrointestinal endoscopy. *Gastrointest Endosc Clin N Am.* 2015 ;25(1):147-158)

Category	Event	Definition
Cardiovascular	Hypotension	Blood pressure <90/50 or a decrease in
	Hypertension	systolic
	Dysrhythmia	pressure of 20% of baseline
	Cardiopulmonary arrest	Blood pressure >190/30 or increase in
	Myocardial infarction	systolic
	Cerebral vascular event	blood pressure >20%
Pulmonary	Hypoxia	SaO ₂ <85%
	Apnea/hypopnea	
	Laryngospasm	
	Bronchospasm	
	Pneumonia	
	Pneumonitis	

Table 2. Risk factors for cardiopulmonary adverse events related with endoscopic sedation (adapted from Vargo JJ 2nd. Sedation-related complications in gastrointestinal endoscopy. *Gastrointest Endosc Clin N Am.* 2015 ;25(1):147-158)

Age
ASA physical classification
Type of anesthesia
Inpatient
Setting (nonuniversity, Veterans Affairs)
Supplemental oxygen
Trainee involvement
Pulmonary disease
Cardiac disease
Obesity



SD 2-2

비심폐 유발증

Understanding and management of non-cardiopulmonary adverse events related with endoscopic sedation

Yehyun Park

Ewha Womans University, Korea

서론

소화기내시경시 시행하는 진정은 약물을 사용해 환자의 의식 수준을 저하시켜 환자의 불안과 불편감을 감소시키고, 검사 동안의 기억을 감소시키며, 검사의 질을 향상시키기 위한 목적으로 사용된다. 그러나 환자마다 진정에 대한 반응은 다르며, 같은 시술을 받더라도 환자마다 필요로 하는 진정의 깊이가 다를 수 있다. 또한, 한 환자가 시술을 받는 동안에도 진정의 깊이가 변할 수 있으므로, 진정 중 환자의 상태를 지속적으로 모니터링하며 의도한 수준의 진정이 유지되고 있는지를 확인하고, 의도보다 깊은 진정이 이루어지는 경우에는 그에 따른 조치를 취하는 것이 진정내시경에 의해 유발될 수 있는 유발증의 예방을 위해 필수적이다.

진정내시경 중 발생할 수 있는 유발증은 크게 심폐 유발증 및 비심폐 유발증으로 나눌 수 있다. 이번 강의에서는 비심폐 유발증의 종류와 특징, 예방과 대처에 대해 살펴보고자 한다.

본론

진정내시경시 발생할 수 있는 비심폐 유발증으로는 구역/구토/흡인, 딸꾹질, 혈당 저하, 알레르기반응, 약물 주입 통증, 불충분한 진정, 근육간대경련, 역설 반응, 치아 손상, 낙상 등이 있다.

1. 구역, 구토, 흡인

1) 특징

진정내시경시 사용하는 진정제, 진통제, 특히 마약성 진통제가 구역과 구토를 유발할 수 있다. 그리고 진정내시경에 사용되는 모든 진정/진통제는 용량 의존적으로 기도 반사를 억제시켜 시술 중 흡인의 가능성을 증가시킬 수 있다. 내시경 시행 도중의 흡인은 상부 위내시경에서 0.19%, 대장 내시경에서 0.1-0.16% 정도의 빈도로 보고되고 있고 흡인에 의한 사망률은 대략 2.73% 정도로 보고되고 있다.

2) 위험 인자

진정내시경시 구역과 구토는 많은 경우 환자가 충분히 진정되지 않았기 때문에 발생한다. 흡인은 위에 액체나 음식물이 남아 있는 경우 위험이 증가하고 심한 경우에는 흡인성 폐렴으로 이어질 수 있으므로 주의를 요한다. 이 외에 흡인의 위험 인자로는 인후두 마취, 진정제의 사용, 고령(65세 이상), 혈액 투석, 30분 이상의 시술, 뇌경색, 식도 폐쇄, 식도 운동장애, 위출구폐쇄, 상부위장관출혈로 인한 내시경이거나 PEG, ESD 등의 시술 등이 있다.

3) 예방

충분한 금식을 시행하는 것이 중요하다. 위 절제 수술을 받았거나 악성 위출구 폐쇄가 있는 환자에서는 금식을 해

도 음식이 위에 남아 있는 경우가 있고, 토혈이나 흑색변으로 응급 내시경을 시행하는 경우에는 충분한 금식이 되어 있지 않은 상태에서 검사를 시행하게 될 수 있어 흡인 가능성에 대해 특히 유의하고 설명 및 동의서가 필요하다. 정맥류 출혈이 의심되는 경우 elective endotracheal intubation이 aspiration을 줄인다는 보고도 있어 대량의 출혈이 있으면서 aspiration 우려가 큰 환자에서는 고려해 볼 수도 있다.

타액 분비가 많거나 가래가 많은 경우 흡인 가능성이 높아지므로 검사 시작 전에 가능한 구강내 분비물을 제거하고 내시경 삽입 시에 구강에서 관찰되는 타액과 가래를 충분히 제거한 후 검사를 진행하는 것이 좋다. 흡인의 위험이 있는 환자는 좌측와위보다 약간 앞으로 기울인 자세에서 검사를 진행하는 것이 흡인을 방지하는 데 도움이 된다. 위에 진입시 액체가 많이 고여 있는 것이 관찰된다면 우선적으로 내시경을 통해 최대한 제거하여 위를 비우도록 해야 한다. 검사 중에 물을 뿌리는 행위는 가능한 적게하고 시술 중간중간에 및 시술 후 내시경의 회수 시에도 가능한 위내에 저류된 액체를 제거해주는 것이 좋다.

검사 후에는 바로 구강내 분비물 제거 후 반좌위(semi-Fowler position)를 취하도록 하며 회복실에서 진정 후 회복이 통상적인 경우보다 길어지는 경우 사용된 진정제의 길항제가 있다면 투여를 고려하며 환자에 대한 주의 깊은 관찰이 필요하다.

4) 대처

흡인이 지속되어 검사가 어려울 경우에는 내시경을 제거하고 suction tube를 통해 액체와 기타 이물질은 제거한 후 환자가 안정이 되면 다시 검사를 진행한다. 흡인이 확인이 된 환자에게는 시술 종료 후 흉부 X-ray를 확인하고 산소포화도를 지속 모니터링하면서 저산소증일 경우 산소의 투여 및 항생제의 투여를 고려해야 한다.

2. 혈당 저하

당뇨병 환자가 검사 전에 당뇨 치료제를 복용하였거나 검사가 오후에 진행되는 경우 발생할 수 있다. 진정이 되면 환자의 저혈당 증상이 간과될 수 있으므로 가능한 검사를 오전에 일찍 시행하고, 저혈당 증상이 의심되면 진정 전에 혈당 검사를 시행하는 것이 필요하다. 때로는 10% 포도당 용액을 투여하면서 검사를 진행하는 것도 고려해 볼 수 있다.

3. 알레르기 반응

상부위장관 내시경 검사 시 인후부를 국소마취시킬 때 사용되는 xylocaine은 그 빈도는 적으나 두드러기와 천식과 같은 알레르기 반응을 일으킬 수 있다. 진정시 사용되는 약제들도 알레르기 반응을 일으킬 수 있으며, 특히 프로포폴을 사용하는 경우 주의해야 한다. 알레르기 반응의 발생 여부는 예측하기 힘들데, 경미한 경우에는 약간의 호흡곤란으로 끝날 수 있으나 심한 경우에는 기도폐쇄, 저혈압, 쇼크에까지 이를 수 있다. 이를 예방하기 위해서는 알레르기 질환의 병력, 약물에 대한 과민증 유무 등에 대한 병력 청취가 진정 전 이루어져야 하며 진정제로 프로포폴을 사용할 예정이라면 콩, 계란 등에 대한 알레르기가 있는 사람에게는 가능한 투여하지 않는다.

4. 역설 반응

역설 반응 또는 모순 반응이란 초기 진정 유도 시 진정이 잘 되지 않고 횡설수설, 감정적 불안, 흥분 및 심한 몸부림 등의 반응을 보이는 것을 말한다. 미다졸람 투여 시 약 5% 정도에서 나타날 수 있으며 프로포폴 투여 시에도 나타날 수 있다고 알려져 있다. 아직까지 그 기전은 명확하지 않으며 임상적으로 수다, 감정 표출, 흥분, 정신 상태 변화, 과다 행동, 적대감, 분노 등의 행동을 보일 수 있다. 충분한 진정 약물이 투여되었음에도 불구하고 진정이 잘 안 되는 경우와의 차이점은 역설 반응에서는 대부분 환자가 깨고 난 후에는 기억을 하지 못한다는 점이다. 역설반응의 발현은 진정제 특히 미다졸람의 과다 투여와 관련이 있고 알코올 섭취, 나이(소아와 노인), 성격 장애, 이전 내시경에서 진정이 안 되었던 경우 등에서 증가하는 것으로 알려져 있다. 환자의 행동이 통제되지 않고 검사 과정에 저항을 보이거나 폭력적인 반응을

보이는 경우 검사를 진행할 수 없게 되는데, 역설 반응과 감별해야 할 유발증은 저산소증 또는 통증으로 인한 고통 반응이다. 따라서 환자가 몸을 심하게 뒤척이는 등의 반응을 보인다면 우선 산소포화도가 떨어졌는지 다시 체크하고 저산소증이나 통증이 아닌 것이 확인되었다면 미다졸람을 증량하거나 프로포폴을 투여한 뒤 2-3분 정도 기다려서 진정이 되면 검사를 다시 진행할 수 있다. 이러한 방법으로도 진정이 되지 않을 때는 길항제인 플루마제닐을 투여하여 진정을 깨운 뒤 다시 내시경을 시도하는 방법이 권장된다. 역설 반응이 심하게 계속되면 일단 시술을 중지하고 길항제를 사용하여 깨우고 다른 날에 미다졸람을 제외한 다른 약제를 사용한다.

5. 약물 주입 통증

프로포폴 주입시 약 30-70%의 환자에서 약물 주입 통증이 발생하며, 대부분 일시적이다. 정맥 내피의 자극과 kinin cascade로 발생된 kininogen의 방출에 의해 주사 부위 통증이 나타날 수 있을 것으로 생각된다. 혈관통을 감소시키기 위한 방법으로는 비교적 굵은 정맥인 전주정맥(antecubital vein)에 투여하는 방법과 20-40 mg의 리도카인을 프로포폴 투여 직전에 주입 또는 프로포폴과 혼합하는 방법이 있다.

6. 치아 손상

상부위장관내시경 검사시에 사용하는 마우스피스를 환자가 진정시에 무의식적으로 꽉 물게 되면 치아가 손상되어 흔들리거나 빠질 수 있고, 빠진 치아가 기도로 들어갈 경우 호흡곤란이 발생하는 위험한 상황이 초래될 수 있어 주의를 요한다. 국내 보고에 따르면 치아 및 잇몸 손상이 8.9%에서 있었고, 내시경 진행 시간이 길어질수록 치아 및 턱 관절 손상과 유의한 관계가 있었다. 따라서 내시경 검사 전 치아의 흔들림, 보철 유무에 대한 문진을 하고 이상이 있으면 가능하면 치과 치료를 먼저 받은 후 검사/시술을 받도록 하고, 만일 치아가 흔들리는 상태에서 검사/시술이 꼭 필요한 경우라면 이에 대한 동의서를 받는 것이 중요하다. 이 때 진정제를 투여하지 않고 내시경을 시행하는 것도 권유해 보고, 신속하게 내시경 검사를 마치고, 마우스피스에 거즈를 감거나 치아가 닿는 부위가 부드러운 고무로 둘러싸여 있는 마우스피스를 사용해 볼 수도 있다.

7. 낙상

낙상은 진정제 투여 후 내시경 검사 중에도 발생할 수 있고, 진정내시경 후 회복실에서도 발생할 수 있다. 내시경 검사는 대부분 좌측와위 상태에서 진행되므로, 특히 대장내시경 검사 중 뒤쪽 안전바가 내려져 있는 상태에서 검사가 시행되는 경우 주의가 필요하다. 내시경 검사가 끝난 후에는 낙상 예방을 위해 바로 안전바를 올려야 하고, 회복실에서도 낙상에 대한 지속적인 모니터링이 필요하다. 환자가 완전히 회복되지 않은 상태에서 퇴실하지 않도록 해야 하며, 이를 위해 진정회복 후 퇴실기준을 정해 명확히 지켜야 한다.

결론

진정내시경에서 가장 중요한 유발증은 심폐 유발증이지만, 진정내시경에서는 다양한 비심폐 유발증도 발생할 수 있다. 다양한 진정 관련 비심폐 유발증에 대해서도 지식을 갖추고, 진정 전 환자 상태에 대한 문진을 통해 유발증 발생을 예측하고 환자 감시를 통해 유발 상황을 빠르게 인지하고 그에 따른 대처를 할 수 있어야 하겠다.

Keywords: Sedation, Adverse events

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SD 2-3

진정 유발증 예방과 대처를 위한 내시경실 세팅 Setting of endoscopy room for preventing and managing sedative complication

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Introduction

Sedative endoscopy is conducted to facilitate endoscopic examinations by reducing the patient's anxiety and pain using sedative medications.¹ However, caution is necessary as the drugs utilized in sedative endoscopy can cause complications, including cardiopulmonary complications. It is essential to be adequately prepared to address these situations appropriately when they occur. In this article, we aim to discuss the preparations and equipment that should be available in the endoscopy room to prevent and handle complications caused by sedative medications.

Main Topic

1. Potential complications during sedative endoscopy

The complications that may arise during sedative endoscopy can be broadly categorized into cardiopulmonary adverse events and non-cardiopulmonary adverse events. Cardiopulmonary-related complications include hypoxia, respiratory depression, respiratory arrest, hypotension, hypertension, arrhythmia, cardiac arrest, angina, and myocardial infarction. Non-cardiopulmonary-related complications encompass retching, vomiting, aspiration, hypoglycemia, allergic reactions, pain, inadequate sedation, paradoxical reactions, tooth damage, and falls. In this article, we would like to exclude non-cardiopulmonary-related complications such as retching, vomiting, aspiration, pain, inadequate sedation, and paradoxical reactions, as they are primarily associated with the endoscopic procedure itself or are not considered preventable complications even with preparation.

2. Endoscopy room setting for addressing cardiopulmonary-related complications

1) Hypoxia

Ventilation failure is relatively common during sedation and can lead to serious complications if it progresses to hypoxia, so constant vigilance is required. Ventilation failure is caused by suppression of the respiratory center by sedatives or opioid analgesics, as well as upper or lower airway obstruction. Prevention, early diagnosis, and initial treatment are all crucial. To prevent ventilation failure, pre-oxygenation therapy can be implemented, and for this, an oxygen delivery system must be in place not only in the endoscopy procedure room but also in the patient waiting and recovery areas. A domestic study reported that hypoxia did not occur during sedative endoscopy in patients who received pre-

oxygenation therapy, emphasizing the importance of having oxygen supply equipment and making it essential to be equipped.² For monitoring hypoxia, pulse oximetry and capnography are available, and at least one of these devices must be in place to monitor hypoxia. Pulse oximetry is the most widely used equipment to measure oxygen saturation. One thing to keep in mind is that pulse oximetry indirectly measures peripheral arterial blood oxygen saturation, not directly reflecting the oxygen pressure in the alveoli. As it reflects the ventilation status about 30-60 seconds prior, the actual oxygen saturation may be lower, and this should be considered. A Japanese study compared pulse oximetry and capnography during sedative endoscopy and revealed differences between the two measurements.³ The Bispectral Index (BIS) can objectively assess the depth of anesthesia by monitoring the patient's brain waves, and it is known to minimize risk and optimize patient comfort. However, in some studies, BIS could not reduced the amount of sedative drugs used.⁴

During sedative endoscopy, if hypoxia occurs, oxygen can be supplied using a nasal cannula. However, if the FiO₂ cannot be sufficiently increased, intubation may be necessary, so a laryngoscope and endotracheal tube should be prepared in endoscopy room. Using a mask that can provide higher oxygen pressure than a nasal cannula also can be effective. High-Flow Nasal Cannula (HFNC) reduces dead space, allowing for improved alveolar ventilation without increasing tidal volume (TV), and can increase flow up to 60L/min. Performing upper endoscopy by providing oxygen through a dual-channel laryngeal mask airway is another method that can be considered for high-risk patients.⁵ The laryngeal mask airway is an excellent piece of equipment to have in the endoscopy room, as it ensures a stable airway without the need for intubation.

2) Cardiovascular complications

Sedatives and opioid analgesics can cause a decrease in cardiopulmonary function in a dose-dependent manner. Therefore, the dosage must be strictly controlled in patients with cardiovascular diseases. However, insufficient sedation during the procedure can also cause problems by inducing hypertension or tachycardia. Moreover, if hypoxia is not detected early due to ventilation failure and persists, it can lead to cardiovascular collapse, which is even more fatal in patients with cardiovascular diseases.⁶ To address cardiovascular complications, it is essential to have emergency medications readily available in a designated location, carefully check stock and expiration dates, and ensure that all endoscopy room staff are familiar with the location of the medications. In addition to the antagonists like flumazenil and naloxone, it is necessary to have medications such as epinephrine, ephedrine, vasopressin, atropine, nitroglycerin (tablets or spray), amiodarone, lidocaine, glucose (50% 10 or 25%), diphenhydramine, hydrocortisone, methylprednisolone, and dexamethasone available for administration in case of cardiovascular complications. Non-invasive blood pressure monitoring and electrocardiography can also be considered for patients at risk of cardiovascular complications.

3) Sufficient recovery space

Even after the endoscopy procedure is completed, patients may still be at risk for adverse events due to the sedative medications. The delayed absorption and metabolism of these drugs can further decrease cardiopulmonary function, making it essential to have a sufficient recovery area where the patient's level of consciousness, blood pressure, pulse, and oxygen saturation can be monitored. It is also necessary to establish discharge criteria and ensure that skilled medical professionals evaluate the patient before allowing them to leave the recovery area.

Conclusion

Adverse events can occur during sedative endoscopy, and having sufficient equipment and facilities in place can help prevent and manage these complications. By ensuring proper preparation and resources, patient safety and overall outcomes can be improved.

Keywords: Sedative endoscopy, Endoscopy room, Equipment

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SD 2-4

위원회 주도 레미마졸람 임상시험

A randomized, investigator initiative trial of remimazolam versus midazolam for sedation in upper endoscopy

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Midazolam and propofol are commonly used for endoscopic sedation. While midazolam and propofol are effective, each has disadvantages. Propofol has excellent sedative properties, with a short half-life, allowing rapid recovery. However, propofol may cause respiratory depression, hypoxia, and hypotension, requiring continuous monitoring of vital signs and respiration. Midazolam with rapid onset of action and potent amnesic properties has been the most commonly used drug among benzodiazepines. Nevertheless, the rather long half-life of approximately 1 to 4 h possibly results in a comparatively long sedative effect of midazolam.

Remimazolam is a novel, ultra-short-acting benzodiazepine that has a shorter half-life (approximately 40 min) than other benzodiazepines, has no active metabolites, and is less likely to affect renal functions. Moreover, similar to other benzodiazepines, remimazolam can be antagonized by flumazenil. Remimazolam has been approved by the Food and Drug Administration for procedural sedation in the US. It has also been approved for use as general anesthesia or procedural sedation in Korea.

Remimazolam has shown to be a safe and effective for endoscopic sedation in several clinical trials. In a randomized double-blind clinical trial of 461 patients undergoing colonoscopy in U.S., Patients administered remimazolam had faster recovery of neuropsychiatric function and were ready for discharge earlier than patients with midazolam.¹ Another randomized clinical trial of 384 patients undergoing upper endoscopy in China, remimazolam had non-inferior sedation success rate compared with propofol. The safety profile was shown to be superior to propofol. In addition, remimazolam shorter time to fully alert than that in the propofol.² Further studies are needed to be done establish the efficacy and safety profiles of remimazolam and to determine the appropriate dose of remimazolam for efficacy and safety.

Keywords: Sedation, Upper endoscopy, Remimazolam

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ABSTRACTS

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PUG-01

Differential diagnosis of thickened gastric fold between hypertrophic gastritis and B4 advanced gastric cancer

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Background/aims: Accurately diagnosing diffuse gastric fold thickening is challenging for endoscopists. Hypertrophic gastritis (HG), while benign, mimics the morphology of advanced gastric cancer Borrmann type 4 (AGC B-4). We compared the features of endoscopy and endoscopic ultrasonography (EUS) between HG and AGC B-4.

Methods: We retrospectively investigated patients who underwent EUS for thickened gastric fold between January 2000 and December 2021. Those with HG or AGC B-4 were selected.

Results: Among 194 patients with hypertrophied rugae, 50 and 115 had HG and AGC B-4, respectively. Male dominance was observed in AGC B-4, as well as significantly lower hemoglobin and total protein levels, weight loss, nausea or vomiting, and dyspepsia, which were significantly more common. AGC B-4 also had a significantly higher rate of antral involvement than HG. Destruction of the proper muscle (PM) layers was only observed in AGC B-4. In AGC B-4 with preserved wall layer, the PM was significantly thicker than in HG. Most AGC with ulcers was confirmed by forceps biopsy; however, only a 42.6% success rate was observed in patients without ulcers, so additional modalities were required. The multivariable analysis showed that thickened PM layer and ulceration were significant risk factors for the diagnosis of AGC B-4.

Table 1. Baseline characteristics of patients with Borrmann type 4 advanced gastric cancer and hypertrophic gastritis.

Characteristics	AGC B-4 (n=115)	Hypertrophic gastritis (n=50)	p value
Age at diagnosis (years)	55.0 (44.5-64.0)	50.5 (43.0-60.0)	0.164
Sex (M / F)	72 / 43	14 / 36	< 0.001
Symptom			
Pain	52 (45.2%)	16 (32.0%)	0.158
Weight loss	56 (48.7%)	6 (12.0%)	< 0.001
Nausea or vomiting	23 (20.0%)	3 (6.0%)	0.042
Dyspepsia	45 (39.1%)	6 (12.0%)	0.001
Underlying diseases			
Hypertension	20 (17.4%)	12 (24.0%)	0.440
DM	10 (8.7%)	7 (14.0%)	0.452
Chronic kidney disease	1 (0.9%)	2 (4.0%)	0.454
Liver cirrhosis	2 (1.7%)	2 (4.0%)	0.751
CVA	1 (0.9%)	0 (0.0%)	1.000
Angina	4 (3.5%)	0 (0.0%)	0.433
Thyroid diseases	2 (1.7%)	0 (0.0%)	0.870
Family history of gastric cancer	18 (15.7%)	5 (10.0%)	0.472
<i>H.pylori</i> status			< 0.001
Infected	47 (40.9%)	40 (80.0%)	
Non-infected	18 (15.7%)	2 (4.0%)	
Previously treated	0 (0.0%)	1 (2.0%)	
Unknown	50 (43.5%)	7 (14.0%)	
Laboratory findings			
Hemoglobin (g/dL)	13.0 ± 1.8	14.6 ± 2.1	< 0.001
Albumin (g/dL)	4.0 ± 1.8	4.0 ± 0.6	0.953
Total protein (g/dL)	6.9 ± 0.7	7.2 ± 0.8	0.041

AGC B-4 Advanced gastric cancer Borrmann type 4; DM Diabetes mellitus; CVA Cerebrovascular accidents; *H.pylori Helicobacter pylori*

Conclusions: Significant differences in sex, clinical symptoms, and laboratory findings were observed between HG and AGC B-4. Prognostic factors for AGC B-4 include thickened gastric fold, antral involvement, ulcer, destructed wall layers, and thickened PM of > 2.39. Forceps biopsy of the ulcer showed an excellent success rate in AGC B-4.

Keywords: Endoscopic ultrasound, Endoscopy, Advanced gastric cancer, Rugal hypertrophic gastritis

Table 2. Endoscopic ultrasonographic findings of patients with Borrmann type 4 advanced gastric cancer and hypertrophic gastritis.

	AGC B-4 (n=115)	AGC B-4 with preserved layers (n=65)	AGC B-4 with destructed layers (n=50)	Hypertrophic gastritis (n=50)	p value
EUS findings					
Wall thickness (mm)	12.5 (9.2-15.7)	9.6 (8.5-14.0)	14.3 (11.5-18.8)	9.9 (6.9-14.4)	< 0.001
PM thickness (mm)	3.9 (2.9-4.8)	3.9 (2.9-4.8)	-	1.2 (0.9-1.7)	< 0.001
- Wall < 2.39 mm	-	5 (7.7%)	-	49 (98.0%)	
- Wall ≥ 2.39 mm	-	60 (92.3%)	-	1 (2.0%)	
Presence of ascites	8 (7.0%)	1 (1.5%)	7 (14.0%)	0 (0.0%)	0.001

AGC B-4 Advanced gastric cancer Borrmann type 4; PM muscularis propria layer; IQR interquartile range

Table 3. Endoscopic findings of patients with Borrmann type 4 advanced gastric cancer and hypertrophic gastritis.

Endoscopic findings	AGC B-4 (n=115)	Hypertrophic gastritis (n=50)	p value
Location			
Antral involvement	45 (39.1%)	2 (4.0%)	< 0.001
Non-antral involvement	102 (88.7%)	50 (100.0%)	0.031
Presence of ulceration			
Present	68 (59.1%)	2 (4.0%)	< 0.001
Absent	47 (40.9%)	48 (96.0%)	

Table 4. Diagnostic methods in advanced gastric cancer Borrmann type 4 according to presence of ulceration

	AGC B-4 without ulcer (n=47)	AGC B-4 with ulcer (n=68)	p value
Methods of diagnosis			
Forcep biopsy	20 (42.6%)	63 (92.6%)	< 0.001
EUS-FNB	5 (10.6%)	1 (1.5%)	
EMR or unroofing	11 (23.4%)	2 (2.9%)	
Surgery	9 (19.1%)	0 (0.0%)	
*Other methods	2 (4.3%)	2 (2.9%)	
Success rate of each method			
Forcep biopsy	20/47 (42.6%)	63/68 (92.6%)	<0.001
EUS-FNB	4/8 (50.0%)	1/2 (50.0%)	1.000
EMR or unroofing	12/16 (75.0%)	3/5 (60.0%)	0.935

AGC advanced gastric cancer; B-4 Borrmann type 4; EUS-FNA endoscopic ultrasound-guided fine needle aspiration; EMR endoscopic mucosal resection; *Other method included analysis of ascites cytology (n=2), punch biopsy of metastatic lesion in skin (n=1), later confirmed during chemotherapy (n=1); AP-CT Abdominal and pelvic computed tomography; PET-CT positron emission tomography-computed tomography

Table 5. Multivariate logistic analysis of risk factors of Borrmann type 4 advanced gastric cancer

Factors	Univariate analysis		Multivariable analysis	
	OR (95% CI)	p value	OR (95% CI)	p value
Thickened pm layer (≥ 2.39 mm)	588.21 (66.47-5201.31)	< 0.001	637.08 (37.88-10714.97)	< 0.001
Sex (Male)	5.39 (2.4-12.08)	< 0.001		
Abdominal pain	1.51 (0.7-3.27)	0.295		
Weight loss	4.29 (1.59-11.56)	0.004		
Nausea or vomiting	3.19 (0.84-12.13)	0.089		
Antral involvement	12.28 (2.73-55.3)	0.001		
Presence of ulceration	31.71 (7.1-141.74)	< 0.001	48.62 (2.61-906.81)	0.009

OR odds ratio; CI confidence interval; IQR interquartile range

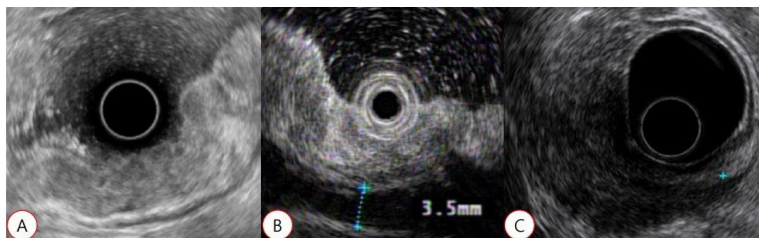


Figure 1. Endoscopic ultrasonographic images of patients diagnosed with hypertrophic gastritis (A), advanced gastric cancer with preserved wall layer (B), and with destroyed wall layer (C).

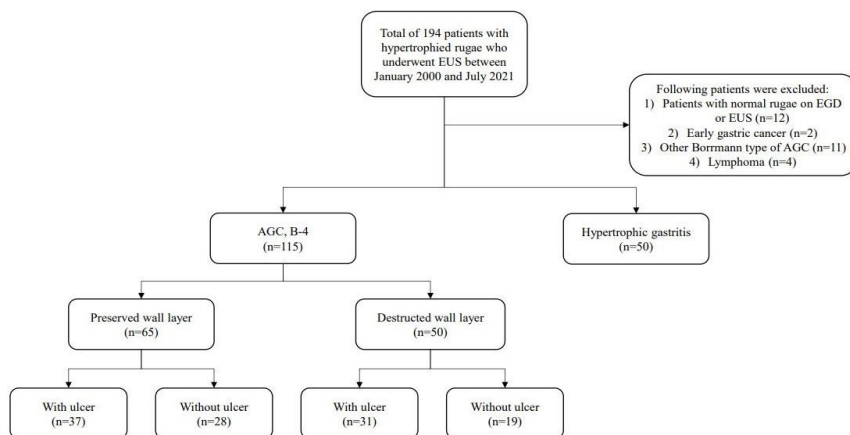


Figure 2. Flowchart of patients with hypertrophied rugae who underwent endoscopic ultrasound. EGD esophagogastroduodenoscopy; EUS endoscopic ultrasound; AGC Advanced gastric cancer; B-4 Borrmann type 4

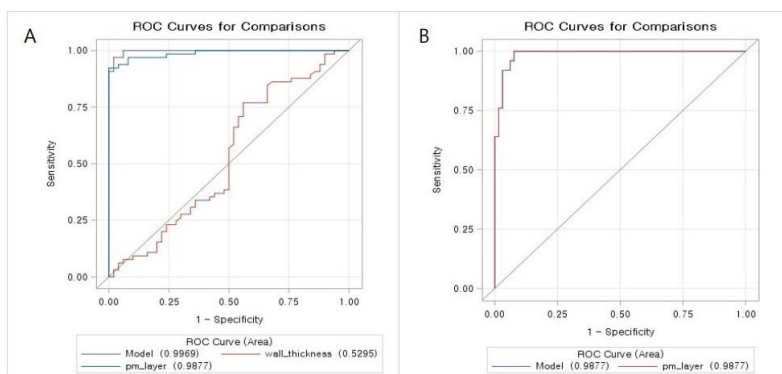


Figure 3. (A) Receiver operating characteristics curve (ROC) for prediction of advanced gastric cancer based on total wall thickness on endoscopic ultrasound between patients with advanced gastric cancer B-4 with preserved wall layer and hypertrophic gastritis. (B) ROC for prediction of advanced gastric cancer based on proper muscle thickness on endoscopic ultrasound between patients with advanced gastric cancer with preserved wall layer and hypertrophic gastritis.

PUG-02

Research hotspots and trend of peroral endoscopic myotomy from 2010 to 2022: A bibliometric analysis

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Background/aims: Over the past decade, peroral endoscopic myotomy (POEM) has become a safe and effective therapeutic modality for achalasia and other diseases. A growing number of relevant articles have been published annually. We aimed to explore global scientific outputs and hot spots of POEM published by different countries, organizations, and authors.

Methods: A total of 875 publications on POEM from 2010 to October 2022 were identified from the Web of Science (WOS) Core database. Bibliometric visualization analyses of countries/regions, institutes, authors, journals, references and keywords were performed by CiteSpace V.5.8.R3.

Results: Overall, the number of POEM-related articles had experienced a gradually increase in the last decade and 875 articles were included in this study. Inoue H was the most productive author, with 68 publications. The United States was the most productive country, while Showa University in Japan was the most productive institution. Among the journals, Surgical Endoscopy published the highest number of articles, followed by Gastrointestinal Endoscopy and Endoscopy. The top 10 keywords with the highest frequencies were achalasia, peroral endoscopic myotomy, poem, myotomy, esophageal achalasia, dysphagia, heller myotomy, endoscopy, gastroparesis and per-oral endoscopic myotomy. Seven frontiers that had impacts on future research on POEM were meta-analysis, high-resolution esophageal manometry, geriatric patient, third space endoscopy, adverse event, endoscopic submucosal dissection, and gastric peroral endoscopic myotomy.

Conclusions: Researches on POEM have significantly increased in the last decade globally, and it will continue to increase. Meta-analysis, high-resolution esophageal manometry, geriatric patient, third space endoscopy, adverse event, and gastric peroral endoscopic myotomy might be the latest research frontiers and should receive more attention.

Keywords: Peroral Endoscopic Myotomy, Hotspot, Bibliometric analysis

PUG-03



Predictive models for peroral endoscopic myotomy treatment failure in achalasia based on machine learning algorithm

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Background/aims: Currently, peroral endoscopic myotomy (POEM) has emerged as the first-line treatment for achalasia, and its long-term efficacy and safety were confirmed by a series of studies. Although the researches on POEM for achalasia have remained high during the recent decade, the predictors of POEM therapy failure are still poorly understood. The present study aimed to develop a predictive model of POEM treatment failure in achalasia by using machine learning algorithm.

Methods: Data of patients with achalasia who received POEM treatment in our department from June 2010 to November 2019 were prospectively collected and analyzed retrospectively. The basic information, clinical data, and follow-up data of patients were collected. The patients were randomly divided into training set and validation set according to the ratio of 8:2. Machine learning classification models including Extreme Gradient Boosting (XGBoost), Logistic Regression, Random Forest, Multi-layer Perceptron Neural Networks (MLP) and Support Vector Machine (SVM) were constructed with treatment failure of achalasia patients as outcome variables. The model with the best predictive performance was selected by comparing the receiver operating characteristic curve (ROC) and the area under ROC curve (AUC) of various models. After further screening the variables, the predictive performance of the model in test set and the key predictors of POEM treatment failure were determined. R version 3.6.3 and python version 3.7 were used for statistical analysis.

Results: During the study period, a total of 612 patients with achalasia who were treated with POEM and follow up completely were enrolled, of which 77 patients failed and 535 patients successful. The median age of all patients was 43 years (range 34–55), and the percentage of women was 56.3%. All patients enrolled underwent successful POEM, and no patient was converted to laparoscopy or open surgery due to operation failure. The median Eckardt score before POEM decreased from 7 (range 5–9) to 1 (range 0–2) after surgery ($P=0.000$) in a median follow-up period of 41.0 months (range 23.4–61.5). The treatment success rate for POEM was 87.4% (535/612) and the failure rate was 12.6% (77/612), as defined by an Eckardt score <3 . In the validation set, the AUC values of XGBoost, Logistic Regression, Random Forest, MLP, and SVM models were 0.859, 0.787, 0.844, 0.692, and 0.659, respectively. Except for the MLP and SVC models, the remaining three models perform better in predicting POEM treatment failure in achalasia, of which XGBoost was the optimal model. After the further screening of variables, the XGBoost model received an AUC value of 0.848, a cutoff value of 0.453, an accuracy of 0.759, a sensitivity of 0.800, a specificity of 0.828, a positive predictive value of 0.700, a negative predictive value of 0.833, and an F1 score of 0.747 in the test set. Ling classification, preoperative Eckardt score, preoperative BMI, and operation time were the four most important predictors.

Conclusions: The machine learning model can precisely predict the occurrence of POEM treatment failure in achalasia. XGBoost was the optimal model among the five machine learning models. Ling classification, preoperative Eckardt score, preoperative BMI, and operation time were the most important predictors for predicting POEM treatment failure in achalasia.

Keywords: Peroral Endoscopic Myotomy, Achalasia, Treatment failure, Predictive models, Machine learning

PUG-04

Analysis of gastric cancer cases in Erdenet city

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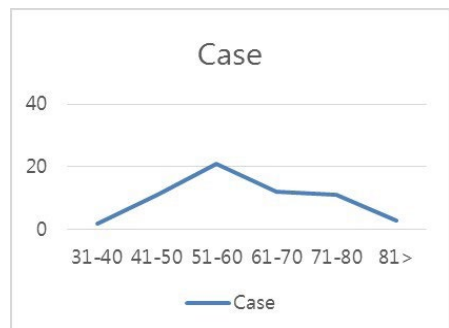
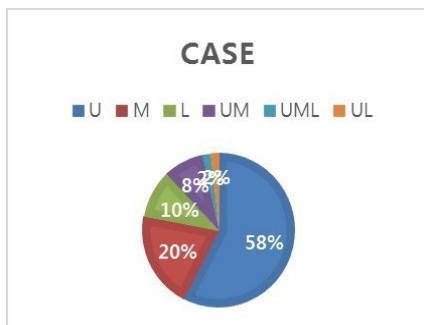
Background/aims: In Mongolia, Gastric cancer is second most common cancer. The number of new gastric cancer cases was 29.3 per 100.000 men and women in Mongolia. A greater percentage of total gastric cancer cases were III, IV stage (85.5%) In Mongolia and Orkhon province, gastric cancer remains an important public health problem.

Methods: A total of 60 gastric cancer cases diagnosed at Medipas Hospital between March 2016 and October 2017 were analyzed retrospectively

Results: The most common location of gastric cancer was upper third (59.7%), followed by middle third (26.9%) and lower third (13.4%) of the stomach. The percentage of total gastric cancer cases were advanced gastric cancer (66.7%) than early gastric cancer (31.7%). 55% of total gastric cancer cases were treated by Endoscopic submucosal dissection and Gastroectomy surgery.

Conclusions: The early gastric cancer detection rate in Japan is 70% and in Korea is 50%, but here in Mongolia about 80–90% of gastric cancer diagnosed in its late stages, so the 5 year surveillance rate is very low and mortality rate is very high. We have to enroll health screening program and improve doctor's education, as well as over all population's health knowledge.

Keywords: Gastric cancer, Hystopathology, Advanced gastric cancer, Gascric cancer location, Gastroectomy



PUG-05

The initial results of endoscopic management for upper gastrointestinal subepithelial lesions from Bach Mai Hospital

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Background/aims: Diagnosis and treatment of upper gastrointestinal subepithelial lesions (GI SEL) is currently controversial. We conducted this study to initially evaluate effectiveness of endoscopic intervention methods and pathology of GI SELs.

Methods: A retrospective descriptive study of 43 patients with upper GI SELs underwent with endoscopic resection was conducted at Bach Mai Hospital from January 2022 to February 2023. Clinical data, interventional techniques, pathology and outcomes were collected and analyzed.

Results: 43 GI SELs were resected, 21 (48.8%) from the submucosal and 22 (51.2%) from muscular layer. Mean size 16.1 ± 7.1 mm. In esophagus, leiomyomas were the most common ($n=14$; 87.5%). In stomach, the most common lesions were GISTs ($n=9$; 34.6%). All lesions from submucosa layer were resected completely, 20 by ESD and one by EMR. Among 21 lesions from the muscle layer, 15 lesions were completely resected (5 by EMD, 3 by EFTR, 5 by STER and 2 by band ligation combined with snare) and 6 lesions were incompletely resected (4 by ESD and 2 by EMD). The overall procedural time was 50.9 ± 5.4 minutes. There were no serious complications.

Conclusions: Endoscopic interventional techniques for GI SELs are generally safe and effective at Bach Mai hospital. Most lesions are benign, only few have malignant potential.

Keywords: Gastrointestinal subepithelial lesions, ESD, EMD, EFTR, GIST

PUG-06

A study of correlation between nodular gastritis and *Helicobacter pylori* infectionOtgontuya Sambuudash*

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Background/aims: Nodular gastritis occurs due to *Helicobacter pylori* (*H. pylori*) infection which is leading to risk factor of gastric cancer. This study aimed to determine the clinical characteristics and correlation between nodular gastritis and *Helicobacter pylori* infection.

Methods: We collected data from the Gastroenterology Endoscopy department in our hospital between June 2022 and Jan 2023, were analyzed by retrospective study. In this study included patients who had underwent upper gastrointestinal endoscopy and had positive result for *Helicobacter pylori* in breathe and stool test.

Results: A total of 1436 patients has done upper gastrointestinal endoscopy and histopathological examination were included in our analysis respectively. 948 (66.1%) of the patients were female and 488 (33.9%) were male in the study. The mean age 32 years. *H. Pylori* infection was identified in 1048 (73%) patients as a result of histopathological examination in breathe and stool test. Nodular gastritis was revealed in 689 (48%) by endoscopically. *H. pylori* was identified in 92% (633) of the 689 patients with nodular gastritis ($p < 0.001$). Nodular gastritis was determined to be significantly higher in *H. pylori* positive patients than in *H. pylori* negative patients.

Conclusions: In conclusion, a positive correlation between the prevalence of nodular gastritis and *H. pylori* infection was established. This study suggests that nodular gastritis by endoscopically is good indicator of *Helicobacter pylori* infection.

Keywords: *Helicobacter pylori*, Nodular gastritis

PUG-07 

Brunner's gland hyperplasia presenting as upper gastrointestinal bleeding seen endoscopically as a duodenal mass

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Brunner's gland hyperplasia is an uncommon, benign duodenal lesion. The symptomatology might be asymptomatic (as an unintentional endoscopic discovery) or include gastrointestinal blockage or hemorrhage. In this case series, we presented two cases of bleeding Brunner's Gland Hyperplasia presenting with upper gastrointestinal bleeding, a scenario that is not commonly encountered nowadays. We also provided a review of related literature, including clinical presentation, endoscopic findings, gross and microscopic pathology, and management of these cases.

Keywords: Brunner's gland hyperplasia, Upper gastrointestinal bleeding, Duodenal mass



Figure 1: Endoscopic image of large Brunner's gland polyp

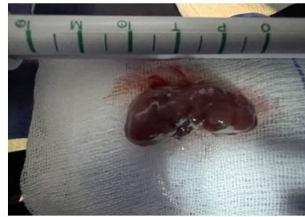


Figure 4: A three-centimeter duodenal polyp on gross anatomy

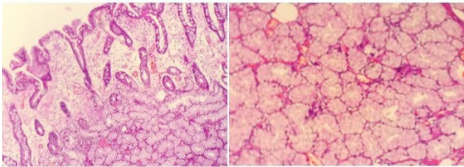


Figure 2: Scanning microscopy of duodenal polyp and low power magnification

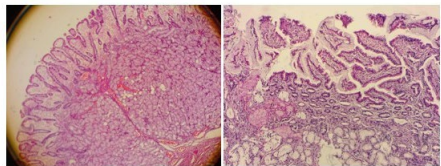


Figure 5: Scanning microscopy of duodenal polyp and low power magnification

PUG-08 

Rapid identification of GI bleeding site by red dichromatic imaging, a novel image enhance endoscopy. Case series

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Gastrointestinal bleeding is one of the most commonly encountered problems in endoscopy. When faced with a critically unstable patient, rapid identification of the precise bleeding point is crucial to providing intervention. Image-enhanced technology has been widely used as of today for the identification of gastrointestinal lesions. The Olympus Corporation recently released red dichromatic imaging (RDI) in its latest model to aid Endoscopists in the identification of bleeding points and vessels. Thus, we present three cases of upper gastrointestinal bleeding, two bleeding Deilulafoy's lesions and one bleeding peptic ulcer disease, in which RDI was used to help identify the bleeding point and provide intervention. This study is the first of its kind in the Philippines.

Keywords: Red dichromatic imaging, RDI, Gastrointestinal bleeding, Image enhance endoscopy

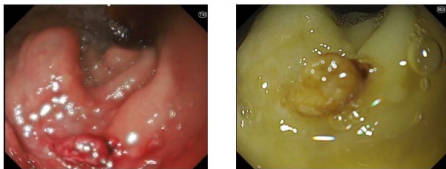


Figure 1: Texture enhance white light endoscopy (left) and Red Dichromatic Imaging (right)

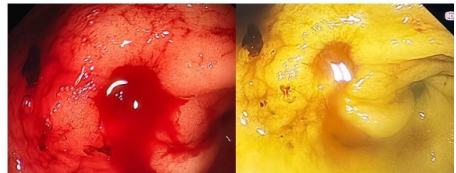


Figure 6: Bleeding gastric ulcer with White light (Left) and RDI (Right)



Figure 3: Deployment of hemoclip with Red Dichromatic Imaging



Figure 7: Hemoclippping of the bleeding gastric ulcer using RDI

PUG-09 

Endoscopic ultrasound: A safe and alternative way to biopsy mediastinal lesions

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The evaluation of mediastinal masses presents diagnostic difficulties. This is because of their various potential pathogenic origins, closeness to several critical structures, and difficulties in obtaining a biopsy. Lesions of the mediastinum may be assessed using both non-invasive and invasive techniques such as Endoscopic ultrasound (EUS). However, EUS is most commonly used to evaluate and sample lesions of the abdomen and has only been used on rare occasions to evaluate and sample other lesions. In this case, we present here of the few EUS-guided fine needle biopsy (FNB) of mediastinal mass.

Keywords: Endoscopic ultrasound, Mediastinal mass, Fine needle biopsy

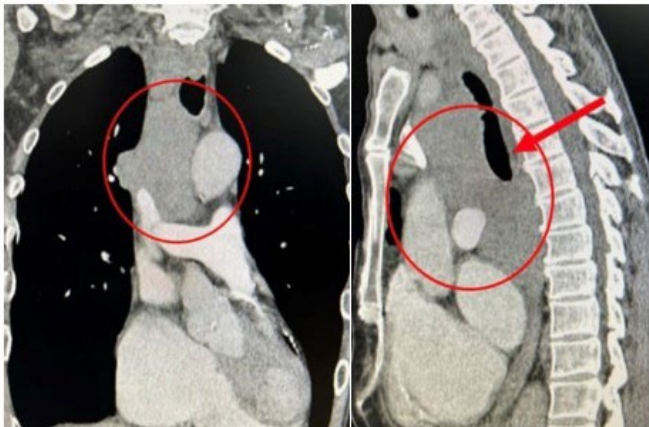


Figure 2: Computed tomography scan A. Coronal view B. Sagittal view showing isodense structure on anterior mediastinum.
(Red arrow: trachea at the level of the carina)



Figure 5: Endoscopic ultrasound fine needle biopsy of mediastinal mass



Figure 6: Gross specimen of Mediastinal mass after fine needle biopsy

PUG-10

A rare case of clinical early gastric cancer presenting with multiple distant lymph node metastasis

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Early gastric cancer (EGC) is defined as gastric adenocarcinoma confined to gastric mucosa or the submucosa regardless of regional lymph node metastasis. Distant lymph node metastasis in EGC is extremely rare. Here we present a case of clinical EGC with symptoms from distant lymph node metastasis.

A 76-year-old male visited the emergency department with complaints of abdominal pain for 3 weeks that had aggravated over time. Computed tomography of abdomen revealed multiple enlarged lymph nodes at subpyloric area, transverse mesocolon, and retroperitoneum without discernible mass in solid organs. Under suspicion of lymphadenopathy related to lymphoma, viral or tuberculosis infection, the patient underwent esophagogastroduodenoscopy (EGD) and colonoscopy. No remarkable findings were observed in colonoscopy except for few small adenomas, but EGD showed a 2 cm type 0-I lesion at anterior wall of antrum. The biopsy of the lesion showed moderately differentiated adenocarcinoma, and endoscopic ultrasonography showed the lesion was limited to submucosa without invasion to muscularis propria. Positron emission tomography revealed multiple nodular lesions in both lower neck, left axilla, and mediastinum. Percutaneous needle biopsy of right neck node was compatible with findings of metastasis adenocarcinoma suggesting Virchow's node metastasis.

EGC has better prognosis with 5-year survival rates of more than 90% and recurrence rates lower than 3%. Lymph node metastasis is uncommon finding in EGC which serves as basis for endoscopic resection as treatment for small EGC, but there have been reported cases of lymph node metastasis despite no apparent lymphovascular involvement. Clinicians should be aware that there are cases with distant lymph node metastasis even in EGC, and this study highlights the importance of staging evaluation even in small sized EGC.

Keywords: Early gastric cancer, Distant lymph node metastasis, Virchow's node

PUG-11 

Early results of endoscopic sleeve gastroplasty from a district hospital in Singapore

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Background/aims: Endoscopic sleeve gastroplasty (ESG) was approved by the FDA as a weight loss procedure in July 2022. The aim of this study is to evaluate the short term outcome of ESG since its introduction in October 2022.

Methods: Two bariatric surgeons with experience in advanced endoscopy, including ERCP, underwent a two-week clinical attachment to acquire ESG skills. A standardized protocol was established. All patients underwent preoperative psychological, dietetics and physiotherapy assessments. ESG was performed under general anesthesia in a supine position using an Olympus 2T endoscope and Apollo Overstitch Gen 2 endoscopic suturing system. All patients underwent very low calorie diet (VLCD) for 2 weeks after the procedure and were quickly progressed to a high-fiber diet thereafter.

Results: From October 2022 to January 2023, nine patients underwent ESG. The median age of the patients was 38.7 years (range: 21.1 to 49.8), and there were seven female and two male patients. The median operative time was 74 minutes (range: 60-110), and the median hospital stay was 1 day (maximum of 2 days). The median preoperative weight was 95.6 kg (range: 76.0 to 112.9), and the median BMI was 34.5 (range: 32 to 40.8). One patient had concomitant ventral hernia repair. At two weeks post-ESG, the median total weight loss percentage (TWL%) was 5.9% (range: 0 to 9.9%) and median BMI was 34.5 (range: 28.8 to 38.0), and at two to three months after ESG, the median TWL% was 8.8% (range: -1.4 to 15%) and median BMI was 31.9 (Range: 28.5 to 38.4). One patient failed to achieve weight loss due to poor dietary compliance and limited mobility secondary to severe diabetic peripheral vascular disease. No complications were observed.

Conclusions: ESG is a safe and effective weight loss procedure in the hands of bariatric surgeons with endoscopic expertise. Healthy diet and active living are essential to achieve optimal weight loss. Long term follow-up is necessary to assess the durability of the procedure.

Keywords: Endoscopic sleeve gastroplasty, ESG, Obesity

PUG-12

Duodenal inflammation and permeability in relation to individual gut microbiota and dietary nutrition

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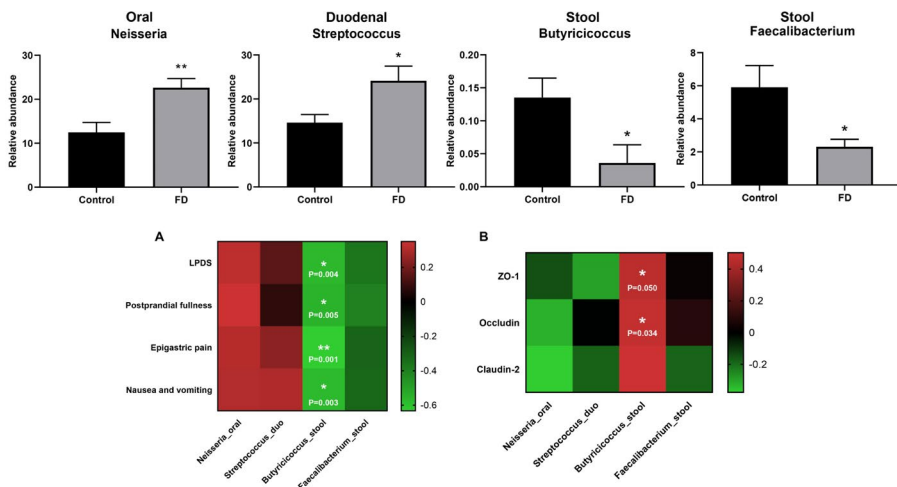
Background/aims: Recent evidence suggests that changes in the duodenal ecosystem may be the key to understanding functional dyspepsia (FD). However, only a few studies have comprehensively analyzed the causative factors. This study aims to identify associated factors and predictive biomarkers of FD.

Methods: This case-control study included 28 participants (12 with FD, 16 healthy controls). We investigated the patients' dietary nutrients, gastrointestinal symptoms, and the duodenal mucosa's immunological status. Microbiome analysis was conducted using 16s rRNA sequencing.

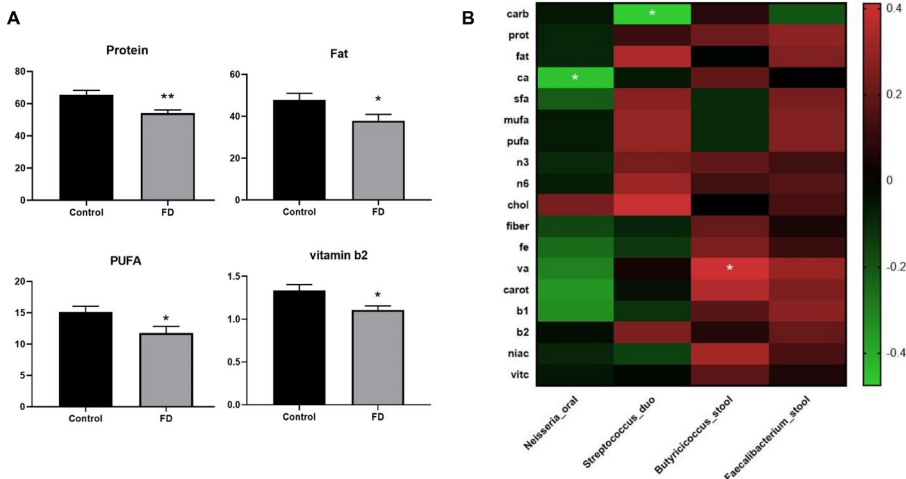
Results: Duodenal mucosal inflammation and impaired expression of tight junction proteins were confirmed in patients with FD. The relative abundance of duodenal *Streptococcus* ($p=0.0139$) and reductions in stool *Butyrivococcus* ($p=0.0468$) were confirmed. These changes in the oral and gut microbiota were both correlated with symptom severity. Dietary micronutrients, such as omega-3 fatty acids and valine, have beneficial effects on intestinal barrier function and the microbiota.

Conclusions: Dietary nutrition and the oral and gut microbiota are associated with FD symptoms, impaired duodenal barrier function, and inflammation. Changes in the duodenal ecosystem will play a key role in the diagnosis and treatment of FD.

Keywords: Functional dyspepsia, Duodenal inflammation, Intestinal permeability, Gut microbiota, Dietary nutrition



Characteristic microbiota species of functional dyspepsia (FD) patients by 16s rRNA sequencing. While duodenal *Streptococcus* is increased in FD, stool *Butyricoccus* is decreased significantly.



Dietary nutrition and gastrointestinal microbial relationships. (A) Distinctive features of dietary micronutrients in FD. (B) The heatmap analysis shows the correlation of each micronutrient with the gut microbiota.

PUG-13

Role of peroral endoscopic myotomy in sigmoid-type achalasia

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Background/aims: Sigmoid-type achalasia represents an advanced stage of achalasia characterized by significant dilation and tortuosity of the esophageal lumen. Considering the demonstrated efficacy of peroral endoscopic myotomy (POEM) in treating early-stage achalasia, this procedure may offer an alternative therapeutic approach for sigmoid-type achalasia. This study aimed to assess POEM's feasibility and short-term efficacy in patients with sigmoid-type achalasia.

Methods: We enrolled 16 consecutive patients with sigmoid-type achalasia (eight with type 1 and eight with type 2). The anticipated outcomes were symptom relief during the 12-month follow-up period (evaluated through a reduction in Eckardt symptom scores), an acceptable incidence of procedure-related adverse events, and a decrease in esophageal diameter and barium height.

Results: POEM was successfully performed in all cases, with a mean operative time of 123.44 minutes. No serious complications associated with POEM were observed. During the 12-month follow-up period, the mean Eckardt symptom score decreased from 6.19 preoperatively to 1.52 ($P=0.004$). Complications were mucosal injuries (25%), pneumoperitoneum (12.5%), and minor bleeding (6.3%), although no interventions were needed.

Conclusions: Our findings suggest that the POEM procedure is a feasible treatment option for sigmoid-type achalasia. The 12-month outcomes demonstrated clinical improvements without serious complications. However, creating a submucosal tunnel and performing a myotomy were more challenging in sigmoid-type achalasia than non-sigmoid-type achalasia.

Keywords: POEM, Achalasia, Sigmoid achalasia, Advance stage of achalasia, Sigmoid-type achalasia

PUG-14

Association of malignant dysphagia with multifactorial risk factors

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Background/aims: To determine the association of malignant dysphagia with multi factorial modifiable and non-modifiable risk factors.

Methods: This cross-sectional study was done in the eight-month recruitment phase, from October 2020 to June 2021, where all patients who met the inclusion criteria were brought on board at the Gastroenterology Department at Liaquat National Hospital and Medical College in Karachi. UGI endoscopy was carried out to determine the result, namely the existence of malignant dysphagia, following the acquisition of informed and written consent, history, and clinical examination.

Results: Median age of participants was 53 (IQR=40–65), around which half of them were males (n=180, 50.8%). More than half of the participants had non-malignant dysphagia (n=217, 61.3%). 81(22.9%) and 55(51.5%) had squamous cell carcinoma and adeno carcinoma with dysphagia. A higher risk of malignant dysphagia was observed amongst smokers and patients with history of weight loss.

Conclusions: On multivariable model, younger age, being corrosive, shorter duration of symptoms (<6 months) and slow disease progression were associated with lower risk of malignant dysphagia. The risk of malignant dysphagia was higher among smokers and patients having history of weight loss.

Keywords: Dysphagia, Endoscopy, Malignancy

PUG-15

Endoscopic laser treatment of lower esophageal sphincter with balloon-equipped light diffuser in in vivo porcine model

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Background/aims: Gastroesophageal reflux disease (GERD) is a common clinical problem, affecting millions of people worldwide. Although radiofrequency treatment is currently used for the GERD management, bleeding, perforation risk, and invasiveness still remain problematic. The aim of the current study was to assess the safety and feasibility of a balloon-equipped cylindrical light diffuser for GERD treatment in ex vivo esophagus tissue and in vivo porcine model.

Methods: Ex vivo study was firstly conducted to confirm the temperature distribution of a balloon-equipped light diffuser in porcine esophagus tissues. The tissue samples were irradiated at 30 W for 90 s. Then, a preliminary in vivo study was performed to secure the safety of laser treatment in four pigs. A GERD porcine model was established by injecting botulinum toxin (BTX) into the lower esophageal sphincter (LES) of the animals. One week after the BTX injection, the animals were randomly divided into two groups; sham operation group as control (CTRL) and endoscopically laser-treated group (30 W for 90 s; three times) surviving for 12 weeks.

Results: In a preliminary in vivo study, histopathologic sections demonstrated submucosa detachment and degeneration one day after the laser treatment along with no injury to the mucosa. The BTX-induced porcine GERD models yielded that both mean LES pressure and thickness were reduced one week after the BTX injection. Esophageal Manometry showed that the mean LES pressure decreased by 56% (CTRL) and 41% (treated) after 12 weeks. EUS exhibited that the treated group increased the LES thickness from 2.2 mm to 3.6 mm (63% thicker), whereas CTRL decreased the LES thickness from 1.9 mm to 1.5 mm (20% thinner). 12 weeks after the treatment, the treated group showed a 31% thicker muscularis propria layer than the CTRL group.

Conclusions: The current findings showed that the endoscopic laser treatment with the balloon-equipped light diffuser appeared to be safe and efficacious for the treatment of GERD.

Keywords: Gastroesophageal reflux disease, Lower esophageal sphincter, Optical fiber, Laser treatment, Balloon catheter

PUG-16 

The efficacy of a hemostatic powder in decreasing the rate of upper gastrointestinal re-bleeding

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Background/aims: Non-variceal upper gastrointestinal bleeding (NVUGIB) accounts for a significant number of patient visits to emergency rooms and remains a major cause of mortality and morbidity worldwide. The re-bleeding rates of NVUGIB after endoscopic treatment within 72 hours have been reported to be up to 25%. re-UI-EWD is a newly developed novel endoscopic hemostatic powder UI-EWD(UI-EWD) that forms an adhesive hydropolymer when sprayed on the surface of the gastrointestinal tract. The aim of this study was to evaluate efficacy of UI-EWD on decreasing the re-bleeding rate after standard endoscopic treatment (SET) of acute NVUGIB.

Methods: This prospective, multicenter, randomized controlled trial was conducted from December 2018 to November 2021. Consecutive patients with acute NVUGIB from high-risk lesions (Forrest classification Ia, Ib, and IIa) who achieved immediate hemostasis through SET were randomized in a 1:1 ratio to UI-EWD powder (P) with SET group (SET+P, test) vs SET only group (SET, control). Primary outcomes were defined as re-bleeding rate within 72 hours following treatment and secondary outcomes were re-bleeding rate within 30 days following treatment, as well as safety of UI-EWD.

Results: A total of 348 patients were randomized into the test (n=175) vs control (n=173) groups. Baseline characteristics were not statistically different between groups. The classification of lesion type (test vs control: Forrest Ia and Ib, 115(66.8%) vs 113(67.3%), $p=0.831$), Glasgow-Blatchford bleeding score (test vs control: 10.7 vs 10.4, $p=0.589$) was not statistically different between groups. Re-bleeding rate within 3 days was statistically significantly lower in the test group than in the control group (2.9% (n=5) vs 11.3% (n=19), $p=0.005$). The 30-day cumulative re-bleeding rate was also lower in the test group than in the control group [7.0% (n=12) vs 18.5% (n=31), $p=0.003$] There was no reported UI-EWD related adverse events.

Conclusions: This study demonstrates that UI-EWD application following SET significantly reduced 3-day and 30-day re-bleeding rates in patients treated for NVUGIB without any adverse reactions. (Clinical trial registration number: NCT04124588)

Keywords: Hemostasis, Powder, Upper, Endoscopic, Decrease

PUG-17

Review of additional endoscopic treatments with only positive lateral margin after endoscopic submucosal dissection

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Background/aims: Endoscopic treatment as additional therapy for noncurative resection in the only positive lateral margin (pLM) after endoscopic submucosal dissection (ESD) for early gastric cancer (EGC) has been recommended in patients with no risk of lymph node metastasis because it is less invasive than surgical gastrectomy with favorable long-term outcome. However, there is no guideline on how to perform follow-up observation until additional ESD is performed.

Methods: We retrospectively analyzed 161 patients with only pLM after ESD for EGC who had undergone at least 2 years of follow up.

Results: Of the 161 patients, 148 patients were undergone endoscopic surveillance and 13 patients were directly undergone additional treatment without further biopsy confirmation. In endoscopic surveillance group, 23 patients were detected local recurrence with median time to local recurrence at 72 days (9–2681 days). However, only one case of no residual tumor was determined out of 20 additional ESD cases in endoscopic surveillance group (1/148, 0.7%). In directly undergone additional treatment group (n=13), 9 cases of no residual tumor were determined (9/13, 69.2%); 3 out of 3 in additional ESD (3/3, 100%), 3 out of 4 in biopsy and APC (75%), and 3 out of 6 in surgical resection (50%).

Conclusions: Close endoscopic surveillance without additional treatment before biopsy confirmation could be a proper treatment strategy in patients with only positive lateral margin after ESD for EGC who has no risk factors for lymph node metastasis.

Keywords: Residual tumor, Endoscopic treatment, Positive lateral margin, Endoscopic submucosal dissection, Early gastric cancer

PUG-18

Performance of linked color imaging compared to conventional white light imaging in endoscopic diagnosis of *Helicobacter pylori* infection: A systematic review and meta-analysis

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Background/aims: Recognizing *Helicobacter pylori* (*H. pylori*) infection during endoscopy is important because its recognition can lead to performing a confirmatory testing. Linked color imaging (LCI) is one of the image enhancement techniques that can improve the detection of gastrointestinal lesions. The purpose of this systematic review and meta-analysis was to evaluate the diagnostic performance of LCI compared to conventional white light imaging (WLI) in endoscopic diagnosis of *H. pylori* infection.

Methods: We conducted a comprehensive literature search in PubMed, Embase, and the Cochrane Library. All studies evaluating the diagnostic performance of LCI or WLI in endoscopic diagnosis of *H. pylori* were considered eligible. Studies on magnifying endoscopy, chromoendoscopy, and artificial intelligence were excluded.

Results: Thirty-four studies were included in the meta-analysis, of which 32 studies reported the performance of WLI and 8 studies reported the performance of LCI in diagnosing *H. pylori* infection. Pooled sensitivity and specificity of WLI in the diagnosis of *H. pylori* infection was 0.528 (95% CI, 0.517–0.539) and 0.819 (95% CI, 0.810–0.829), respectively. Pooled sensitivity and specificity of LCI in the diagnosis of *H. pylori* was 0.816 (95% CI, 0.790–0.841) and 0.868 (95% CI, 0.850–0.884), respectively. Pooled diagnostic odds ratio of WLI and LCI was 15.170 (95% CI, 8.047–28.599) and 31.838 (95% CI, 15.576–65.078), respectively. The area under the summary receiver operating characteristics curves (AUC) of WLI and LCI was 0.868 and 0.911, respectively.

Conclusions: LCI showed higher sensitivity in endoscopic diagnosis of *H. pylori* infection than standard WLI.

Keywords: *Helicobacter pylori*, Gastrointestinal endoscopy, Image enhancement, Sensitivity and specificity

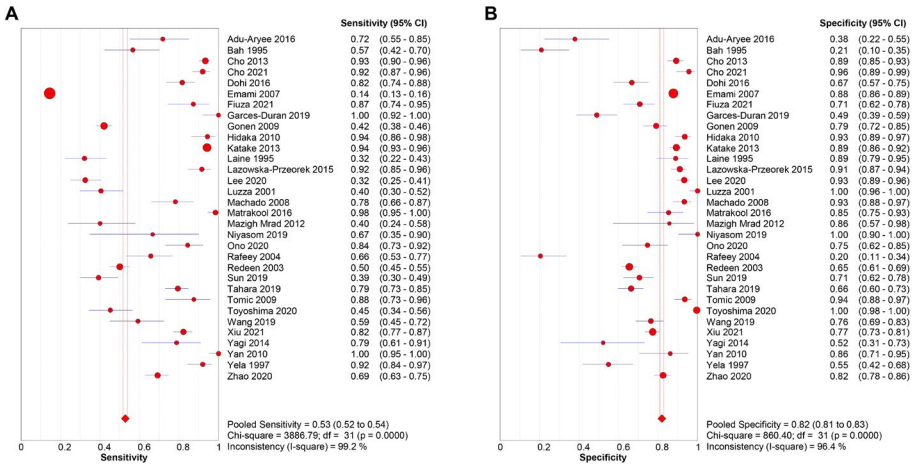


Figure 2. Pooled estimates of sensitivity and specificity of WLI in endoscopic diagnosis of *H. pylori* infection.

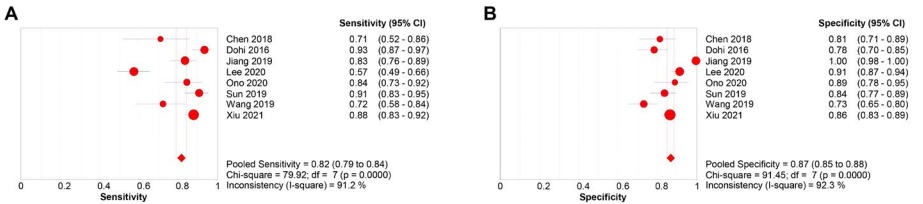


Figure 3. Pooled estimates of sensitivity and specificity of LCI in endoscopic diagnosis of *H. pylori* infection.

PUG-19

***Helicobacter pylori* coccoid form relates to treatment failure**

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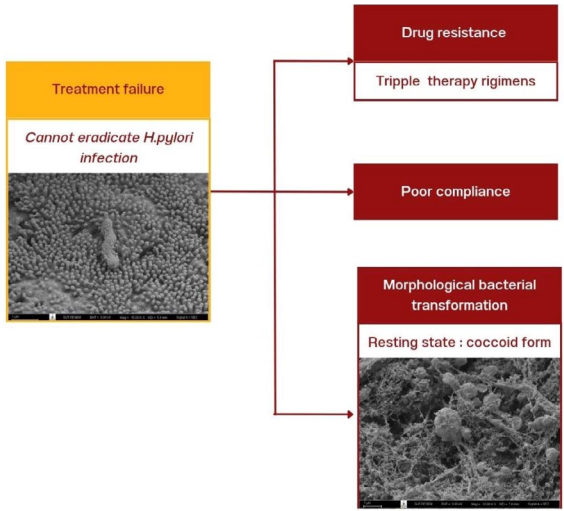
Background/aims: *Helicobacter pylori* (*H. pylori*) infection is strongly associated to peptic ulcer and also gastric cancer which can result in high mortality rate and morbidity associated diseases. However, conventional regimens (triple, sequential, concomitant and dual therapy) are dramatically increased in treatment failure rate of *H. pylori* eradication due to many factors. For example, drug resistance, poor compliance and bacterial conversion into resting state; coccoid form which is unsusceptible to conventional regimens. This study was aimed to study the association between bacterial transformation into coccoid form and rate of *H. pylori* treatment failure under the electron microscope.

Methods: 50 patients with *H. pylori* infection who had treatment failure after receiving standard triple therapy from Suranaree University of Technology Hospital. The scanning electron microscope (SEM) was used to exam the gastric mucosa. The correlation between coccoid form and treatment failure was tested by using the Chi-square methods.

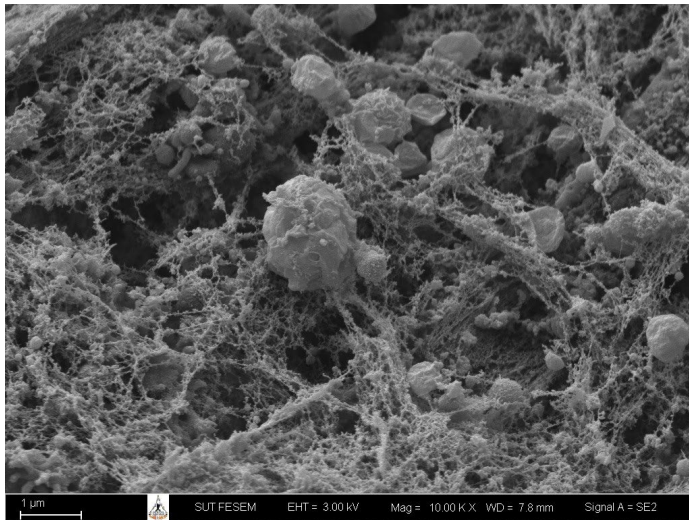
Results: The result showed that 32/50 (64%) samples were found bacterial morphology conversion into coccoid form under SEM. After analyzing correlation by Chi-square test, it showed a significant association (p-value 0.037) between bacterial conversion and risk of *H. pylori* treatment failure.

Conclusions: Morphological conversion of *H. pylori* from spiral into coccoid form can be one of significant factors of *H. pylori* eradication failure among people who received standard triple therapy.

Keywords: Treatment failure, Coccoid form



Patterns of treatment failure



PUG-20

Morphology of *H. pylori* on the human gastric surface under scanning electron microscope

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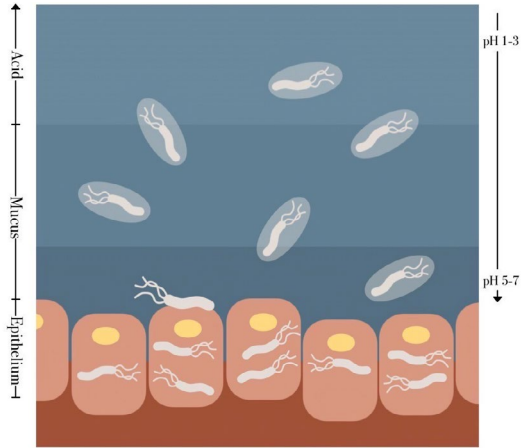
Background/aims: Once *H. pylori* enters the stomach, the urease enzyme is used to create a self-defense barrier to survive the stomach due to concentrated acidity. Then use flagella to move into the gastric in the mucus a layer. After attaching to the stomach, the bacteria will release the toxin, causing inflammation in the stomach. Morphology of *H. pylori* reveals unclear especially the coccoid form. The goal of this study was to examine the morphology of *H. pylori* in gastric biopsies of patients infected with *H. pylori* using scanning electron microscope.

Methods: A total of 50 patients with gastritis were included. We have studied the shape of bacteria in the human gastric mucosa by using scanning electron microscope.

Results: The result showed that 32/50 (64%) samples were found the spiral form and 18/50 (36%) bacterial morphology conversion in the coccoid form under SEM.

Conclusions: Spiral form and coccoid form were found in human gastric mucosa. The spiral form is a form that can damage the stomach and can multiply on the surface of the stomach while the coccoid form is a shape that responds to inappropriate environmental conditions such as alkali or antibiotic and also a shape that should be able to transmit to other people.

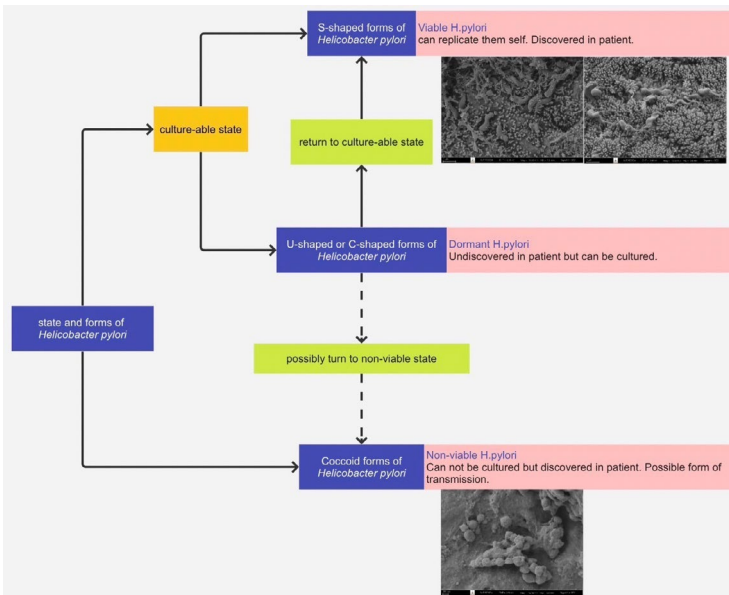
Keywords: *H. pylori*, Spiral form, Coccoid form



Infection and Pathogenesis

1. Reaches the host and survive
2. Get to the epithelium by using flagella
3. Creates the organization by adhering to the adhesion-receptor
4. Peptic ulcer is brought on by toxic discharge

Pathophysiology of *Helicobacter pylori* infection.



State and forms of *Helicobacter pylori*.

PUG-21

Artificial Intelligence assisted interpretation of rapid urease test using convolutional neural networks

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Background/aims: Rapid urease test (RUT) is a diagnostic method for *H. pylori* infection with high sensitivity and specificity. However, interpretation of subtle color change is subjective and may lead to lower accuracy. In this study, we aimed to develop an AI model that can interpret the results of RUT kits with high objectiveness and accuracy.

Methods: A total of 331 patients (622 images of wells of RUT kits) were enrolled. They were exclusively divided into train, validation, and test datasets per patient (N=199, 66, and 66, respectively). UBT and *H. pylori* culture were tested for establishing the ground truth of *H. pylori* infection. Four AI models were trained and validated with the photos of RUT kits. The AI models and six humans were tested with the same test dataset. Diagnostic performances were compared between the AI models and humans.

Results: Among the four AI model, ResNet101 showed the best diagnostic performance (sensitivity; 0.963, specificity; 0.887; and accuracy; 0.92). Three doctors and three nurses interpreted the same test dataset, and all showed similar or lower diagnostic performances compared to ResNet101 (Table 1).

Conclusions: We developed an AI model that can interpret RUT kits with high objectiveness and accuracy. This result will help to develop an automatic RUT reading system.

Keywords: *Helicobacter pylori*, Urea breath test, Artificial intelligence

Table 1. Diagnostic performance of AI models and six humans for the test dataset

		Sensitivity	Specificity	PPV	NPV	Accuracy
Humans	Nurse A	0.907	0.887	0.860	0.926	0.896
	Nurse B	0.944	0.887	0.864	0.955	0.912
	Nurse C	0.944	0.859	0.836	0.953	0.896
	Doctor A	0.907	0.901	0.875	0.928	0.904
	Doctor B	0.907	0.887	0.860	0.926	0.896
	Doctor C	0.907	0.887	0.860	0.926	0.896
AI models	ResNet50	0.926	0.901	0.877	0.941	0.912
	ResNet101	0.963	0.887	0.867	0.969	0.920
	EfficientNet-B0	0.907	0.887	0.860	0.926	0.896
	DenseNet121	0.889	0.915	0.889	0.915	0.904

* PPV; Positive predictive value, NPV; negative predictive value

PUG-22

Promotion of awareness of gastrointestinal endoscopy and *H. pylori* infection through application

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Background/aims: This study was done to gain knowledge, understanding, and concern for the general public using the Endoscopic Advice application so that they will see a doctor for examination and treatment faster, therefore, the number of patients who are severely ill will decrease.

Methods: The application also included information about the test's treatment, advantages, and side effects of the test. Moreover, there are video clips about the symptoms of people who should be tested in Thai and English language. Assessment of the quality of the app can be done by questionnaire for users to assess their satisfaction and evaluate and give feedback.

Results: Results indicated that all users demonstrated an improved understanding of upper gastrointestinal endoscopy, colonoscopy, and *H. pylori* as indicated in Table 1. Additionally, Table 2 showed a significant increase in the percentage of users who recognized the importance of gastrointestinal endoscopy after using the application. In-app videos were found to contribute significantly to users' understanding, with 97.9% of users reporting that the videos helped them understand the content (Table 3). Lastly, a vast majority of users (97.9%) reported being likely to recommend the application to acquaintances, as demonstrated in Table 4.

Conclusions: The application can help users understand and become more aware of the importance of upper gastrointestinal endoscopy (EGD), colonoscopy, and *H. pylori* testing. This increased from 97.9% to 100%. From this result, applications can be of great help in reducing *H. pylori* infection and gastrointestinal disease as people become more aware of the importance of and ability to obtain timely treatment before severe symptoms arise.

Keywords: *H. pylori*, Endoscopy, Awareness



PUG-23

Possible route of transmission of *Helicobacter pylori*

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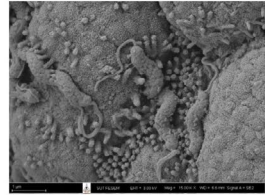
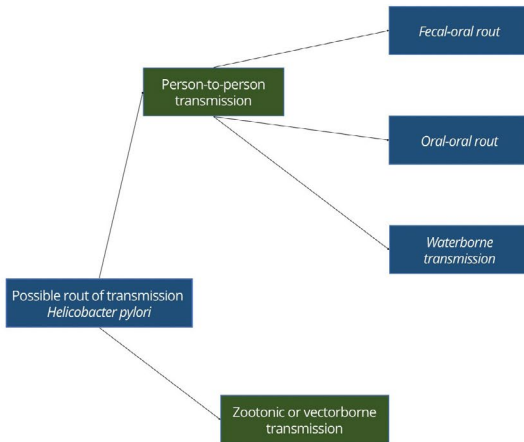
Background/aims: The way spread of *H. pylori* is unclear, from study cases suggesting that pathogens can be transmitted from person-to-person Waterborne transmission Zoonotic or vector borne transmission including contaminated medical device, In general this pathogen has a spiral form when it infects, but in unsuitable conditions will change form into a coccoid form in order to survive an unsuitable environment. For the purpose of this investigation study is to study different ways of the transmission of *Helicobacter pylori* to determine the possibility of transmission of the infection as a coccoid form by electron microscope from the gastric biopsies.

Methods: Gastric mucosal biopsies from 50 individuals infected with *H. pylori*. The patient's stomach is biopsied and examined under an electronic microscope to find the coccoid shape which can be in the shape used to propagate in the environment.

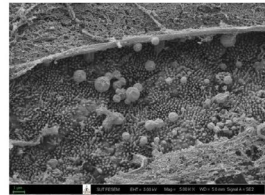
Results: Results showed that 64% (32/50) of *H. pylori* was coccoid form, especially those given antibiotics and those taking antacids. Some bacteria are unable to tolerate antibacterial agents that destroy the bacterial structure and inhibit their growth and thus die, but most have changed from spiral to coccoid to be resistant to the antibacterial agent.

Conclusions: *H. pylori*, which is transformed from spiral to coccoid, is able to live in an inappropriate environment, making transmission easier. The main transmission method is from person to person. The most common method of transmission is person-to-person. Particularly from mouth to mouth (oral-oral), because it can be infected directly and has the greatest risk of contagion. *H. pylori* may also adhere to the environment as coccoid. In case of contact with the environment, the hands must be washed thoroughly each time and consume only cooked food.

Keywords: *H. pylori*, Transmission



spiral form of H.pylori



possible transmission form

Rout of transmission

PUG-24

Relationship between EBV(+) gastric cancer and multiple genes related to gastric carcinogenesis

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Background/aims: Gastric cancer has been categorized into molecular subtypes including Epstein-Barr virus (EBV)-positive tumors, which provide clinicopathological and prognostic information. In this study, we investigated the EBV infection status of patients with gastric cancer and its correlation with the clinicopathological characteristics and multiple genes related to gastric carcinogenesis.

Methods: The data of 460 gastric cancer patients who underwent curative gastrectomy with D2 lymph node dissection between January 2017 and February 2022 were analyzed. The clinicopathological features and prognosis of the patients with EBV-positive gastric cancers were compared with those of EBV-negative gastric cancers. Immunohistochemistry for epidermal growth factor receptor (EGFR), C-erb B2, Ki-67, and p53 was performed. Additionally, in situ hybridization was conducted to detect EBV, and microsatellite instability (MSI) analysis was used to assess the deficiency in mismatch repair (MMR) genes.

Results: EBV-positivity and MSI were identified in 10.4% and 37.3% of gastric cancer patients, respectively. EBV positivity was associated with male gender ($P=0.001$), proximal location ($P=0.004$), poorly differentiated histological type ($P=0.048$), moderate to severe lymphoid stroma ($P=0.006$), high Ki-67 expression ($P=0.02$), and a shorter resection margin. EGFR was more often expressed in EBV-negative gastric cancers ($P<0.001$). MSI tumors were associated with older age ($P=0.01$), the presence of lymphatic invasion ($P=0.02$), less perineural invasion ($P=0.05$), and the presence of *H. pylori* infection ($P=0.05$).

Conclusions: EBV positive gastric cancer is associated with increased Ki-67 and decreased EGFR expression and a shorter resection margin due to the prominent lymphoid stroma. However, MMR deficiency is not associated with EBV status even though MSI gastric cancer is related to *H. pylori* status.

Keywords: Gastric cancer, EBV, MSI, *H. pylori*

PUG-25

Diagnostic accuracy of probe-based confocal laser endomicroscopy and narrow band imaging in gastric neoplasia

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Background/aims: Histologic examination is essential to diagnose gastric cancer or a benign disease for the gastric lesions which were found using white light endoscopy (WLE). Probe-based confocal laser endomicroscopy (pCLE) and magnified narrow band imaging (mNBI) have been introduced as methods to reduce biopsy, but studies comparing the two are rare. In this study, we estimate the accuracy of pCLE and mNBI for diagnosis of gastric neoplasia.

Methods: MNBI and pCLE were performed for patients in whom WLE and initial endoscopic biopsy failed to discriminate between malignant and benign. All examinations were performed by 1 endoscopist (S.K.L.) who is expert in advanced endoscopic procedures and endoscopic imaging techniques. Gastroscopy (GIF-HQ190, Olympus) and through-the-endoscope probe (pCLE; Mauna Kea Technologies, France) was used in this study. The histopathology diagnosis was used as reference standard.

Results: In 50 study participants, 58 lesions in the stomach were examined. A comparison of pCLE and mNBI shows a numerically higher accuracy and sensitivity for pCLE in the lesions with gastric cancer. The accuracy, sensitivity, and specificity of pCLE were found to be 81.0%, 87.5%, and 73.0%, respectively, as compared with 70.6%, 59.3%, and 84.6%, respectively. However, only sensitivity was statistically significant ($P=0.01$).

A comparison of pCLE and mNBI shows a statistically significant higher accuracy ($P<0.005$) and sensitivity ($P<0.001$) for pCLE in the lesions with gastric cancer or high-grade dysplasia. The accuracy, sensitivity, and specificity of pCLE were found to be 87.9%, 94.2%, and 78.2%, respectively, as compared with 65.5%, 54.2%, and 82.6%, respectively (Table 1). The Area under curve (AUC) for pCLE and mNBI were 0.863 (95% CI, 0.747–0.939, $p<0.0001$) and 0.684 (95% CI, 0.549–0.800), $p=0.0017$.

Conclusions: Our study suggests that pCLE has superior accuracy sensitivity as compared with mNBI for detection of cancer and high-grade dysplasia in gastric lesions.

Keywords: Confocal, NBI, Cancer, Dysplasia

PUG-26

Analysis of E-Cadherin in oesophageal squamous cell carcinoma – association with histological characteristics

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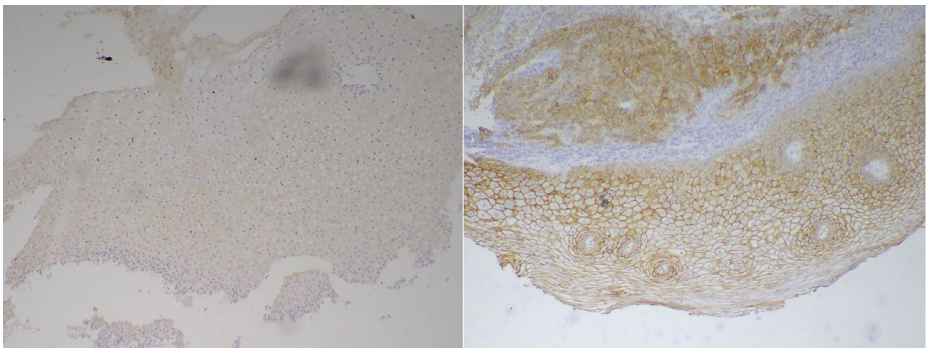
Background/aims: Oesophageal Squamous Cell Carcinoma is one of the common malignant tumours of oesophagus which is associated with poor prognosis. This study was thus designed to E-Cadherin in prognosis of Oesophageal Squamous Cell Carcinoma.

Methods: A total of 100 Oesophageal Squamous Cell Carcinoma were identified. Hematoxylin and eosin staining were done to identify the basic pathological characteristics followed by immune-histochemistry for analysis of E-Cadherin. The data was analyzed by using Statistical Package for Social Sciences version 21.0.

Results: It was observed during the research that majority of the 65% patients with Oesophageal Squamous Cell Carcinoma were found to have E-Cadherin expression that was less than 10% positive/mildly stained in the carcinoma cells, whereas only 35% patients had expression of CD 133 that was 10% to 30% positive and moderately stained in the carcinoma cells.

Conclusions: The findings revealed that expression of E-Cadherin lowers with the presence of Oesophageal Squamous Cell Carcinoma in patients. Thence, it can be a helpful immune-histochemical marker and its expression in lower quantity and quality can be an indication of presence of the tumor and bad prognosis in patients with Oesophageal Squamous Cell Carcinoma.

Keywords: Esophageal squamous cell carcinoma, Immuno-histochemistry, E-cadherin



Staining of Cells by E-Cadherin at DR LUMHS Lab a) Mild Staining
b) Moderate Staining

PUG-27



Timed barium esophagography can predict recurrent achalasia after peroral endoscopic myotomy

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Background/aims: Achalasia is a rare esophageal motility disease that characterized by an absence of peristalsis and failure of lower esophageal sphincter relaxation. Timed barium esophagography (TBE) is widely used as screening and diagnostic tools due to its availability and simplicity. Peroral Endoscopic Myotomy (POEM) is currently emerged that can be applied to all types of achalasia. However, there was no study on the utility of TBE as a follow up tool after POEM. This study aimed to determine the predictor tools for recurrent achalasia treated by POEM.

Methods: A retrospective study was conducted in achalasia patients who underwent POEM during January 2015 to December 2021. The pre- and post-treatment Eckardt scores were recorded. Preoperatively, the radiographs were taken for width and height measurement of Barium column at 0, 1, 2, and 5 minutes after ingestion. Another TBE was scheduled at 1 month after POEM. The patients were divided into two groups: discordant group (Eckardt score was improved by more than 50% but TBE result decreases less than 50%) and concordant group (both Eckardt score and TBE result showed significant improvement more than 50%). The recurrence was assessed by Eckardt score of more than 3.

Results: 42 patients underwent POEM which 30 patients had complete records. 17 patients (56.67%) were in discordant group, while 13 patients (43.33%) were in concordant group. 10 patients (23.81%) had recurrent achalasia during 5-year follow-up and the mean time-to-recurrence was 1.73 years. The discordant group had 6.87 times higher recurrent rate compared with the concordant group [9/17 (52.9%) vs 1/13 (7.7%); $P < 0.017$]. The most common recurrence was type II. There was no significant risk factor for recurrence in this study.

Conclusions: Our study strongly suggested that Eckardt score and TBE can be used to predict recurrent achalasia after being treated by POEM. The patients in discordant group are at risk. Significant risk factors for recurrence may be identified by further research.

Keywords: POEM, Achalasia, Recurrent Achalasia, Timed barium esophagogram

PUG-28 

Preliminary report of non-exposure simple suturing-EFTR (NESS-EFTR) for EGC for egc (SENORITA 3 phase 2 trial)

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Background/aims: Non-exposure simple suturing endoscopic full-thickness resection (NESS-EFTR) was developed to prevent tumor exposure to the peritoneal cavity during EFTR. The aim of this study was to identify the efficacy of NESS-EFTR.

Methods: This trial is a prospective phase II trial. Patients with EGC less than 3 cm in size without absolute indication for endoscopic submucosal dissection were eligible. Sentinel basin was detected using Tc99m-phytate and indocyanine green, and the NESS-EFTR procedure was performed when all sentinel basin nodes were tumor-free by frozen pathologic examination. The primary outcome was the rate of complete resection, and secondary outcomes were the rate of successful NESS-EFTR. Estimated sample size is 88 patients.

Results: This is the preliminary report of 44 patients where half of target sample size is registered. Six patients received conventional laparoscopic gastrectomy because metastatic sentinel lymph nodes were detected (n=5) or withdrew consent. NESS-EFTR was successful in 34 of the 38 remaining patients (89.4%). Reasons of failure of NESS-EFTR were unclear tumor margin (n=2) or perforations which could not be controlled by endoscopic procedure (n=2).

Complete resection rate as a primary endpoint was 89.4% (34/38). In cases of incomplete resection, immediate additional intraoperative endoscopic submucosal dissections (n=3) or argon plasma coagulation (n=1) was performed. There were four perforations.

Conclusions: Early preliminary data shows NESS-EFTR with sentinel basin dissection is promising. This study is expected to identify the efficacy of NESS-EFTR with sentinel basin dissection for EGC.

Keywords: NESS-EFTR, Early gastric cancer, Sentinel lymph nodes

PUG-29

Bronchial obstruction by esophageal stent in advanced esophageal cancer patient

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Clinical situation

A 70-year-old man who had undergone dysphagia was diagnosed esophageal cancer and SEMS was inserted on the lesion. Concurrent radiochemotherapy was initiated.

Due to cancer invasion, tracheo-esophageal fistula occurred and additional esophageal SEMS was placed.(stent in stent)(Figure 1a)

Course of events

After discharge, He revisited hospital with dyspnea, cough and general weakness two months later.

Diagnosed as community acquired pneumonia, he was treated with antibiotics for 7 days but dyspnea was aggravated and fever developed.

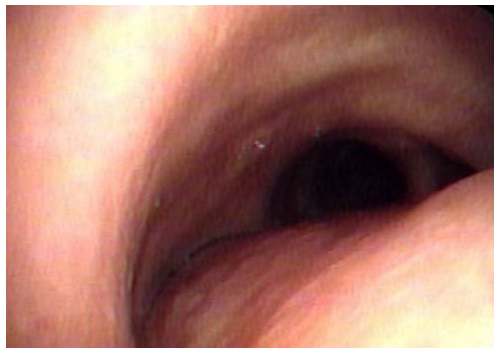
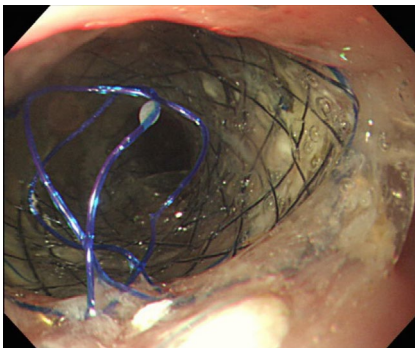
Follow up chest X ray showed white out of left hemi thorax (Figure 1b).

To evaluate possible endobronchial lesion, flexible bronchoscopy was done and extrinsic compression of left main bronchus(Figure 1c) was noted.

Discussion and Conclusion

In our patient, inoperable advanced esophageal cancer was managed palliatively by esophageal stenting to improve the quality of life.

Keywords: Esophageal cancer, Esophageal stent, Advanced esophageal cancer, Double stenting, Bronchial compression



PUG-30

Clinical outcomes of young early gastric cancer patients who underwent endoscopic submucosal dissection

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Background/aims: A small portion of patients are diagnosed as early gastric cancer (EGC) and undergo endoscopic submucosal dissection (ESD) at young age, however, their clinical outcomes are rarely known. We investigated clinical characteristics and outcomes of patients who underwent ESD for treatment of EGC at age under 50.

Methods: We enrolled patients who were diagnosed as EGC and underwent ESD during 2006 and 2020. We divided them either for young age (YA) group if age ≤ 50 years and other age (OA) group if > 50 years.

Results: We enrolled 1,349 patients (YA group: 105 patients [7.8%], OA group: 1244 [92.2%]). Compared with OA group, YA group contained more female patients (36.2 vs. 26.5%, $P=0.033$), their tumor was located at middle third (41.0 vs. 29.6%, $P=0.006$) and was depressed (40.0 vs. 28.8%, $P=0.001$), and had more undifferentiated (30.5 vs. 12.1%, $P<0.001$) and diffuse type (22.9 vs. 7.3%, $P<0.001$) histology. However, synchronous tumor was less frequent in YA group (2.9 vs. 12.4%, $P=0.001$). When we sorted 884 patients who achieved curative resection and were followed-up longer than 12 months, Kaplan-Meier analysis showed that metachronous neoplasm (dysplasia or cancer) and metachronous cancer were significantly less in YA group than OA group ($P=0.003$ and 0.013 , respectively), however, local recurrence was not significantly different between two groups.

Conclusions: ESD is a favorable and effective therapeutic modality for EGC patients who are aged under 50, once curative resection is achieved.

Keywords: Early gastric cancer, Endoscopic submucosal dissection, Recurrence

PUG-31

Clinical outcomes of traction-assisted ESD for pyloric neoplasms: Propensity score matching

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Background/aims: Endoscopic submucosal dissection (ESD) of gastric neoplasms in pylorus is a challenge for endoscopist. Previous studies have indicated that traction-assisted ESD (TA-ESD) significantly shortens the procedure time. However, there are limited TA-ESD studies for pyloric neoplasms. Therefore, this study aimed to investigate the clinical outcomes of TA-ESD for pyloric neoplasms.

Methods: We retrospectively analyzed 208 cases of adenoma or early gastric cancer who had undergone ESD between 2016 and 2021 at Pusan National University Hospital. The cases were divided into the conventional ESD (C-ESD) group (n=173) and the TA-ESD group (n=35). Using 1:1 propensity score matching (PSM) analyses, 33 pairs were made.

Results: In the unmatched cohort, compared to the C-ESD group, the TA-ESD group had significantly higher incomplete resection rate, positive vertical margin rate, and longer procedure time. After the 1:1 PSM, the TA-ESD group had a significantly shorter procedure time than the C-ESD group. In multivariate analysis, there was no statistically significant factor affecting the complete resection rate.

Conclusions: Compared to C-ESD, TA-ESD significantly shortened the procedure time. We found no significant differences in the complete resection rate or the adverse event rate between these groups.

Keywords: Endoscopic submucosal dissection, Traction-assisted ESD, Propensity score matching, Stomach, Pyloric neoplasm

	Before PSM			After PSM		
	C-ESD(n=173)	TA-ESD(n=35)	p value	C-ESD(n=33)	TA-ESD(n=33)	p value
Procedure time, min (SD)	25.3 (22.0)	34.2 (26.1)	0.036	43.7 (32.1)	30.1 (18.1)	0.040
Adverse event, n (%)						
Bleeding	1 (0.6)	1 (2.9)	0.309	1 (3.0)	1 (3.0)	1.000
Perforation	0 (0.0)	1 (2.9)	0.168	0 (0.0)	1 (3.0)	1.000
Stenosis	4 (2.3)	3 (8.6)	0.095	2 (6.1)	2 (6.1)	1.000
Venous invasion, n (%)			0.309			1.000
Absent	172 (99.4)	34 (97.1)		33 (100.0)	32 (97.0)	
Present	1 (0.6)	1 (2.9)		0 (0.0)	1 (3.0)	
Lymphatic invasion, n (%)			1.000			1.000
Absent	170 (98.3)	35 (100.0)		32 (97.0)	33 (100.0)	
Present	3 (1.7)	0 (0.0)		1 (3.0)	0 (0.0)	
Horizontal margin, n (%)			0.134			1.000
Negative	168 (97.1)	32 (91.4)		31 (93.9)	31 (93.9)	
Positive	5 (2.9)	3 (8.6)		2 (6.1)	2 (6.1)	
Vertical margin, n (%)			0.028			0.492
Negative	173 (100.0)	33 (94.3)		33 (100.0)	31 (93.9)	
Positive	0 (0.0)	2 (5.7)		0 (0.0)	2 (6.1)	
En bloc, n (%)			1.000			1.000
No	4 (2.3)	1 (2.9)		1 (3.0)	0 (0.0)	
Yes	169 (97.7)	34 (97.1)		32 (97.0)	33 (100.0)	
Complete resection, n (%)			0.014			0.672
No	5 (2.9)	5 (14.3)		2 (6.1)	4 (12.1)	
Yes	168 (97.1)	30 (85.7)		31 (93.9)	29 (87.9)	

C-ESD, conventional endoscopic submucosal dissection; PSM, propensity score matching analysis; SD, standard deviation; TA-ESD, traction-assisted endoscopic submucosal dissection.

Procedure outcome of both groups before and after PSM

Variables	Univariate analysis		Multivariate analysis	
	Odds ratio (95% CI)	p value	Odds ratio (95% CI)	p value
Location				
PP-type	1 (Reference)			
P-type	0.000*	0.998*		
Directional distribution				
12 to 3	1 (Reference)			
3 to 6	0.737 (0.057-9.457)	0.815		
6 to 9	1.368 (0.112-16.704)	0.806		
9 to 12	1.105 (0.141-8.636)	0.924		
Circumferential extent of the resection				
≤ 1/2	1 (Reference)		1 (Reference)	
> 1/2	0.143 (0.016-1.299)	0.084	0.137 (0.014-1.288)	0.082
Macroscopic finding				
Flat/elevated	1 (Reference)		1 (Reference)	
Depressed/excavated	3.714 (0.627-21.989)	0.148	3.395 (0.531-21.687)	0.196
Tumor size				
≤ 20mm	1 (Reference)			
> 20mm	0.400 (0.064-2.489)	0.326		
Histopathology				
Adenoma/mucosal cancer	1 (Reference)			
Submucosal cancer	0.455 (0.044-4.691)	0.508		
Ulcer				
Absent	1 (Reference)			
Present	0.769 (0.079-7.464)	0.821		
Procedure method				

Multivariate analysis of predictive factors for complete resection

PUG-32

Risk factors for rebleeding of non-variceal upper gastrointestinal bleeding when taking dual antiplatelet agents

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Background/aims: Patients who are receiving dual anti-platelet therapy (DAPT) may suffer from recurrent gastrointestinal (GI) bleeding. We investigated clinical characteristics and associated factors of recurrent non-variceal upper gastrointestinal bleeding (NVUGIB) in patients who had a history of NVUGIB while receiving DAPT.

Methods: We enrolled patients who received DAPT and was diagnosed as NVUGIB during 2006 to 2020. All NVUGIB events were confirmed if definite bleeding focus was found on upper GI tract by esophagogastroduodenoscopy.

Results: A total of 124 patients who received DAPT were diagnosed as NVUGIB. Patients were male-predominant (103, 83.1%), and bleeding was mostly from stomach (94, 75.8%) and peptic ulcer (72, 58.1%). After stabilization of index NVUGIB, 36 patients (29.0%) showed at least one episode of recurrent UGI bleeding, 19 patients (15.3%) expired, and among them, 7 (5.6%) were bleeding-related death. Multivariate analysis showed that age was the significant factor for rebleeding (odds ratio [OR]: 1.050, 95% confidence interval [CI]: 1.001–1.102, P-value: 0.047), all-cause mortality (OR: 1.096, 95% CI: 1.020–1.178, P=0.013) and rebleeding-related mortality (OR: 1.187, 95% CI: 1.032–1.364, P-value: 0.016). Kaplan-Meier analysis showed that cumulative probability of rebleeding, death and bleeding-related death was significantly higher among patients with age >70 years compared with patients with age ≤ 70 years (P=0.008, <0.001 and 0.009, respectively).

Conclusions: Clinicians need to be cautious of rebleeding and mortality when elderly patients are hospitalized due to NVUGIB during DAPT.

Keywords: Dual anti-platelet therapy, Upper gastrointestinal tract, Bleeding, Mortality

PUG-33

Gastroparesis as a complication of stretta for gastroesophageal reflux disease: Three case reports

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Background/aims: Stretta is a minimally invasive treatment for gastroesophageal reflux in intolerant, non-responsive to proton pump inhibitors. It induces hypertrophy in the lower esophageal sphincter using radiofrequency energy. Gastroparesis is a potential complication due to vagal nerve injury, but its incidence and risk factors are unclear. We report three cases of Stretta-associated gastroparesis to aid in identifying risk factors and prognosis.

Methods: This study analyzes Stretta cases performed at Seoul St. Mary's hospital from 2019 to March 2023, and reports on three cases of gastroparesis as a complication of Stretta. We checked the three cases patient character including age, underlying disease, medical history. Treatment and follow up hospital clinical records were also documented.

Results: A single experienced endoscopist performed 41 Stretta procedures over 4 years at a single center. Of these, 10 were performed on patients older than 65, and the remaining 31 were performed on younger patients. Three cases developed gastroparesis within a week after the procedure, with symptoms including abdominal distension, vomiting, and bloating. CT scans and x-rays showed edematous wall thickening in the distal esophagus and marked gastric distension. Two of the affected patients were elderly (75 and 81 years old) and two had underlying conditions of hypothyroidism and dyslipidemia on prophylactic antithrombotic drugs. Recovery took about one week and included nasogastric tube drainage, intravenous macrolide to improve gastric emptying, and metoclopramide, mosapride to improve motility.

Conclusions: The study suggests that gastroparesis is an uncommon complication of Stretta for gastroesophageal reflux, which tends to occur at a higher rate in older patients and may be related to the use of antithrombotic drugs or a history of hypothyroidism. However, further research is needed to confirm these findings due to the small number of cases analyzed.

Keywords: Stretta, Gastroesophageal reflux disease, Gastroparesis

PUG-34

Prediction of *Helicobacter pylori* infection in endoscopic features

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Background/aims: Recently, several attempts have been made to distinguish the *Helicobacter pylori* infection status using endoscopic morphology, however, it might be complicated to apply in clinical practice. Therefore, we analyzed endoscopic features and developed a simple scoring system to detect *H. pylori* infection.

Methods: We retrospectively investigated the patients who underwent upper gastrointestinal endoscopy with obtaining gastric mucosal tissues for *H. pylori* culture test, between January 2019 and December 2021 at tertiary hospital. *H. pylori*-positive was defined as 1) culture positive or 2) both positive in rapid urease test (RUT) and urea breath test (UBT), while *H. pylori*-negative as all negative in culture, RUT, and UBT.

Results: The numbers of *H. pylori*-positive and negative patients were 358 and 132, respectively. There were significant endoscopic findings including atrophy (98.6% vs. 81.1% $p<0.001$), intestinal metaplasia (64.0% vs. 45.5%, $p<0.001$), diffuse redness (47.5% vs. 3.0%, $p<0.001$), spotty redness (77.1% vs. 6.8%, $p<0.001$), and sticky mucus (28.5% vs. 1.5%, $p<0.001$) in *H. pylori*-positive patients. The scoring system showed a 5% infection rate with a score of 0, 45% with a score of 1, 96% with a score of 2, and 99% with a score of 3.

Conclusions: *H. pylori* testing should be considered if there is spotty redness, diffuse redness, nodularity, and absence of RAC on endoscopic findings as determined by the predicting scoring system.

Keywords: *Helicobacter pylori*, Eradication therapy, Gastritis

Table 1. Endoscopic features according to *Helicobacter pylori* infection status diagnosed with rapid urease test, urea breath test, or *H. pylori* culture.

	<i>H. pylori</i> positive (N=358)	<i>H. pylori</i> negative (N=132)	<i>p</i> value
M/F	224/134 (62.6%)	72/60 (54.5%)	1.000
Age	61.8 ± 10.9	60.6 ± 13.9	0.349
Endoscopic features			
<i>H. pylori</i> -uninfected features			
RAC	4 (1.1%)	74 (56.1%)	< 0.001
Fundic gland polyp	2 (0.6%)	17 (12.9%)	< 0.001
Linear streak	3 (0.8%)	50 (37.9%)	< 0.001
Raised erosion	7 (2.0%)	38 (28.8%)	< 0.001
Hematin	11 (3.1%)	7 (5.3%)	0.371
<i>H. pylori</i> -infected features			
Atrophy	353 (98.6%)	107 (81.1%)	< 0.001
Closed-type	87 (24.3%)	41 (31.1%)	< 0.001
Open-type	266 (74.3%)	66 (50.0%)	
Intestinal metaplasia	229 (64.0%)	60 (45.5%)	< 0.001
Diffuse redness	170 (47.5%)	4 (3.0%)	< 0.001
Spotty redness	276 (77.1%)	9 (6.8%)	< 0.001
Edema	51 (14.2%)	7 (5.3%)	0.010
Sticky mucus	102 (28.5%)	2 (1.5%)	< 0.001
Enlarged folds	22 (6.1%)	0 (0.0%)	0.008
Nodularity	27 (7.5%)	0 (0.0%)	0.003
Xanthoma	76 (21.2%)	26 (19.7%)	0.806
Hyperplastic polyp	28 (7.8%)	4 (3.0%)	0.089

H. pylori Helicobacter pylori; RAC regular arrangement of collecting venule

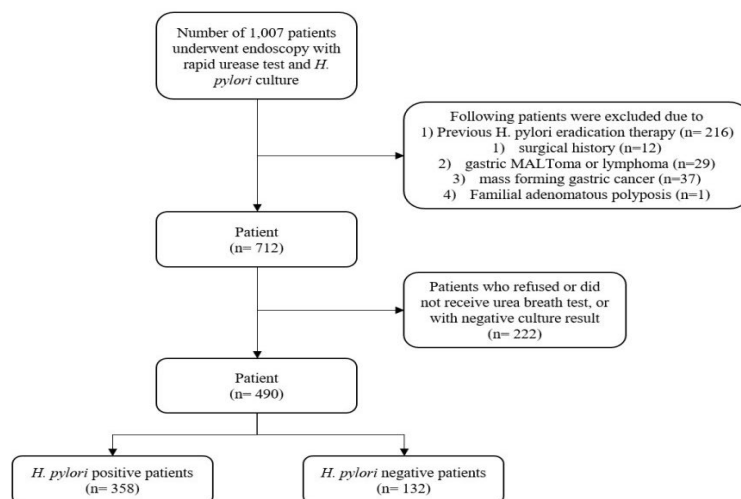
Table 2. Estimate of risk of *Helicobacter pylori* infection according to the scores in the development set and validation set.

Total score	Estimate of risk	development (N=349)			validation (N=141)		
		N	event	%	N	event	%
0	0.0252	37	2	0.0541	40	1	0.0250
1	0.4538	56	23	0.4107	29	13	0.4483
2	0.9639	238	231	0.9706	67	65	0.9701
3	0.9988	18	18	1.0000	5	5	1.0000

Table 3. Initial *Helicobacter pylori* eradication rate according to the endoscopic findings.

	Success (n=198)	Failure (n=30)	<i>p</i> value
M/F	126/72 (63.6%)	17/13 (56.7%)	0.752
Age	60.6 ± 10.3	62.1 ± 11.5	0.444
<i>H. pylori</i> IgG titer	4.6 ± 2.2	4.7 ± 2.3	0.877
Endoscopic morphology			
<i>H. pylori</i> -uninfected features			
RAC	2 (1.0%)	0 (0.0%)	1.000
Fundic gland polyp	2 (1.0%)	0 (0.0%)	1.000
Linear streak	1 (0.5%)	0 (0.0%)	1.000
Raised erosion	5 (2.5%)	1 (3.3%)	1.000
Hematin	5 (2.5%)	1 (3.3%)	1.000
<i>H. pylori</i> -infected features			
Atrophy	194 (98.0%)	30 (100.0%)	0.969
Closed-type	48 (24.2%)	12 (40.0%)	0.154
Open-type	146 (73.7%)	18 (60.0%)	
Intestinal metaplasia	122 (61.6%)	22 (75.9%)	0.237
Diffuse redness	87 (43.9%)	20 (66.7%)	0.033
Spotty redness	152 (76.8%)	22 (73.3%)	0.856
Edema	30 (15.2%)	7 (23.3%)	0.386
Sticky mucus	53 (26.8%)	14 (46.7%)	0.044
Enlarged folds	14 (7.1%)	2 (6.7%)	1.000
Nodularity	16 (8.1%)	1 (3.3%)	0.583
Xanthoma	47 (23.7%)	7 (23.3%)	1.000
Hyperplastic polyp	19 (9.6%)	1 (3.3%)	0.433
<i>H. pylori</i> -past infected features			
Patchy redness	5 (2.5%)	1 (3.3%)	1.000
Map-like redness	5 (2.5%)	0 (0.0%)	0.833
Multiple whitish flat lesions	0 (0.0%)	0 (0.0%)	1.000

H. pylori *Helicobacter pylori*; RAC regular arrangement of collecting venule

Figure 1. Flowchart of patients tested for *H. pylori* infection

H. pylori *Helicobacter pylori*

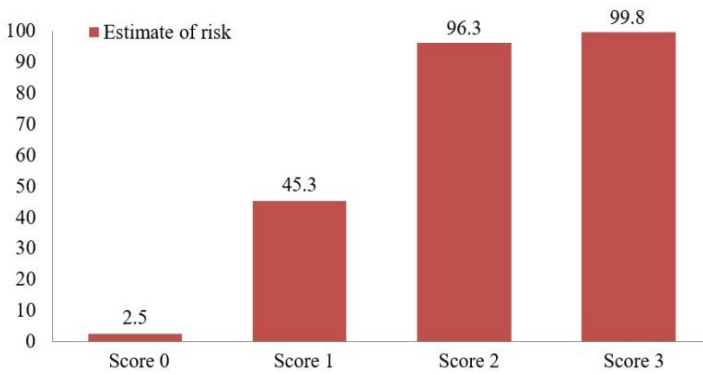


Figure 5. Estimated risk of positive *Helicobacter pylori* infection according the scores. The probability of the risk was estimated using a logistic regression model. The probability of the event occurring equals one divided by the sum of one and the exponential function of negative one times the sum of negative 0.9884 and 4.4197 times score (Estimate of the risk= $1/(1+\exp(-(-0.9884+4.4197*\text{Score}^2)))$).

PUG-35

Artificial intelligence detecting dysplastic lesions of ampulla of vater in conventional endoscopic image

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Background/aims: Ampullary dysplasia arise in and around the duodenal papilla with pre-malignant potential. Endoscopic advances in recent years have shifted the paradigm of treatment toward attempted endoscopic resection prior to surgery. Nevertheless, it is challenging to detect ampullary dysplasia without side-viewing endoscopy because of its location and rarity. Herein, we aimed to develop the AI model detecting ampullary dysplastic lesions in conventional endoscopic image, using convolutional neural network (CNN).

Methods: We collected 507 endoscopic images from 187 patients and 590 images from 365 controls and trained both images. Confirmation of all dysplastic lesions was done with pathologic result. Data splits were performed with ratio of 7:1.5:1.5. To solve the data imbalance problem between the patients and the control group, a focal loss was used as a loss function and a weighted random sampling (WRS) method was applied. We compared the performance of models (SE_ResNet50, and Resnet50) and choose the Resnet50. The performance of each network is evaluated based on accuracy (ACC), area under the receiver operating characteristics (AUROC), and gradient class activation map (Grad-CAM) metrics. Gastroenterology fellows with less than 3 years of endoscopy experience were tested to compare the classification powers of our proposed network.

Results: ResNet50 showed outstanding Grad-CAM results and the most robust performance in accuracy (90%) and AUROC (0.896). AI model outperformed gastroenterology fellows in detection test (median 54/60 vs. 46/60)

Conclusions: Our AI model performed well in finding ampullary dysplasia and is likely to help inexperienced endoscopists. Further validation using large multicenter trials with larger and more mature datasets are needed to optimize accurate diagnoses.

Keywords: Artificial intelligence, Ampulla of vater, Dysplasia, Deep learning, Convolutional neural network

Figure 1. Gradient class activation map (Grad-CAM) metrics results detecting ampullary dysplastic lesions using ResNet50.

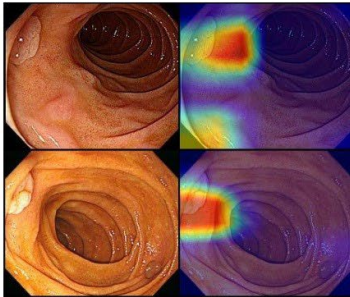


Figure 2. Train & validation accuracy and loss in ResNet50 model detecting ampullary dysplastic lesions in train & validation data set.

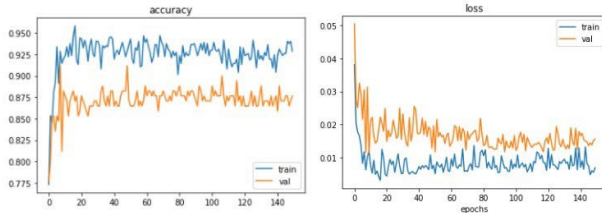


Figure 3. Confusion matrix and receiver operating characteristic curve (ROC) in ResNet50 model detecting ampullary dysplastic lesions.

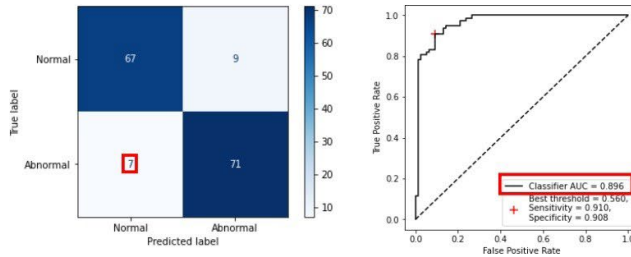


Table 1. Accuracy, precision, recall, F1-score for ResNet50 model detecting ampullary dysplastic lesions.

	Class	precision	recall	f1-score	support	Accuracy
Result	0 (normal)	0.91	0.88	0.89	76	0.90
	1 (abnormal)	0.89	0.91	0.90	78	

Table 2. Scores of artificial intelligence model and gastrointestinal fellows according to the biliary and non-biliary part

Experience	Non-biliary fellow (n=12)	Biliary fellow (n=2)	AI Model	P value
0-1 year	4 (33.3%)	1 (50.0%)		0.627
1-2 year	4 (33.3%)	0 (0.0%)		
2-3 year	4 (33.3%)	1 (50.0%)		0.035
Scores	44.5 (42.0-48.0)	53.5 (53.0-54.0)	53/60	

PUG-36

Comparative study of ESD and surgical resection for gastric sets originated from muscularispropriaChang Beom Ryu*

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Background/aims: Endoscopic resection for gastric subepithelial tumors (SETs) originated from the muscularispropria (GSET-PM) has offered less invasive alternatives to surgical resection.

Methods: The aims of this study were to compare endoscopic submucosal dissection (ESD) with surgical resection for the removal of GSET-PM. This study involved 17 patients with GSET-PM removed by ESD and 76 patients who underwent curative surgical resection. ESD was attempted in GSET-PM with well marginated tumors which was below 5cm and showed an endoluminal growth pattern according to endoscopic ultrasound (EUS) finding.

Results: ESD group were more likely to have upper portion (10/17, 58.8%) and surgery group were more likely to have mid portion (41/76, 53.8%) ($p=0.039$). ESD group were smaller median tumor size (25.6 mm vs 35.9 mm, $p=0.037$) and higher endoluminal ratio ($58.5\pm 9.1\%$ vs $45.8\pm 15.4\%$, $p=0.002$). ESD group were mostly to have Yamada type III (10/17, 58.8%) and surgery group were mostly Yamada type I (52/76, 68.4%) ($p<0.001$). Complete resection by ESD was lower than by surgical resection (82.4% vs 100%, $p<0.001$). In ESD group, 3 performed surgical resection after ESD (1 incompletely resection and 2 uncontrolled bleeding) and 1 showed perforation was completely resected with endoscopic closure. In surgery group, complications occurred in 6 patients (1 leakage, 1 stricture, 1 hernia and bowel obstruction, 1 wound infection and 2 worsened general condition after surgery). Although surgery group were lower in complication rate than ESD group ($p=0.006$), severity of complications were higher in the surgery group and there were no mortalities in the ESD group compared with 2 in the surgery group. There was no statistical difference of recurrence and the follow-up period between two group.

Conclusions: ESD can be one of good options for the resection of endoluminal GSET-PM and could be replace treatment by surgical resection in Yamada type III with a high endoluminal ratio.

Keywords: Subepithelial tumor, Endoscopic submucosal dissection

PUG-37

Study on endoscopically

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Background/aims: To compare the clinical efficacy and safety of endoscopic "calabash" ligation and resection (ECLR) and endoscopic submucosal excavation (ESE) in the treatment of endogenous gastric stromal tumors (GST) originating from muscularis propria and with the greatest diameter ≤ 15 mm, so as to provide a new method for endoscopic treatment of GST with the greatest diameter ≤ 15 mm.

Methods: An analysis was carried out on the clinical data and follow-up data statistically in patients with endogenous gastrointestinal submucosal tumors (SMT) originating from muscularis propria who were hospitalized in Shenzhen People's Hospital of the Second Clinical Medical College of Jinan University from February 2019 to December 2020. All patients were examined with endogenous tumors by EUS preoperatively. The specimens removed by therapeutic endoscopy were pathologically diagnosed as GST, with the greatest diameter ≤ 15 mm. Cases treated with traditional ESE were included in the control group (n=142), and those received ECLR were classified in the study group (n=135).

Results: 1. The average endoscopic treatment time, average hospitalization time and average hospitalization cost of the study group were all lower than those of the control group ($P < 0.001$). 2. The incidence of intraoperative perforation, average score of postoperative abdominal pain, postoperative abdominal infection and postoperative electrocoagulation syndrome in the study group were lower than those in the control group ($P = 0.022$, $P < 0.001$, $P = 0.045$, $P = 0.030$). There was no statistical difference in the incidence of postoperative delayed bleeding, postoperative delayed perforation and postoperative respiratory tract infection between the two groups ($P > 0.999$, $P = 0.500$, $P = 0.651$). 3. There was no tumor recurrence, metastasis and death in patients of both groups during the period of follow-up.

Conclusions: ECLR is worth popularizing clinically to the treatment of endogenous GST originated from muscularis propria with the greatest diameter ≤ 5 mm.

Keywords: Gastric stromal tumor, Muscularis propria, Endogenous, Endoscopic submucosal excavation, Calabash ligation and resection

PUG-38

A study of the intermediate- to long-term outcome of corrosive ingestion

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Background/aims: The ingestion of corrosive substances is linked to enduring consequences, particularly in cases with high-grade mucosal damage. This study aimed to examine the correlation between the severity of mucosal injury grading and the intermediate (more than 1-month follow-up) to long-term outcomes (more than 12 months) following corrosive ingestion.

Methods: Patients who presented with corrosive ingestion between January 2017 and December 2022 were included consecutively. A comprehensive review of medical records was conducted to gather information.

Results: During the study period, a total of 106 patients were admitted with corrosive ingestion, out of which 72 underwent esophagogastroduodenoscopy. Among the patients who underwent EGD, 19 (26.4%) were found to have high-grade esophageal lesions. The severity of gastrointestinal mucosal injury was not found to be related to the amount of ingestion or time to EGD, but upper gastrointestinal hemorrhage was significantly associated with high-grade esophageal injury and mortality. Three patients died during the index hospitalization, and the remaining patients were followed up for a median period of 821 days (14–1295), during which 18 patients were lost to follow-up. During the intermediate-term follow-up, three patients with high-grade injury significantly died as a result of corrosive ingestion (45, 325, 350 days), and four patients had significant esophageal strictures. Neither group exhibited any adverse consequences of corrosive ingestion during the long-term follow-up.

Conclusions: Patients with high-grade esophageal injury experienced significant morbidity and mortality during the intermediate term follow-up. On the other hand, patients with low-grade esophageal injury did not exhibit any adverse consequences during the follow-up period. Therefore, after an endoscopy shows a low-grade esophageal injury, patients can be treated as outpatients and do not require long-term follow-up.

Keywords: Corrosive ingestion, High-grade esophageal injury, Esophageal stricture

PUG-39

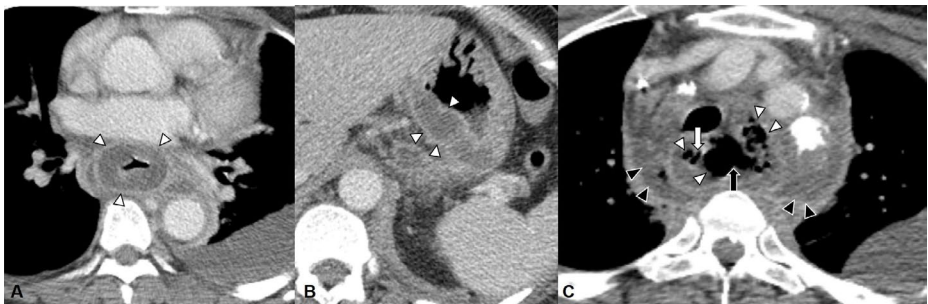
Acute phlegmonous esophagogastritis complicated with mediastinal abscess and esophageal perforation

Hyung-Hoon Oh, Dae-Seong Myung, Wan-Sik Lee, Young-Eun Joo*

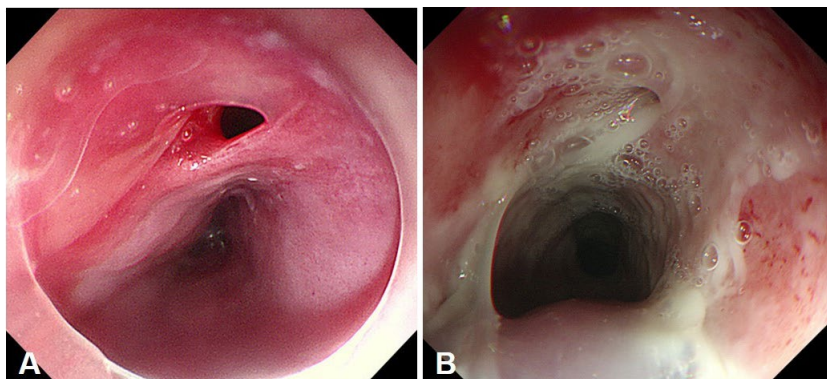
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Acute phlegmonous esophagogastritis is an extremely rare and fatal event, characterized by diffuse and purulent inflammation of the submucosa and muscle layers of esophagus and stomach, sparing the mucosa. Therefore, early diagnosis and immediate treatment of this disease are very important in determining the prognosis of patients. A 55-year-old woman was admitted with a 4-week history of odynophagia, chest pain, and vomiting. Contrast-enhanced CT revealed diffuse edematous wall thickening of esophagus and stomach with intra- and perilesional air-bubbles and mediastinal fluid collection, suggestive of phlegmonous esophagogastritis, complicated with mediastinal abscess and esophageal perforation. She started antibiotic treatment and feeding jejunostomy was done on the 10th day of hospitalization. On the 14th day of hospitalization, EGD revealed that the false lumen is located above the true lumen at the level of 23 cm distal from the incisor. On the 28th day of hospitalization, EGD revealed pus draining through the esophageal fistula. Thereafter, she gradually improved and oral intake was started with water feeding on the 42th day of hospitalization and she was discharged on the 60th day of hospitalization.

Keywords: Phlegmonous esophagogastritis



Contrast-enhanced chest and abdominopelvic computed tomography (CT) revealed diffuse edematous wall thickening of esophagus and stomach with intra- and perilesional air-bubbles and mediastinal fluid collection, suggestive of phlegmonous esophagogastritis.



On the 14th day of hospitalization, EGD revealed that the false lumen is located above the true lumen at the level of 23 cm distal from the incisor (Figure 2A). On the 28th day of hospitalization, EGD revealed pus draining through the fistula.

PUG-40

Comparison of a new hemostatic device for gastric ESD: Prospective, randomized trial for coajet® vs.hemograsper®

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Background/aims: Gastric endoscopic submucosal dissection (ESD) is often accompanied by bleeding. Coajet® is a new useful device for hemostasis through monopolar contact and has an injection needle inside. Therefore, this study was conducted to evaluate the effectiveness and safety of a new hemostatic device comparing to hemostatic forceps.

Methods: This prospective, randomized, single center study has enrolled consecutive patients who were candidates for gastric ESD from Feb. 2022 to Jan. 2023. The Hemograsper® group (HG) had underwent hemostasis by conventional method and the Coajet® (CG) was used for a marking of lesion, submucosal injection in initial stage of ESD and then for hemostasis.

Results: A total 56 patients were enrolled (HG, n=28, CG, n=28). Baseline characteristics between the two groups showed no significant difference in terms of age, sex, diagnosis, locations, endoscopic sizes, and morphology. The total operation time(minutes, HG 15.97±6.92 vs. CG 12.36±6.73, p=0.05) and hemostasis time(seconds, HG 186.6±134.5 vs. CG 130.4±81.49, p=0.06) were shorter when Coajet® was used compared to Hemograsper®. The procedure related other variables such as complete en bloc resection rate, admission days, grade of immediate bleeding, and delayed bleeding within 30days (HG n=1 vs. CG n=1) showed no difference.

Conclusions: A new hemostatic device Coajet® showed comparable efficacy to conventional hemostatic forceps for bleeding control and prevention of delayed bleeding in gastric ESD. Lesser procedure time with Coajet® would be beneficial to both endoscopists and patients.

Keywords: Hemostatic device, Gastric endoscopic submucosal dissection, Coajet, Hemograsper

PUG-41

**Risk factors associated with recurrence of gastric hyperplastic polyps:
A single-center, long-term retrospective study**

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Background/aims: The likelihood of recurrence of gastric hyperplastic polyps (GHPs) following endoscopic resection and the need for long-term follow-up remain unknown. We investigated the factors associated with the recurrence and cumulative incidence of GHPs over a 10-year period.

Methods: Between April 1997 and December 2020, 1,018 GHPs larger than 1 cm were endoscopically resected from 869 patients. The medical records of these patients were retrospectively reviewed, and clinical features and outcomes were assessed.

Results: A total of 104 patients (12.0%) who underwent endoscopic removal of GHPs experienced recurrence. Compared to patients without recurrent GHPs, patients with recurrent GHPs showed considerably larger polyps (28 mm vs. 14 mm, $P < 0.001$), a higher proportion of multiple polyps (41.3% vs. 29.3%, $P=0.020$), polyps with lobulation (63.5% vs. 40.3%, $P=0.001$), and exudate (63.5% vs. 46.8%, $P=0.001$). Further, compared to the local recurrence ($n=52$) group, the metachronous recurrence ($n=52$) group had larger polyps (20 mm vs. 16 mm, $P=0.006$) as well as higher rates of polyp lobulation (86.5% vs. 40.4%, $P < 0.001$) and exudate (82.7% vs. 44.4%, $P=0.001$). After primary GHP excision, the cumulative incidence of recurrence was 7.2% at 2 years, 12.7% at 5 years, and 19.6% at 10 years.

Conclusions: The incidence of GHP recurrence following endoscopic excision increased as the follow-up period lengthened, especially in patients whose GHPs were large-sized, multiple, or characterized by surface exudates/lobulations.

Keywords: Hyperplastic polyp, Gastric polyp, Endoscopic submucosal dissection, Endoscopic mucosal resection, Recurrence

PUG-42

Predictive factors for lymph node metastasis and clinical outcomes in undifferentiated early gastric cancer

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Background/aims: The presence of lymph node metastasis is crucial in treating undifferentiated-type early gastric cancer through endoscopic resection. This study aims to determine the factors that predict successful endoscopic treatment of undifferentiated-type early gastric cancer, and whether clinical outcomes differ between signet ring cell carcinoma (SRC) and poorly differentiated adenocarcinoma (PD).

Methods: Data from 120 patients (88 SRC, 32 PD) who had undergone gastrectomy with D2 lymph-node dissection undifferentiated-type early gastric cancer between January 2013 and December 2021 were retrospectively reviewed. The study analyzed various clinicopathological factors and their associations with the presence of lymph node metastasis to identify risk factors.

Results: The 5-year survival rates for patients with SRC and PD were 98.6% and 87.1%, respectively, with no significant difference between the two groups ($P=0.181$). However, lymph node metastasis was found in 9 patients (10.2%) in SRC and 11 patients (34.4%) in PD, a statistically significant difference ($P=0.002$). Multivariate logistic regression analysis identified tumor diameter of 2 cm or larger, lymphatic involvement, and PD histology as independent risk factors for lymph node metastasis ($P=0.016$, $P<0.001$, $P=0.044$, respectively).

Conclusions: Undifferentiated early gastric cancer with poorly differentiated adenocarcinoma histology, tumor size larger than 2cm, and lymphatic involvement were associated with lymph node metastasis. Given the limited number of cases in the subgroups, more extensive prospective data are required to perform the endoscopic treatment of patients with undifferentiated-type early gastric cancer.

Keywords: Gastric cancer, Lymph node metastasis, Endoscopic resection

PUG-43

The outcomes of repeated radiofrequency ablation (Stretta) for the treatment of gastroesophageal reflux disease

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Background/aims: Gastroesophageal reflux disease (GERD) prevalence is rising, and fundoplication surgery may be considered if proton pump inhibitors are ineffective. It is not easy to decide on revision surgery if GERD recurs after fundoplication. Endoscopic procedures like Stretta offer alternatives to medication/surgery. For Stretta, redo endoscopic minimally invasive procedures may be preferable to surgery. Understanding the prognosis is essential when considering a redo Stretta.

Methods: 41 Stretta cases were performed at Seoul St. Mary's Hospital from 2019 to March 2023. 5 cases were redo procedures for GERD relapse after the first Stretta. 4 out of 5 had their first procedure at the same institution, and 1 had it at an another hospital. We analyzed the patients' characteristics, and effects at the time of the first procedure in these five cases.

Results: From 2019 to March 2023, five out of 41 Stretta cases were redo procedures for GERD patients. One patient was over 65 years old, and another had hyperlipidemia. Reflux symptoms were the main symptoms in three patients, while globus was the main symptom in two patients. Four patients showed at least 70% symptomatic improvement after the first Stretta, with one able to stop taking all medications. The average interval was 16.5 months, and improvement lasted an average of 15.2 months before symptoms recurred and improvement was confirmed after the second Stretta. However, in one patient, improvement was less than 50% after the first Stretta, and a second Stretta did not improve symptoms even after 6 months.

Conclusions: In this study, clear symptom improvement after the Stretta was the most important factor in predicting the effectiveness of the second Stretta. Therefore, if symptoms recur, a redo Stretta may be an alternative to surgery. However, the number of cases was limited, and it did not include cases of symptom recurrence in patients who underwent fundoplication, so it is thought that further research is needed for this.

Keywords: Stretta, Gastroesophageal reflux disease, Recurrence

PUG-44

Esophageal stricture and bezoar formation due to prolonged nasogastric tube placement

Yujin Kim*

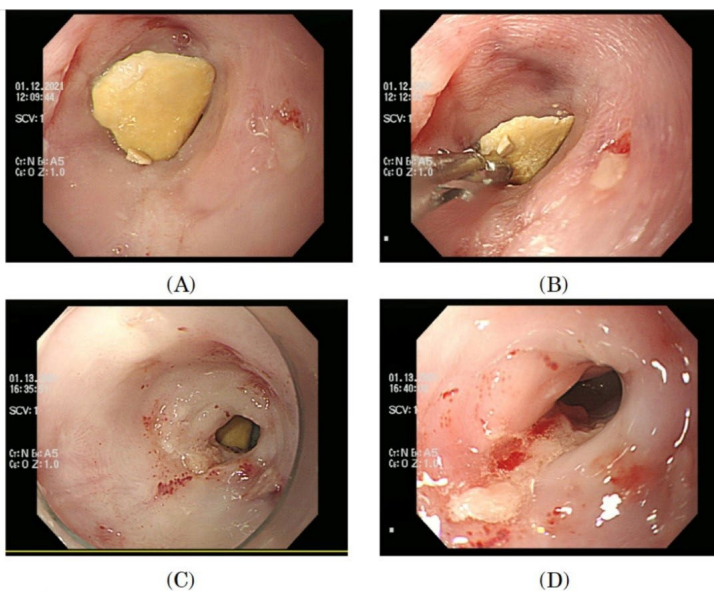
Internal Medicine, Cheju Halla General Hospital, Korea

Background: Bezoars are accumulations which are hardened in the gastrointestinal tract and are known to be very rare in the esophagus. In this study, we report a case of esophageal stricture and bezoar formation in the esophagus in a patient receiving nutrition through NG tube.

Case Presentation: An 84-year-old woman in a bedridden status with a medical history of right middle cerebral artery cerebral infarction presented to our ER with a complaint of difficulty in NG tube placement. Chest computed tomography images revealed an 1.4 cm-sized foreign body in the gastroesophageal junction, and slight thickening of the esophageal wall in the distal esophagus and gastroesophageal junction. The patient underwent upper gastrointestinal endoscopy and an 1.5 cm-sized yellow triangular bezoar at the lower esophagus was observed. We tried to remove it with the rat tooth forceps, with no success. The next day, we tried to cut the hanging bezoar with a snare, but failed and pushed it into the stomach. A narrowing in the lower esophagus was observed, and the gastroscope could no longer pass. Eventually, a jejunostomy tube was installed by a general surgeon, and after a gradual diet build up, she was discharged from the hospital.

Discussion: In this case, the esophageal mucosa was damaged by repeated NG tube placements, and a number of predisposing factors; the patient's prolonged disease period, spinal supine position, a medical history of cranial nerve disease and diabetes, and the NG tube itself facilitated the gastric acid reflux. In the presence of a mucosal break due to the surface trauma, gastric acid reflux may induce the progression of inflammatory process along with the enlargement of the raw area and induce the esophageal muscle fibrosis. As a result, esophageal stricture may occur. It was also observed that common enteral feeding formula can coagulate and form a bezoar in the esophagus. As NG tube feeding is a standard routine practice in the clinical environment, it is important for the medical faculty to pay cautious attention to this rare, but detrimental complication.

Keywords: Esophagus, Bezoar, Structure



Endoscopic Findings

- (A) The bezoar extending over the lumen at the lower esophagus, 35cm below the front teeth
- (B) Endoscopic trials to remove the bezoar with the rat tooth forceps, with difficulty due to its brittleness and tightly jammed position in the esophagus
- (C) The bezoar endoscopically pushed into the stomach
- (D) A narrowing of the lower esophagus, where the scope could not enter any further

PUG-45

Endoscopic and bronchoscopic management for tracheo-esophageal fistula in HIV with disseminated tuberculosis: Case report

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Tracheo-esophageal fistula is a rare condition wherein there is a communication between the posterior trachea-bronchial wall and the anterior esophageal wall. These fistulas are either congenital or acquired, with the most common cause of acquired fistulas secondary to malignancies of the esophagus or the adjacent structures. Although lung disease is the most common form of TB, all organs may be affected, especially in the group of patients with compromised immunity. In HIV-positive patients, extrapulmonary TB occurs most frequently and its most common clinical manifestation is lymphadenitis. Esophageal involvement of extrapulmonary TB is low, and trachea-esophageal fistula secondary to tuberculosis is rare (constituting 0.2% of Extrapulmonary TB cases).

This is a case of a 30 year old male who is a known case of HIV WHO Clinical stage IV with bacteriologically confirmed tuberculosis presenting with 7 months history of cough after swallowing associated with hoarseness of voice and unintentional weight loss of 15 kg. Chest CT scan with IV contrast showed presence of multiple sub-centimeter pulmonary, mediastinal and splenic nodules that were likely infectious in origin and presence of broncho-esophageal fistula. Barium esophagogram using water-soluble contrast showed a fistulous tract from the mid esophagus to the distal trachea at the level of T5-T6, prompting opacification of the adjacent distal trachea corresponding to the presence of distal tracheoesophageal fistula. Patient was then started on anti TB regimen and TDF-Dolutegravir-Lamivudine after two weeks of TB treatment.

After completion of 6 months of TB treatment with documented sputum seroconversion and low HIV viral load, there were still persistence of cough and hoarseness of voice. Patient was apprised for surgical procedure but opted to do endoscopic management.

EGD was done which showed a 1–2 mm punctum in the mid esophagus (~20 cm from the incisors) with smooth mucosal edges and presence of clear discharge. A subsequent endoscopic management with simultaneous diagnostic bronchoscopy was undertaken after a month. Re-epithelialization of the fistula opening using Argon plasma coagulation with 30 watts and 0.5L/min settings was done, followed by deployment of an over-the-scope (OVESCO) clip was deployed on the fistula opening with sealing of the defect. Confirmation under bronchoscopy was done showing patency of the tracheal area. NSS flushing in the tracheal side was done with no noted leakage of fluid in the esophageal side confirming closure of the fistula.

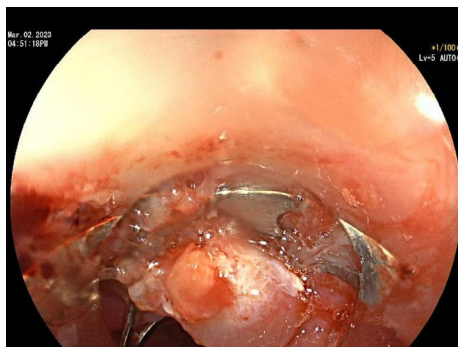
Post procedure, the patient was able to speak without cough, choking and swallowing difficulty. A chest radiograph was done which showed presence of the radio-opaque clip in the T5-T6 level. Patient was however placed on enteral nutrition with oral antibiotics upon discharge.

Tracheo-esophageal fistula, regardless of underlying pathology, must be repaired to prevent complications, however pose a challenge. Although surgical correction is the cornerstone treatment, new endoscopic techniques and devices have emerged as alternative options. Endoscopic therapy has been safe and with lower morbidity and mortality compared to surgery. This novel multimodal approach to trachea-esophageal fistula repair may serve as guidance and options to fistula management with a successful outcome.

Keywords: Case report, Trachea-esophageal fistula, Extrapulmonary tuberculosis, Human immunodeficiency virus



Barium Esophagogram of TEF



Post OVESCO deployment

PUG-46

Decision of surgery or follow-up after non-curative ESD for gastric cancer based on the risk of lymph node metastasis

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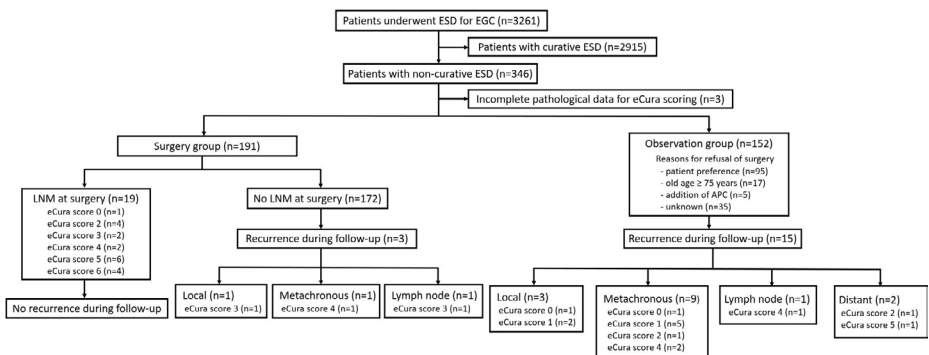
Background/aims: Previous studies have developed risk stratification systems for lymph node metastasis (LNM) after non-curative ESD for gastric cancer, such as the eCura system, to sort out patients with low risk of LNM who may not need additional surgery. This study aimed to assess applicability of the eCura system for decision of radical gastrectomy after non-curative ESD.

Methods: We retrospectively investigated 343 patients who had non-curative ESD for EGC at a tertiary hospital in Korea from 2006 to 2021 and divided them into the surgery (n=191) and observation (n=152) groups. Each group was classified into 3 subgroups according to LNM risk stratification of the eCura system. Cumulative recurrence-free and overall survival rates were evaluated for each category.

Results: In terms of overall survival, there were no differences between the surgery and observation groups for the low (p=0.168) and intermediate-risk patients (p=0.306), however, the surgery group had better 5-year overall survival than the observation group (p<0.001) for the high-risk patients.

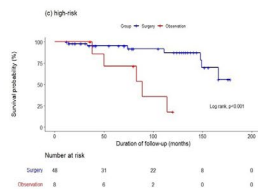
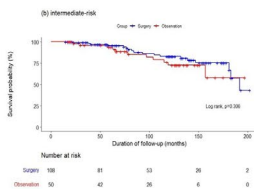
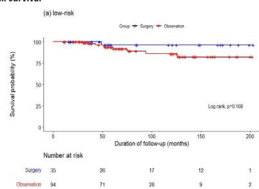
Conclusions: Follow-up after non-curative ESD can be a reasonable option for low-risk, and even for intermediate-risk patients according to the eCura system based on no difference in overall survival rate, especially for those with old age and comorbidities.

Keywords: Early gastric cancer, Non-curative ESD, Ecura system, Lymph node metastasis

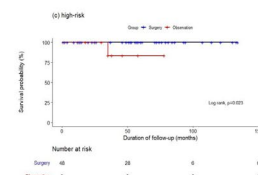
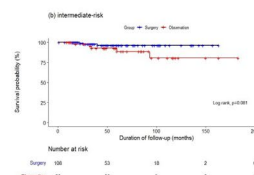
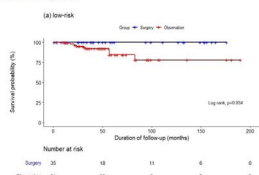


Flow diagram of patient enrollment and follow-up outcome

Overall survival



Recurrence-free survival



Overall and recurrence-free survival curves between the surgery and observation groups: low-risk (a), intermediate-risk (b) and high-risk (c)

PUG-47

Development of an artificial intelligence algorithm detecting superficial esophageal cancer

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Background/aims: Esophageal cancer has relatively poor prognosis. The early detection and diagnosis are important for the survival and prognosis of esophageal cancer patients. Recently development of artificial intelligence (AI) and its application to clinical medicine has made remarkable progress. This study aims to develop and validate AI algorithm for the detection of superficial esophageal cancer by analyzing clinical endoscopic data.

Methods: In this study, we retrospectively obtained total of white light 14,356 EGD images from 837 patients who underwent screening exam at 6 university affiliated hospital. 14,356 images were composed of 8,356 esophageal cancer images, and 6,000 images without esophageal cancer.

The esophageal cancer detection method proposed in this study has three steps: image pre-processing, esophageal EGD image classification, and esophageal cancer detection. We processed 10-fold cross validation to prevent overfitting of the deep learning model.

In image pre-processing, the EGD image was reconstructed to have an efficient training time. The classification model was applied to sort out esophageal images among EGD images to reduce false positives. The classification model was trained by using the ResNet50 structure. A U-Net structure using DenseNet201 model as encoder was applied to learn the detection model.

Results: Developed AI algorithm reached a sensitivity of 90.8%, precision of 80.0%, and accuracy of 96.6% on detecting esophageal cancer independent of Intersection over Union (IoU) value. In external validation, it achieved a sensitivity of 85.0%, precision of 90.2%, and accuracy of 94.2%.

Conclusions: Developed AI algorithm demonstrated high diagnostic sensitivity with high accuracy to detect esophageal cancer. It has demonstrated substantial potential to assist endoscopists in screening and detecting esophageal cancer.

Keywords: Artificial intelligence, Esophageal cancer, Endoscopy

PUG-48

A prospective comparative study of optimos and IT2 knife for endoscopic submucosal dissection of gastric tumor

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Background/aims: Endoscopic submucosal dissection (ESD) is effective treatment method for early gastric tumor. A novel versatile ESD knife was developed to perform effective ESD with single knife that has been conventionally used. The aim of this study is to compare efficacy of Optimos ESD knife and IT2 ESD knife for endoscopic submucosal dissection of gastric tumor.

Methods: This prospective randomized multicenter trial was conducted at three tertiary hospitals from March 2018 to March 2021. Patients were randomly assigned to two groups (Optimos ESD knife or IT2 ESD knife). Total procedure time, dissection time, en bloc resection rate, complete resection rate and complication rate of perforation and bleeding were evaluated and compared between two groups. The primary outcome was dissection time including total procedure time. The secondary outcomes were rate of en bloc dissection, complete resection, and complication.

Results: There were 64 patients in Optimos ESD knife group and 61 patients in IT2 ESD knife group. Total procedure time (23.3 minutes vs. 23.1 minutes, $p=0.671$), dissection time (19.3 minutes vs. 16.1 minutes, $p=0.847$), en bloc resection rate (0.98% vs. 100%, $p=0.990$) and complete resection rate (96.9% vs. 100%, $p=0.4963$) did not present significant difference between two groups. Complication including perforation and bleeding was not present in two groups.

Conclusions: Optimos knife and IT2 knife did not show significant difference in efficacy on ESD for gastric tumor. Considering Optimos knife has efficacy of single use on ESD compared with IT2 knife, this study suggests benefits of Optimos knife over IT2 knife.

Keywords: Endoscopic submucosal dissection, Gastric tumor, Optimos ESD knife, IT2 ESD knife

PUG-49

Validation of scratch sign in predicting *Helicobacter pylori* infection status as a novel endoscopic marker

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Background/aims: As *Helicobacter pylori* (*H. pylori*) is associated with gastric malignancy, it is essential to detect *H. pylori* infection status. A recent study showed a red linear scrape-like appearance named "scratch sign" might be associated with the *H. pylori*-negative gastric mucosa. We aimed to study to verify the association of scratch sign with *H. pylori* status.

Methods: Patients who underwent endoscopy in the health screening center of Bundang Jesaeng General Hospital in March 2023 were reviewed. Patients with a previous eradication therapy were excluded. We assessed the endoscopic status of *H. pylori* using Kyoto classification of gastritis with scratch sign.

Results: Scratch sign was significantly higher in patients with non-infection than with current infection (30.9% vs. 8.1%, $p=0.001$). There was significant association between scratch sign and diffuse mucosal findings including presence of regular arrangement of collecting venules, atrophy, diffuse redness, spotty redness, edema, and sticky mucus.

Conclusions: In our center, a novel endoscopic marker, the scratch sign was found to be a good indicator of *H. pylori* negative status. In addition to Kyoto classification of gastritis, it will help the endoscopists to know *H. pylori* infection status.

Keywords: Gastritis, *Helicobacter pylori*

Table 1. Baseline characteristics and laboratory findings of patients diagnosed with *H. pylori* infection and non-infection status.

	Non-infection (n=110)	Infection (n=62)	p value
Age	60.0 (49.0-65.0)	58.0 (51.0-66.0)	0.959
Sex	74/36 (67.3%)	31/31 (50.0%)	0.695
Body weight	67.0 (60.5-74.9)	69.5 (57.5-76.9)	0.949
Height	166.1 (159.6-170.0)	162.8 (159.7-166.9)	0.367
BMI	25.1 (22.9-26.6)	25.3 (22.9-27.4)	0.970
Body composition			
Fat composition (%)	27.6 (24.0-29.7)	28.0 (25.1-31.3)	0.402
Skeletal muscle mass (kg)	27.5 (23.0-31.5)	27.1 (22.7-30.2)	0.679
SMI	10.0 (9.2-10.6)	10.1 (9.1-10.5)	0.716
Comorbidity			
Hypertension	25 (34.7%)	8 (21.1%)	0.408
DM	7 (11.3%)	5 (13.9%)	0.953
Dyslipidemia	8 (11.1%)	1 (2.6%)	0.239
Cardiac disease	3 (4.8%)	3 (8.3%)	0.796
CVA	2 (2.8%)	1 (2.6%)	0.795
Medication			
Antiplatelet	8 (7.3%)	6 (9.7%)	0.782
Anticoagulation	0 (0.0%)	0 (0.0%)	
NSAIDs	2 (1.8%)	1 (1.6%)	

BMI body mass index; SMI skeletal muscle index; DM diabetes mellitus; CVA cerebrovascular accidents; NSAIDs Non-steroidal anti-inflammatory drugs.

Table 2. Endoscopic findings of patients with *Helicobacter pylori* infection and non-infection.

	Non-infection (n=110)	Infection (n=62)	p value
Reflux esophagitis			0.010
Absent	38 (34.5%)	34 (54.8%)	
LA-m	52 (47.3%)	27 (43.5%)	
LA-A	13 (11.8%)	0 (0.0%)	
LA-B	6 (5.5%)	1 (1.6%)	
LA-C	1 (0.9%)	0 (0.0%)	
LA-D	0 (0.0%)	0 (0.0%)	
Kyoto classification morphology			
Negative findings			
RAC (both positive)	35 (31.8%)	2 (3.2%)	< 0.001
RAC at low body	36 (32.7%)	3 (4.9%)	< 0.001
RAC at high body	67 (60.9%)	3 (4.9%)	< 0.001
Fundic gland polyp	10 (9.1%)	1 (1.0%)	0.110
Linear Streak	46 (41.8%)	4 (6.5%)	< 0.001
Raised erosion	56 (50.9%)	11 (17.7%)	< 0.001
Hematin	52 (47.3%)	8 (12.9%)	< 0.001
Positive findings			
Atrophy			
Absent	34 (30.9%)	3 (4.8%)	< 0.001
Closed type	48 (43.6%)	16 (25.8%)	
Open type	28 (25.5%)	37 (59.7%)	
Intestinal metaplasia			
Antrum	12 (10.9%)	16 (25.8%)	< 0.001
Corpus	40 (36.4%)	33 (53.2%)	
Diffuse redness			
With partial RAC	2 (1.8%)	6 (9.7%)	< 0.001
Severe	7 (6.4%)	48 (77.4%)	
Spotty redness	10 (9.1%)	39 (62.9%)	< 0.001
Edema	19 (17.3%)	40 (64.5%)	< 0.001
Sticky mucus	2 (1.8%)	28 (45.2%)	< 0.001
Enlarged folds	5 (4.5%)	15 (24.2%)	< 0.001
Nodularity	1 (0.9%)	10 (16.1%)	< 0.001
Xanthoma	7 (6.4%)	6 (9.7%)	0.625
Hyperplastic polyp	1 (0.9%)	4 (6.5%)	0.109
Past infection			
Patchy redness	4 (3.6%)	3 (4.8%)	1.000
Map-like redness	4 (3.6%)	3 (4.8%)	0.596
Multiple whitish flat lesions	12 (10.9%)	2 (3.2%)	0.139
Total Kyoto scores	1.0 (0.0-3.0)	5.0 (4.0-6.0)	< 0.001
Scratch sign	34 (30.9%)	5 (8.1%)	0.001

RAC regular arrangement of collecting venules

Table 3. Endoscopic findings of patients according to the presence of scratch sign.

	Negative scratch sign (n=133)	Positive scratch sign (n=39)	p value
Kyoto classification morphology			
Negative findings			
RAC (both positive)	20 (15.0%)	17 (43.6%)	< 0.001
RAC at low body	22 (16.7%)	17 (43.6%)	< 0.001
RAC at high body	43 (32.6%)	27 (69.2%)	< 0.001
Fundic gland polyp	7 (5.3%)	4 (10.3%)	0.454
Linear Streak	30 (22.6%)	20 (51.3%)	0.001
Raised erosion	50 (37.6%)	17 (43.6%)	0.625
Hematin	48 (36.1%)	12 (30.8%)	0.673
Positive findings			
Atrophy			0.011
Absent	22 (16.5%)	15 (38.5%)	
Closed type	56 (42.1%)	14 (35.9%)	
Open type	55 (41.4%)	10 (25.6%)	
Intestinal metaplasia			0.037
Antrum	24 (18.0%)	4 (10.3%)	
Corpus	61 (45.9%)	12 (30.8%)	
Diffuse redness			< 0.001
With partial RAC	7 (5.3%)	1 (2.6%)	
Severe	60 (45.1%)	2 (5.1%)	
Spotty redness	46 (34.6%)	3 (7.7%)	0.002
Edema	54 (40.6%)	5 (12.8%)	0.003
Sticky mucus	30 (22.6%)	0 (0.0%)	0.002
Enlarged folds	19 (14.3%)	1 (2.6%)	0.085
Nodularity	7 (5.3%)	4 (10.3%)	0.454
Xanthoma	11 (8.3%)	2 (5.1%)	0.758
Hyperplastic polyp	5 (3.8%)	0 (0.0%)	0.492
Past infection			
Patchy redness	4 (3.0%)	3 (7.7%)	0.400
Map-like redness	8 (6.0%)	1 (2.6%)	0.658
Multiple whitish flat lesions	12 (9.0%)	2 (5.1%)	0.653
Total Kyoto scores	3.0 (1.0-6.0)	1.0 (0.0-4.0)	< 0.001

RAC regular arrangement of collecting venules

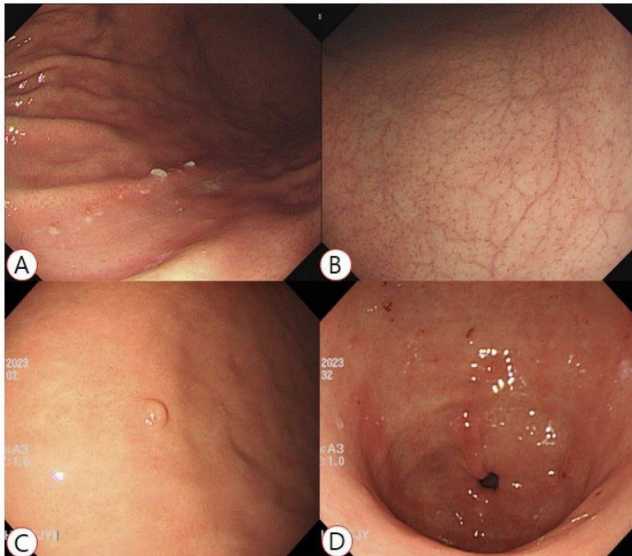


Figure 1. Endoscopic images which suggest the non-infection status of *Helicobacter pylori*. (A) The scratch sign (B) Regular arrangement of collecting venules (C) Fundic gland polyp (D) Raised erosions and hematin

PUG-50

A case of anisakidosis co-infected to stomach and small bowelJoonhee Han¹, Heung up Kim^{*1,2}, Se Jin Kim¹, Yeon Namgung¹, Hyun Joo Song²¹Internal Medicine, Jeju National University Hospital, Korea²Internal Medicine, Jeju National University School of Medicine, Korea

Background/aims: The intestinal anisakidosis is not uncommon in Jeju Island. The authors this abstract experience and report a case of anisakidosis co-infected to both stomach and small intestine.

Case: A 57-year-old man presented with severe vomiting that had occurred one day earlier. He ate raw whitespotted conger 5 days ago and had abdominal distension 4 days ago. Abdominal distension gradually got worse and was the most severe the day before, and accompanied by severe vomiting. The vital signs were BP 173/109 mmHg, pulse rate 90/min, respiration rate 18/min, body temperature 37.8°C. The bowel sounds were increased, but tenderness was not prominent. The laboratory exam showed WBC 5,300/μL (eosinophil 6.3%), Hb 16.9 g/dL, PLT 225×106/μL and CRP 8.33 mg/dL, Anisakis specific IgE was corresponded to class 3. Abdominal computed tomography performed on the same day showed approximately 5 cm segmental wall thickening in the mid jejunum with proximal dilatation. Ascites loculated from the Rt perihepatic space along the Rt paracolic gutter to the appendiceal bed, and in the LUQ mesentery (Figure 1). During gastroscopy, an anisakidae larva was found and removed on the center of angle. (Figure 2) The patient's symptoms improved rapidly, so he started to diet the 3rd day of hospitalization and discharged on the 5th day of hospitalization.

Conclusions: Even if intestinal anisakidosis is diagnosed, if vomiting is the main symptom, it is desirable to consider the possibility of gastric co-infection with the larva.

Keywords: Anisakiasis, Coinfection, Ileus, Ascites, Nausea



Figure 1. Abdominal computed tomography shows about 5 cm wall thickening of mid jejunum with proximal dilatation. Ascites loculated from the Rt perihepatic space along the Rt paracolic gutter to the appendiceal bed, and in the LUQ mesentery.

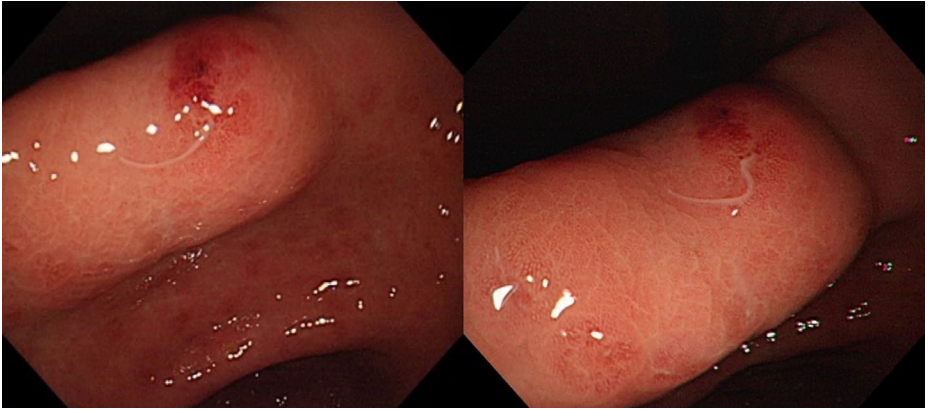


Figure 2. Gastroscopy shows a Anisakidae larve invades the gastric angular mucosa.

PUG-51

Eosinophilic gastrointestinal diseases-uncommon entity on the rise

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Background/aims: Eosinophilic gastrointestinal diseases (EGID) are uncommon diseases with poorly defined diagnostic criteria, hence difficult to diagnose. A recent rise in awareness prompted us to study the spectrum and presentation of EGID.

Methods: This is a retrospective descriptive study that included all patients diagnosed with EGID. Data was collected from the last two years of outdoor and indoor patients at Dr. D Y Patil Medical College and Hospital. Patients were analyzed for epidemiological data, blood parameters, endoscopic findings, and outcomes.

Results: A total of 13 patients were included in the study. The majority were male (n=10.77%), mean age was 34.61 years. Seven patients had eosinophilic esophagitis (54%), while 6 had eosinophilic gastroenteritis (46%). The dominant symptom in the esophagitis group was dysphagia (n=6.86%), while pain abdomen was the dominant symptom in the gastroenteritis group (n=5.83%). One patient in the esophagitis group presented with refractory gastro-esophageal reflux disease, while one patient in the gastroenteritis group was evaluated for obscure dilated CBD. In the gastroenteritis group, two patients presented with complete intestinal obstruction without any transit zone on computed tomography with diffuse thickening of the small bowel. Three patients in the esophagitis group underwent high-resolution esophageal manometry, two showed ineffective peristalsis while one showed spastic esophagus. Blood reports revealed mean absolute eosinophil counts of 687 cells/ μ L. Three of the 13 patients had normal AEC. Serum IgE was elevated in 11 patients with a mean value of 507 IU/L. Three patients had a history of allergy, asthma in 2, and atopic dermatitis in 1. On endoscopy three patients had esophagitis, one had only rings, one had only stricture, one patient had stricture and esophagitis and one had stricture and rings. All patients of esophagitis were diagnosed by esophageal biopsy with >15 eosinophils per high-power field. In the gastroenteritis group diagnosis was tricky and made on the basis of histopathology (only those with an eosinophilic abscess on histopathology along with an increase in eosinophils) and supportive evidence. All patients of esophagitis were given systemic steroids for a short course (oral in 8, IV in 5) followed by maintenance steroids in local form (budesonide respules in honey n=5), budesonide sustained release tablets in gastroenteritis (n=3). One in the esophageal and three in the gastroenteritis group required oral systemic steroids for maintenance therapy. The median follow-up was for 3 months. All patients symptomatically improved at 8 weeks.

Conclusions: EGID is an uncommon disease with a varied range of presentations, often challenging to diagnose with a good response to steroids.

Keywords: Eosinophilic esophagitis, Eosinophilic gastroenteritis, Dysphagia, Abdominal pain, Allergy

PUG-52

Prevalence of *H-pylori* infection among patients undergoing upper GI endoscopy

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Background/aims: To survey current prevalence of H-Pylori infection in our region for public awareness and to promote effective health care services in Myanmar.

Methods: A retrospective review of prevalence of *H pylori* infection in 721 patients (333 males and 388 females) those underwent upper GI endoscopy at PHH from 1st January 2022 to 31st December 2022. The diagnosis was done by CLO test kit (rapid urease Test). Age, gender, indications for endoscopy and endoscopic diagnosis were analyzed in this study.

Results: 192 patients (26.63% of total patients) positive for *H-Pylori* on CLO test in this study. *H-Pylori* is more prevalent in 31–45 age group and 46–60 age group which are 40% and 30% respectively in age prevalence. Similar to published studies, 65% of symptomatic patients and 20% of medical checkup group were infected with *H-Pylori* respectively. Severe antral gastritis is the most common in positive cases. However sex differentiation is more or less the same.

Conclusions: The *H-pylori* prevalence in Asia is estimated about 54.7% while global prevalence is about 50% across populations. Our study of *H-pylori* prevalence in Pun Hlaing Hospital, a private medium hospital in Yangon (26.63%) is relatively low in comparison to other studies in Myanmar. The reason for relatively lower *H-pylori* prevalence in this study is probably due to study on selected populations who came for treatment and medical checkup in this hospital. However the study shows prevalence of H-pylori in Myanmar is still higher among the population. As increasing global and regional health care challenges to *H-pylori* infection, we need to promote public awareness for prevention of morbidity and mortality from *H-pylori* related diseases including gastric cancer.

Keywords: Prevalence, *H-pylori* infection, CLO test

PUG-53

Clinical outcomes of argon plasma coagulation for the treatment of gastric neoplasm

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Background/aims: Our study investigated the clinical outcomes after APC for treatment of gastric neoplasm and associated variables with the risk of recurrence.

Methods: This study included 927 patients who underwent APC at the Asan Medical Center from July 2007 to March 2022 with a minimal follow-up of 12 months. Subjects who underwent APC without submucosal saline lifting or without any information about *Helicobacter pylori* infection status were excluded. The clinical outcomes of APC were analyzed by retrospective review. Hazard ratios (HR) and 95% confidence intervals (CI), determined by Cox regression analysis were used to find clinical and oncologic variables associated with recurrence after APC.

Results: Total 474 patients were followed up for median 27 months (interquartile range 17–47). Recurrence was found in 120 patients, 68 cases of local recurrence and 64 cases of metachronous recurrence, respectively. Multivariate analysis showed age (HR 1.04, 95% CI, 1.02–1.07), lesion size (HR 1.04, 95% CI, 1.01–1.07) and non-lifting sign (HR 1.49, 95% CI, 1.01–2.20) were associated with recurrence. These variables were also associated with local recurrence as well. Any cancer related death was not detected.

Conclusions: We should do more frequent endoscopic follow up in patients who underwent APC treatment for gastric neoplasm with older age, larger lesion and non-lifting sign for early detection of recurrence. When recurrence is detected, additional endoscopic treatment could be done.

Keywords: Gastric neoplasm, Argon plasma coagulation

PUG-54

A case of esophageal actinomycosis after endoscopic mucosal resection for a subepithelial tumor

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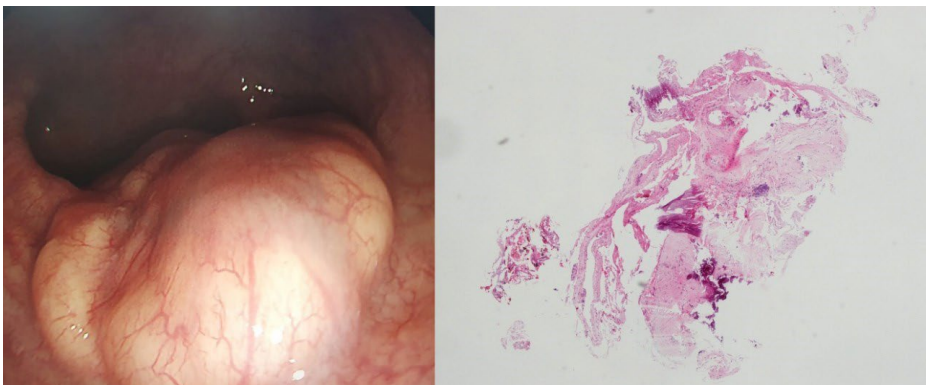
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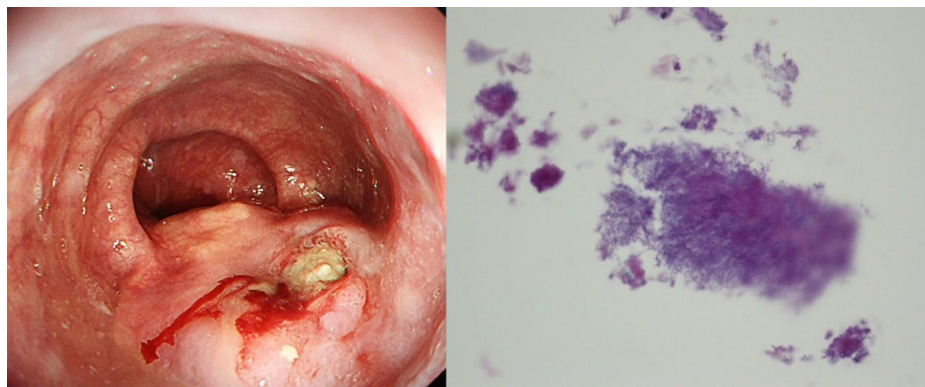
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Introduction: Esophageal actinomycosis is a rare, chronic granulomatous disease, caused by Actinomycosis species. Esophagogastroscope and biopsy for lesions are very important in the diagnosis. In this review, we report a case of esophageal actinomycosis after endoscopic mucosal resection (EMR) for a subepithelial tumor (SET). Case: A 74-year-old man has an esophageal SET without any symptoms of esophagus. First upper endoscopy was done, showing a 3 cm sized flat smooth elevation in the esophagus. After EMR, the result of pathology was nonspecific degenerated mesenchymal tissue with calcifications (Figure 1). 3 months later, Gastroscopy was done for him again, a large ulcer on the past tumor in the esophagus was found and biopsied. This time histopathology showed granulomatous tissue and sulfur granule-like structure of actinomycetes, considered actinomycosis (Figure 2). Nothing particularly abnormal was found on his CT scan of chest and abdomen, blood tests. After 6 months of antibiotics treatment, the ulcer on the esophageal SET improved.

Conclusions: Not healed mucosal ulcerative lesions after EMR can be the cause of bacterial invasion and cause disease. Upper gastroscopy for monitoring and biopsy have helped in early diagnosis, timely treatment.

Keywords: Esophageal actinomycosis, Endoscopic mucosal resection, Subepithelial tumor





PUG-55

Comparison the efficacies of 7-day and 10-day PPI-containing triple therapy for *Helicobacter pylori* eradication

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Background/aims: *Helicobacter pylori* (HP) colonize in the stomach and cause various diseases such as peptic ulcers, gastric cancer, and gastric mucosa-associated lymphoid tissue (MALT) lymphoma. It has been gradually accepted that all HP-infected patients should be treated because HP is regarded as an infection. Therefore, the importance of selecting the optimal treatment regimen has increased. Although the 14-day standard triple therapy (STT) is recommended in the current guidelines, but the treatment duration is controversial in real practice because of inconsistent results from previous data and the risk of adverse effects. We aimed to compare the eradication rate between 7 and 10 days STT.

Methods: A prospective randomized controlled trial was conducted, which was divided into 2 treatment groups: the control group was 7 days of STT, and the test group was 10 days of STT. The eradication regimen was 10 mg ilaprazole, 500 mg clarithromycin, and 1000 mg amoxicillin twice daily. We included patients who were diagnosed with positive results of H pylori examination. We compared the HP eradication rate according to treatment duration, CYP2C19 subtype and endoscopic diagnosis.

Results: We enrolled a total of 254 patients consisting of 127 patients in each treatment arm. The eradication rates of the control and test groups were 65.4% (82/127) and 74.8% (95/127), respectively, in the intention-to-treat analysis (P=.1). In the per-protocol analysis, 70.3% (83/118) and 82.6% (94/115) were eradicated in each group, which was statistically significant (P=.027). The CYP2C19 subtype was examined in 230 patients. The eradication rate was 79.2% (57/72), 75.4% (92/122), and 72.2% (26/36) in each group, which was not significantly different (P=.704). The safety profile of this therapy was favorable, and there were no significant laboratory changes during the treatment period.

Conclusions: Ten-day STT was more effective than 7-day STT for HP eradication. The eradication rate was not affected by the CYP2C19 genotype.

Keywords: *Helicobacter pylori*, Treatment, Duration, Cyp2c19

PUG-56

Endoscopic surveillance of chronic atrophic gastritis and intestinal metaplasia on a Latin American population

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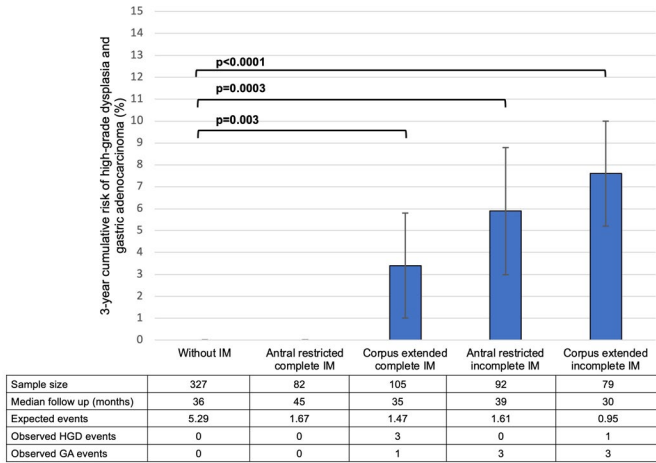
Background/aims: Chronic atrophic gastritis (CAG) and intestinal metaplasia (IM) are gastric premalignant conditions. Optimal risk stratification may favor early detection of gastric cancer. Our aim was to define the risk of high-grade dysplasia (HGD) and gastric adenocarcinoma (GA) among a Chilean population with CAG and IM.

Methods: A retrospective cohort of patients with endoscopic surveillance was conducted between 2015–2023. CAG and IM were stratified by Operative Link on Gastritis Assessment (OLGA). Primary outcome was HGD/GA. Cumulative risk curves and Cox regression were applied, adjusted for age, sex and *H. pylori*.

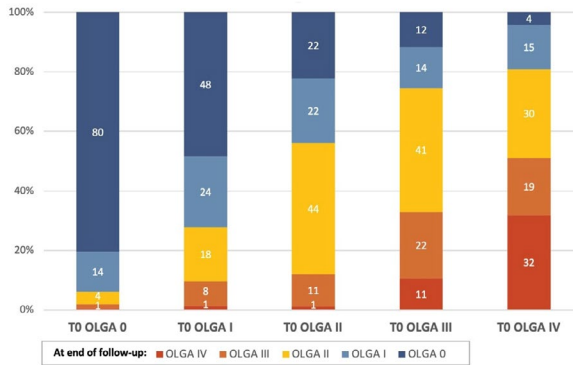
Results: 685 patients (62% female; mean 56 years-old) were included. Baseline histology was 31% OLGA 0, 23% OLGA I, 25% OLGA II, 14% OLGA III and 7% OLGA IV. IM was observed in 52%. Median follow-up was 36 months (IQR 22–52). The 3-year cumulative risk of HGD/GA was 0.3% (95%CI: 0.04–1.9) in OLGA 0-I, 1.0% (95%CI: 0.2–7.2) in OLGA II and 5.5% (95%CI: 2.3–13) in OLGA III-IV. Significantly higher risk of HGA/GA was observed in OLGA III-IV (HR 17.7, 95%CI: 2.2–142), corpus-extended IM (HR 4.5, 95%CI: 1.3–15.3) and incomplete-type IM (HR 8.9, 95%CI: 1.9–42.2).

Conclusions: Our results support endoscopic surveillance in patients with advanced stages of CAG and incomplete-type or corpus extended IM in Latin America.

Keywords: Stomach neoplasm, Endoscopy, Cohort studies, Precancerous conditions



Cumulative risk of high-grade dysplasia (HGD) and gastric adenocarcinoma (GA) among intestinal metaplasia (IM) subtypes. Error bars represent the standard errors and differences are established by log-rank test for equality survival function.



Atrophy Score		Corpus			
		No Atrophy (score 0)	Mild Atrophy (score 1)	Moderate Atrophy (score 2)	Severe Atrophy (score 3)
Antrum	No Atrophy (score 0) (including <i>incisura angularis</i>)	STAGE 0	STAGE I	STAGE II	STAGE II
	Mild Atrophy (score 1) (including <i>incisura angularis</i>)	STAGE I	STAGE I	STAGE II	STAGE III
	Moderate Atrophy (score 2) (including <i>incisura angularis</i>)	STAGE II	STAGE II	STAGE III	STAGE IV
	Severe Atrophy (score 3) (including <i>incisura angularis</i>)	STAGE III	STAGE III	STAGE IV	STAGE IV

Dynamics of the Operative Link for Olga Assessment (OLGA) stages during the follow up. Columns represent baseline OLGA, and the colors represent OLGA at the end of the follow up. T0: baseline.

PUG-57

Incidence of esophageal varices in cirrhotics and evaluation of prophylaxis of esophageal variceal bleeding in Orkhon

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Background/aims: Mongolia has the highest incidence of morbidity and mortality of chronic liver diseases, especially liver cirrhosis and liver cancer worldwide. Esophageal variceal bleeding is one of the main complications of liver cirrhosis. Bleeding from esophageal varices is the second most common cause of upper GI bleeding, after duodenal and gastric ulcers. Non-selective beta-blockers (NSBBs) and endoscopic variceal ligation (EVL) are the mainstay for primary prophylaxis of esophageal varices. Medipas hospital introduced endoscopic variceal ligation for the first time in rural areas of Mongolia. Since 2016, a total of 50 cases of esophageal varices were successfully treated, but 32 cases (64%) were performed as an emergency procedure during acute bleeding, which is our concern and the reason for conducting this study.

Methods: This study followed 106 patients with liver cirrhosis in Orkhon province, Mongolia from January 2021 to February 2022. Complete blood count, liver function, blood coagulation, HBsAg, anti-HDV and anti HCV tests results were collected from all patients. All patients underwent an abdominal ultrasound to assess liver and ascites. Upper GI endoscopy were recorded to screen and grade esophageal varices. The other clinical data and evaluation of primary prophylaxis of esophageal variceal bleeding were collected using standardized questionnaire.

Results: A total of 106 patients with a mean age of $56 \pm 11,7$ years were evaluated. There were 59.5% and 40.5% men and women respectively, with a male to female ratio of 1.5:1. By Child-Pugh Classification, 72 (67.92%) patients were in class A, 27 (25.47%) in class B and 7 (6.6%) in class C at presentation. On UGIE, 53 (50%) had varices and 53 patients (50%) had no varices. 24 of the varices (45.2%) were small varices and 29 of the varices (54.8%) were medium and large varices. According to the treatment guidelines, 24 people are prescribed to take non-selective beta-blockers, but only 7 people take them. 17 cases received EVL (endoscopic variceal ligation) of the 33 people who were indicated for EVL.

Conclusions: Esophageal varices occurred in 50% of the study participants, one of the third of them (28%) did not know about varicose veins and risk of bleeding. Around 30% of patients was prescribed beta blockers, but only 30% of them were taken medications regularly. 51% had endoscopic variceal ligation but 30% of them were emergency vasectomy because of bleeding. In conclusion, the primary prevention of esophageal variceal bleeding in Orkhon province, Mongolia were not provided sufficiently. Therefore, first of all, family doctors, internists and gastroenterologists of Orkhon province should follow one evidence based guidelines of liver cirrhosis. Doctors and nurses need to educate patients who diagnosed liver cirrhosis effectively. In the last, endoscopists and nurses of Orkhon province should be able to perform endoscopic variceal ligation, all hospital of endoscopy department should be equipped with endoscopic variceal ligation.

Keywords: Prevalence, Liver cirrhosis, Orkhon province, Primary prophylactic, Esophageal varices

PUG-58

Combination of low-cost biomarkers yield excellent performance for the non-invasive detection of gastric neoplasia

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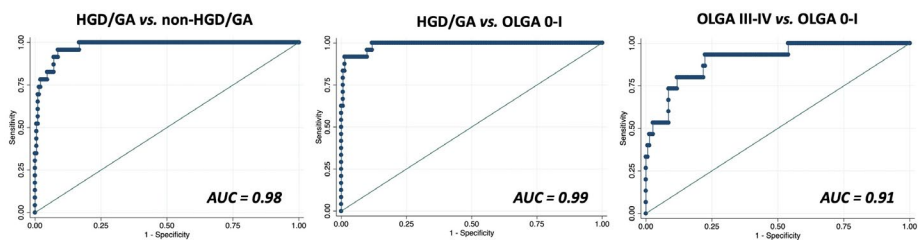
Background/aims: Limited diagnostic tools are available for the non-invasive detection of gastric preneoplasia and adenocarcinoma (GA). Our aim was to evaluate the diagnostic yield of a combination of biomarkers for the detection of gastric preneoplasia and GA.

Methods: A cross-sectional analysis of adult patients with esophagogastroduodenoscopy was conducted. Demographical variables and serum biomarkers were evaluated: *H. pylori* IgG antibodies, Pepsinogen I/II, Trefoil Factor 3, Ferritin, ultrasensitive C reactive protein, Ca 15-3, anti-parietal cell and anti-intrinsic factor antibodies. Logistic regression and receiver operating characteristic models were applied to assess diagnostic yield of gastric preneoplasia and GA.

Results: 220 patients were analyzed [64% female; median 60 years-old]. Sensitivity (SE) and specificity (SP) of individual biomarkers were low. The combined regression model demonstrated an area under the curve (AUC) of 0.98 (SE 96%/SP 91%) for HGD/GA, AUC of 0.99 (SE 96%/SP 90%) for HGD/GA vs. OLGA 0-I and AUC of 0.91 (SE 93%/SP 78%) for OLGA III-IV vs. OLGA 0-I.

Conclusions: Combination of biomarkers and demographic variables may allow excellent diagnostic yield for the non-invasive detection of gastric premalignant conditions and GA. Prospective studies are needed to confirm these results.

Keywords: Stomach neoplasm, Endoscopy, Precancerous conditions, Diagnostic test



Receiving operative characteristics curve analyses and area under the curve (AUC) for the diagnosis of high grade dysplasia (HGD)/gastric adenocarcinoma (GA) vs. non-HGD/GA (left); HGD/GA vs. Operative Link on Gastritis Assessment (OLGA) 0-I stages (center); OLGA III-IV stages vs. OLGA 0-I stages (right).

PUG-59

Acute gastric necrosis after vascular embolization in patient with acute ulcer bleeding

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Background: If a bleeding lesion is not found by endoscopy or endoscopic hemostasis is difficult, other hemostasis methods are considered. Angiography and transcatheter arterial embolization are intervention procedures that can be considered if endoscopic diagnosis and hemostasis fails. The usefulness and safety of angiography and embolization in patient with upper GI bleeding have been reviewed several times in other studies on upper gastrointestinal bleeding, but we would like to report a case of Acute Gastric Necrosis after the angioembolization.

Case: We would like to report a case. A 76-year-old female patient visited other hospital due to hematemesis and had an upper gastrointestinal endoscopy. gastric ulcer, Forrest IIb at angle (Figure 1,2) was found and she was hospitalized for conservative care. Upper GI endoscopy was performed again due to rebleeding during hospitalization, but hemostasis was failed because the lesion was large and difficult to treat. So, she was transferred to our hospital and Left gastric artery angioembolization was done. (Figure 3,4,5) Afterwards, acute gastric necrosis was shown at endoscopic follow-ups. (Figure 6,7) Eventually, total gastrectomy was performed due to necrosis.

Discussion: Most of the upper gastrointestinal tract have sufficient collateral blood flow, so the risk of intestinal ischemia or infarction after embolization is reported to be rare. But it can progress to severe complications as in this case, requiring sufficient communication with skilled endoscopists before embolization. It is also possible to consider whether pseudoaneurysm will be a risk factor.

Keywords: Gastric ulcer, Gastric necrosis, Pseudoaneurysm, Angioembolization, Left gastric artery

PUG-60

Epidemiology of eosinophilic esophagitis in Korea: A multicenter historical cohort study based on nationwide data

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Background/aims: The incidence and prevalence of eosinophilic esophagitis (EoE) have risen rapidly, worldwide, but epidemiological studies have not been fully evaluated in Asia. We aimed to investigate the clinicopathological characteristics of EoE, and treatment pattern in Korea using multicenter nationwide endoscopic data.

Methods: From 2007 to 2021, endoscopic data from 13 tertiary care centers were collected. We diagnosed EoE based on ≥ 15 eosinophils/high-power field (HPF) and, symptoms of esophageal dysfunction. Endoscopic findings were scored with the endoscopic reference score (EREFS).

Results: We diagnosed EoE in 168 patients (124 men and 44 women; mean age, 45.7 ± 13.9 years) with presenting symptoms of, dysphagia (28.6%), nausea/vomiting (16.7%), and chest pain (15.5%). 48 patients (28.6%) had a personal history of allergy, with asthma (10.7%), and allergic rhinitis (10.7%) diagnosed most commonly. The mean peak eosinophil count (PEC) was $54.7 (\pm 84.3)/\text{HPF}$. The mean total score of EREFS scores was $2.3 (\pm 1.79)$ and the most common endoscopic finding was furrow (62.6%) while stricture was rarely observed (7/168, 4.2%). 70.2% of patients (118/168) were treated with proton pump inhibitors whereas 26.8% of patients (45/168) were treated with corticosteroid as a first- or second-line therapy.

Conclusions: EoE is not uncommon disease in Korea which has become an important disease in patients with symptom of esophageal dysfunction. Additional studies are necessary to evaluate epidemiology, natural history of the disease, and proper management.

Keywords: Eosinophilic esophagitis, Esophagus, Endoscopy

PUG-61

Perioperative care in esophagectomy patients at Muhimbili National Hospital

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Background/aims: Esophagectomy, while effective in offering curative treatment for operable esophageal cancers is dreaded with high morbidity. ERAS protocol was designed to enhance the postoperative recovery phase and has improved post-operative immediate outcomes. At MNH the number of esophagectomies is increasing yearly yet the immediate outcomes haven't yet been assessed. Objective: To audit perioperative care procedures in esophagectomy patients at Muhimbili National Hospital (MNH) between 2015 and 2019.

Methods: This was a secondary data analysis audit revising the past five years of data on esophagectomy patients. Information obtained from the theatre, ICU, wards, and medical record department was filled in a data-collecting tool and analyzed using Statistical Package for Social Sciences (SPSS) version 23.0. All patients who underwent esophagectomy due to EC between 2015 and 2019 were included in the study, excluding those who underwent esophagectomies due to reasons other than EC or whose case notes were not obtained from the sources. After analysis, current conventional practices were compared to standard ERAS protocol guidelines.

Results: A total of 33 esophagectomies were performed in a period of five years from 2015–2019 while 21 (63.6%) case notes were obtained for review. In the fifth decade, 6 (28.6%) comprised the majority, with the male gender leading 12 (57.1%). Perioperative good practices were observed in areas of preoperative antibiotic use, timely operation after completion of neo-adjuvant treatment with a mean duration of 10 ± 2.3 weeks, and the use of postoperative antithrombotic prophylaxis. Preoperative nutritional assessment was inadequately performed in the majority of cases, only a few parameters were assessed, including BMI 16 (72.2%), Serum albumin level 18 (85.7%), and performance status 10 (47.6%). Of 21 cases, 19 (90.5%) cases were operated through an open Ivor Lewis esophagectomy with a mean duration of operation of 402 ± 114 minutes. The gastric conduit was the commonest esophageal replacement over other conduits. Post-operative NGT stayed for an average of 7 ± 2.3 days, whereas enteral-feeding and ambulation were initiated on an average of 6 ± 1.5 and 5 days post-operative respectively, on the other hand, the chest tube stayed for a median of 9.5 days. The overall morbidity and mortality were 15 (71.4%) and 10 (47.6%) respectively, six patients recovered without any significant complications. Pneumonia and sepsis were the commonest post-operative complications, all patients were admitted to the ICU after an operation, and the median stay was 12 days (range 8–31 days) and most deaths 6 (28.6%) occurred in the ICU.

Conclusions: This clinical audit study reveals significant morbidity and mortality post-esophagectomy, pitfalls in current traditional/ conventional perioperative practices contributed significantly to undesirable immediate post-operative outcomes. Inadequate pre-operative patient assessment,

nutritional status optimization, and patient choice are among the areas to consider more in subsequent operations. Use of pre-operative antibiotics, timely operation from completion of neoadjuvant chemoradiation, and use of antithrombotics are among the good practices observed.

Keywords: Enhanced recovery after surgery, Esophageal cancer, Esophagectomy, Clinical audit

PUG-62

Prevalence of *Helicobacter pylori* infection and antimicrobial susceptibility pattern among dyspeptic patients

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Background/aims: *Helicobacter pylori* (*H. pylori*) infection is common, affecting almost half of the world population. Resistance of *H. pylori* is high among the antibiotics used in the treatment. Few studies have addressed the prevalence of *H. pylori* infections and resistance patterns in Tanzania. Therefore, we aimed to determine the prevalence of *H. pylori* infection, associated factors, and antimicrobial susceptibility patterns in our community.

Methods: A cross-sectional study was conducted at Muhimbili National Hospital from September 2020 to February 2021. We consecutively enrolled patients after meeting inclusion criteria. *H. pylori* infection was diagnosed by using a rapid urease test. Columbia base agar supplemented with sheep blood was used for culture. The isolates with characteristics of gram-negative straight rods, oxidase-positive, urease-positive, and catalase-positive were identified as *H. pylori*. Antimicrobial susceptibility testing was done by using the disc diffusion method.

Results: A total of 290 participants were included. The median age of the study participants was 48 years; majority being females. The Prevalence of *H. pylori* infection was 42.4%. Use of well-water and family history of peptic ulcer disease were independently associated with *H. pylori* infection. Resistance pattern of *H. pylori* to clarithromycin, amoxicillin, metronidazole, levofloxacin, ciprofloxacin and tetracycline were 65.5%, 86.2%, 100%, 0%, 3.5%, and 31% respectively.

Conclusions: The prevalence of *H. pylori* infection is relatively high. The resistance to common antibiotics used in treating and eradicating *H. pylori* infection is very high. Extensive local studies are needed to guide local prescription patterns to obtain relevant conclusions.

Keywords: *H. pylori*, Endoscopy, Rapid urease test, Biopsy, Antimicrobial susceptibility pattern

PUG-63

Diagnostic performance of Kyoto and modified Kyoto classification scores for *Helicobacter pylori* infection

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Background/aims: Gastroscopy can reveal distinct manifestations of Hp-infected gastric mucosa, categorized by the Kyoto classification of gastritis with a score ≥ 2 indicating possible current Hp infection. Recently, a modified Kyoto scoring system has been proposed, which has shown improved accuracy in diagnosing HP current infection (score ≥ 3). However, sensitivity and specificity of certain manifestations may vary in different populations. This study aims to evaluate the performance of the Kyoto classification score and the modified Kyoto classification score in diagnosing Hp current infection in a Peruvian cohort, compared to biopsy results.

Methods: An observational prospective study was performed from January to March of 2023, on consecutively recruited patients (>18 y.o.) with prior history of uninvestigated dyspepsia and without history of previously Hp eradication treatment, gastric cancer, liver cirrhosis, surgery or coagulopathy. All patients had undergone a gastroscopy with high definition endoscopes and biopsy sampling according to Sydney protocol, they were scored by two experts endoscopist after the procedure. The Hp infection status was determined by histopathologic analysis. The prevalence, diagnostic sensitivity, especificity, PPV, NPV, +LR, -LR and accuracy for each classification score system were calculated.

Results: A total of 81 patients (age 52.7 ± 12.6) were evaluated, the prevalence of Hp infection according to histopathological analysis was 59 (72%). The diagnostic sensitivity, especificity, PPV, NPV, +LR, -LR and accuracy for the Kyoto classification score were 96.6%, 27.2%, 78%, 75%, 1.33, 0.12 and 77.78% respectively. The diagnostic sensitivity, especificity, PPV, NPV, +LR, -LR and accuracy for the modified Kyoto classification score were 94.92%, 40.91%, 81.16%, 75%, 1.61, 0.12 and 80.25% respectively.

Conclusions: Our study demonstrated high sensitivity and a reasonable accuracy for both scoring systems, albeit with low specificity and a favorable negative likelihood ratio.

Keywords: Kyoto score, Modified Kyoto score, Endoscopy, *Helicobacter pylori*

PUG-64

Gender differences of esophageal cancer in Korea

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Background/aims: Esophageal cancer is known to be a strongly male dominant disease. However, the gender differences have not been well understood. We aimed to evaluate the differences between male and female esophageal cancer in Korean population.

Methods: We retrospectively analyzed patients confirmed as esophageal cancer in Asan Medical Center between January 2005 and December 2015. The clinical features of patients, histopathologic characteristics of tumor, treatment response, and survival were investigated between male and female patients respectively.

Results: A total of 2,068 patients were analyzed. The median age was younger in female (62 years; interquartile range [IQR] 38–85) than male (64 years, IQR 37–90), and the male to female ratio was 13.4:1. Squamous cell carcinoma was major pathologic type (99.0% in male and 93.1% in female), however, the proportion of adenocarcinoma was higher in female than male (5.6% vs. 0.8%, $p<0.001$). Female patients smoked less (22.2% vs. 86.5%, $p<0.001$) and drank less alcohol (26.4% vs 89.9%, $p<0.001$) than male patients. Female had upper and middle esophagus dominant tumor location (75.0%), whereas middle and lower dominant in male (81.7%). Multivariate analysis showed that gender (Hazard ratio [HR], 0.77; 95% CI, 0.60 to 0.99; $p=0.044$), age (HR, 1.03; 95% CI, 1.02 to 1.03; $p<0.001$), and advanced tumor stage (stage 4, HR, 14.3; 95% CI, 8.43 to 24.4; $p<0.001$) were independent prognostic factors for overall survival. The 5-year overall survival rate of female was higher than those of male (53.5% vs. 44.5%, $p=0.038$). Cancer recurrence rate in complete remission patients were significantly lower in female than male (15.3% vs. 25.1%, $p=0.03$).

Conclusions: The gender is an independent prognostic factor for esophageal cancer, with favorable survival outcomes in female than male. Further research is warranted to determine the cause of prognostic difference in esophageal cancer in male and female.

Keywords: Esophageal cancer, Gender, Prognosis, Sex differences

PUG-65

Recurrent respiratory arrest in achalasia patient

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Achalasia is a rare motility disorder of the esophagus characterized by loss of enteric neurons leading to absence of peristalsis and impaired relaxation of the lower esophageal sphincter. Here in, we report an unusual case of 71-year-old male patient presenting as acute reparatory failure with hemodynamic compromise.

A 71-year-old man with a history of achalasia visited complaining short of breath. He had history of pneumatic balloon dilatation due to achalasia in 2002, 2008 and 2015. On admission, he was intubated due to acute respiratory failure in other hospital. Chest CT demonstrated a severely dilated esophagus with compression of the trachea. After decompression of esophageal contents by placement of endotracheal tube in the esophagus, patient soon recovered from respiratory distress. Extubation was performed on admission day 3 and discharged with medication of isosorbide dinitrate and calcium channel blocker. However, he was lost to follow up. Two years later, he re-visited our hospital after intubated due to respiratory arrest at local hospital. Chest CT showed a dilatation of esophagus and left bronchus passive obstruction, caused by food materials. Esophagogastroduodenoscopy confirmed a massively tortuous esophagus, with a large amount of retained food, which was gradually removed endoscopically with placement of overtube. After stabilization, the patient was treated with pneumatic balloon dilation of the distal esophagus and gastroesophageal junction and discharged.

Acute dilatation of the esophagus causing respiratory obstruction is an uncommon presentation of achalasia. The most successful treatment in previous reported cases is to decompress the esophagus with a nasogastric tube. Our case highlights that various instruments such as endotracheal tube or overtube can be used to decompress the esophagus and prevent aspiration from esophageal contents. Also, physicians should be aware that untreated achalasia may lead to recurrent respiratory failure.

Keywords: Achalasia, Acute respiratory failure, Pneumatic balloon dilatation

PUG-66

Pneumatic balloon dilation for management of achalasia: A 3-year single center experience

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Background/aims: Achalasia is a motility disorder of the esophagus affecting both genders equally. Therapeutic options in Ethiopia are limited to pneumatic balloon dilation (PBD) and open thoracotomy and cardiomyotomy. The aim of this study is to evaluate the response of achalasia patients undergoing pneumatic balloon dilation in MCM CSH, Ethiopia. This is the first and largest study in Ethiopia to assess PBD for achalasia.

Methods: The study was conducted in Myungsung Medical College/Myungsung Christian Medical Center Comprehensive Specialized Hospital, Addis Ababa, Ethiopia. A prospective cohort study design was used. Purposive sampling method was employed to enroll all 36 achalasia patients who underwent PBD over a period of 3 years (2021 to 2023). Predilation Eckardt's score and post dilation Eckardt's score at one and three months after the procedure was assessed. Safety of the procedure was also assessed. Descriptive statistics using frequency, mean and range was used to analyze the results.

Results: Among the 36 patients, 20 (56%) were male and 16 (44%) female. The mean age at presentation was 32.6 years (range: 15–67 years). All patients had dysphagia, while 32 (89%) patients presented with one or more additional symptoms (weight loss, regurgitation, or chest pain). The mean duration of symptoms before diagnosis was 2.67 years. 32 (89%) patients had both timed barium esophagogram and esophagogastroduodenoscopy as a diagnostic tool, whereas the remaining 4 (11%) patients had only esophagogastroduodenoscopy as the diagnostic tool. The mean predilation Eckardt's score was 7, and post dilation Eckardt's score at one and three months were 3. 5 (14%) patients required a second dilation session. Only 1 (3%) patient had complication (perforation).

Conclusions: Pneumatic balloon dilation (PBD) is an outpatient procedure for patients with achalasia with fewer complications. Furthermore, PBD is cost effective and safer for achalasia patients with short hospital stay. Henceforth, PBD for achalasia management can be safely performed in Ethiopia with endoscopy and fluoroscopy set ups.

Keywords: Pneumatic balloon dilation, B=myungsung medical college, Achalasia, Myungsung christian medical center comprehensive specialized hospital

PUG-67

Natural history of gastric leiomyoma

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Background/aims: Even though most gastric leiomyomas are known to be asymptomatic and benign subepithelial tumors (SETs), some may increase in size or become symptomatic. Given the potential for these tumors to grow and become symptomatic, it is important to understand their natural history. Therefore, in this article, we investigated the natural history of histologically proven gastric leiomyomas.

Methods: We retrospectively reviewed histologically proven gastric leiomyoma at a single tertiary center. The baseline characteristics of these cases were described, and those with a follow-up period of at least 12 months without immediate resection were analyzed. The primary outcome was the frequency of size increase more than 25% during the follow-up period, and the secondary outcome was the histopathologic results in cases that underwent resection.

Results: A total of 231 patients with histologically proven gastric leiomyomas were included and the most frequent location was the cardia (77.1%), and the median size was 3 cm (IQR 2–4 cm). In 84 cases that were followed up at least 12 months, the median size was 2.5 cm (IQR 2–3 cm) and the median follow-up period was 50.8 months (IQR 27.2–91.3 months). During the follow-up period, an increased tumor size was observed in 2 cases (2.4%) and surgical results revealed one case as leiomyoma and another case as leiomyosarcoma. Among the remaining cases that did not show any size increase, 15 cases underwent surgical resection (n=10) or endoscopic resection (n=5), and all cases were confirmed as leiomyoma.

Conclusions: Most of gastric leiomyomas are benign SETs and increase of size is not frequent even in large sized cases. However, risk of malignancy still exists, therefore, close monitoring with regular follow up should be needed.

Keywords: Stomach, Leiomyoma, Leiomyosarcoma, Subepithelial lesion, Natural history

PUG-68

POEM as a rescue therapy in patients with recurrence achalasia after laparoscopic Heller's myotomy (LHM)

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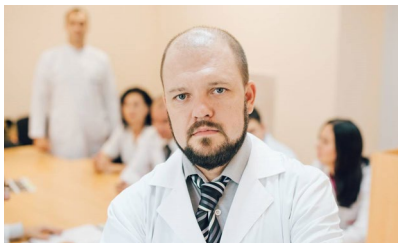
Aims: Achalasia cardia means motility disorders of esophagus with progressive clinical dysphagia and regurgitation, which has as complications: aspiration, pneumonia, and etc. The main treatment is laparoscopic myotomy of Heller with fundoplication. However provided operation was found not efficient as the patient has recurrent clinical dysphagia.

Clinical case: a 35-year-old female patient, diagnosed with achalasia cardia 3 type, was operated in 2007 by the method of LHM with Dor fundoplication. Since 2020, she has noted a problematic passage of food and liquid, periodically vomiting. The symptoms kept progressing, and by the end of 2021, the patient has noted an increased number of episodes of vomiting and losing weight. X-Ray showed there was a delay of the contrast agent for more than 15 minutes with a gradual evacuation into the stomach. Endoscopic picture: the lumen of the esophagus is dilated, convoluted. There is a significant amount of liquid and food leftovers in the lumen. The LES for the endoscope is easy to go through, there is a persistent stenosis in the area of the LES, which may indicate the presence of scarring changes in this area. After further examination, it was decided to perform a posterior oral endoscopic myotomy.

Material and method: We performed POEM with dissection of the posterior wall of the esophagus according to the standard technique, under general anesthesia in the supine position. The length of the esophageal myotomy was 7 cm, followed by dissection of the LES and stomach muscles up to 2 cm. The mucosal incision was closed with 4 hemostatic clips. On the control X-ray after the operation, complete passage of the contrast agent is noted for 1 minute without delay.

Conclusion: Peroral endoscopic myotomy is the method of choice in patients with recurrent achalasia cardia after LHM with Dor fundoplication, because myotomy is performed on the preserved posterior wall of the esophagus. This case shows a good POEM result, but requires further observation and studies in the most of similar cases.

Keywords: POEM, Achalasia, Myotome, Esophagus, Heller



PUG-69

The role of small bowel capsule endoscopy in determining the treatment strategy for duodenal follicular lymphoma

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Background/aims: Duodenal follicular lymphoma (DFL) is a rare type of non-Hodgkin lymphoma that originates in the duodenum. Staging of DFL is determined based on the involvement of the small intestine and other organs or lymph nodes. Due to its indolent nature and generally favorable prognosis compared to other types of lymphoma, treatment options for DFL can range from a wait-and-see approach to radiotherapy or systemic chemotherapy. This study aims to analyze the role of capsule endoscopy in determining the treatment approach for DFL.

Methods: A single-center analysis was conducted on patients diagnosed with DFL at Seoul St. Mary's Hospital between 2015 and 2022. Clinical and imaging data from a total of 41 patients were analyzed.

Results: Of the 41 patients, 26 underwent capsule endoscopy to confirm the presence of small bowel lesions during the initial workup. Capsule endoscopy was performed in 7 out of 15 patients who were found to have no extranodal involvement in the initial PET-CT scan. There was no significant difference between the group that underwent capsule endoscopy and the group that did not. However, the proportion of patients who chose watchful waiting was higher in the group that underwent capsule endoscopy and did not show signs of small intestine involvement (71.4%), while the group that did not undergo capsule endoscopy had a higher proportion of patients who chose radiation therapy as the primary treatment for duodenal involvement (87.5%).

Conclusions: Capsule endoscopy can play a crucial role in determining the appropriate treatment approach for DFL by identifying small intestinal lesions that may not be detected by other imaging techniques, such as PET-CT. The presence or absence of small intestinal involvement may impact the decision to pursue a "wait and see" approach versus radiotherapy or systemic chemotherapy. Therefore, it is considered that capsule endoscopy plays an important role in determining the treatment plan for duodenal follicular lymphoma.

Keywords: Duodenal follicular lymphoma, Capsule endoscopy

PUG-70

**Non-mucin secreting intraductal papillary neoplasm of the bile duct:
Presenting repeated episodes of acute cholangitis**

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Intraductal papillary neoplasm of the bile duct (IPNB) is a rare disease entity that originates from the biliary epithelium with a prevalence of 4% to 15% among bile duct tumors. Non-mucin secreting IPNB in Asian pooled prevalence is 52.1% and it is predominant in females. (1, 2) It developed within any part of the biliary tract. It can be a multifocal or exophytic pattern, with or without macroscopically visible mucin secretion. It has been established as a precursor lesion towards cholangiocarcinoma including premalignant biliary lesions. The morphological features intraductal papillary growth pattern are similar to the intraductal papillary mucinous neoplasm (IPMN) of the pancreas. (3-5) Approximately 40%-80% of IPNB can be invasive carcinoma or adenocarcinoma, suggesting that this disease is a high potential for malignancy. (6) The survival of patients with mucin-secreting tumors seems to be shorter than the ones with non-mucin secreting tumors; 5-year survival of 30% and 52%, respectively (7-9).

The most common clinical manifestations are right upper quadrant pain (35%-88.5%), repeated episodes of acute cholangitis (5%-59%), obstructive jaundice (20%-36%), and asymptomatic. (4, 6, 10)

Case Report: A 68-year-old female patient. The patient was admitted for acute cholangitis 3 years ago. The patient had no significant past medical or surgical history prior to that event. Magnetic resonance imaging (MRI) showed mild prominence of bilateral intrahepatic ducts, normal size of common hepatic duct, and common bile duct. One year ago, the patient developed mild epigastric pain with abnormal laboratory test results included: alkaline phosphatase 240 U/L (normal: 104-338 U/L); aspartate aminotransferase 85 U/L (normal: 10-37 U/L); alanine aminotransferase 71 U/L (normal: 3-34 U/L), total bilirubin 1.8 mg/dl (normal: 0.2-1.1 mg/dl), direct bilirubin 0.9 mg/dl (normal: less than 0.3 mg/dl). The patient was prescribed antibiotics. After that the symptoms recovered well until she became symptomatic again in 4 months. The patient came to the hospital with complaints of epigastric pain, jaundice, and fever. Laboratory test results included: alkaline phosphatase 184 U/L (normal: 104-338 U/L); aspartate aminotransferase 563 U/L (normal: 10-37 U/L); alanine aminotransferase 184 U/L (normal: 3-34 U/L); total bilirubin 4.6 mg/dl (normal: 0.2-1.1 mg/dl); direct bilirubin 2.7 mg/dl (normal: less than 0.3 mg/dl); CA19-9: 22 U/ml (normal: less than 37 U/ml). The patient underwent an abdominal ultrasound, which showed dilatation of bilateral intrahepatic bile ducts and common bile duct was 0.8 centimeters in diameter with an internal turbid content. Additionally, magnetic resonance cholangiopancreatography (MRCP) revealed a 1.7×1.2×2 centimeter oval lesion at bile duct confluence extended to the right and left intrahepatic duct to common hepatic duct causing upstream bilateral intrahepatic duct dilatation (Figure 1A).

Further, endoscopic retrograde cholangiopancreatography (ERCP) showed a filling defect at common hepatic duct up to proximal bilateral intrahepatic duct (Figure 1B, C). Cholangioscopy was performed, which showed numerous papillary growing tumors (Figure 2A, B) in the left and right intrahepatic duct to common hepatic duct without mucin retention, and a biopsy was taken by SpyBite Max. The biopsy results revealed non-mucin secreting IPNB with high-grade dysplasia (Figure 2C, D) and the patient underwent radical liver resection.

Discussion: Papillary tumors of the bile duct are rare precancerous lesions. These tumors have a better long-term prognosis than other types of bile duct cancer. The IPNB without macroscopically visible mucin secretion was found in 60% of US and Europe pooled and 52% of Asian pooled IPNB. (1) The current data reveals that overall survival rates of non-mucin secreting IPNB and mucin-secreting IPNB are 89% and 69% at 1 year, 57% and 37% at 3 years, and 52% and 19% at 5 years, respectively. The mean survival period of non-mucin secreting IPNB and mucin-secreting IPNB was 52 months and 31 months. (9) From our standpoints, the morphologic morphology, macroscopically non-mucin secreting IPNB has the best prognosis. The majority of the lesions were usually found in the hilum and left-sides biliary tract. However, the primary lesion neither affect the cause of the disease nor its prognosis and there was no difference in survival rate. (2) Acute cholangitis is not a common presentation of cholangiocarcinoma. However, it is the second most common manifestation of IPNB since the friable tumor emboli can easily detach from their origins or fliting of the movable part of a tumor leading to acute bile duct obstruction. (6) In this case, the patient does not have distant metastasis and the extension of the lesion was well determined by cholangioscopy. So surgical resection is considered for this case.

Conclusion: Intraductal papillary neoplasm of the bile duct is a rare biliary tumor, but it has a better prognosis than cholangiocarcinoma. The leading symptom is mechanical bile duct obstruction including cholangitis, but there are many obstructive symptoms that are non-specific. Cholangioscopy is useful for diagnosis, localization, and progression. Cholangioscopy is important to determine an operative method based on information. Surgical resection is the major treatment and an important factor for long-term survival, especially in early-stage IPNB. Consequently, early and accurate diagnosis is essential for better patient outcomes.

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Keywords: Non-mucin secreting, Intraductal papillary neoplasm of the bile duct, Acute cholangitis

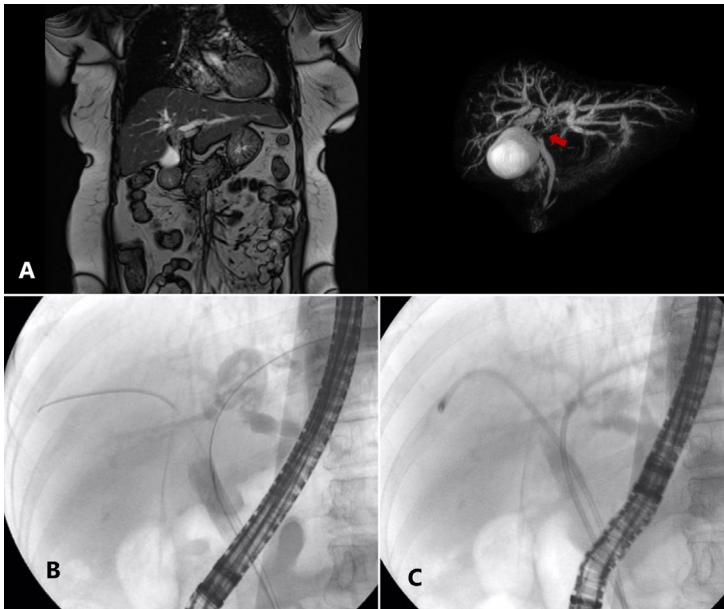


Figure 1A. Magnetic resonance cholangiopancreatography (MRCP) revealed a 1.7×1.2×2 centimeter oval lesion (red arrow) at bile duct confluence extended to the left and the right intrahepatic duct to common hepatic duct causing upstream bilateral intrahepat

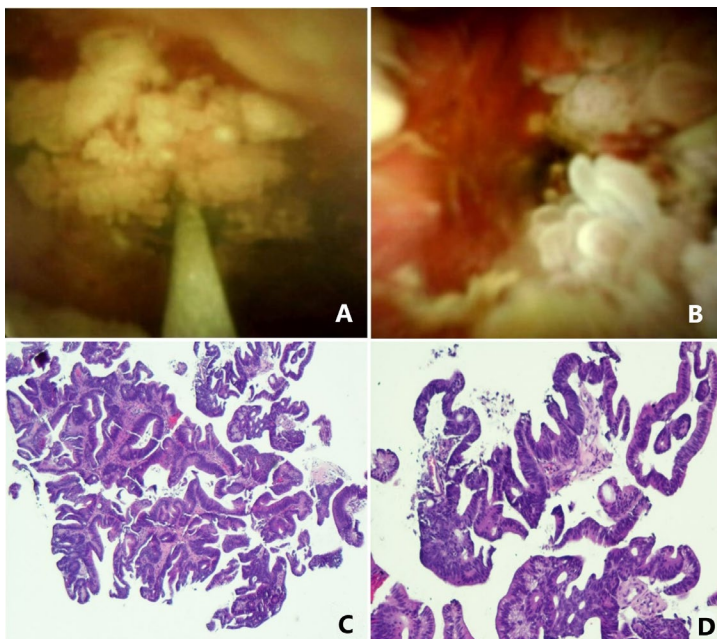


Figure 2A, B. Cholangioscopy revealed numerous papillary growing tumors or a cauliflower-like protruding into the left and the right intrahepatic duct to common hepatic duct without mucin retention.

Figure 2C. H&E, 40x. Intraductal papillary neoplasm of B.

PLG-01

Endoscopic submucosal dissection: Results of 30 colorectal neoplastic lesions from the Bach Mai interventional endoscopy

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Background/aims: Endoscopic submucosal dissection (ESD) help to increase the rate of en-bloc resection of the gastrointestinal neoplastic lesions. However, it is not yet widely applied in Vietnam due to the high complication rate and limited experience. The purpose of this study is to evaluate the initial outcome of implementing ESD procedures at Bach Mai hospital in Vietnam.

Methods: ESD procedures were used to treat large colorectal neoplastic lesions more than 2 cm that could not be resected in one piece by other endoscopic methods. The procedure was carried out by doctors with more than 1 year experience in performing ESD techniques. The total of 30 lesions were performed endoscopic submucosal dissection from 1/2021 to 4/2022 at Bach Mai hospital. Procedure duration, en-bloc, complete (R0) resection, complication rates, recurrence rates after a 3-month and 12-month follow-up were analyzed.

Results: There were 30 patients underwent ESD mostly with rectal lesions (n=16, 53.3%). The overall median procedure time was 85 minutes (range, 15–320 minutes). The mean lesion diameter was 2.5 cm (range 1.5–6.0 cm). En-bloc and R0 resection rates were 100%, 93.3% respectively. There were no delayed bleeding and perforation occurred after ESD procedure. Recurrence rates were undetected during the follow-up time.

Conclusions: ESD is useful and safe for resection of large colorectal polyps, it can be widely applied in Vietnam.

Keywords: Colorectal neoplasm, Endoscopic submucosal dissection, Polyp

PLG-02 

Colorectal cancer incidence, single center data results

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Background/aims: Colorectal cancer is the 6th most common cancer in Mongolia for both males and females. The prevalence of colon cancer is 8.1 in males and 8.3 in females per 10.000 populations. In 2020, the colon and rectum cancer was recorded approximately 4% (262) among the all newly recorded cancer cases. The department of endoscopy at Ulaanbaatar Songdo Hospital has diagnosed 28.6% of all newly diagnosed colorectal cancer in Mongolia. According to the TNM classification, 42% of colorectal cancer were diagnosed at stage 3 and 37.4% at stage 4 in 2020. In recent 5 years of prevalence, incidence, and mortality is keep increasing.

Methods: We selected a total of 38950 consecutive colonoscopy results from 2009 to 2021 in the departments of Gastroenterology and Endoscopy at Ulaanbaatar Songdo Hospital, Mongolia. We took histologically confirmed colorectal cancer cases, and classified by their age, distribution, location, pathological type, and treatment method.

Results: The mean age of patients diagnosed with colorectal cancer was 60.3 ± 14.3 . The gender ratio for 45% males and 55% for females. We totally diagnosed 982 colorectal cancer from 2009 to 2021 among those examined by routine colonoscopy. The incidence of colorectal cancer increased from 1.60% in 2009 to 3.6% in 2021. Colorectal ESD treatment was also increased from 0 to 11. The location of colorectal cancer that we diagnosed by colonoscopy was 52.5% in the sigmoid colon, 9.3% in ascending colon, 8.9% in hepatic flexure, 8.6% in the cecum, and 20.7% in other sites. According to pathological type, 93% was adenocarcinoma, 3% percent was signet cell carcinoma, and 4% was others in pathological type.

Conclusions: The incidence of colorectal cancer is increasing in recent years. Colonoscopy plays a crucial role in diagnosing and treating colorectal cancer.

Keywords: Colorectal cancer, Pathological type, Adenocarcinoma

PLG-03

The study for the diagnosis of colon cancer and precancerous lesion

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Background/aims: Colorectal cancer is the third most common cancer type worldwide, in 2020 by the report from International Agency for Research on Cancer. WHO reported, it is the 6th most common cancer in Mongolia. Narrow band imaging is a recently developed technology from Olympus brand that uses specific wavelengths to enhance the visibility of vessels and other tissue on the mucosal surface. The other main development in the endoscopy field is chromoendoscopy. In our country we use indigocarmine to diagnose colon mucosal change and detect lesions, and evaluate therapy results. NBI technology versus Chromoendoscopy is less studied in our country, so I have chosen above topic.

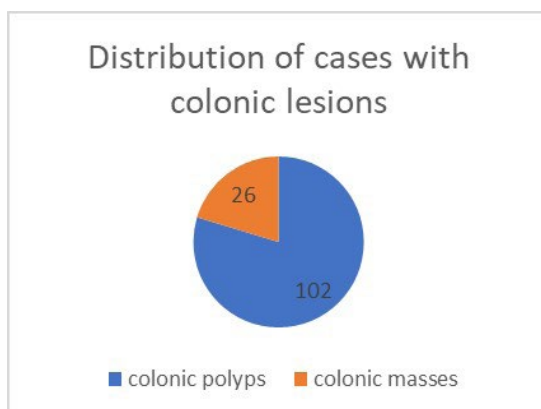
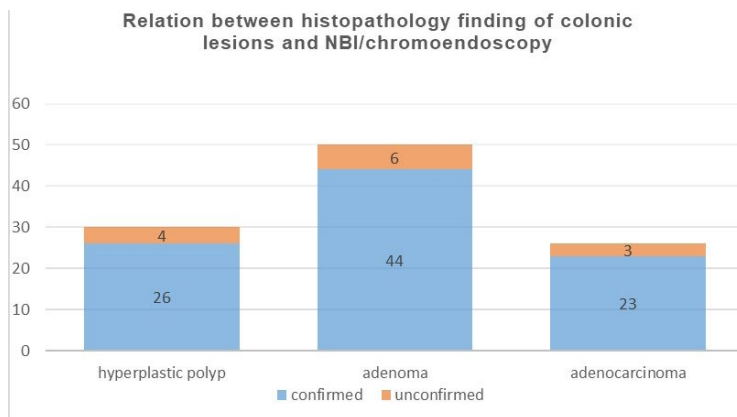
Purpose: Comparison between chromoendoscopy and NBI technology for detecting cancer and precancerous lesions in Colon.

Methods: The study analysis was screening and diagnostic tests. Adult patients enrolled in our study who visited the Endoscopy department of the some local private hospital in UB to examined by colonoscopy during January, 2022 till January, 2023. There were 155 patient, 27 patient were excluded from the study due to pregnancy, bowel obstruction, IBD and psychological disorder. The rest of them participated in our study, total patient number were 128. Data were expressed using SPSS software package version 23.0 and described using mean standart deviation. The chi squared test was to assess statistical significance of mean difference between the studied groups.

Results: There were 128 patient were participated our study, among them 57 (44.5%) patient were male and 71 (55.5%) patient were female. They were checked by both NBI and chromoendoscopy method during the colonoscopy. Adenocarcinoma detection sensitivity was 100%, specificity was 93.75%; hyperplastic polyp detection sensitivity was 86.67%, specificity was 88.89%; adenoma detection sensitivity was 88.0%, specificity was 76.92%; colon cancer detection sensitivity was 100%, specificity was 66.67%.

Conclusions: The NICE classification is based on narrow-band images of colon polyps, on the other hand Kudo's classification based on pit pattern of lesions. Both classification is a highly accurate method for differentiating between non-neoplastic and neoplastic polyps. Our study has shown it has high accurate percentage with final pathology result. This our country has to use above classifications in our daily endoscopic procedure.

Keywords: Colonoscopy, NBI, Nice classification, Chromoendoscopy, kudo classification, Histopathology, Colonic polyp/mass



PLG-04



Association between the location of colon diverticular disease and irritable bowel syndrome

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Background/aims: There is no correlation study of Irritable bowel syndrome and colonic diverticular disease in Mongolia. Therefore we decided to evaluate prevalence of colonic diverticular location and association of IBS in Mongolian population.

Methods: Cross-sectional study design was used. The study population were among adults who visited the Endoscopy department of the some private hospital in UB to examined by colonoscopy during September, 2019 till June, 2022. There were preformed 296 adults all of them had colon diverticula. IBS and the IBS subtype were defined using Rome III criteria. Evaluated the association between DD and IBS.

Results: The participants mean age was 59,6±13.4 years, and male : female ratio 1:1.8. In our study find out proximal diverticula 15.9%, distal diverticula 4% and bilateral colon diverticular 6.4%. IBS was observed in 8.4% of subjects. Distal sided DD and bilateral DD were independent risk factors for IBS. We didn't find any IBS in patients, who has proximal diverticular disease.

Conclusions: The presence of Distal sided DD and Bilateral-sided DD was both associated with a high risk of IBS.

Keywords: Colonic diverticular disease, Irritable bowel syndrome, Rome iii criteria, Colonoscopy, IBS subtype

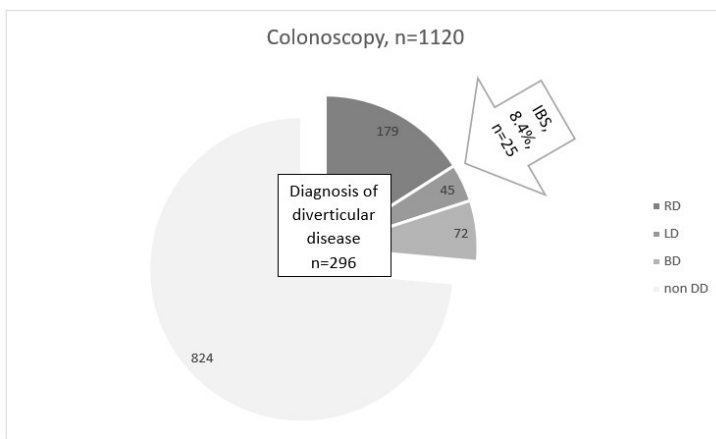


Figure 1. BD, bilateral diverticular disease; IBS, irritable bowel syndrome; LD, left-sided diverticular disease; n, number

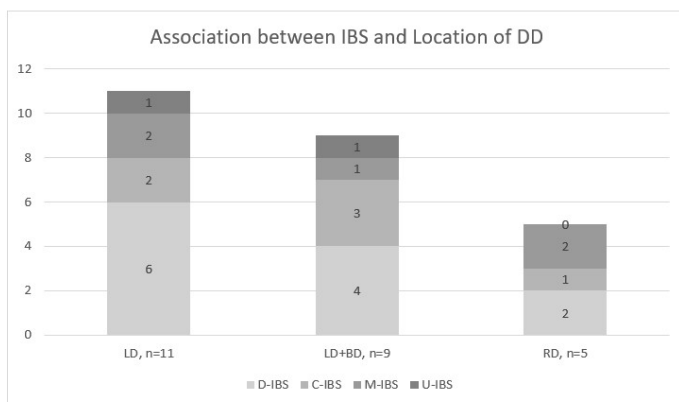


Figure 2. BD, bilateral diverticular disease; C-IBS, constipation-predominant IBS; DD, diverticular disease; IBS, irritable bowel syndrome; LD, left-sided diverticular disease; M-IBS, mixed IBS; n, number; RD, right-sided diverticular disease; U-IBS, un-subtype IBS.

PLG-05

There is a lethal one. Don't miss it

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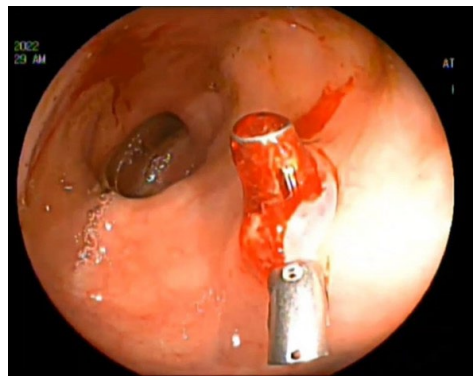
63 year old man with chronic kidney disease underlying diabetes mellitus and hypertension was admitted for massive lower GI bleeding. Two days ago, he was discharged from other hospital with the same problem and 11 units of blood was transfused. Index colonoscopy at this hospital showed a sessile polyp at rectosigmoid junction and no bleeding source was identified. OGD showed no ulcer and varices. Mesenteric angiogram showed no extravasation of contrast throughout small and large bowels.

On physical examination, Blood pressure was 80/60 mmHg and marked pallor was noted. After stabilizing of hemodynamic status, the patient was counselled for second look colonoscopy. On second look colonoscopy, no bleeding source was identified from terminal ileum to sigmoid colon. But there was a small mucosal break at rectum (10 cm from anal verge) without active bleeding (Fig.1). On air insufflation, exposed vessel within mucosal defect was identified clearly and two haemoclips were applied to the lesion (Fig.2) with the impression of Dieulafoy's lesion. The patient was stabilized, and no more bleeding was occurred after procedures and he was discharged from hospital three days later.

Keywords: Dieulafoy's lesion, Massive lower GI bleeding, Unusual cause, Second look endoscopy



Rectal Dieulafoy's lesion
(Before and after Air insufflation)



Two Haemoclips were applied to Lesion

PLG-06

Endoscopic submucosal dissection of colorectal neoplasm in high Charlson comorbidity index

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Background/aims: As life expectancy increases, the colorectal neoplasm is often found accompanied by various underlying diseases. Endoscopic submucosal dissection (ESD) is an effective procedure for removing early colorectal lesions. However, studies on whether ESD can be performed safely and effectively according to various underlying diseases are lacking.

Methods: Patients who underwent ESD for colorectal neoplasms for 6 years at 5 tertiary medical centers were retrospectively analyzed. The presence or absence of each underlying disease was investigated, and the Charlson Comorbidity Index (CCI) score was calculated and analyzed by dividing it into a high CCI group (CCI \geq 3) and a low CCI group (CCI<3).

Results: A total of 1446 patients were enrolled, of which 140 patients (9.7%) had a CCI of 3 or higher. The high CCI group was older (70.6 vs 64.7, $p<0.01$) and had a higher proportion of men (70.7% vs 58.7%, $p<0.01$) than the low CCI group. The high CCI group had a higher incidence of cancer than adenoma compared to the low CCI group (77.9% vs 65.2%, $p<0.01$). The high CCI group had higher aspirin (25% vs 7%, $p<0.01$) and clopidogrel (10.7 vs 2.7%, $p<0.01$) intake rates than the low CCI group. Sedative endoscopy was performed less frequently in the high CCI group than in the lower CCI group (57.9% vs 71.7%, $p<0.01$).

En-bloc resection rates (90.0% vs 89.3%) and R0 resection rates (75.7% vs 81.2%) were not significantly different between the two groups. There was no significant difference between the two groups in the incidence of perforation, hemorrhage, and electrocoagulation syndrome after ESD. There was no significant difference between the two groups in sedative endoscopy-related complications such as hypotension and desaturation.

Conclusions: Even patients with many underlying diseases could receive colorectal ESD relatively safely and effectively.

Keywords: Colon, Endoscopy, Neoplasm

PLG-07

Efficacy evaluation of hemostatic powder (UI-EWD) in patients with lower GI bleeding

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Background/aims: A novel endoscopic hemostatic powder (UI-EWD/NexpowderTM, Nextbiomedical, Incheon, South Korea) was applied for the control of upper gastrointestinal bleeding (GIB). Although UI-EWD has been demonstrated to be effective in hemostasis in upper-GIB, it is still unclear in lower-GIB. The aim of this study was to evaluate the hemostatic efficacy and safety of UI-EWD applied to Lower-GIB.

Methods: We evaluated the effect of UI-EWD in a cohort of Lower-GIB at a single tertiary center in south Korea. One hundred and ninety-eight patients with Lower-GIB who were enrolled from 2017 through 2022 and divided into the conventional treatment group (n=112) and the UI-EWD treatment group (n=86). The success rate of immediate hemostasis, re-bleeding rate, and adverse events related to hemostasis were evaluated.

Results: The immediate hemostasis was successfully achieved in all patients in both groups. The cumulative re-bleeding rate within 28 days was significantly lower in the UI-EWD treatment group than in the conventional treatment group. (7.0% vs. 17.9%, p=0.033) There were no UI-EWD related adverse events, such as perforation or embolism were recognized. On the other hand, complications due to mechanical damage of mucosa were observed in the conventional treatment group.

Conclusions: Our results suggested that the application of UI-EWD in Lower-GIB was safe, effective for immediate hemostasis, and useful for reducing re-bleeding. UI-EWD can be considered as one of the feasible bleeding control modality in Lower-GIB.

Keywords: Bleeding, Hemostasis, Hemostatic powder, Rebleeding

PLG-08

Barriers and willingness for colorectal cancer screening in a muslim population of South Asian country: Nationwide survey

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Background/aims: Colorectal cancer(CRC) is the third most common cancer worldwide. CRC is treatable if detected early. Barriers and willingness for CRC screening are not studied previously in Pakistan. Our study aim to evaluate barriers to CRC screening in the Pakistani population aged >40 years.

Methods: A cross sectional, questionnaire-based study was conducted among the general population from all provinces of Pakistan. All the Data were analyzed by using IBM SPSS Statisticsv27.

Results: In our study 5244 participants were included with a mean age of 45.40±11.69 years. Out of these, 3604 (68.7%) were males. The results showed that 4026 (76.8%) participants were unaware of CRC disease. Furthermore, 3518 (77.3%) participants had no intention to get screened in the future. The main barriers were, lack of knowledge/awareness of CRC screening test 76.8% (p<0.000), cost and lack of government funded screening program 85.5% (p<0.000). Shame of getting screened 24% and absence of preferred gender doctor for colonoscopy 31% (p<0.000). Ineffectiveness of screening tests and doubt about the safety of colonoscopy 85.6%, fear of getting abnormal results 55.5% (p<0.000), and lack of doctor's recommendation for CRC screening 74.7% (p<0.000) was also found to be a significant barrier.

Conclusions: In our survey, we found multiple colorectal cancer screening barriers among the general Pakistani population. A majority of participants were unaware of CRC disease. An extensive government-led awareness campaign must be launched and doctors should discuss CRC screening with their patients. Moreover, the availability of preferred gender endoscopists must be ensured to increase compliance.

Keywords: Colorectal cancer, Screening

PLG-09

Adenoma detection rate as a quality indicator for colonoscopy: A prospective cross-sectional study from a tertiary care

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Background/aims: Adenoma detection rate (ADR) is accepted for measuring quality of colonoscopy, however there is lack of colorectal cancer (CRC) screening program in Pakistan. The aim of our study is to identify the prevalence, and clinical and pathologic characteristic of colonic polyps among Pakistani patients undergoing a comprehensive colonoscopy, and determine the polyp detection rate (PDR) and adenoma detection rate (ADR).

Methods: This prospective, cross-sectional study was performed at the Liaquat National Medical college and Hospital, Karachi, Pakistan, on patients ≥ 18 years, who underwent colonoscopy between January 1, 2022 and June 30, 2022.

Results: Overall, 210 patients were enrolled. Men 148 (70.47%) and women 62 (29.52%) with the mean age 45 years (range 18–95). The most common indication for colonoscopy was bleeding-per-rectum (37.1%) and overall PDR and ADR were 16.19% (34/210) and 10% (21/210) respectively. There was no significant difference between genders for either PDR.

Conclusions: The prevalence of polyps and adenomas in this study is less than that reported in the Western populations. We have concluded low PDR and ADR, which require further investigation and research. In addition, we believe there should be a different baseline ADR and PDR as a quality indicator for colonoscopy in our region, where no internationally recommended colonoscopic screening programs have been implemented.

Keywords: Adenoma, Carcinoma in situ, Colorectal cancer, Colonoscopy, Polypectomy

PLG-10

Artificial intelligence for automated bowel preparation scoring

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Background/aims: Although a reliable assessment of bowel cleanliness is important for qualified colonoscopy, current bowel preparation scoring systems are limited by inter-observer variability. This study aimed to investigate whether the deep learning algorithm could assess bowel preparation status objectively.

Methods: A convolutional neural network was developed using retrospectively collected 1400 still images from 346 colonoscopies. Three experts reviewed and annotated the training images and videos based on Boston Bowel Preparation Scoring (BBPS) system (0–3). We validated the developed algorithm with 522 images from 219 colonoscopies and tested the performance of the algorithm with 369 images from 128 colonoscopies. In addition, we validated the algorithm using 113 10-sec video clips and tested the performance of the algorithm on 30 full colonoscopy videos.

Results: In the still image test set, the algorithm achieved an accuracy of 78.7% for 4 classes of BBPS and an accuracy of 93.9% for the binary classification of BBPS (0–1: inadequate vs. 2–3: adequate). In the 10-sec video validation set, the algorithm demonstrated an accuracy of 74.3% for 4 classes of BBPS and an accuracy of 94.7% with 0.983 of the area under the ROC for binary classification of BBPS. In the withdrawal phase of full colonoscopies with 79 segments (24 right, 25 transverse, and 30 left colons), the overall accuracy was 92.4% and the sensitivity for inadequate bowel preparation was 91.7%.

Conclusions: The algorithm assessment of bowel preparation based on BBPS showed good performance in the test with full colonoscopy videos.

Keywords: Colonoscopy, Bowel preparation, Artificial intelligence

PLG-11

Association between atherosclerosis and high-risk adenomas based on cardio-ankle vascular index and ankle-brachial index

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Background/aims: Colorectal adenomatous polyp is a precancerous lesion. Screening for detection and removal of colorectal adenomatous polyps has been shown to reduce mortality related to colorectal cancer. Recent studies have shown that colorectal adenomatous polyp is associated with atherosclerosis. Cardio-ankle vascular index (CAVI) and ankle-brachial index (ABI) are non-invasive methods to evaluate atherosclerosis and cardiovascular disease as well as peripheral artery disease. This study aimed to investigate the association between atherosclerosis and high-risk adenoma based on CAVI and ABI.

Methods: We retrospectively analyzed data of patients aged ≥ 50 years who had CAVI, ABI, and a colonoscopy from August 2015 to December 2021 in Kangwon National University Hospital. After having a colonoscopy, subjects were divided into groups with and without adenoma or high-risk adenoma (size ≥ 1 cm, high-grade dysplasia or villous adenoma, 3 or more adenomas) based on pathologic findings. Data were then subjected to univariate and multivariate logistic regression analyses.

Results: A total of 1,164 subjects were included. Adenomas were found in 613 (52.6%) subjects and the high-risk adenomas were found in 118 (10.1%) subjects. The rate of positive ABI (< 0.9) and positive CAVI (≥ 9.0) were significantly higher in the high-risk adenoma group (22.0% and 55.9%) than those in the no adenoma (12.3% and 39.6%) and the overall adenoma group (15.7% and 44.0%) ($p=0.008$ and $p=0.006$, respectively). In a multivariate analysis, positive CAVI and smoking were significantly associated with high-risk adenoma ($p=0.027$ and $p=0.021$, respectively).

Conclusions: In this study, a significant correlation between positive CAVI and high-risk adenoma was observed. The use of CAVI could be a significant predictor of the presence of a high-risk adenoma.

Keywords: Colorectal adenomatous polyp, High-risk adenoma, Atherosclerosis, Cardio-ankle vascular index, Ankle-brachial index

PLG-12

Outcome of 1,000 colonoscopies performed in a community, South Korea: Experience of a single hospital

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Background/aims: Adequate quality control of colonoscopies is essential for optimal clinical outcomes. However, there is a lack of established reference values for quality indicators, particularly in community settings.

Methods: From June, 2021 to February 2023, data of 1,000 consecutive colonoscopies were analyzed. All the procedures were performed by one experienced endoscopist using a cap-assisted manner.

Results: Mean age was 62.2 years old and 52.8% of subjects was female. Majority (65%) were examined due to polyp screening (or surveillance) and 17.6% of patients due to positive for stool occult blood tests. Hematochezia and bowel habit change was 5.5% and 4.5%, respectively. Adequate bowel preparation rate, cecal intubation rate, average withdrawal time was 92.1%, 99.5%, and 6 minutes 1 second, respectively. A total of 1,876 polyps were detected among 701 patients and removed by forceps biopsy (n=1,134), cold snaring (n=614), or endoscopic mucosal resection (n=128). No procedure-related complications occurred. Low grade tubular adenoma was diagnosed among 454 patients and followed by tubulovillous adenoma (n=20), sessile serrated lesion (n=19), traditional serrated adenoma (n=8), and high grade adenoma (n=3). Adenocarcinoma was diagnosed in two patients following mucosal resection. Advanced malignant tumors were found in 14 patients. Adenoma detection rate among subjects over 50 years in a screening colonoscopy (n=559) was 53.8% (male, 57.0%; female, 51.4%; P=0.193).

Conclusions: Under the proper quality control, colonoscopy can achieve adenoma detection rate more than 50% in a community setting in South Korea.

Keywords: Colonic polyps, Colonoscopy, Quality control

PLG-13

Efficacy and safety of 1L PEG/ASC vs 2L PEG/ASC in the hematochezia patients: A prospective multicenter study

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Background/aims: Hematochezia is a risk factor of inadequate bowel preparation and low compliance for colonoscopy. To date, however, there has been no comparison investigation of low volume (2L) polyethylene glycol (PEG) and extremely low volume (1L) PEG in hematochezia patients. Therefore, the purpose of this study is to conduct a prospective evaluation of the efficacy and safety of 1L PEG/ascorbic acid (ASC) in hematochezia patients undergoing colonoscopy.

Methods: This was a prospective, randomized, multicenter, non-inferiority study. Patients with hematochezia undergoing colonoscopy were randomly allocated to 2L PEG/ASC group or 1L PEG/ASC group, taken as regular regimens before colonoscopy. Quality of bowel preparation was assessed by the Boston Bowel Preparation Scale (BBPS). Patient's satisfaction, adverse events, and polyp detection rate were also measured.

Results: A total of 184 patients were finally analyzed. There was no significant difference in successful bowel cleansing: 76.1% in the 2L PEG/ASC group vs. 78.3% in the 1L PEG/ASC group. Additionally, the non-inferiority test revealed that the 1L PEG/ASC group was not inferior to the 2L PEG/ASC group. When comparing the two groups with the sum of BBPS, the 1L PEG/ASC group had a score of 6.87 and the 2L PEG/ASC group had a score of 6.30, indicating that the 1L PEG/ASC group was superior, with a marginally significant difference ($P=0.053$). In terms of patient satisfaction, the 1L PEG/ASC group performed better than the 2L PEG/ASC group, but the difference was not statistically significant. There was no difference in the polyp detection rate, intake of all solution, and adverse events between the two groups.

Conclusions: 1L PEG/ASC was not inferior to 2L PEG/ASC for colonoscopy bowel cleansing in patients with hematochezia. In addition, 1L PEG/ASC is safe, and patient satisfaction and bowel clearing are slightly better than 2L PEG/ASC.

Keywords: Bowel preparation, Hematochezia, Colonoscopy

PLG-14

Eupatilin reduces the risk of small bowel bleeding in aspirin users

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Background/aims: Capsule endoscopy (CE) has shown that low-dose aspirin occasionally causes small bowel (SB) bleeding. We herein evaluated the protective effects of mucoprotective agents (MPAs) on SB bleeding in aspirin users using the nationwide database of claims data from the National Health Insurance Service (NHIS).

Methods: As CE is an insured procedure, we constructed an aspirin-SB cohort using NHIS claims data, with a maximum follow-up period of 24 months. Patients with anemia, melena, or hematochezia that occurred within 4 weeks before and after performing CE were suspected to have SB bleeding. A Cox proportional hazards regression model was used to determine the risk factors for SB bleeding. Subgroup analyses were conducted among patients who used acid suppressants, such as proton pump inhibitors (PPIs) and histamine-2 receptor antagonists.

Results: A total of 15,542 aspirin users were included. Anticoagulant use (hazard ratio [HR]=3.22), high Charlson comorbidity index score (≥ 2) (HR=3.54), and PPI use (HR=2.85) were significantly associated with SB bleeding, whereas eupatilin use (HR=0.35) was a preventive factor. SB bleeding occurred more frequently in concurrent users of acid suppressants than in nonusers (1.3% vs. 0.5%). Subgroup analysis revealed that eupatilin significantly reduced the risk of SB bleeding in aspirin users with concurrent use of acid suppressants (HR=0.23 vs. 2.55).

Conclusions: Eupatilin was associated with a reduced risk of SB bleeding in both aspirin users and those with concomitant use of acid suppressants. Eupatilin use should be considered for aspirin users, especially for those concomitantly taking acid suppressants.

Keywords: Eupatilin, Aspirin, Small bowel bleeding, Capsule endoscopy

PLG-15

Clinical Course and prognosis of patients with fecal impaction: Multicenter study

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Background/aims: Fecal impaction is a common problem in the elderly and other risk group. We determined the clinical presentation, the in-hospital complications and their prognosis in patients diagnosed with fecal impaction (FI).

Methods: This was a retrospective study of the medical records of 267 patients who visited the emergency department for fecal impaction at 6 medical institutions in Korea with between January 2017 and December 2018. Patient-specific demographics, visit-specific details, medical and medication histories, and hospital treatment and outcome measures were included in a database and analyzed.

Results: The mean age of the patients was 74.18±13.57 years and 94 (35.2%) were men. The site of impaction was the rectum in 49.0%. The patients were treated by endoscopic treatment 41 (15.4%), operation 15 (5.6%) and conservative management 211 (73.5%). In-hospital complications occurred in 66 (24.7%) patients, the most common of which were infectious 32 (12.0%), cardiopulmonary 15 (5.2%) and colon related 4 (1.4%). Compared with survivors, the death group had a higher mean age (79.58±7.034 vs 73.76±13.870), p=0.005) and a longer mean hospital stay (12.58±20.045 vs 10.10±11.754, p=0.006). There was no differences in diagnostic methods or risk factors of disease. In addition, the incidence of complications was higher among the death group (100% vs 19.0%, p=0.000), and death was the highest due to cardiopulmonary complications (47.4% vs 2.4%, p=0.000).

Conclusions: Patients presenting with FI had high risk of morbidity and mortality, complex medical histories. The higher the mortality rate related to fecal impaction is elderly the longer the hospital stay, and the more complications occur during hospitalization.

Keywords: Fecal impaction, Constipation, Morbidity, Mortality, Complications

PLG-16

A rare case of sigmoid colonic duplication in adult womanSoe Naung Win*

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Gastrointestinal duplication is rare congenital anomalies. It can occur anywhere along the gastrointestinal tract. This is a case report about colonic duplication in 43 years old lady. She presented with acute onset pain in lower abdomen and RIF, associated with constipation. She was treated as TB abdomen with partial intestinal obstruction. She was admitted repeatedly for similar complaints with additional nutritional problems in later parts. CECT (whole abdomen) revealed fistulous tract between caecum and native sigmoid colon. Exploratory laparotomy was done, finding was retroperitoneal colonic duplication tract connecting medial pole of caecum and native sigmoid colon. Limited right hemicolectomy including duplicated colon was done. Histopathology revealed normal colonic mucosa. Patient's postoperative period was uneventful and improvement seen on her regular follow up.

Keywords: Sigmoid duplication, Fistula, Adult woman

PLG-17

The incidence of acute gastric mucosal of oral sulfate tablet versus 1L polyethylene glycol plus ascorbic acid

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Background/aims: Recently, oral sulfate tablet (OST) showed similar safety and efficacy to a PEG/Ascorbic acid agent, and was as safe as PEG-based preparations under real-world conditions. In this observational study, we evaluated the efficacy and safety, including acute gastric lesions, of OST during colonoscopy.

Methods: This was a retrospective study for subjects who underwent both of screening EGD and colonoscopy at single Health Promotion Center in Korea between January 1, 2021 and December 31, 2022. A primary outcome was the comparison of the bowel preparation quality in OST group and PEG-based group. A secondary outcome was the safety of bowel preparation in relation to drug-induced gastric mucosal lesions.

Results: The mean age of the OST group was 53.8 and that of the 1L PEG-ASC group was 51.2. Since the proportion of patients aged 50 or older was high (OST 69%, 1L PEG-ASC 54.6%) and there were more males (OST 56.6%, 1L PEG-ASC 63.0%), propensity score matching was performed for gender and age. Bowel preparation quality was evaluated using the Boston Bowel Preparation Scale (BPPS), and the mean scores of the OST and 1L PEG-ASC groups were 7.6 ± 1.5 and 7.8 ± 1.5 , respectively, with no difference. In detail, there were no significant differences in the quality of bowel preparation in right-sided colon, transverse colon, and left-sided colon. Gastric mucosal lesions were evaluated in 4 categories: acute gastric mucosal lesion-like blood stain or clot, lesions at GC side of antrum or body, multiple lesions, and overlying mucosal erythema or edema. All categories showed p-value of 0.000 which means significant incidence of gastric mucosal lesions in the OST group.

Conclusions: In this study, there was no difference in the quality of bowel preparation between the OST and 1-PEG-ASC groups, and it was confirmed that gastric lesions occurred significantly more in the OST-using group. Finding a way to reduce the occurrence of gastric lesions can maximize its advantages as a low-volume preparation agent.

Keywords: Oral sulfate tablet, Acute gastric mucosal lesion, Polyethylene glycol, Bowel preparation

PLG-18

The efficacy and safety of oral sulfate tablet versus 1L polyethylene glycol for bowel preparation in elderly population

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Background/aims: Considering the increasing burden of elderly population in colonoscopy, old age has been known as a predictive factor for inappropriate bowel preparation. Elderly subjects have been often excluded from clinical trials with low-volume agents. Therefore, we compared the efficacy and safety of 1L-PEG/ASC versus Oral sulfate tablet (OST) in elderly subjects with those in younger subjects.

Methods: This was a retrospective study for subjects who underwent both of screening EGD and colonoscopy at a Health Promotion Center (January 1, 2021 - December 31, 2022). A primary outcome was the comparison of the bowel preparation quality in different age groups. A secondary outcome was the safety of bowel preparation in relation to drug-induced gastric mucosal lesions according to age groups.

Results: The mean ages of each group were 40.8 for young age group, 56.7 for middle age group and 69.2 for old age group. Regardless of the type of bower preparation agent, bowel preparation efficacy was lower in old age group. (p-value=0.000) In detail, Right sided colon did not show significant result, but in case of transverse colon and left-sided colon, bowel preparation efficacy was significantly lower in old age group. Acute gastric mucosal lesions were also significantly high in old age group. Acute gastric mucosal lesions were evaluated in four categories: acute gastric mucosal lesion-like blood stain or clot, lesions at GC side of antrum or body, multiple lesions, and overlying mucosal erythema or edema. Except overlying mucosal erythema or edema, other three categories showed significant incidence of gastric mucosal lesions with increasing age. There was no difference in the quality of bowel preparation according to the type of bowel preparation agents within the same age group.

Conclusions: Bowel preparation quality was significantly lower in older age, but there was no difference in bowel preparation quality according to the type of agents. Acute gastric mucosal lesions were significantly increased with age.

Keywords: Colonoscopy, Bowel preparation quality, Oral sulfate tablet, Acute gastric mucosal lesion, Old age

PLG-19

Unleashing the mystery of mckittrick wheelock syndrome: A fascinating case of GI symptoms in a young femaleSeung Hee Kim, Seonyoung Park*

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A 32-year-old female patient presented to the emergency department with complaints of nausea, abdominal discomfort, and constipation that had been present for 2 months. The patient denied any significant medical history or family history of gastrointestinal disorders.

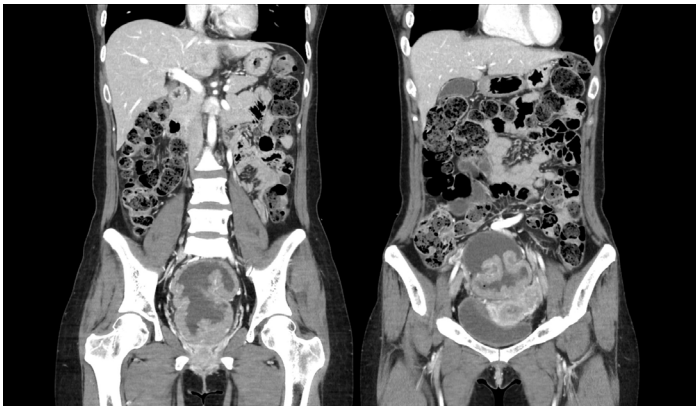
On physical examination, the patient appeared fatigued, and her heart rate was 92 beats per minute. Laboratory investigations revealed severe electrolyte imbalances, including a sodium level of 128 mmol/L, potassium level of 2.7 mmol/L, and chloride level of 79 mmol/L. The serum osmolality was 259 mOsm/kg, and the creatinine level was 0.75 mg/dL.

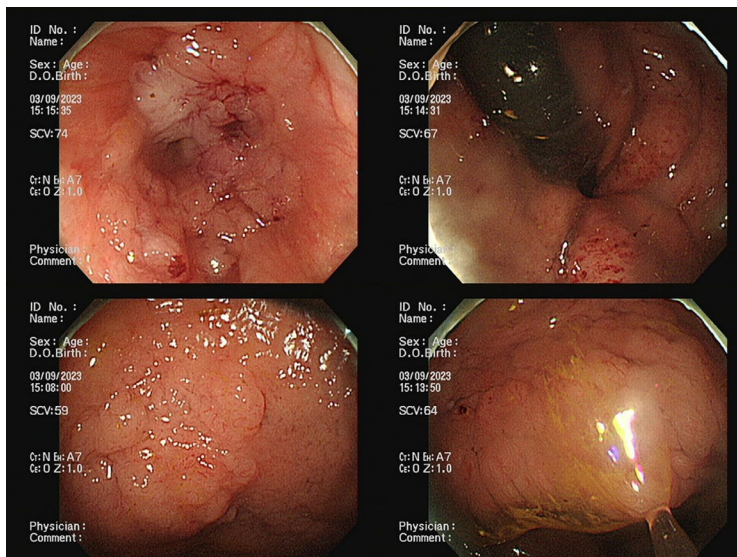
The patient was admitted to the nephrology department for further evaluation and management of the electrolyte imbalances. Hormonal systems, such as the renin-angiotensin-aldosterone system, were normal. CT scan of the abdomen revealed thickening of the rectal mucosal layer.

A sigmoidoscopy was performed, which revealed villous mucinous changes with thick mucin extending from the dentate line to the rectosigmoid junction. Biopsy was taken, and histopathological evaluation confirmed a diagnosis of tubulovillous adenoma with low-grade dysplasia. Further investigation, including colonoscopy, chest CT, and PET-CT, was recommended to exclude malignancy.

Based on the biopsy results, the treatment method is yet to be decided. The focus is currently on correcting the electrolyte imbalance and preventing renal failure until treatment for the tumor can be initiated.

Keywords: Colon adenoma, Acute renal injury, Electrolyte imbalance, Chronic diarrhea, Constipation





PLG-20

Efficacy and safety of 1L polyethylene glycol plus ascorbic acid in elderly: Comparison with oral sulfate solution

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Background/aims: Recently, 1 L of polyethylene glycol (PEG) plus ascorbic acid (ASC) has been introduced in Korea as a colonoscopy preparation agent. Data on its efficacy and safety in older adults have been limited. We aimed to evaluate the safety and efficacy of 1 L PEG/ASC in older adults by comparing it with oral sulfate solution (OSS).

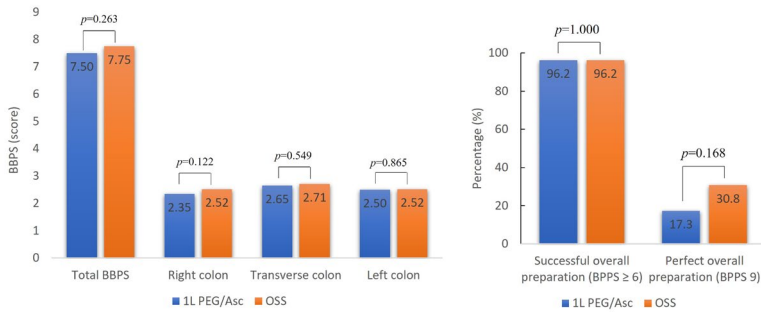
Methods: A prospective multicenter randomized study was conducted with subjects aged ≥ 65 years who underwent colonoscopy. The participants were randomized to receive 1 L PEG/ASC or OSS. The primary endpoint was successful bowel preparation. Patient satisfaction, adverse events, and renal function changes were compared between the groups.

Results: Among the 106 patients, 104 were finally included in the analysis. Overall successful bowel preparation was achieved in 96.2% of both groups. The satisfaction scores for taste, total amount ingested, overall feeling, and willingness to repeat the same regimen were not significantly different between groups. There were no significant changes in electrolyte levels and renal function.

Conclusions: The successful bowel preparation rate was $>90\%$ in both groups without severe adverse effects and significant changes in renal function. As a new low-dose preparation regimen for colonoscopy in older adults, 1 L PEG/ASC, is as effective and safe as OSS.

Keywords: Colonoscopy, Bowel preparation, Polyethylene glycol, Oral sulfate solution

Comparison of bowel preparation efficacy of 1L PEG/Asc and OSS using Boston bowel preparation scale



PLG-21

Primary eosinophilic gastroenteritis in a 28-year old female with persistent diarrhea and vomiting: A case report

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Eosinophilic gastroenteritis, with its greatly varied clinical manifestations due to its involvement along any segments from the stomach to the colon and a subgroup within eosinophilic gastrointestinal disorders (EGIDs), is a rare disease with poorly understood pathophysiology. This paper presents a case of an adult female who was evaluated for persistent abdominal pain, recurrence of diarrhea, nausea, and vomiting after completion of *Helicobacter pylori* eradication regimen for acute gastric antral mucosal erosions secondary to *H. pylori* infection without a history of atopy. Colonoscopy showed ileitis, descending sigmoid colitis, and mixed hemorrhoids. Peripheral leukocytosis with eosinophilia, ascitic fluid eosinophilia and has negative signs of parasitism were documented. Biopsy of the ileum revealed marked eosinophilic proliferation with moderate non-specific chronic inflammation. Good clinical outcome was observed after the commencement of oral corticosteroids on top of proton pump inhibitors, aminosalicylate, antiemetics, and analgesics. The report underlines the lack of consensus regarding the diagnosis of this disease, the significance of histopathology, and the consideration of this rare disease among possible differential diagnoses of alimentary illness in patients with persistent nausea and vomiting on a background of peripheral eosinophilia.

Keywords: Eosinophilic gastroenteritis, Eosinophilic infiltration, Ascites, Diagnosis, Peripheral eosinophilia

PRIMARY EOSINOPHILIC GASTROENTERITIS IN A 28-YEAR OLD FEMALE WITH PERSISTENT DIARRHEA AND VOMITING: A CASE REPORT

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ABSTRACT

Eosinophilic gastroenteritis, with its greatly varied clinical manifestations due to its involvement along any segments from the stomach to the colon and a subgroup within eosinophilic gastrointestinal disorders (EGIDs), is a rare disease with poorly understood pathophysiology. This paper presents a case of an adult female who was evaluated for persistent abdominal pain, recurrence of diarrhea, nausea, and vomiting after completion of *Helicobacter pylori* eradication regimen for acute gastric antral mucosal erosions secondary to *H. pylori* infection without a history of atopy. Colonoscopy showed ileitis, descending sigmoid colitis, and mixed hemorrhoids. Peripheral leukocytosis with eosinophilia, ascitic fluid eosinophilia and has negative signs of parasitism were documented. Biopsy of the ileum revealed marked eosinophilic proliferation with moderate non-specific chronic inflammation. Good clinical outcome was observed after the commencement of oral corticosteroids on top of proton pump inhibitors, aminosalicylate, antiemetics, and analgesics. The report underlines the lack of consensus regarding the diagnosis of this disease, the significance of histopathology, and the consideration of this rare disease among possible differential diagnoses of alimentary illness in patients with persistent nausea and vomiting on a background of peripheral eosinophilia.

Keywords: Eosinophilic gastroenteritis, diagnosis, eosinophilic infiltration

PLG-22

Tuberculosis ileocolitis: A case report

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Background/aims: Tuberculosis (TB) will remain important health problem issues. The national incidence based on Global Report by World Health Organization (WHO) in 2020, six million people diagnosed with Tuberculosis. In 2019, extrapulmonary tuberculosis occurs about 20% of tuberculosis case, whereas the 10% is Intestinal Tuberculosis. The common region of ITB is ileocaecal region, which could mimic other disease like Crohn's disease, abdominal lymphoma and challenging to distinguish. Moreover, along with other condition, could delay the diagnosis and treatment.

Methods: A summary of case report of Tuberculosis Ileocolitis and a review of available literature on the subject using electronic journal database for relevant literature search.

Results: A 27-year-old woman came with right upper quadrant pain since three months ago, with diarrhea, nausea and vomiting. In the last two months she complained weight loss, fever, and sweating profusely during the night. Physical examination revealed underweight, right upper quadrant pain, and hypertympanic abdomen. Laboratory examination showing anemia microcytic hypochromic and hyponatremia. Abdominal Ultrasound shows multiple mesenteric lymphadenitis and colonoscopy revealed multiple ulcers in colon, mucous hyperemia edema with ulcer in caecum-terminal ileum suspect tuberculosis ileocolitis. A sample taken for pathology and PCR examination to confirm tuberculous ileocolitis.

Conclusions: Ileocaecal is the most frequent predilection of intestinal tuberculosis as one of extrapulmonary tuberculosis. Endoscopy procedure recommended to establish diagnosis along with biopsy procedure. Intestinal Tuberculosis is treated with the same antituberculosis regimen as pulmonary tuberculosis, with a 6-month of therapy.

Keywords: Colitis, Ileocolitis, Tuberculosis

PLG-23 

Clinical usefulness of traction method in colon submucosal dissection: A multicenter randomized controlled study

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Background/aims: In colon ESD, Traction ESD has recently been increasingly used. we aimed to investigate the efficacy and safety of the traction method of colon ESD in this multicenter randomized trial.

Methods: We conducted prospective, multicenter, randomized, control trials at six centers in Korea. A 1:1 allocation was conducted conventional ESD (C-ESD) and Traction ESD (T-ESD) groups.

Results: We included 53 C-ESD and 53 T-ESD cases from April 2022 to January 2023. The mean pure resection speed for C-ESD and T-ESD were 18.7 ± 9.9 and 25.5 ± 9.9 mm²/min ($p=0.018$), respectively, and significant differences were observed between the groups. Both groups were adjusted for age, sex, body mass index, type of endoscope, medication history of anti-thrombotic agents, maneuverability, movement by respiration, fibrosis, submucosal fat, and random effect of endoscopists (Table 1). The pure resection speed of the T-ESD group was faster than that of the C-ESD group. Also T-ESD is faster than C-ESD regardless of the length (Figure 1). There was no difference in complications between the two groups.

Conclusions: The traction method is a relatively simple and low-cost intervention that can increase the resection speed by about 36% and does not increase complications compared to conventional C-ESD.

Keywords: Traction, Dissection, Resection speed, Complication

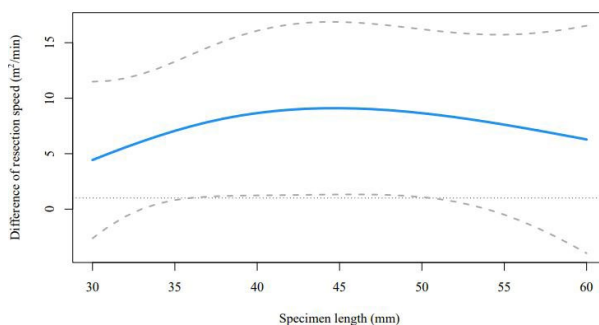
Table 1. outcomes of resection speed and resection time

variables	Conventional ESD (<i>n</i> = 53)	Traction ESD (<i>n</i> = 53)	P-value
Resection speed (mm ² /min)	19.0 (10.9-27.2)	23.3 (14.2-32.4)	0.109
Pure resection speed (mm ² /min)	18.7 (9.8-27.6)	25.5 (15.6-35.4)	0.018
Resection time (min)	55.4 (34.6-76.2)	52.4 (29.9-74.8)	0.542

* Pure resection speed = specimen area/(resection time-traction time)

Values were given as adjusted "adjusted mean (95% confidence interval).

All models were adjusted for age, sex, body mass index, type of endoscope, medication history of anti-thrombotic agents, maneuverability, movement by respiration, fibrosis, submucosal fat, and random effect of endoscopists.

**Figure 1.** Differences in resection speed according to specimen length

PLG-24

Clinical outcomes of endoscopic resection for large colorectal neoplasms in difficult locations: Propensity score matching analysis

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Background/aims: We conducted a single-center retrospective study to investigate the clinical outcomes of endoscopic resection for large colorectal neoplasms in difficult locations.

Methods: From January 2010 to December 2020, 87 patients who had undergone endoscopic resection for adenoma, serrated lesion, or adenocarcinoma in difficult locations were retrospectively analyzed. All lesions were 20 millimeters or larger in size. Difficult locations were defined as cases in which the margin of the lesion is located within 0.5 cm of the dentate line, appendiceal orifice, or ileocecal valve. Clinical baseline characteristics, procedure outcome, and local recurrence were investigated. In all cases, the excision method was endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD). The EMR group included patients who had undergone EMR after circumferential precutting (EMR-P) as well as patients who had undergone conventional EMR. Using 1:1 propensity score matching (PSM) analyses, 21 pairs were made.

Results: The resection procedure was performed by EMR or EMR-P (EMR group) in 35 cases and ESD (ESD group) in 52 cases. In the unmatched cohort, the EMR group had a significantly shorter procedure time (19.0 ± 14.1 min vs. 67.8 ± 62.6 min, $p < 0.001$), and more polypoid macroscopic shape (34.3% vs. 11.5%, $p = 0.022$) than the ESD group. After the 1:1 PSM, the EMR group still had a significantly shorter procedure time (22.9 ± 15.5 min vs. 58.5 ± 54.5 min, $p = 0.008$). There were no statistically significant differences in the other variables, including adverse event, complete resection rate, and local recurrence rate, between these two groups. In multivariate analysis, lesion size ≥ 40 mm was a negative predictive factor (odds ratio [OR], 0.268 and 95% confidence interval [CI], 0.091–0.789) affecting the complete resection rate.

Conclusions: Our findings highlighted EMR as a feasible method for large neoplasms in difficult colorectal locations.

Keywords: Large colorectal neoplasm, Endoscopic submucosal dissection, Difficult location

PLG-25

A case report: Colonic obstruction in ulcerative colitis patient treated with self-expandable metallic stent

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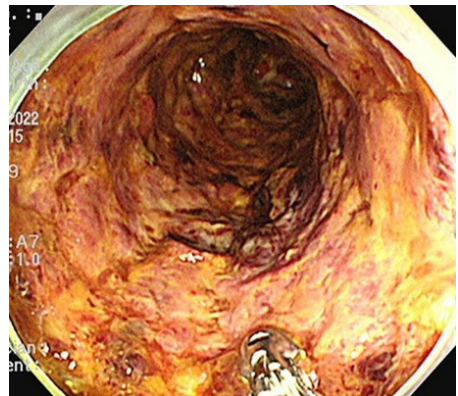
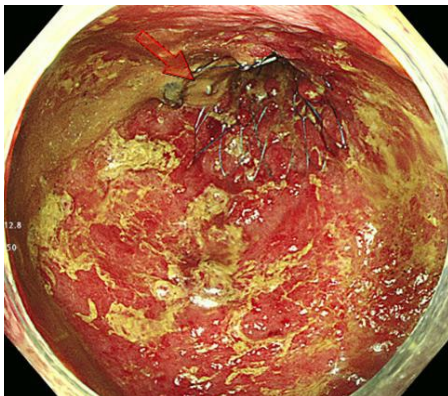
A 61-year-old patient was visited to our hospital. Chief complaint of patient was abdominal pain with constipation. He was diagnosed ulcerative colitis about 12 years ago, and sigmoidoscopy performed at local hospital showed diffuse sigmoid colon ulcer with stricture.

After four days of outpatient diagnosis, he was admitted to our hospital for colonoscopy. But after five hours of taking polyethylene glycol, he complained abdominal pain with vomiting. Physical examination showed distended abdomen, and X-ray showed stepladder sign. CT found near total obstruction (cut-off sign) of distal sigmoid colon. Urgent colonoscopic stent placement using self-expandable metallic stent (8 cm, uncovered BONA stent) was performed for treating obstruction.

After stent placement, patient's symptom and abdomen X-ray was rapidly improved. Patient started enteral feeding two days after stent placement, with 3600 mg of oral 5-ASA and 40 mg of methylprednisolone. Colonoscopic biopsy result was negative for dysplasia or malignancy.

Patient was safely discharged on the seventh day after stent placement, and remained stable for six months without delayed complications such as perforation or bleeding when observed through an colonoscopy.

Keywords: Self expandable metallic stent, Colitis, ulcerative, Stenosis, Colonoscopy



PLG-26

Endoscopic submucosal dissection versus trans-anal endoscopic microsurgery for rectal submucosal tumor

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Background/aims: There are few studies comparing endoscopic submucosal dissection (ESD) and transanal endoscopic microsurgery (TEM) for the treatment of rectal subepithelial tumors (SET). This study aimed to investigate treatment efficacy and safety between ESD and TEM for the treatment of rectal SET.

Methods: From March 2013 and December 2021, we retrospectively analyzed patients who were treated using ESD or TEM for rectal SET. A total of 72 patients were enrolled (ESD 60 patients, TEM 12 patients). Treatment efficacy such as en bloc resection, procedure time, local recurrence, hospital stay, additional procedure rate, and safety between the treatment groups were evaluated and analyzed.

Results: No significant differences in basal characteristics of patients were observed. There were differences in tumor size (ESD VS TEM, 0.8 ± 0.64 cm VS 2.86 ± 1.67 cm, $P=0.001$), location (Low rectum, 88.1% VS 51.7%, $P=0.001$), and diagnosis (Neuroendocrine tumor 90% VS 41.7%, $P=0.001$). For ESD compared to TEM, en bloc resection rates were 100% vs 100% and R0 resection rates were 98.3% vs 91.6% ($p=0.308$). The operation time (12 ± 20.15 min VS 64.58 ± 16.58 min, $P=0.001$), hospital stay (3.00 ± 1.06 day VS 5.58 ± 2.47 day, $P=0.004$) and NPO day (1.02 ± 0.13 VS 2.17 ± 1.27 , $P=0.009$) were shorter in ESD than TEM. There were no significant differences between recurrence rates, additional procedure rates, and complications in the two groups.

Conclusions: ESD and TEM are both effective and safe for the treatment of rectal SET because of favorable R0 resection rates and recurrence rates. Although there are differences in tumor characteristics, the ESD showed shorter operation time and hospital stays than the TEM. Therefore, ESD may be considered more preferentially than TEM in the treatment of rectal SET and a future prospective study will be required.

Keywords: Endoscopic submucosal dissection, Rectal neoplasms, Transanal endoscopic microsurgery

PLG-27

The extent of the disease affects the availability of fecal calprotectin in ulcerative colitis

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Background/aims: Fecal calprotectin (FC) is a good surrogate marker for bowel inflammation. However, it is not clear whether the disease extent of ulcerative colitis (UC) affects the usefulness of FC. In this study, we evaluate correlation of FC with disease extent in UC patients.

Methods: Between January 2015 and December 2020, UC patients scheduled to undergo a colonoscopy were enrolled and fecal samples for FC measurement were collected prior to the procedure. We checked patient data on demographic and clinical variables according to disease extent in UC. Clinical and endoscopic disease activity was assessed using the partial mayo score and mayo endoscopic sub score (MES), respectively.

Results: A total 208 colonoscopies were performed on 108 UC patients. A correlation between fecal calprotectin and MES for remission (MES=0 vs. 1,2,3) in each disease extent subgroup was decreased in proctitis (E1/E2/E3, $r=0.298/r=0.533/r=0.574$, $p=0.010/p=0.001/p=0.001$). When the cut off value of FC was 77 in proctitis, the AUC was 0.752, the sensitivity was 64%, and the specificity was 84%. Left sided colitis had an AUC of 0.821, sensitivity of 83%, and specificity of 100% at a cut off value of 164, respectively. Pancolitis had an AUC of 0.870, a sensitivity of 86%, and a specificity of 83% at a cut off value of 222. The FC test for C reactive protein was superior at discriminating MES 0 for all disease extent.

Conclusions: FC level was shown to be correlated with the extent of affected mucosa in UC patient. However, patients with proctitis show a low correlation between FC level and endoscopic findings.

Keywords: Disease extent, Ulcerative colitis, Fecal calprotectin, Proctitis

PLG-28

Effect of position on cecal intubation rate for colonoscopy trainees: Rt. lateral vs Lt. lateral decubitus

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Background/aims: Colonoscopy insertion is one of the important quality measures for colonoscopy. Left lateral position is standard position during colonoscopy insertion. Few studies reported that right lateral position resulted in favorable outcome of colonoscopy insertion. However, comparison of right lateral (RLP) position and left lateral position (LLP) was not done for beginners. In this study, we compared rate of colonoscopy insertion among gastroenterology fellows who had no experience of colonoscopy.

Methods: We conducted a randomized controlled trial where patients were randomized to begin in either the RLP or LLP in 4 permuted block. Colonoscopy was done by 6 gastroenterology fellows who were novice for colonoscopy. We planned to perform 200 cases of colonoscopy for each colonoscopist. The primary endpoint was colonoscopy insertion rate for the two groups. To investigate learning curve of colonoscopists, colonoscopy insertion rate was calculated for consecutive 40 cases of colonoscopy. The secondary endpoint included colonoscopy insertion time and easiness of colonoscopy insertion rated by colonoscopists.

Results: After exclusion, a total of 1098 participants completed colonoscopy (RLP, n=548; LLP, n=550). The rate for colonoscopy insertion was superior in the left LLP than that of RLP (RLP, 68.4% vs LLP, 77.3%, $p=0.009$). Technical easiness was comparable for the two groups ($p=0.936$). All colonoscopists reached colonoscopy insertion rate $\geq 85\%$ when after 160 colonoscopies.

Conclusions: For colonoscopy novice, RLP of colonoscopy was inferior to conventional LLP on colonoscopy insertion rate.

Keywords: Colonoscopy, Colonoscopy insertion, Trainee, Position, Cecal intubation

PLG-29

Predictors of clinical outcomes of stent treatment for left-sided malignant colorectal obstruction

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Background/aims: There has been increased use of self-expandable metal stents in treating malignant colorectal obstruction (MCO) as a bridge to surgery and palliative treatment. The aim of this study was to investigate factors that are associated with the outcomes of SEMS placement for left-sided MCO.

Methods: Clinical data from patients who underwent SEMS placement for MCO at six hospitals in Honam province of South Korea between 2009 and 2018 were reviewed retrospectively. 696 patients underwent SEMS placement for left-sided MCO and their data were analyzed. Technical success, clinical success, complications, and predictors of outcome were included as main outcome measures.

Results: Technical and clinical success rates were 98.6% (686/696) and 89.2% (621/696), respectively. Complications including stent migration, tumor ingrowth, outgrowth, perforation, bacteremia/fever, and bleeding occurred in 114 (16.4%) patients. BMI was associated with technical success ($P=0.045$). BMI, length of obstruction, type of stent was associated with clinical success rate ($P=0.044$, $P=0.014$, $P<0.001$, respectively). Stage IV, type of stent was associated with complication rate ($P=0.007$, $P<0.001$ respectively).

In multivariate regression analyses, BMI was a significant independent predictive factor for the technical success of SEMS placement ($P=0.045$). Length of obstruction, the use of uncovered stent were significant independent predictive factors for the clinical success of SEMS placement ($P=0.011$, and $P<0.001$, respectively). The use of covered stent were significant independent predictive factors for the development of complications after SEMS placement ($P<0.001$).

Conclusions: Higher BMI was predictive factor for higher technical success rate. Lower length of obstruction, the use of uncovered stent were predictive factor for higher clinical success rate. The use of covered stent was risk factor for development of complications.

Keywords: Self-expandable metal stent, Colon cancer, Obstruction

PLG-30

A case of dasatinib induced hemorrhagic colitis diagnosed by colonoscopy

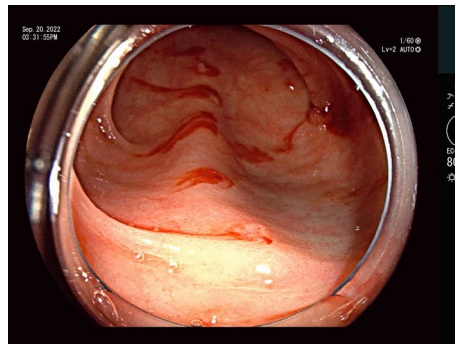
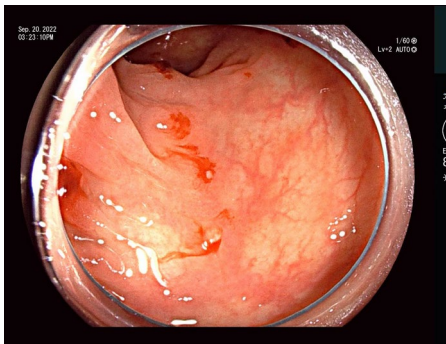
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Dasatinib, a second-generation tyrosine kinase inhibitor, is useful treatment option for patients with Philadelphia chromosome positive chronic myeloid leukemia. However, dasatinib can cause side effects, such as myelosuppression, pleural effusion, hemorrhagic colitis and cytomegalovirus colitis. Hemorrhagic colitis has been reported as a rare complication.

We report the case of 70-year-old male patient with dasatinib induced hemorrhagic colitis. After three months of treatment with dasatinib 100mg once a day, the patient visited the emergency room with hematochezia, occurred 1 month ago. A colonoscopy showed numerous small erosions with spontaneous oozing and bleeding from the ascending colon to the transverse colon. Endoscopic biopsy demonstrated chronic colitis with severely active inflammation and presence of infectious pathogens, including cytomegalovirus and *Clostridium difficile*, were not proved. Cessation of dasatinib led to resolution of symptoms, while reintroduction of the treatment with dasatinib 50mg once a day led to the recurrence of lower gastrointestinal bleeding. The colitis associated with dasatinib has not been clearly identified. Early colonoscopy enables timely diagnosis and management. Further research on this is needed in the future.

Keywords: Dasatinib, Hemorrhagic colitis, Colonoscopy, Adverse event



PLG-31

Is peri-appendiceal inflammation of clinical significance in patients with ulcerative colitis?

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Background/aims: Peri-appendiceal inflammation (PAI) is often found in patients with left-sided ulcerative colitis (UC) or proctitis. However, there is still no consensus on the clinical significance of PAI. This study aimed to identify the clinical significance of PAI in UC as a prognosis factor.

Methods: We retrospectively collected medical records and endoscopic results of patients with diagnosed left side UC or proctitis between January 2013 and December 2021. According to the presence of PAI, we divided the patients into PAI and non-PAI groups. Demographic features and clinical course of the two groups were collected and analyzed.

Results: A total of 107 patients (41 of left side UC, 56 of proctitis) were enrolled, of which 52 were in the PAI group and 55 were in the non-PAI group. There was no difference in most of the demographic and clinical variables between the PAI and non-PAI groups. During the follow-up period of 51 months for the PAI group and 46 months for the non-PAI group, respectively, there was no difference in disease relapse rate (47.1% vs 49.1%, $p=0.823$), cumulative rate of disease relapse at 1,3, and 5 years (10.7%, 26.2%, 34.8% vs 8.39%, 23.0%, 36.7%, $p=0.823$), rate of treatment escalation (59.6% vs 41.8%, $p=0.066$) and proximal disease extension (25% vs 25.5%, $p=0.957$). however, new occurrence of PAI during the follow-up period in the non-PAI group was associated with proximal disease extension (55.6% vs 19.6%, $p=0.037$). In this study, oral 5-aminosalicylate (ASA) was administered to most patients regardless of the extent of the disease. In patients with proctitis with PAI, oral 5-ASA did not affect relapse rate (37.1% vs 66.7%, $p=0.550$) and proximal disease extension rate (28.6% vs 33.3%, $p=1.000$).

Conclusions: PAI at diagnosis did not affect the course of the disease nor did oral 5-ASA in proctitis, however new occurrences of PAI during follow-up were associated with proximal disease extension.

Keywords: Ulcerative colitis, Appendiceal orifice, Proximal disease extension

PLG-32

An uncommon case of recto-sigmoid leiomyosarcoma confirmed by surgery

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Backgrounds: Recto-sigmoid (RS) leiomyosarcoma (LMS) is very rare, accounting for 0.1% of all colorectal malignancies. We report a case that was finally diagnosed as RS LMS by surgery rather than endoscopic biopsy.

Case report: A 68 years old female patient with ischemic heart disease and heart failure who visited the hospital with mucous-like melena. On the contrast-enhanced abdominal computed tomography, a lesion was seen in the RS junction. And then, we found an encircling ulcerative mass at RS junction on sigmoidoscopy and inserted a metal stent. We diagnosed "A malignant tumor, high grade" on histological examination but the sample was immunohistochemically negative for Cytokeratin, SMA (smooth muscle actin), Desmin, S-100 and CD34. For RS malignant tumor, We performed laparoscopic Low Anterior Resection for absolute curative resection. There was direct invasion to the peritoneum, but no lymphovascular invasion. Unlike the biopsy obtained by sigmoidoscopy, the specimen obtained during the operation showed immunohistochemically positive for SMA and Desmin, So "LMS" was diagnosed. Afterwards, we fully discussed with the patient, and she decided not to receive adjuvant chemotherapy due to heart disease.

Conclusions: We report an uncommon case of RS LMS confirmed by surgery. Although this case is rare, We need to consider that there may be malignancy from smooth muscle in colorectal malignancies.

Keywords: Leiomyosarcoma, Recto-sigmoid, Surgery

PLG-33

Relationship between diameter, depth of infiltration, lymphovascular invasion and prognosis of rNETs

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Background/aims: Neuroendocrine tumors (NETs) are malignant tumors that originate from peptidergic neurons and neuroendocrine cells throughout the body, with the rectum being the most frequent site. The incidence of Rectal neuroendocrine tumors (rNETs) has increased significantly with the widespread implementation of colon cancer screening programs and the improvement of endoscopic techniques in recent years. Current rNETs are mainly diagnosed based on a combination of endoscopic presentation, ultrasound endoscopy, and histological examination. The choice of treatment is based on tumor diameter, depth of infiltration, and tumor grade. Domestic and international expert consensus recommends endoscopic resection for tumors with a diameter of <10 mm, grade G1, and no muscularis propria invasion. However, with the application of immunohistochemical staining markers specific for lymphovascular invasion, such as CD34, CD31, EVG and D2-40, the detection rate of lymphovascular invasion in rNETs increased significantly compared with the past, but there was no significant change in tumor metastasis, recurrence and mortality. Therefore, whether lymphovascular invasion really affects the prognosis of rNETs and the relationship between lymphovascular invasion, tumor diameter, and depth of infiltration has become an urgent question to be explored. This is crucial to improve the quality of survival and reduce the treatment burden of patients with rNETs.

Methods: In this study, we retrospectively collected case data of patients with pathological diagnosis of rNETs after endoscopic resection at the Endoscopy Center of the Affiliated Hospital of Guizhou Medical University from January 2015 to December 2020, and followed up their prognosis. Tumor tissue specimens preserved in the Department of Pathology of the Affiliated Hospital of Guizhou Medical University were extracted from the above patients, and pathological sections were reconstructed and stained with CD34, CD31, EVG and D2-40 to determine the tumor diameter, depth of infiltration, lymphovascular invasion rate and other relevant indexes. Combined with the detection of tumor specimens and patient follow-up results, the relationship between tumor diameter, depth of infiltration, and lymphovascular invasion of rNETs with diameter <10 mm and their relationship with prognosis were comprehensively analyzed.

Results: Analysis revealed that the tumor diameter was larger under white light endoscopy and ultrasound endoscopy compared to the diameter measured under pathology. Linear regression revealed that the larger the tumor diameter, the deeper the infiltration depth ($P < 0.001$), but all tumors were confined within the submucosa and no muscularis propria invasion was detected. There was no significant difference in tumor diameter between patients with and without lymphovascular invasion, nor was there a significant difference in the incidence of 50% ($n = 27/54$) of lymphovascular invasion

>5 mm in diameter versus 41.7% (n=10/24) of lymphovascular invasion \leq 5 mm in diameter (P=0.496). There was no significant difference in the detection rate of lymphovascular invasion between the 43 patients whose tumor infiltration was confined to the muscularis mucosae and the 27 patients whose tumor infiltration reached the submucosa (44.2% vs. 51.9%, P=0.532). For this fraction of rNETs <10 mm in diameter, tumor diameter, depth of infiltration, and lymphovascular invasion were not associated with the short-term prognosis of patients.

Conclusions: In rNETs with diameters <10 mm, the greater the tumor diameter, the deeper the depth of infiltration, but muscularis propria invasion was rare, and tumor diameter did not affect the occurrence of lymphovascular invasion. Meanwhile, tumor diameter, infiltration depth and lymphovascular invasion were not associated with the short-term prognosis of patients.

Keywords: Rectal neuroendocrine tumors, Tumor diameter, Depth of infiltration, Lymphovascular invasion, Prognosis of disease

PLG-34

The efficacy of a hemostatic powder (UI-EWD) in decreasing the incidence of PCES: A case series

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Background/aims: Endoscopic submucosal dissection (ESD) was an effective treatment modality for large colorectal tumor and has become more commonly used to avoid the invasive surgery but leads to several complications. Post ESD coagulation syndrome (PECS) is one of common complications describing as localized abdominal pain, fever, and leukocytosis after ESD. We present a case series of successful endoscopic prevention of PECS by UI-EWD apply after ESD, demonstrating the feasibility and safety of UI-EWD.

Methods: A total of 11 patients that received UI-EWD after ESD for colorectal neoplasm in a tertiary referral center were retrospectively reviewed. PECS was defined as localized abdominal pain at the ESD site that occurred within 3 days of ESD without perforation.

Results: Localized abdominal pain and fever did not occur in any of the evaluated patients. Elevation of CRP above 1 mg/dL was recognized in 4 cases. (36.4%) One case of delayed bleeding was identified at 7 days after ESD (9.1%).

Conclusions: Although PECS is commonly observed in patients undergoing ESD for colorectal neoplasm, it was not observed in this case series. It was suggested that the application of UI-EWD after colorectal ESD has a good association with a decrease in PECS occurrence. To obtain significant information on the performance of UI-EWD in a decrease of PECS, a well-designed, large-scale, prospective study is needed.

Keywords: ESD, Coagulation syndrome, Hemotatic powder

PLG-35

Comparisons of efficacy and safety between 1L and 2L water intake during bowel preparation with 1L-PEG for colonoscopy

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Background/aims: Although the newly developed 1L PEG solution has the advantage of reducing the dose, it may cause hyponatremia due to high doses of sodium ascorbate and sodium sulfate in the solution. The aim of this study is to compare the efficacy of bowel preparation and safety in the group taking 1L and 2L of water in patients using 1L PEG solution as a laxative for colonoscopy bowel preparation.

Methods: This was a single-blind, multicenter, noninferiority, randomized control study. Subjects were randomly assigned either 1L or 2L group. The patients in the 1L group took 1L of PEG solution and 1L of water, while the 2L group took 1L of PEG solution and 2L of water. The endoscopists were blinded to the examinee's group. Examinee's compliance were evaluated by questionnaire.

Results: Total 170 subjects were enrolled (87 for 1L group, 83 for 2L group). There was no significant difference in bowel preparation between both groups (6.36 ± 1.24 (1L group) vs 6.55 ± 1.24 (2L group), $p=0.364$). There was no difference in bowel preparation in each segment between both groups. The total number of polyps being detected during colonoscopy was high in 1L group (1.60 ± 1.97 vs 1.23 ± 2.29 , $p=0.025$). The number of polyps large than 1 cm was also high in 1L group (0.37 ± 0.84 vs 0.08 ± 0.32 , $p=0.001$). The satisfaction level of the examinees was significantly higher in the 1L group (52.9% vs 37.3%, $p=0.029$). Nausea, vomiting, abdominal pain was more common in 2L group. However thirst was reported only in 1L group. There was no significant difference in changes of electrolytes, including BUN, creatinine, sodium, potassium, and chloride.

Conclusions: There was no difference in the efficacy of bowel preparation and safety between both groups. Polyp detection rate was higher and examinee's compliance was better in 1L group. Appropriate selection based on examinee's characteristics would be necessary.

Keywords: Bowel preparation, Polyethylene glycol, Safety

PLG-36

Comparison of cold EMR and conventional EMR for small colorectal polyps: Multicenter randomized controlled trials

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Background/aims: Cold snare polypectomy is a standard method for the resection of small non pedunculated colorectal polyps; however, even aside from the cauterization effect, EMR is still widely used because of the benefit of submucosal injection (making the margin of the lesion easier visible and manipulating the lesion into a form that is easier to remove). We aimed to assess the efficacy of cold endoscopic mucosal resection, compared with conventional endoscopic mucosal resection, for small colorectal polyps (6–9 mm) including pedunculated polyps.

Methods: Small colorectal polyps including pedunculated polyps were randomly allocated to either the cold EMR group or the conventional EMR group. Primary outcome was local recurrence rate.

Results: A total of 70 and 70 polyps were resected using cold EMR or conventional EMR, respectively. In this interim analysis, Approximately, 80% of patients were completed surveillance colonoscopy. Demographic and clinical features of the two groups were similar. In the intention-to-treat population, the local recurrence rate was 0% in the cold EMR group and 0% in the conventional EMR group. En bloc resection rate for the A-EMR and C-EMR group was 98.6% vs 98.6% ($P=1.000$), respectively. There was not a delayed bleeding and a perforation in both group.

Conclusions: In this interim analysis, cold EMR was non inferior to conventional EMR for the local recurrence rate of small colorectal polyps. Cold EMR might be considered one of the standard methods for the removal of small colorectal polyps including pedunculated polyps.

Keywords: Cold EMR, Conventional EMR, Small colorectal polyp

PLG-37

Piecemeal polypectomy of large pedunculated polyp near dentate line: A case report

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Introduction: Pedunculated polyps usually pose no difficulty during polypectomy because it is relatively easy to ensnare the stalk. Large pedunculated polyp has higher risk of bleeding due to the higher number of blood vessels in the stalk. The location of the polyp can also increase the difficulty of polypectomy, for example if the location of the polyp is close to the dentate line. The hot snare can accidentally cut the dentate line and cause bleeding and pain to the patient.

Patient: A 67-year-old man was referred to a tertiary medical center because of he experienced a lump goint in and out of his anus for 5 years. The patient initially dismissed the symptoms because he experienced no pain, bleeding, and other alarming symptoms such as weight loss.

Diagnosis: Colonoscopy revealed a large, pedunculated polyp in the rectum, just after the dentate line. The polyp surface was slightly brownin color compared to the surroundings and the elongated stalk was covered with normal mucosa. Histopathological examination of the resected specimens revealed a tubulovillous adenoma with low grade dysplasia.

Intervention: Endoscopic mucosal resection was performed on the polyp using hot snare, but it is initially difficult to ensnare the polyp because of its proximity to the dentate line. Distal part of the polyp was resected first to clear the view before the polyp was completely resected.

Outcomes: There was no evidence of immediate or delayed bleeding after endoscopic mucosal resection, and the hemoglobin level was stable in laboratory follow-up.

Lessons: We report a case of a large pedunculated polyp close to the dentate line which present a problem for polypectomy. The decision to do complete or piecemeal polypectomy should weigh many factors such as the type, size, and location of the polyp.

Keywords: Piecemeal, Polypectomy, Pedunculated polyp, Dentate line, Hot snare

PLG-38

Risk factors for colorectal cancer in a fecal immunochemical test-positive group: The National Health Insurance database

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Background/aims: Among the various CRC screening test, fecal immunochemical test (FIT) is a simple yet most commonly used. Nevertheless, there have been only few long-term studies on subjects with FIT-positive. Therefore, in this study, we aimed to investigate the risk factors for CRC in FIT-positive patients using the National Health Insurance Service Bigdata database.

Methods: According to exclusion criteria, 101,148 participants included finally (fig 1). The CRC incidence up to 2018 was investigated using the National Cancer Registry.

Results: Out of the 101,143 FIT-positive participants, 4,395 (4.35%) were diagnosed with CRC. The FIT-positive patients who underwent a second round of screening showed a 5-year cumulative CRC incidence of approximately 1.25%, whereas those who did not, showed an incidence of approximately 3.75%. Among the FIT-positive patients, the CRC incidence in the non-compliance group for the second round of screening was 2.8 times higher than that in the compliance group (fig 2).

Conclusions: In FIT-positive participants, non-compliance with the second round of screening was identified as a major risk factor for CRC development. It is necessary to establish appropriate strategies for CRC in FIT-positive patients to increase the rate of compliance with the second round of CRC screening.

Keywords: Colorectal cancer, Fecal immunochemical test, National cohort, Colonoscopy, Screening

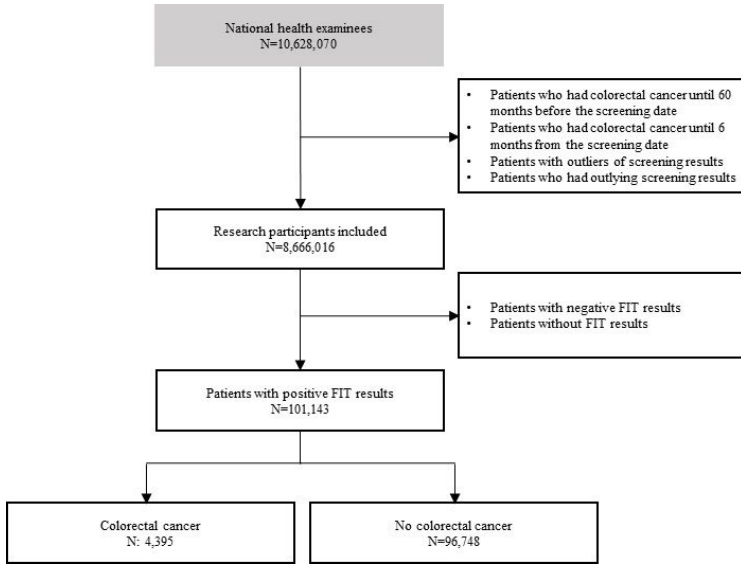


Figure 1. CRC incidence study flow chart for the selection of individuals for colorectal cancer screening

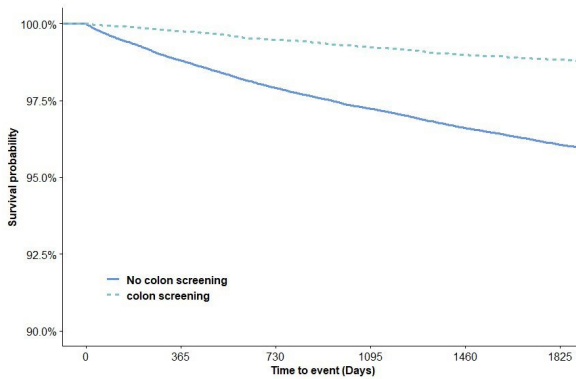


Figure 2. Kaplan–Meier graph for colorectal cancer incidence (survival probability) in the second round of screening

PLG-39

Impact of perforation following self-expandable metal stent as a bridge to surgery for malignant colorectal obstruction

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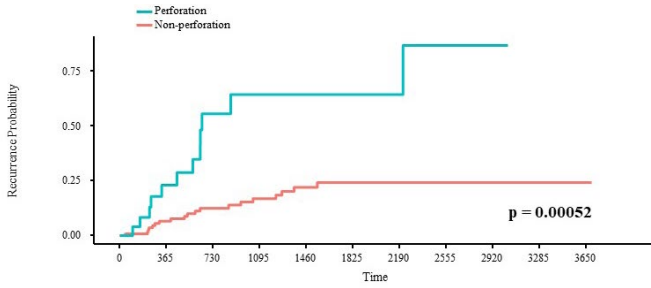
Background/aims: Although self-expandable metal stent (SEMS) is very useful for relieving malignant colorectal obstruction, it may cause bowel perforation and result in impaired oncological outcomes. We aimed to compare overall survival and recurrence rates depending on SEMS-related bowel perforation.

Methods: This multicenter study included obstructive colorectal cancer patients treated with SEMS as a bridge to surgery. The data were retrospectively collected and the patients were matched at a ratio of 1:5 according to age, sex, tumor location, pathologic stage, and curative resection.

Results: From January 2008 to May 2019, 412 patients were included. Of these patients, 25 (6.1%) had SEMS-related perforations (the perforation group). Overt and silent perforations were identified in 21 and 4, respectively. In comparison with 125 matched controls (the non-perforation group), the perforation group was associated with a higher rate of emergent surgery, open surgery, and stoma formation and had a shorter time from SEMS to surgery. The 5-year recurrence rate was significantly higher in the perforation group (47.4% vs. 21.5%, $p < 0.001$). The 5-year survival rate was not significantly different between two groups (63.8% vs. 80.0%, $p = 0.330$).

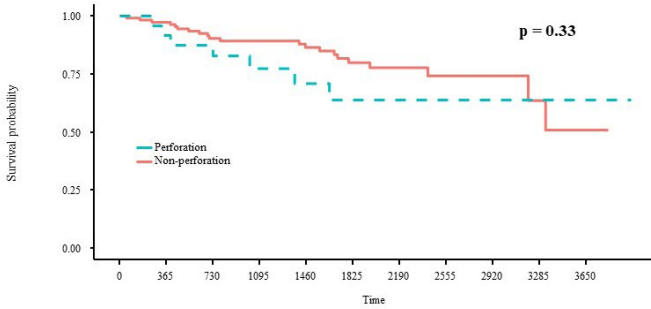
Conclusions: SEMS-related perforation was associated with poor surgical outcomes and increased recurrence rate.

Keywords: Colorectal cancer, Intestinal obstruction, Self-expandable metal stent, Intestinal perforation



Perforation	25	19	12	9	8	6	5	4	1	0	0
Non-perforation	125	97	76	64	51	30	20	13	6	5	1

Recurrence rate according to perforation



Perforation	25	22	18	13	11	8	7	7	3	2	1
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Overall survival according to perforation

PLG-40

A case of small intestinal epithelioid angiosarcoma presenting as melena

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Backgrounds: Angiosarcoma is an aggressive mesenchymal sarcoma with high mortality. Angiosarcoma of the small intestine is rare and its nonspecific clinical presentation often leads to delayed diagnosis. Herein, we report a case of angiosarcoma on small intestine.

Case: A 64-year-old man visited emergency room with persistent melena for 7 days. Initial vital signs were within normal limits and there was no specific abnormality on physical examination. Hemoglobin was 7.9g/dL. The patient underwent gastroscopy and sigmoidoscopy, however, no definite bleeding focus was found. Abdominal CT showed several diverticula in ascending colon without definite evidence of active bleeding. After transfusion, the patient's vital sign was normal and no further episode of bleeding was observed. The patient was discharged and revisited to the outpatient clinic with melena. Patient underwent capsule endoscopy and bleeding was observed on mid to distal jejunum. After admission, oral approach single balloon enteroscopy was performed. Multiple small hyperemic mucosa with blood clots and about 3cm sized protruding mass with central ulcer covered with dark red color was observed. Biopsy was done on the mass and hemoclipping were done on the hyperemic mucosa with easy touch bleeding. Due to ongoing bleeding from the angiosarcoma, laparoscopic small bowel resection was performed. Epithelioid angiosarcoma was confirmed on pathology with invasion to the visceral peritoneum and 3 regional lymph node metastasis (size: 2.5×1.5cm, pT4a). There was no more bleeding and the chemotherapy was scheduled.

Conclusions: Angiosarcomas have been detected in nearly all organs, but small bowel involvement is unusual. The diagnosis of small bowel angiosarcoma may be very challenging due to the non-specific clinical, radiological features. It is important that understanding clinical feature and management of small intestine angiosarcoma, which is essential for the early diagnosis of this rare but fatal disease.

Keywords: Angiosarcoma, Small bowel bleeding, Capsule endoscopy, Enteroscopy

PLG-41 

Efficacy of small bowel polyp removal with balloon-assisted enteroscopy in patients with Peutz-Jeghers syndrome

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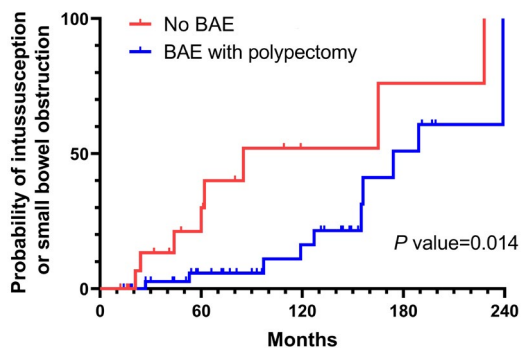
Background/aims: Although Peutz-Jeghers syndrome (PJS) guidelines recommend the removal of small bowel polyps larger than 1 cm in order to reduce the risk of polyp-related complications, data on the effectiveness of this intervention in PSJ patients is sparse. We aimed to investigate whether small bowel polypectomy using balloon-assisted enteroscopy (BAE) can affect the incidence of intussusceptions in PJS patients.

Methods: We retrospectively reviewed the medical records from consecutive patients with PJS between September 2006 and January 2021 from four tertiary hospitals.

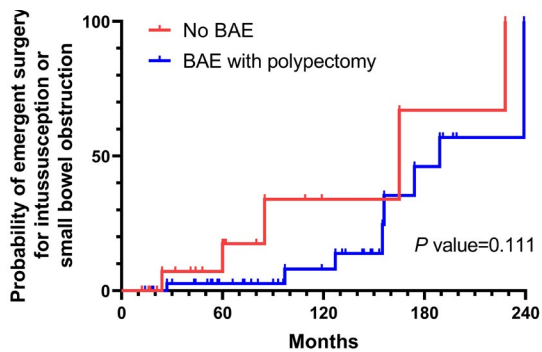
Results: Sixty-four PJS patients (30 men and 34 women) with a median age of 25.0 years were enrolled. During the follow-up period, BAE-guided polypectomy was performed in 44 patients. This patient group had a significantly lower incidence of intussusception or small bowel obstruction than those who did not undergo BAE ($P=0.014$). The incidence of emergent surgery for intussusception or small bowel obstruction was also lower in the patient group who received BAE ($P=0.111$). The overall complication rate of BAE-guided polypectomy was 9.1% (3 post-procedural bleeding and one small bowel perforation).

Conclusions: BAE-guided removal of small bowel polyps appears to be effective in preventing intussusceptions and small bowel obstruction in PJS patients.

Keywords: Peutz-Jeghers syndrome, Enteroscopy, Balloon-assisted enteroscopy, Small bowel polyp



Comparison of the probability of intussusception or small bowel obstruction between the patients' group who received balloon-assisted enteroscopy with polypectomy and those who did not.



Comparison of the probability of emergent surgery between the patients' group who received balloon-assisted enteroscopy with polypectomy and those who did not.

PPB-01



A case report on biliary ascariasis presenting as acute pancreatitis in a 36-year old Filipino

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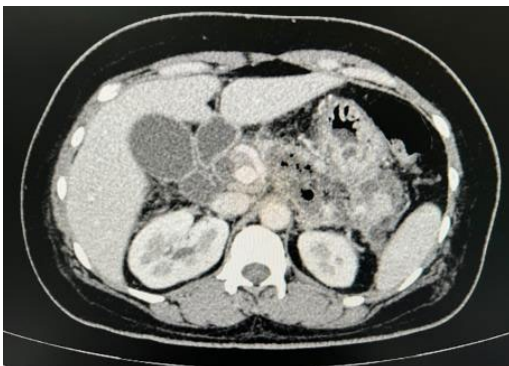
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Introduction: *Ascaris lumbricoides* is the largest intestinal nematode infecting the human intestine and is one of the most common helminthic human infections worldwide. The adult worms can migrate into the hepatobiliary tree and can cause obstruction resulting to complications such as cholecystitis, cholangitis, pancreatitis, and hepatic abscesses. *Ascaris*-induced pancreatitis is a rare cause of acute pancreatitis. Of all patients with pancreaticobiliary ascariasis, only approximately 5% have pancreatic disease.

Discussion: We present a 36-year old female who came in due to epigastric pain and vomiting. Diagnostic work up revealed increased serum amylase and lipase and patient was managed as a case of acute pancreatitis and was given intravenous fluids, analgesics and anti-emetics. Whole abdomen CT scan showed a diffusely enlarged pancreas with 30% necrosis. The common bile duct is dilated measuring 1.1 cm. Gallbladder is distended with pericholecystic fluid collection. ERCP was done where a round worm was extracted from the ampulla. Patient was treated with mebendazole. Patient's condition improved, diet progression was done and patient was eventually discharged.

Conclusions: Ascariasis should be considered as a possible etiology of acute pancreatitis especially in areas where the disease is endemic. A strong index of suspicion may help in the early diagnosis and prevention of complications in these patients.

Keywords: Pancreatitis, Biliary ascariasis, ERCP, Case report, Filipino



Whole abdomen CT scan showing distended gallbladder and dilated common bile ducts

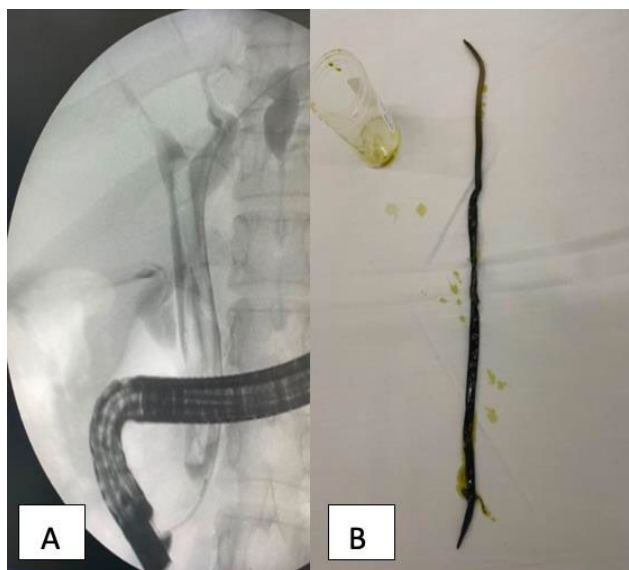


Figure A. Cholangiogram showing dilated CBD with elongated filling defect
Figure B. Extracted ascariasis carcass

PPB-02

The role of endoscopic hemostasis for hemobilia from above papilla during ERCP

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Background/aims: Hemobilia can be caused by various factors and its management is often challenging. Recently, endoscopic hemostasis has shown promising efficacy with the advent of hemostatic modalities such as self-expandable metal stents (SEMS). In this study, we retrospectively compared the success rates and other clinical outcomes of endoscopic hemostasis and angiographic embolization.

Methods: Patients who underwent CT angiography, diagnostic or therapeutic angiography in addition to ERCP were included in this retrospective study. Patients with bleeding originating from outside the biliary system, and those with sphincterotomy site bleeding were excluded. Patients were divided into two groups: endoscopic treatment (ENDO group) and angiographic embolization (EMBO group). The primary outcome was the success rate of endoscopic hemostasis.

Results: A total of 198 patients were included and 170 patients were excluded. Ultimately, 28 patients were analyzed. 21 patients received initial endoscopic hemostasis (ENDO group) and 7 received initial angiographic embolization (EMBO group). The hemostasis success rate in the ENDO group was 85.7% compared to 100% in the EMBO group.

Conclusions: In carefully selected patients and by an experienced endoscopist, endoscopic hemostasis with a fully covered SEMS is a treatment option.

Keywords: Hemobilia, Endoscopic hemostasis, Metal stent

Table 1. Baseline characteristics

	Overall (n=28)	ENDO (n=21)	EMBO (n=7)	P value
Male sex (n, %)	19 (67.9%)	15 (71.4%)	4 (57.1%)	0.646458
Age (mean, SD)	66.4 (10.2)	66.4 (11.0)	66.4 (8.2)	0.996104
Anticoagulation (n, %)	4 (14.3%)	2 (9.5%)	1 (14.3%)	1.000000
Thrombocytopenia (n, %)	2 (7.1%)	1 (4.8%)	1 (14.3%)	0.444444
Liver cirrhosis (n, %)	6 (21.4%)	6 (28.6%)	0	0.288294
ESRD (n, %)	0	0	0	-
Bleeding site	RHA : 14 LHA : 4 LGA : 1 gastroduodenal a : 1 Unknown : 8	RHA : 10 LHA : 1 LGA : 1 gastroduodenal a : 1 Unknown : 8	RHA : 4 LHA : 3	-

Table 2. Hemostasis success rate and other clinical outcomes

	Overall (n=28)	ENDO (n=21)	EMBO (n=7)	P value
Hemostasis success	25 (89.3%)	18 (85.7%)	7 (100%)	0.551282
Hemostasis method	-	<u>fcSEMS</u> : 8 <u>ucSEMS</u> : 2 plastic stent : 11	Coil and glue : 2 Glue and PVA : 1 Coil : 2 Glue : 1 PVA : 1	-
Delayed bleeding	9 (32.1%)	7 / 18 (38.9%)	1 / 7 (14.3%)	0.362297
RBC transfusion (pack, mean, SD)	4.86 (4.704)	4.19 (4.045)	6.86 (6.230)	0.199511
Vasoactive drugs (hypovolemic shock)	8 (28.6%)	5 (23.8%)	3 (42.9%)	0.371481

Table 3. Hemostasis success rate by stent type

	<u>fcSEMS</u> (n=8)	<u>ucSEMS</u> (n=2)	Plastic stent (n=11)
Hemostasis success	6 / 8 (75.0%)	2 / 2 (100%)	10 / 11 (90.9%)
Delayed bleeding	1 / 6 (16.7%)	1 / 2 (50.0%)	5 / 10 (50.0%)

PPB-03

Successful endoscopic management of acute pancreatitis caused by an ingested toothpick: A case report

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Acute pancreatitis is a rare complication caused by foreign body penetration of the digestive tract. Most ingested foreign bodies pass through the intestinal tract uneventfully. However, sharp, long, and rigid objects may perforate the gastrointestinal wall. Here, we report a novel case of endoscopic management of acute pancreatitis caused by an ingested toothpick.

A 57-year-old man presented to our hospital with the chief complaint of recurrent epigastric pain that lasted for 3 months. Esophagogastroduodenoscopy performed at a local clinic revealed a toothpick penetrating the gastric antrum. Computed tomography (CT) of the abdomen at our hospital revealed a linear, radiopaque structure traversing the stomach and the pancreas. Pancreatic swelling and peripancreatic soft-tissue stranding were also observed. Laboratory data revealed elevated levels of amylase (276 U/L), lipase (1186 U/L), and C-reactive protein (10.1 mg/dL), diagnostic of acute pancreatitis.

The foreign body was successfully removed through endoscopy without any complication, and pancreatitis was treated with intravenous hydration. Feeding advance was initiated on hospital day (HD) 3, and the patient was discharged on HD 5 following improvement in symptoms. Follow-up abdominal CT performed 2 weeks after discharge revealed improvement in pancreatic swelling and peripancreatic soft-tissue stranding.

This case implies that the unintentional ingestion of toothpicks must be considered as a potential cause of pancreatitis. CT scan and endoscopy were shown to be efficient in detecting the ingested toothpick. Surgical removal using laparotomy has been performed in previous cases; however, to the best of our knowledge, this is the first case of successful endoscopic management of pancreatitis occurring secondary to ingested toothpick perforation of the stomach. We believe that endoscopic management should also be considered as a potential treatment modality for pancreatic foreign body removal.

Keywords: Pancreatitis, Foreign bodies, Intestinal perforation, Pancreas

PPB-04

Prediction factor for recurrency of ampullary neoplastic lesion after endoscopic papillectomy

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Background/aims: Guideline recommends endoscopic papillectomy (EP) be an alternative to surgical treatment for selected ampullary adenoma. However the recurrent rate of EP is variate. Therefore the impact factors for the recurrence after EP is important.

Methods: Patients receiving EP after between December 2010 and April 2021 at National Taiwan University Hospital were retrospectively enrolled for analysis. The primary outcome was the impact factor for recurrency after EP. The secondary outcome was recurrent rate and complication for EP.

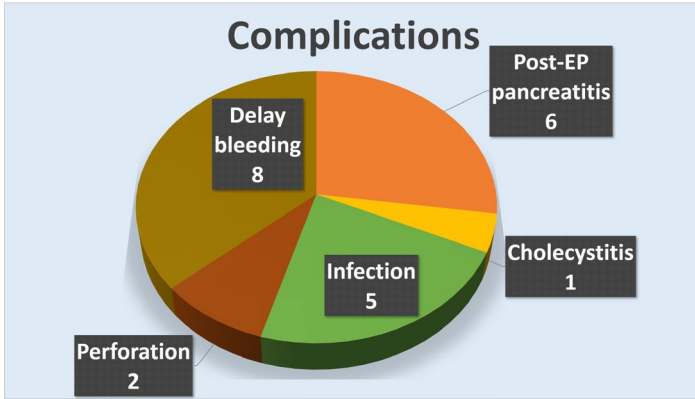
Results: A total of 100 patients were included in the study. The median age was 65 and 50% were male. No basic characteristics was different between two groups. The recurrent rate after EP for neoplastic lesion was 10.3% (8/77). The potential impact factors associated with recurrence of neoplastic lesion were included for analysis. After adjusting for confounding variables, multivariate logistic regression analysis showed that intraductal extension (odds ratio, 14.326; 95% confidence interval, 1.68–122.01) was significantly associated with recurrence of neoplastic lesion. The overall complication was 22% (22/100) and the most common complication was delayed bleeding which was 8% (8/100).

Conclusions: Intraductal extension is associated with the recurrency after endoscopic papillectomy.

Keywords: Ampulla, Endoscopic papillectomy, ERCP, Adenoma, Major papilla

	Univariate analysis		
	OR	95% CI	P-value
MPD or CBD dilation	0.405	0.047-3.521	0.671
Intraductal extension	6.300	1.200-33.078	0.047
Malignancy	5.417	0.817-35.934	0.115
Piecemeal resection	0.514	0.059-4.513	0.683
Margin free	2.750	0.518-14.587	0.280
	Multivariate analysis		
	OR	95% CI	P-value
Intraductal extension	14.326	1.682-122.01	0.015

Potential risk factors for recurrence of neoplastic lesion



Complication of endoscopic papillectomy

PPB-05



Moving echoendoscope technique improves technical success rate of device insertion during EUS-guided hepaticogastrostomy

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Background/aims: Most previous reports have focused mainly on guidewire insertion, tract dilation, or stent deployment, and have not reported technical tips for device insertion during EUS-HGS. To improve the technical success rate of device insertion without unnecessary tract dilation, the pushing force should be transmitted directly from the channel of the echoendoscope to the intrahepatic bile duct. For these reasons, we developed a novel technique, termed 'moving echoendoscope technique'. We herein describe the technical feasibility of this technique during EUS-HGS.

Methods: The primary outcome of this study was the technical success rate of dilation device insertion. The initial technical success rate of dilation device insertion was defined as successful insertion into the biliary tract. If dilation device insertion failed, the moving scope technique was attempted. Technical success of the moving scope technique was defined as an increase in angle between the intrahepatic bile duct and the guidewire after application of the moving scope technique, compared with the angle prior to application of the moving scope technique.

Results: A total of 143 patients were enrolled in this study. The initial technical success rate for device insertion was 80.4% (115/143). We attempted the moving scope technique in all 28 of these patients, which improved the mean angle between the intrahepatic bile duct and the guidewire to 141.0° and resulted in a technical success rate of 100% (28/28). The area under the ROC curve (AUC) was 0.88, and 120° offered 88.0% sensitivity and 78.8% specificity for predicting successful dilation device insertion. Regarding adverse events, bile peritonitis (n=8) and cholangitis (n=2) were observed, but were not severe.

Conclusions: In conclusion, the moving scope technique may be helpful during EUS-HGS to achieve successful insertion of the dilation device into the biliary tract. These results should be evaluated in a prospective randomized controlled trial.

Keywords: Endoscopic ultrasound, Endoscopic ultrasound-guided biliary drainage, Ultrasound-guided hepaticogastrostomy

PPB-06

Safety and challenges of endoscopic retrograde cholangiopancreatography among elderly patients (Interim analysis)

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Background/aims: To determine the safety and challenges of endoscopic retrograde cholangiopancreatography between patients of ≤ 60 years and ≥ 60 years.

Methods: Cross sectional study, Non Probability Consecutive Sampling done.

Patient's age is categorized into two age group as Group A i.e. ≤ 60 years and Group B i.e. ≥ 60 years. Endoscopist with similar experience.

Standard video duodenoscopies with side view (Olympus, Tokyo, Japan) with 4.2 mm accessory channel caps used. Data will be compiled and analyzed through statistical package for Social Sciences (SPSS) Version 25.

Results: It's an ongoing study with 54 patients. 37 in group A and majority were females (68.5%) while 17 patients in group B with 64.7% females. Most frequently noted finding on ERCP in group A was CBD sludge 32.4% followed by choledocholithiasis 29.7% while in group B choledocholithiasis was 58.8% followed by malignant biliary stricture 17.6%. Time taken by procedure in group A is 25.27 ± 14.43 while group B 28.35 ± 14.9 . Length of stay in hospital in group A 2.70 ± 1.39 days while in group B 2.41 ± 1.32 days. Complication noted in both groups is bleeding with group A 2.7% and group b 5.9% while outcome in terms of expiry group A 5.4% and in group B 11.8%.

Conclusions: Endoscopic retrograde cholangiopancreatography (ERCP) is a diagnostic and therapeutic procedure for biliary and pancreatic diseases and is a safe procedure with less number of complications.

Keywords: Endoscopic retrograde cholangiopancreatography, Choledocholithiasis, Elderly

PPB-07 

Safety and efficacy comparison of endobiliary laser ablation with balloon dilation vs radiofrequency ablation in a swine

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Background/aims: Endoscopic local treatments including endobiliary radiofrequency ablation (EB-RFA) have got noticed for palliative management of cholangiocarcinoma. However, safety concerns have emerged and clinical benefits have not yet been accurately demonstrated. We have newly developed a dilation balloon-equipped cylindrical laser light diffuser for local endoscopic treatment of cholangiocarcinoma. We focused on the comparison of the safety and efficacy of biliary endoscopic balloon-based laser treatment (EBLT) and EB-RFA in normal bile duct swine model.

Methods: Ten mini pigs were allocated into biliary EBLT and EB-RFA groups. All animals underwent endoscopic retrograde cholangiography and biliary EBLT (5 mm, 10~>7 W active length; 10 sec irradiation time) and EB-RFA (22 mm, 7 W electrode length; 80 sec ablation time) were performed in 5 animals in EBLT group and 5 animals in RFA group. Then follow up cholangiogram was performed in all animals right after the procedures. And the bile ducts were extracted from all animals for pathologic analysis 24 hours later.

Results: No bile duct perforation or hemobilia occurred in all animals of both groups. Ablation depth of biliary EBLT was half that of EB-RFA (mean, 2.2 vs. 4.8 mm). And ablation length of biliary EBLT was approximately 1.5 times that of active length in laser diffuser (mean, 8.4 mm) and ablation length was similar to electrode length in case of EB-RFA (mean, 18.2 mm).

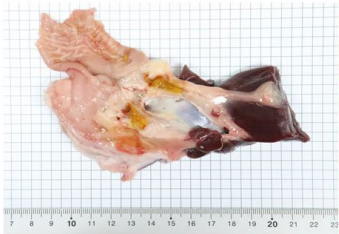
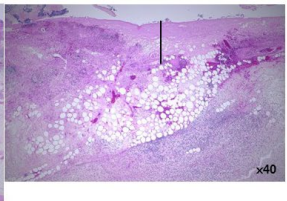
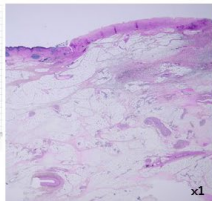
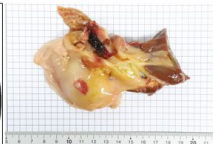
Conclusions: Biliary EBLT and EB-RFA showed acceptable safety profile in normal swine bile duct. And biliary EBLT showed a thinner tissue coagulation depth & more uniform necrosis than EB-RFA.

Keywords: Cholangiocarcinoma, Endoscopic local treatment, Endobiliary laser ablation with balloon dilation, Radiofrequency ablation

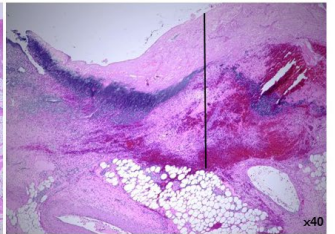
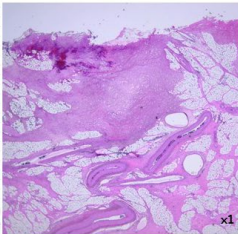
Variable	EBLT (n=5)	EB-RFA (n=5)
Active segment or electrode length, mm	5	22
Ablation depth, mean, mm	2.2	4.8
Ablation length, mean, mm	8.4	18.2



EBLT group



EB-RFA group



PPB-08



Technical and clinical success of EUS-directed transgastric ERCP (EDGE) in Roux-en-Y gastric bypass (RYGB) patients

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Background/aims: Roux-en-Y gastric bypass (RYGB) surgery is the second most common weight loss surgery, known for its success in treating obesity. However, this surgery can make endoscopic retrograde cholangiopancreatography (ERCP) technically challenging due to altered anatomy. To overcome this challenge, Endoscopic Ultrasound-Directed Transgastric ERCP (EDGE) has been developed as a minimally invasive endoscopic procedure. In this study, we evaluated EDGE in RYGB patients.

Methods: In this study, we evaluated the clinical and technical success of the studies reported performing EDGE in RYGB patients in a systematic review study. Indications and complications were analyzed as the secondary objective.

Results: From the 76 studies on ERCP in RYGB patients, 27 study reported performing EDGE entered our first evaluation. After removing the case reports and the papers not reporting the technical and clinical success rates, 11 study were selected for the final analysis. Technical success was reported between 81.25–100% and clinical success was reported as 62.5–100%. Total of the analyzed patients were 303 patients, 293 were technically successful (96.6%) and 279 (92%) were clinically successful. Choledocholithiasis was the most prevalent indication (45.8%). 36% of all the patients developed complications. Stent migration and displacement were among the most prevalent incidences in the surgery (4.9%).

Conclusions: Technical and clinical success rate of the EDGE in RYGB patients justify this procedure. However, high complication rate of this procedure should be considered in critically ill patients.

Keywords: EDGE, ERCP, RYGB, Endoscopic

PPB-09

Comparison of conventional smear cytology and liquid based cytology according to EUS-FNA location for pancreatic cancer

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Background/aims: Although endoscopic ultrasound guided fine needle aspiration (EUS-FNA) has been reported as a accurate diagnostic test with high sensitivity and specificity for pancreatic solid lesions, it is difficult to expect a high negative predictive value. To supplement these limitations and find a better specimen preparation method, we analyzed the diagnostic yields of conventional smear cytology (SC) and liquid-based cytology (LBC, SurePath) according to aspiration location (stomach/duodenum).

Methods: We retrospectively reviewed the medical records of consecutive 608 patients who underwent EUS-FNA for pancreatic lesions from January 2016 to July 2021 at tertiary single center. Inclusion criteria were all ages, both genders, solid lesion, at least 3 needle punctures and 10 or more needle pushes and pulls using a 10 ml syringe for suction. Sensitivity, specificity, diagnostic accuracy, positive predictive value (PPV), and negative predictive value (NPV) were compared. Rapid on-site evaluation was not available in all cases.

Results: 139 patients in SC group and 81 patients in LBC group met the inclusion criteria. 201 cases (91.4%) had confirmed malignancy, and 19 cases (8.6%) confirmed benign lesions. In the tests performed in the duodenum, NPV of LBC group was higher than that of SC group with statistical significance (66.7% vs 30.8%, $p=0.0007$, respectively). The sensitivity and accuracy of LBC group were also higher than those of SC group, but there was no statistical significance (93.5% vs 83.9%, 94.3% vs 85%, respectively). In the tests performed in the stomach, LBC group had higher sensitivity, accuracy, and NPV than SC group, but there was no statistical significance (92.7% vs 88.9%, 91.3% vs 88.6%, and 57.1% vs 42.9%, respectively).

Conclusions: In case of duodenal approach for EUS-FNA of pancreatic solid lesions, liquid-based cytology (SurePath method) showed a higher NPV than conventional smear cytology and non-inferior results.

Keywords: Pancreas cancer, EUS-FNA, Smear cytology, Liquid based cytology

Table 1. Operative characteristics of duodenal approach

	Liquid-based cytology (n = 35)	Smear cytology (n = 60)	P value
Sensitivity	93.6 (78.6 – 99.2)	83.9 (71.7 – 92.4)	0.170
Specificity	100.0 (39.8 – 100.0)	100.0 (39.8 – 100.0)	
AUC	0.968 (0.845 – 0.999)	0.920 (0.820 – 0.974)	0.826
Accuracy	94.3 (80.8 – 99.3)	85.0 (73.4 – 92.9)	0.174
PPV	100	100	
NPV	66.7 (34.4 – 88.4)	30.8 (19.6 – 44.7)	0.0007

Values in parentheses are 95 % confidence intervals.

Abbreviation : AUC, area under the ROC curve; PPV, positive predictive value; NPV, negative predictive value

Table 2. Operative characteristics of gastric approach

	Liquid-based cytology (n = 46)	Smear cytology (n = 79)	P value
Sensitivity	92.7 (80.1 – 98.5)	88.9 (79.3 – 95.1)	0.491
Specificity	80.0 (28.4 – 99.5)	85.7 (42.1 – 99.6)	0.408
AUC	0.863 (0.730 – 0.947)	0.873 (0.779 – 0.937)	0.970
Accuracy	91.3 (79.2 – 97.6)	88.6 (79.5 – 94.7)	0.635
PPV	97.4 (86.8 – 99.6)	98.5 (91.2 – 99.8)	0.666
NPV	57.1 (29.2 – 81.2)	42.9 (26.7 – 60.6)	0.127

Values in parentheses are 95 % confidence intervals.

Abbreviation : AUC, area under the ROC curve; PPV, positive predictive value; NPV, negative predictive value

PPB-10

Silent Gallbladder stone in kidney transplantation recipients: Should it be treated preventively?

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Background/aims: Treatment and follow-up strategies for silent gallbladder (GB) stones in patients before kidney transplant (KT) have not been established.

Methods: We conducted a retrospective cohort analysis of 2,295 KT recipients at Seoul National University Hospital from January 2005 to July 2022. The incidence of biliary complications in observation group was analyzed. The post-operative complications and severity between the pre-KT cholecystectomy group and the observation group were compared. Cox proportional hazards models were used to assess risk factors for biliary complications.

Results: A total of 230 patients with gallstone stones were enrolled. In 214 patients who were observed, biliary complications occurred in 20 patients (9.3%) during a median follow-up period of 72.1 months. The patients who had multiple stones (aHR 2.96, $p=0.04$) and GB wall thickening (aHR 5.04, $p=0.006$) were more likely to have biliary complications. The incidence of postoperative complications were 6.3% in the pre-KT cholecystectomy group and 38.8% in the post-KT cholecystectomy group, respectively ($p=0.04$). Post-KT cholecystectomy group showed higher frequency of fatal complications greater than grade 4 compared to pre-KT cholecystectomy group.

Conclusions: Gallstone-related biliary complications and subsequent cholecystectomy after KT results in more serious complications and worse treatment outcomes. Therefore, cholecystectomy before KT may be considered in the presence of multiple gallstones or GB wall thickening.

Keywords: Gallstones, Kidney transplantation, Cholecystectomy, Postoperative complication

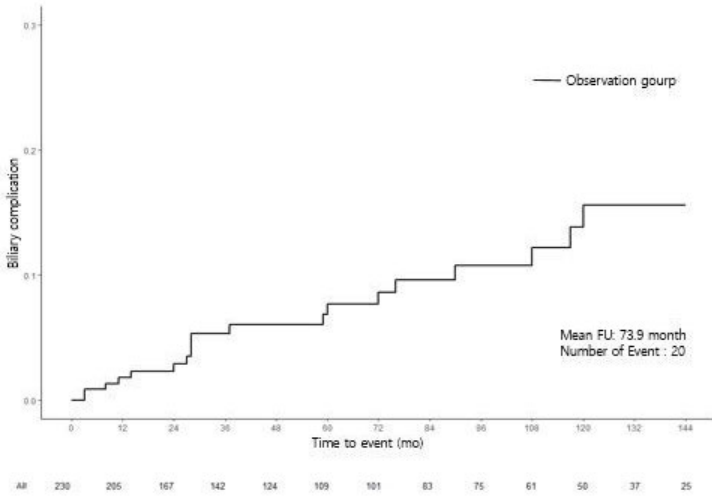


Figure 2. Kaplan-Meier Curve of Biliary Complication in Observation Group

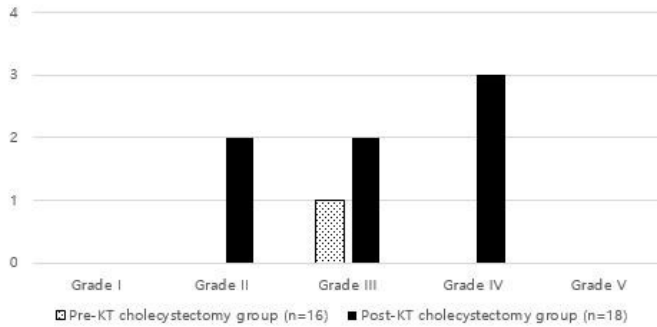


Figure 3. Severity of postoperative complications in pre-KT and post-KT cholecystectomy group

PPB-11

Clinical profile of patients with obstructive jaundice

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Background/aims: There are various causes of obstructive jaundice, malignancy is the most common causes. The objectives of this study were to determine the clinical profile, management, and outcome of patients with obstructive jaundice.

Methods: The data from this research consecutively collected from patient's medical record with diagnosed obstructive jaundice at Internal Medicine Department of Dr Soetomo General Hospital Surabaya between July 2022 to January 2023.

Results: A total of 360 patients were included in this present study. Males are more affected (56.7%) as compared to females. Elder age groups (51–60 years) were commonly affected. Malignant causes (56.4%) were the most and carcinoma of head pancreas were the most common, followed by choledocholithiasis (27.2%) and biliary stricture (16.4%). The most frequent clinical comorbid were coagulopathy (70.5%), anaemia (66.6%), and renal impairment (59.4%). Interventional procedure underwent only in 37.3% cases. Most of the cases were advanced and inoperable, so that best supportive care become the only option.

Conclusions: Better understanding of the clinical profile in the patients with obstructive jaundice, rising awareness to the community, and building a better health system will facilitate appropriate management and lead to improved survival.

Keywords: Clinical profile, Obstructive jaundice, Choledocholithiasis, Head pancreas carcinoma, Cholangiocarcinoma

PPB-12

Gut microbiome predicts UDCA/CDCA response in gallstone patients: Responder vs. non-responder comparison

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Background/aims: Ursodeoxycholic acid (UDCA) and chenodeoxycholic acid (CDCA) are commonly used to treat gallbladder (GB) stones. Nevertheless, the factors responsible for influencing the response rates to such therapeutic interventions have not been comprehensively elucidated. Therefore, we investigated the relationship between the response to UDCA/CDCA treatment and the gut microbiome in patients with GB stones. The study aimed to identify certain gut microbiomes that could be susceptible to UDCA/CDCA treatment and predict treatment response.

Methods: In this preliminary, prospective study, patients with GB stone were treated with UDCA/CDCA for six months. In accordance with the treatment outcome, the patients were classified into two groups: responders and non-responders. The gut microbiome was analyzed by 16S rDNA sequencing. Taxonomic composition and abundance of bacterial communities were analyzed before and after UDCA/CDCA treatment. Alpha and beta diversities were measured to analyze the similarity between microbiome compositions. The functional prediction of PICRUST2 analysis was conducted to identify the gut microbial functional pathways.

Results: Thirteen patients completed the treatment, with 62% (8 patients) showing a response and being assigned to the responder group, while the remaining patients were assigned to the non-responder group. The decrease in the abundance of the Erysipelotrichi lineage was found to be significantly associated with a favorable response to UDCA/CDCA, while an increase in the Firmicutes phylum was found to be indicative of no or poor response.

Conclusions: Our results suggested that a significant association was observed between a favorable response to UDCA/CDCA and a decrease in the abundance of the Erysipelotrichi lineage, while an increase in the Firmicutes phylum was indicative of no or poor response. These findings suggest that certain gut microbiomes could be susceptible to UDCA/CDCA treatment and could be used to predict treatment response in patients with GB stones.

Keywords: Gallbladder stone, Litholysis treatment response, UDCA/CDCA, Gut microbiome, Metabolic pathway

PPB-13

Remimazolam and propofol for ERCP Sedation: A non-inferiority trial

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Background/aims: ERCP is a common procedure for the diagnosis and treatment of pancreaticobiliary diseases. Appropriate sedation is essential to ensure patient comfort and procedural success. An ideal sedative agent should provide a predictable duration of action as well as safety. We tried to compare the efficacy and safety of remimazolam and propofol in patient who undergone ERCP procedures.

Methods: We performed a randomized double-blind, single center study that comparison of remimazolam to propofol for ERCP. Study medications were administered under the supervision of the endoscopist. A total 110 patients scheduled to undergo ERCP were randomly assigned to receive remimazolam or propofol. The primary endpoint was a composite of successful completion of the procedure and no requirement for rescue medication. Secondary endpoints included sedation efficacy, recovery time, and adverse events.

Results: Of 110 patients randomized, 108 underwent sedation and ERCP (53 received remimazolam, 55 propofol). The primary endpoint was met for remimazolam and propofol in 100% of patients in both arms. Incidence and frequency of treatment emergent adverse events including desaturation were comparable in both arms. ERCP was started sooner in the propofol arm (mean, 63.18±16.56 sec) compare with remimazolam (75.23±32.27 sec; p-value=0.02). Time to full alertness after the end of ERCP was also significantly shorter in patients treated with propofol than remimazolam (304.18±146.25 vs. 448.34±224.09 sec; p-value <0.001).

Conclusions: This trial demonstrated that remimazolam is non-inferior to propofol in achieving the primary endpoint of successful completion of ERCP without the need for rescue medication. The incidence and frequency of adverse events were comparable between both drugs. Therefore, Remimazolam can be considered a safe and effective alternative to Propofol for ERCP sedation, which could expand the options for clinicians and improve patient outcomes.

Keywords: ERCP, Remimazolam, Propofol, Non-inferiority

PPB-14

Positive cultures from bile sampled during ERCP for biliary plating stenting increase the risk of early cholangitis

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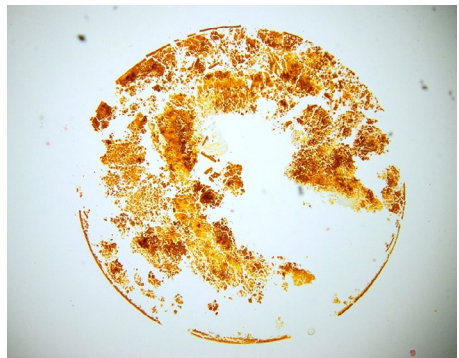
Background/aims: The aim of this study was to identify and analyze risk factors for early cholangitis in patients with biliary plastic stents.

Methods: In this prospective observational follow-up study, we included patients with native papilla who received biliary plastic stents. A second ERCP was performed at 3 months or emergently. We analyzed bile sampled at both ERCPs and measured the degree of occlusion for retrieved stents. The main outcome was early cholangitis (<3 months) and secondary outcomes included: survival, time until development of cholangitis, degree of biliary stent occlusion, and biliary composition changes.

Results: 159 patients (65±11 years, 60 female) were included and 176 stents inserted, most of them for malignant strictures (84%). 42 patients died, 17 were lost to follow-up, and 75 stents were analyzed. 47/136 patients developed cholangitis after a median of 33 days (IQR 56) with 7 directly attributable deaths. Degree of stent lumen occlusion or type of stent were not associated with early cholangitis. Biliary concentrations of IgG and IgA increased after stenting ($p < 0.001$) and biliary cholesterol was significantly lower in patients with cholangitis ($p = 0.006$). On multivariable analysis positive bile culture on index ERCP was the only risk factor for early cholangitis (OR 4.71; CI 95% 1.69–13.17).

Conclusions: Positive biliary cultures at index ERCP predict early cholangitis after biliary plastic stenting. Routine bile sampling when considering plastic stenting is advisable and stent exchange or removal should be considered at 1 month in patients with positive cultures.

Keywords: ERCP, Cholangitis, Stenting



Cross-sectional view of retrieved biliary stent showing partial occlusion due to biliary pigment

PPB-15

A feasibility study of double pigtail plastic stent insertion with supra-papillary method in Klatskin's tumor

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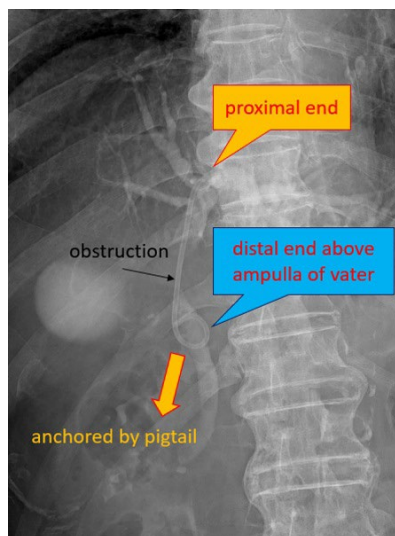
Background/aims: As the survival rate of biliary tract cancer has improved, stents are often required to be replaced. This study evaluated the feasibility of double pigtail plastic stent insertion using the supra-papillary method during ERCP in patients with Klatskin's tumor.

Methods: Trans-papillary plastic stent insertion as a conventional method was applied to 14 patients, and supra-papillary plastic stent insertion as a new method was performed on 13 patients alternately. We compared the technical success rate, clinical success rate, and retrieval time of both methods.

Results: The clinical success rate that bilirubin is normalized within two weeks after the stent installation was 76.9% with the supra-papillary method and 85.7% with the trans-papillary method, which showed no difference between the two groups ($p=0.564$). Both groups had no failed cases for retrieval of a stent, and the retrieval time took longer in the supra-papillary method (72.4 ± 12.0 sec) than the trans-papillary method (60.6 ± 15.3 sec) ($p=0.037$).

Conclusions: The double pigtail plastic stent insertion with a supra-papillary method took a long time for retrieval compared to a trans-papillary method, but there was no difference in the stent installation process, drain performance, and retrieval success rate.

Keywords: Plastic stent, Double pigtail stent, Supra-papillary method, Klatskin's tumor



Type_Pro	Supra-papillary (N=13)	Trans-papillary (N=14)	P
Sex			0.802
Female	4 (30.8%)	6 (42.9%)	
Male	9 (69.2%)	8 (57.1%)	
Age	70.8 ± 11.5	74.1 ± 6.2	0.371
Bismuth_Type			0.231
1	1 (7.7%)	2 (14.3%)	
2	5 (38.5%)	1 (7.1%)	
3	4 (30.8%)	8 (57.1%)	
4	3 (23.1%)	3 (21.4%)	
Technical_Success			1.000
Incomplete	1 (7.7%)	1 (7.1%)	
Yes	12 (92.3%)	13 (92.9%)	
Clinical_Success			0.564
Incomplete	2 (15.4%)	2 (14.3%)	
No	1 (7.7%)	0 (0.0%)	
Yes	10 (76.9%)	12 (85.7%)	
Retrieval_Success			
Yes	13 (100.0%)	14 (100.0%)	
Retrieval_Time	72.4 ± 12.0	60.6 ± 15.3	0.037

PPB-16



Utility of D-dimer, antithrombin-III, protein C in prediction of severity and prognosis of acute pancreatitis

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Background/aims: Derangement in coagulation parameters is intrinsic to the pathogenesis of acute pancreatitis. The present study was conducted to assess the predictive value of D-dimer, Antithrombin III, Protein C, and other coagulation parameters in the severity and prognosis of acute pancreatitis.

Methods: This is a single-center, prospective observational study of patients admitted with Acute Pancreatitis (AP) in a tertiary healthcare center in South India between January 2018 and January 2019. Platelet count, Prothrombin time (PT), Activated partial thromboplastin time (APTT), Thrombin time (TT), Fibrinogen, Antithrombin III (AT III), Protein C, and D-dimer were measured in plasma on day 0, and day 3 of admission. The severity of AP was defined according to the revised Atlanta classification. Outcomes such as the length of hospital stay, organ failure, and in-hospital mortality were analyzed.

Results: Sixty-one patients were included; 15 (25%) with mild, 24 (39%) with moderately severe, and 22 (36%) patients with severe acute pancreatitis, out of which 7 (11%) patients expired during the hospital stay. Prothrombin time, D- dimer and fibrinogen levels were significantly higher whereas platelet counts, protein C, and ATIII were significantly lower among severe pancreatitis and non-survivors. Fibrinogen levels, TT, and APTT were not statistically different between survivors and survivors. Protein C, and AT III on day 3 at cut-off $\leq 72\%$ and $\leq 82\%$ respectively were better predictors of severe acute pancreatitis with an AUROC of 0.886, and 0.877 respectively. D- Dimer on day 0 at cut-off ≥ 0 mcg/ml was a better predictor of mortality with an AUROC of 0.881.

Conclusions: Coagulation parameters in the early phase can be utilized to predict the severity and prognosis of acute pancreatitis.

Keywords: Acute pancreatitis, D -dimer, Antithrombin iii, Protein C, Severity

PPB-17

The role of single operator cholangioscopy for the management of intraductal papillary neoplasm of the bil

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Background/aims: Given the difficulties in diagnosing intraductal papillary neoplasms of the bile duct (IPN-Bs) with indirect diagnostic modalities, single-operator cholangioscopy (SOC) appears useful with high-quality endoscopic imaging. We evaluated the usefulness of SOC for the diagnosis and management of IPN-B.

Methods: Consecutive patients diagnosed with tissue-confirmed IPN-B by SOC-guided forceps biopsy sampling (SOC-FB) were enrolled. The diagnostic utility of SOC was measured by calculating the rate of patients whose management plan was changed through SOC examination.

Results: A total of 40 patients diagnosed with IPN-B after digital disposable SOC (D-SOC, n=23) and/or direct peroral cholangioscopy using an ultra-slim endoscope (D-POC, n=17) were analyzed. Image-enhanced endoscopy using narrow-band imaging and/or i-SCAN were performed in all patients who underwent D-POC. SOC revealed new IPN-Bs which were not observed in cross-sectional imaging in 47.5% (19/40). Of these, 40% (16/40) patients changed their management plan after SOC. Adverse events occurred in 2.5% (1/40) patients and were resolved after conservative treatment.

Conclusions: SOC is a useful modality for the detection and decision of subsequent management plans of IPN-B.

Keywords: Cholangioscopy, Biliary neoplasms, Intraductal papillary neoplasms of bile duct, Single operator cholangioscopy

PPB-18

Endoscopic classification of intraductal neoplasms of bile duct using peroral cholangioscopy with narrow-band imaging

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Background/aims: Indirect diagnostic modalities are unsatisfactory for detecting intraductal neoplasm of the bile duct (IN-B), which can be detected by peroral cholangioscopy (POC) with narrow-band imaging (NBI). We investigated the POC findings of IN-B and developed a feasible endoscopic classification system.

Methods: A total of 471 patients who underwent direct POC from April 2008 to July 2020 were enrolled. Intraductal superficial lesions of the bile duct (ISL-Bs) were classified according to surface structure and microvascular pattern on POC with NBI and correlated to histologic findings after POC-guided forceps biopsy (POC-FB) or surgery. The primary outcome was the detection rate of IN-Bs, and the secondary outcomes were the associations of POC findings with IN-B, the technical success rates of POC and POC-FB, and adverse events (AEs).

Results: Direct POC was successful in 458 of 471 patients (97.2%). Among the patients, 131 (27.8%) exhibited ISL-Bs. The technical success rate of POC-FB was 94.7% (124 of 131). Among the 124 patients who underwent POC-FB, IN-B was revealed in 54 (43.5%), for a detection rate of 11.8% (54 of 458). Papillary lesion ($P=0.041$), nodular lesion ($P=0.044$), and irregularly or regularly dilated and tortuous vessels ($P=0.004$; $P=0.006$) were POC findings associated with IN-B. The area under the receiver operating characteristic curve of the novel classification system was 0.899.

Conclusions: POC with NBI can be useful for the detection of IN-Bs. Our novel classification system based on both surface structure and microvascular pattern may allow differentiation of IN-B from ISL-Bs.

Keywords: Intraductal neoplasm of the bile duct, Intraductal superficial lesion of the bile duct, Peroral cholangioscopy, Narrow-band imaging

PPB-19

Long-term outcomes of a modified non-flared FCSEMS for refractory anastomotic biliary strictures after LDLT

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Background/aims: Although fully covered self-expandable metal stents (FCSEMSs) are considered to be effective for managing anastomotic biliary stricture (ABS) after liver transplantation, related long-term outcomes remain unclear. We evaluated the long-term efficacy of a modified non-flared FCSEMS (M-FCSEMS) for refractory ABS after living donor transplantation (LDLT).

Methods: We reviewed our database of patients who underwent M-FCSEMS placement for ABS after LDLT. Stent removal was performed at 3 months after placement. The primary outcome was the recurrence of anastomotic biliary stricture that requires re-intervention during the follow-up period.

Results: A total of 21 consecutive patients with symptomatic ABS after LDLT unresolved by plastic stents underwent intraductal placement of M-FCSEMS. Intended stent removal was successful in all patients. During the median follow-up of 69 months (IQR, 58.3–76.8 months), 3 patients (14.3%) underwent re-intervention for the management of stricture recurrence. The median recurrence-free interval was 49.8 months (IQR, 39.4–62.1 months). Stent-induced de novo stricture was not observed in all patients.

Conclusions: Intraductal placement of an M-FCSEMS can be a promising option for patients with refractory ABS after LDLT.

Keywords: Modified non-flared fully covered metal stent, Anastomotic biliary stricture, Living donor transplantation

PPB-20

Comparison of disposable D-SOC versus D-POC for the management of ISL-BS

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Background/aims: Disposable digital single-operator cholangioscopy (D-SOC) and direct peroral cholangioscopy (D-POC) using an ultra-slim endoscope are both established modalities for the diagnosis and treatment of biliary diseases. We aimed to evaluate and compare the usefulness of the D-SOC and D-POC for the management of intraductal superficial lesions of the bile duct (ISL-Bs).

Methods: Consecutive 37 patients with suspected ISL-Bs underwent both D-SOC and D-POC. The primary outcome was the detection rate of the ISL-Bs, and the secondary outcomes were the technical success of POC and POC-guided forceps biopsy sampling (POC-FB), and total procedure time.

Results: D-SOC showed a higher technical success of POC without a significant between-group difference (D-SOC vs D-POC, 100% vs 94.6%, $P=0.480$). Although there was no difference in the detection rate of the ISL-Bs in both systems (D-SOC vs D-POC, 18.9% vs 27.0%, $P=0.289$), D-POC showed a significantly higher detection rate of ISL-B in the subgroup of bile duct diameter > 12 mm (D-SOC vs D-POC, 10.0% vs 77.8%, $P=0.041$). The technical success rate of POC-FB was not different between the two systems (D-SOC vs D-POC, 85.7% vs 90.0%, $P=1.000$). The total procedure time was significantly shorter with D-SOC (D-SOC vs D-POC, 8.00 ± 1.34 vs 11.03 ± 2.95 , $P<0.001$).

Conclusions: While D-SOC allows high technical success and short procedure time, D-POC can be useful in patients with a large bile duct diameter (>12 mm). The use of an appropriate POC system according to the characteristics of the bile duct diseases can enhance the proper management of ISL-Bs.

Keywords: : Peroral cholangioscopy (POC), Single-operator cholangioscopy (SOC), Intraductal superficial lesions of the bile duct (ISL-B)

PPB-21

Long-term efficacy of a modified non-flared fully covered metal stent for benign main pancreatic duct strictures

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Background/aims: Despite fully covered self-expandable metal stents (FCSEMSs) can be effective for the treatment of main pancreatic duct (MPD) strictures associated with chronic pancreatitis, relevant long-term results are rarely reported. We evaluated the long-term efficacy of the modified non-flared FCSEMS (M-FCSEMS) in patients with benign MPD strictures due to chronic pancreatitis.

Methods: We reviewed our database for patients who underwent complete resolution of MPD stricture after placement of M-FCSEMS. The M-FCSEMS was placed intraductally or transpapillary according to the location and length of the stricture. Stent removal was performed at 3 months after placement. The primary outcome was the recurrence of MPD stricture that requires re-intervention during the follow-up period.

Results: Endoscopic placement of M-FCSEMSs was technically successful for all 25 patients, and achieved the resolution of stricture. Intraductal placement was performed in 11 patients (44.0%). Intended stent removal was successful in all patients. Re-intervention for the management of MPD stricture recurrence was performed in 12.0% (3/25) of patients during 76.9 months of median duration of follow-up (interquartile range [IQR], 52.5– 93.8 months). No FCSEMS-related de novo stricture was observed.

Conclusions: These findings from long-term follow-up results suggest that M-FCSEMS shows long-term efficacy for stricture resolution without de novo stricture in patients with benign MPD stricture.

Keywords: FCSEMS, Pancreatic duct stricture

PPB-22

Correlation of the duodenal major papilla morphology on the difficulty of biliary cannulation during ERCP

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Background/aims: We investigated which morphology type of papilla would cause a more difficult biliary cannulation during endoscopic retrograde cholangiopancreatography (ERCP) and its complications. Our study is the first to utilize the inter- and intraobserver validated Viana Classification and correlate it with the difficulty of biliary cannulation using standard conventional techniques.

Methods: A 2-year single center, prospectively recorded database and video recording were reviewed retrospectively. Patients who had ERCP and naive major duodenal papilla were included. The Viana Classification was used for papilla morphology as follows: Flat (Type I), Prominent Tubular Non-pleated (Type IIA), Prominent Tubular Pleated (Type IIB), Prominent Bulging (Type IIC), Intradiverticular (Type IIIA), Diverticular Border (Type IIIB), Unclassified (Type IV). Difficult biliary cannulation was defined by >5 contacts with the papilla, >5 minutes attempting to cannulate and >1 unintended pancreatic duct cannulation.

Results: A total of 206 patients were included. Sex and indications were not different among the types of papillae. Difficult cannulation was highest in Type IIB papilla (76.67%) followed by Type IIIB (60%) and lowest in Type I (38.89%) ($p=0.001$). Type IIB took the longest time to cannulate (8.6 mins, IQR 5.2–12.6 mins) followed by Type IIIB (5.7 mins, IQR 3.1–9.2 mins) and shortest in Type I (4.6 mins, IQR 2.6–7.0 mins) ($p=.003$). Furthermore, more attempts were done (6 attempts, IQR 3–10 attempts, $p=.002$) and precut papillotomy were more frequent (18.33%, $p=.014$) in Type IIB. Logistic regression analysis identified Type IIB was a significant predictor of difficult cannulation (OR=3.38; 95% CI [1.71–6.67]; $p<.001$). We found insufficient evidence to state a difference as to adverse events.

Conclusions: The prominent tubular pleated, type IIB is associated with difficult and prolonged cannulation, frequently requiring precut papillotomy.

Keywords: Major papilla, ERCP, Cannulation, Viana classification

PPB-23

Successful treatment of persistent post cholecystectomy cut of bile duct using single operator cholangioscopy and ERCP

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We report the case of a 38-year-old female who presented with right upper quadrant pain, nausea and fever, following a laparoscopic cholecystectomy performed for cholelithiasis two months prior. Laboratory results revealed hyperbilirubinemia, cholestasis and elevated levels of lipase and CRP. Abdomen contrast-enhanced computed tomography showed dilated intrahepatic bile ducts, bile leakage, and a stricture on the hepatic bile duct. Prior to ERCP, percutaneous transhepatic biliary drainage was performed. During the first ERCP, sphincterotomy was performed, but the cut of the bile duct could not be cannulated due to the distal curve of the PTBD tube. The PTBD tube was then removed with the help of a radiologist, and a second ERCP was performed to cannulate the leakage. Various conventional ERCP cannulation methods, including the use of a hydrophilic guidewire, were attempted but failed. Ultimately, a single operator cholangioscopy (Spyglass) was used to successfully cannulate the bile duct with the leakage present. A 10 French×13 cm plastic stent was placed in the bile duct with the leakage. The patient was discharged on postoperative day 3 and the stent was replaced at 3 months and removed 3 months later. The patient had no further biliary complications at the 6-month follow-up.

Keywords: Transection of bile duct, Cholecystectomy, Endoscopic retrograde cholangiopancreatography, Difficult bile duct cannulation, Single operator peroral cholangioscopy



The cut of the bile duct and bile leakage. Status post percutaneous transhepatic biliary drainage (PTBD) was performed.



single operator cholangioscopy (Spyglass) was used to successfully cannulate the bile duct with the leakage present. A 10 French×13 cm plastic stent was placed in the bile duct with the leakage.

PPB-24

A case of small solid pseudopapillary neoplasms of pancreas in male diagnosed after EUS-FNA

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Solid pseudopapillary neoplasms of pancreas (SPN-P) are rare in men and are often misdiagnosed. In males, SPN-P generally shows relatively small lesions with higher percentages of solid components and calcification. The rarity and lack of concern of SPN-P in men makes its' clinicopathological features unclarified. Furthermore, small SPN-P shows significantly higher maximal standardized uptake volume (SUVmax) than those of pancreatic ductal cancer or pancreatic neuroendocrine neoplasm on fluorodeoxyglucose positron emission tomography (FDG-PET). This fact makes differential diagnosis more difficult. Here, we present an interesting case of small SPN-P which was diagnosed after endoscopic ultrasound guided fine needle aspiration (EUS-FNA).

Case description: A 42-year-old man visited to an outpatient clinic because of pancreatic body lesion in a medical checkup. He has been healthy and has no previous medical history. Initial laboratory tests were within reference value including CA 19-9 and Chromogranin-A levels. The CT scan showed about 1 cm hypovascular mass without calcification at the body of pancreas which showed progressive enhancement. The pancreatic duct was not dilated. The MR showed 1 cm well defined mass with progressive enhancement and diffusion restriction. The FDG-PET showed mild focal FDG uptake (SUVmax=2.8) at the lesion. About 1.2 cm hypoechoic mass was visualized using a curvilinear echoendoscope (GF-UCT260-AL10; Olympus Medical Systems Co., Tokyo, Japan). There were hyperechoic foci within the lesion abutting splenic vein. The lesion was punctured with 22 gauge clear Tip A-type needle (FINEMEDIX, Daegu, Korea) through the stomach wall. Three passes were made using color Doppler imaging to avoid intervening vessels. The pathology showed many atypical monotonous cells with loss of cohesion, favor for SPN. The follow-up CT scan after two months showed no interval change.

Keywords: Solid pseudopapillary neoplasm, Pancreas, Endosonography

PPB-25

Prediction of ERCP success using the asge grading system in adults who underwent ERCP: A retrospective cohort study

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Background/aims: Our study aims to assess whether using the ASGE grading system can be utilized to help in predicting development of post-ERCP complications in the local setting.

Methods: This is a single center, retrospective cohort study that was conducted at Cardinal Santos Medical Center in San Juan, Metro Manila, Philippines. Patients that underwent ERCP between January 2021 and September 2022 were included. Procedural difficulty was graded according to the grading system proposed by the ASGE workshop. Technical success rates and complications were recorded.

Results: A total of 196 patients who underwent ERCP were included in this study. Patients were divided based on their ASGE grade. 63 cases were grade 1 (33%), 85 cases were grade 2 (44%), 42 cases were grade 3 (22%), and 2 cases were grade 4 (1%). Complications were recorded in 13% of all cases with post-ERCP pancreatitis (7.3%) and bleeding (5.2%) being the more common ones. No statistically significant difference was noted between the groups with regard to complications.

Conclusions: The ASGE grading system is a useful tool in predicting the success rate of ERCP, however, it might not be recommended to be applied in our local setting. It is also not recommended in predicting post-ERCP complications based on our study.

Keywords: Endoscopic retrograde pancreatograp, American society for gastrointestinal endoscopy, Post-ERCP complications

PPB-26

The association between pancreatic exocrine insufficiency and CT-based morphological severity in chronic pancreatitis

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Background/aims: The association between pancreatic exocrine insufficiency (PEI) and morphologic findings in chronic pancreatitis has not been fully studied. The aim of this study was to investigate the correlation between PEI severity and computed tomography (CT)-based morphological severity in patients with chronic pancreatitis.

Methods: This multicenter retrospective study included 180 patients with chronic pancreatitis aged 18 years or older between January 2018 and December 2021. PEI severity was measured by PEI questionnaire (PEI-Q), and morphological severity was measured using a CT-based scoring system including pancreatic duct caliber, pancreatic duct stricture or intraductal obstructing calculus, pancreatic atrophy, and pancreatic calcification. In addition, 35 patients who received pancreatic enzyme replacement therapy (PERT) were evaluated by PEI-Q whether PEI improved after PERT.

Results: PEI severity was normal (n=89), mild (n=69), moderate (n=14), and severe (n=8). The severities of pancreatic duct caliber and pancreatic duct stricture or intraductal obstructing calculus had significantly small associations with PEI severity (Cramer's V=0.121 and 0.141, respectively). The severities of pancreatic atrophy and pancreatic calcification were not significantly associated with PEI severity. PEI severity showed a significant improvement after PERT (P<0.001).

Conclusions: PEI severity had a significant association with CT-based morphological severity, including pancreatic duct caliber and pancreatic duct stricture or intraductal obstructing calculus. In addition, PEI-Q could be a useful indicator for evaluating the therapeutic effect of PERT in clinical practice.

Keywords: Chronic pancreatitis, Pancreatic exocrine insufficiency, Computed tomography

PPB-27

The association between alcohol drinking status, changes in heavy drinking habit, and acute pancreatitis

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Background/aims: Although alcohol abuse is one of the most common causes for acute pancreatitis (AP), there are no studies regarding the risk of AP and its association to changes in drinking behavior. The aim of this study was to investigate the incidence of AP according to alcohol drinking status and heavy drinking habit changes of the Korean population.

Methods: We used clinical data from individuals (aged 20 years or older) who received health examinations arranged by the Korean National Health Insurance Service in 2009 (n=4,238,822) or in 2009 and 2011 (n=2,617,306). The incidence of AP was analyzed according to alcohol drinking status or heavy drinking habit change reported by individuals during their health examination. Newly diagnosed AP was identified using claims data from baseline to the date of diagnosis or until December 31, 2018.

Results: The risk of AP was significantly higher in heavy drinkers compared to non-drinkers regardless of age or sex. The adjusted hazard ratio (HR) of AP in drinkers increased according to the frequency of drinking (HR 1.5; 95% CI, 1.4–1.6 in drinkers who drank 3–4 times a week, HR 2.02; 95% CI, 1.87–2.18 in drinkers who drank 5–7 times a week) and the duration of drinking (HR 1.24; 95% CI, 1.16–1.32 in those drinking for 5–7 years, HR 1.52; 95% CI, 1.42–1.63 in those drinking for more than 8 years). The adjusted HR of AP in continuous heavy drinkers was 2.24 (CI, 2–2.52) compared with non-heavy drinkers, and was higher than past heavy drinkers (HR 1.77; CI, 1.57–2).

Conclusions: In this Korean population-based cohort study, alcohol drinking increased the incidence of AP in frequency and duration-dependent manner, and heavy drinking cessation helped decrease the incidence of AP.

Keywords: Acute pancreatitis, Alcohol drinking, Population-based cohort study

PPB-28

Experience of endoscopic ultrasound-guided biliary, pancreatic and gallbladder drainage at a secondary care hospital

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Background/aims: Endoscopic ultrasound (EUS)-guided biliary, pancreatic and gallbladder (GB) drainage has been developed as well-established, effective, but sometimes challenging and also risky procedure. Although the EUS procedure may not be generalizable to secondary care hospital with less familiarity and proven expertise, the procedure can be attempted with the help of the previous accumulated data of efficacy and safety of the procedure.

Methods: From early 2018 to mid-2022, all adult patients who undertaken EUS-guided procedure for any other reason were retrospectively included. EUS-guided procedure was performed chiefly after failed or insufficient ERCP (endoscopic retrograde cholangiopancreatography). The results of the procedure were assessed based on the technical and clinical success rate. The technical success was defined as successful execution of the procedure and clinical success was defined as improvement of patient's symptom and laboratory finding such as 50% reduction of bilirubin and C-reactive protein within 1 week. The minor and major adverse events were also observed and the minor event was defined as the resolution of the event only by conservative treatment without any other procedure. The major event was defined as the event necessitating any other procedure or surgery and the hospitalization of more than 2 weeks after the EUS procedure.

Results: All 62 patients were included in this study during the period. The characteristics of the patients, the types of EUS procedures, the success rate and adverse events was shown in the below table.

Conclusions: Although EUS-guided procedure is difficult and challenging procedure in some cases, the procedure can be carefully applied in the selected patients in the secondary hospital by help of accumulated recent data of this hospital.

Keywords: Endoscopic ultrasound, Biliary, Pancreatic, Gall bladder, Drainage

	EUS-HGS	EUS-CDS	EUS-GBD	EUS-PD
Gender				
Male, N	21	7	5	9
Female, N	11	6	2	1
Age (years), Mean	63.4	70.1	73.3	69.4
Comorbid presenting disease, N				
Pancreatic cancer	6	4	1	2
Cholangiocarcinoma	10	3	3	1
Duodenal or AOV cancer	1	2		
GB cancer	2			
Hepatoma	2	1		
Metastatic stenosis from other malignancy	3	1		
Benign cause	8	2	3	7
Reason of the above procedures, N				
Postoperative altered anatomy	8			
Inadequate or failed ERCP	18	7		5
Pyloric obstruction	6	6		
Poor surgical condition			7	
Pseudocyst or WOPN				5
Adverse event, N (%)				
No major event	30 (93.8%)	11 (84.6%)	6 (85.7%)	9 (90.0%)
Specific major event	2 (6.3%)	2 (15.4%)	1 (14.3%)	1 (10.0%)
Technical success, N (%)	30 (93.8%)	12 (92.3%)	7 (100%)	9 (90%)
Clinical success, N (%)	20 (62.5%)	8 (61.5%)	6 (85.7%)	8 (80.0%)

EUS, endoscopic ultrasound; HGS, hepaticogastrostomy; CDS, choledochoduodenostomy; GBD, gallbladder drainage; PD, pancreatic drainage; AOV, ampulla of vater; ERCP, endoscopic retrograde cholangiopancreatography.

PPB-29

Opening window fistulotomy: A novel method of biliary cannulation to prevent post ERCP pancreatitis

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Background/aims: Post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis (PEP) is the most common and serious complication in ERCP. To prevent this event, a unique precutting method, termed opening window fistulotomy (OWF), was trialed in patients with a large infundibulum as a primary procedure for biliary cannulation, whereby a supra-papillary laid-down H-shaped incision was made without touching the orifice. This study aimed to assess the safety and feasibility of this novel technique.

Methods: One-hundred-ten patients with naïve papilla, and for whom biliary cannulation were needed were prospectively enrolled in this study. Patients with a papillary roof size of >15 mm received OWF for primary biliary access. The incidence of complications and the success rate of biliary cannulation were evaluated.

Results: The overall median size of the papillary roof was 10 mm (range, 3–20 mm). OWF was performed in 30 (28%), which contain 18 malignancies including 6 pancreato-biliary cancers. None of whom displayed PEP. The median value of pancreatic amylase (P-AMY) on next day of ERCP was 33.5 U/L (range, 5–209 U/L). Duodenal perforation was recorded in 1 patient (3%), which was resolved by biliary metal stenting and conservative treatment. The successful cannulation rate was high at 97% (29/30). The median duration of biliary access was 8 min (range, 3–15 min). The incidence and median value of P-AMY on next day were 10% and 55.5 U/L (range, 8 - 2938) for 80 patients of non-OWF group, respectively. Median P-AMY value of OWF group was significantly lower.

Conclusions: OWF achieved high safety with no PEP complications and a high success rate of biliary cannulation, thus demonstrating its feasibility for primary biliary access.

Keywords: Opening window fistulotomy, Biliary cannulation, Post-ERCP pancreatitis

PPB-30



Evaluation of early arterial lactate levels as a predictive marker of pancreatic necrosis and outcome in acute pancreatitis

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Background/aims: Early recognition of subjects at high risk for Pancreatic Necrosis and identification of patients with a high likelihood of developing severe disease are important goals in determining optimal management of patients with Acute pancreatitis. The present study was designed to evaluate the role of arterial lactate levels [with in 72 hours of disease onset] as a predictor of severity and outcome of acute pancreatitis.

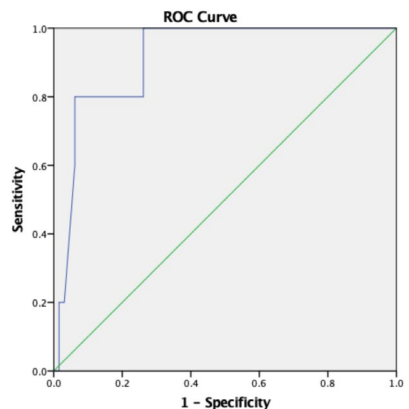
Methods: The study was conducted from March 2021 to October 2022 in the Department of Gastroenterology -Pancreas division, Artemis Health Institute, Gurugram, India. Total 210 patients were screened from which 75 patients were recruited with diagnosis of acute pancreatitis as per revised Atlanta classification. Five patients left hospital against medical advice and hence, excluded from certain analysis. Baseline characteristics, arterial lactate at admission and BISAP were noted. CT abdomen was done in 38 patient as per clinical indication. The outcome measures studied were development of pancreatic necrosis, severity of acute pancreatitis, organ failure, mortality, duration of ICU and hospital stay. P-value <0.05 was considered statistically significant.

Results: In our cohort we found Males (74.6%) were predominant and mean age was in late forties. 15.7% (n=11) had severe disease. Overall mortality was 7.1% (n=5).

Early lactate values were significantly associated with later on development of necrosis (2.90 vs 1.37, $P<0.05$), BISAP score >3 (1.68 vs 3.81, $P<0.05$) and future development of organ failure during disease (4.65 vs 1.57, $P<0.05$), hence predicting severe disease early. Raised early arterial lactate was significantly associated with length of hospital and ICU stay ($P<0.05$). An arterial lactate level >4.25 mmol/L on admission for the prediction of mortality from AP had AUC of 0.91 (95% CI: 0.82–1.00) with sensitivity of 80% and specificity of 93.8%.

Conclusions: Early arterial lactate levels can predict mortality, necrosis and longer periods of hospital and ICU stay.

Keywords: Acute pancreatitis, Arterial lactate, Necrosis, Early prediction of severity



AUC, sensitivity and specificity of arterial lactate on admission in predicting mortality from acute pancreatitis

PPB-31

Partially versus fully covered stents in patients with unresectable distal malignant biliary obstruction

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Background/aims: Covered self-expandable metal stents (CSEMSs) are now widely available for distal malignant biliary obstruction (MBO). Among these commercially available CSEMSs, fully covered self-expandable metal stents (FCSEMSs) is thought to be easier to migrate due to its morphological features than partially covered self-expandable metal stents (PCSEMSs). However, few comparative studies have been reported. Our study aimed to compare FCSEMSs with PCSEMSs in patients with unresectable distal MBO.

Methods: This was a retrospective study in two referral centres from January 2007 to January 2019. We compare the time to recurrent biliary obstruction (TRBO), stent migration, stent-related adverse events, and survival between FCSEMSs and PCSEMSs. Wilcoxon nonparametric test or t test for continuous variables, Chi-square or Fisher exact test for categorical variables were used.

Results: Total 119 patients were enrolled in our study. Stent migration and stent occlusion were significantly lower in partially covered self-expandable metal stents (PCSEMSs) group than fully covered self-expandable metal stents (FCSEMSs) group (P-value <0.05). However, recurrent biliary obstruction, complications related to stent insertion and survival curve showed not significantly differences between two groups.

Conclusions: According to our results, PCSEMSs were related to lower rate of stent migration and stent occlusion than FCSEMSs among patients with unresectable distal MBO.

Keywords: Partially covered self-expandable metal stents, Fully covered self-expandable metal stents, Malignant biliary obstruction

PPB-32

Prevalence of ascariasis among cases of biliary system obstruction in northern area of Pakistan

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Background/aims: Ascariasis is one of the commonly occurring soil transmitted helminthic (STH) infection, most commonly found in jejunum. Most of the infested people are asymptomatic but sometimes lead to complications such as intestinal obstruction and biliary system invasion resulting in different symptoms such as obstructive jaundice, cholangitis and recurrent biliary colic. In the developing world, worm infestation is among the rising causes of biliary system obstruction that leads to significant morbidity and considerable economic burden.

Methods: The aim of the study is to determine the prevalence of ascariasis among cases of biliary system obstruction in northern area of Pakistan.

Methods: Its a Descriptive cross-sectional study, conducted from January to December 2022 at Advance Endoscopy Suite, Zaffar GI Clinic, Timergara Lower Dir, KPK, Pakistan.

Results: Among the total performed 240 ERCP for obstructive jaundice in last one year at our center, 28 patients (10%) were having obstruction of biliary system due to worm infestation (ascariasis).

Female patients comprised 64% (n=18). The mean age was 26±11.4 years. 65% (n=17) of patients were under age 30years. Obstructive jaundice with cholangitis (42.9%) and recurrent biliary colic (39.3%) are the most common presentation of biliary ascariasis. in majority of the patients (92.9%), ERCP was the solvage therapy for biliary system draining and ascaris worm extraction. Only 7.1% had biliary system surgical exploration due to intestinal obstruction along with biliary system obstruction from ascariasis.

Conclusions: Biliary ascariasis is an uncommon cause of biliary system obstruction in industrialized countries, but it's a major cause of obstructive jaundice in third-world countries, where ERCP is the therapy of choice. Further studies with large sample sized are recommended how we can reduce/prevent the morbidity associated with biliary ascariasis.

Keywords: Obstructive jaundice, Cholangitis, Biliary ascariasis, Biliary colic, Endoscopic retrograde cholangiopancreatography

PPB-33



Result of endoscopic retrograde cholangiopancreatography procedure performed at second state central hospital of Mongolia

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Background/aims: Compared to other digestive endoscopic (gastroscopic, colonoscopic) procedures, ERCP has a high rate of complications leading to fatality. The primary aim of our study was evaluate safety of and review of outcomes of our experience during the past 5 years. The secondary aim was to describe the microbiology of bile aspirates collected at the ERCP.

Methods: In this single-center retrospective study we selected 777 cases of ERCP. At the ERCP procedures patients' bile samples were aspirated for bacteriology identification from January 2018 to June 2022.

Results: In total, 791 patients were included in this study, and the average age was 60. A total of 777 (98%) ERCP procedures selective cannulation of bile duct was done successfully, whereas 14 (2%) of the cases were unsuccessful. A total of 107 complications occurred post-ERCP procedure for patients between the ages 18 to 85. Overall complication rate was 13.5%. Among them, post-ERCP pancreatitis-PEP 66/777 (8.3%), hemorrhage 21/777 (2.6%), acute cholangitis 8/777 (1%). ERCP related mortality was 4/777 (0.5%). No incidence of perforation was observed. Of the 777 bile aspirates, 375 cases with biliary obstruction were analyzed for microbiology patterns, of which 229 (61%) were positive and 24 (10%) were polymicrobial. The most common pathogen was *E. coli* 78 (34.4%). Other pathogens were identified as *Klebsiella* spp. 57 (25%), *Enterococcus* spp. 46 (20.3%), *Pseudomonas* spp. 23 (10%), *Candida* spp. 8 (3.5%), and *Acinetobacter* spp. 4 (1.7%). From positive bile culture, prevalence of Gram-negative organisms 142 (62%) were significant. Number of multidrug-resistant organisms (ESBL, MRSA, CRE) were notable (77/229; 33.6%).

Conclusions: We conclude that the ERCP procedure is effective and safe procedure focusing on therapeutic indications. Majority of bile cultures 62% were positive. Biliary aspirates during the ERCP may help to develop an adequate antibiogram, prevention from antimicrobial resistance.

Keywords: ERCP, Post-ERCP complications, Bile culture

POT-01

The role of endoscopic ultrasound in evaluation of subepithelial lesions of GI tract at Intermed Hospital, Mongolia

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Background/aims: A subepithelial lesion (SET) is defined as a lesion, bulge or impression visible within the lumen of the gastrointestinal tract that is covered by normally appearing mucosa and usually found incidentally during routine endoscopy. Endoscopic ultrasound (EUS) is considered the best imaging test for the diagnosis and evaluation of subepithelial lesions of the gastrointestinal tract.

The present study aims to describe the endosonographic characteristics of gastrointestinal subepithelial lesions and our experience using endoscopic ultrasound for evaluation of such lesions. There is no subepithelial lesions study in Mongolia because EUS was first introduced in Mongolia in 2019.

Methods: Since have being introduced endoscopic ultrasound technique from September 2019, we have performed EUS evaluation of subepithelial and biliopancreatic lesion as well as gastrointestinal neoplasia staging for 443 patients This was a retrospective study involving 337 patients with subepithelial lesions diagnosed and treated at Intermed hospital from August 2019 to June 2022.

Results: The mean age was 52.0 ±11.3 years (17–87 years). Fifty nine percent were female. 127 (41.9 %) patients had lesions in the esophagus, 119 (39.3 %) in the stomach, 45 (14.9 %) in the duodenum and 11 (3.6%) in the colon. The provisional diagnosis of the subepithelial lesions, regarding only clinical and endosonographic characteristics were leiomyoma, gastrointestinal stromal tumor (GIST) neuroendocrine tumor (NET), cysts, pancreatic rest, lipoma, external compression and others (39.6%, 14.3%, 4.5%, 11.7%, 10.4%, 8.1%, 9.3% and 2.1 % respectively).

Most common subepithelial lesions in the esophagus were leiomyoma (62.9%) and cyst (14.1%); in the stomach were GIST (26.8%) and leiomyoma (32.7%); in the duodenum were GIST (17.7%) and pancreatic rest (31.1%); in the colon were NET (81.8%) and external compressions (9%). All the lesions were diagnosed as GIST originated from either the forth layer (81.8%) or the second layer (2.2%) of gastric or duodenal wall.

Deep biopsy or endoscopic resection was performed in 54 patients (38.5%). The positive predictive value, negative predictive value and accuracy of diagnosis of subepithelial lesion made by endosonographers based on only endosonographic characteristics were 95%, 100% and 86% respectively.

Conclusions: Endoscopic ultrasound evaluation of subepithelial lesions has been very important for stratification into risk groups and to determine the best management.

Keywords: Subepithelial lesion, Endoscopic ultrasound-EUS

POT-02

Comparative outcome of single versus two double-pigtail stents for endoscopic drainage of pancreatic pseudocysts

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Background/aims: Endoscopic ultrasound (EUS)-guided cystogastrostomy is the treatment of choice for symptomatic pancreatic pseudocysts. As the studies on the number of stents for optimal drainage of pseudocysts are limited, the present study was conducted to compare the outcome of single versus two double-pigtail stents for endoscopic drainage of pancreatic pseudocysts.

Methods: This is a single-center, retrospective analysis of patients undergoing EUS-guided drainage of pancreatic pseudocysts at a tertiary healthcare center in South India from October 2020 to October 2022. Patients with multiseptated cysts, >30% solid debris, presence of associated pancreatic ascites, and incomplete follow-up were excluded. Patients were followed up for assessment of clinical improvement, and stents were removed after documentation of reduction of cyst size on imaging.

Results: Sixty-three patients (82.5% males, median age: 34 years) fulfilling the selection criteria were included. Most patients had chronic pancreatitis (73%), with alcohol being the commonest etiology of pancreatitis (58.7%). Only two patients required transduodenal drainage, while the rest underwent transgastric drainage (96.8%). For single stent placement (n=47), stents of size 8.5 Fr or 10 Fr were used, while for placement of two stents (n=16), 7 Fr stents were used. Technical success was achieved in all cases. Intraprocedural and early post-procedural adverse events (all mild to moderate) were comparable between the groups (8/47, 17.0% with single stent vs. 4/16, 25.0% with two stents). Clinical success was achieved in 96.8% of patients, with no difference between both groups (95.7% vs. 100%). Two patients in the single stent group required additional procedures. All patients underwent successful stent removal after a median follow-up of 14 weeks with no recurrence until their last follow-up.

Conclusions: A single pigtail stent of 8.5 Fr or 10 Fr size provides similar efficacy and safety as two stents for drainage of pancreatic pseudocysts.

Keywords: Endoscopic ultrasound, Pseudocyst, Cystogastrostomy, Plastic stents

POT-03

Endoscopic ultrasound guided liver biopsy: A single centre experience from Malaysia

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Background/aims: EUS guided liver biopsy (EUS-LB) is an emerging technique with comparable efficacy and safety to the more widely used percutaneous liver biopsy. We aimed to review and report our early experience of performing EUS-LB from Malaysia.

Methods: All patients who had undergone EUS-LB in Hospital Al-Sultan Abdullah were retrospectively identified. The electronic medical records were reviewed and relevant information on demographics, clinical condition, technical details of the EUS-LB procedure, and pathological evaluation were obtained.

Results: Between September 2021 till August 2022, there were 12 patients who underwent EUS guided liver biopsy. The gender distribution was 66.7% females and 33.3% males. The median age (IQR) was 51.5 (40, 65) years. The indications were suspected autoimmune hepatitis (AIH) (58.3%) and unexplained abnormal liver biochemistry (41.7%). The Trident EUS 19G needle (Micro-Tech Endoscopy) was used in 10 patients and the EZ shot 3 19G needle (Olympus) was used in the other two. The left lobe of the liver was punctured in all patients and the median (IQR) number of passes was 3 (2,4). The right lobe was additionally punctured in 5 patients. The technical success rate of obtaining core specimen was 100%. There were no major complications observed. The median length (IQR) of the longest specimen was 17.5 (10, 23.8) mm and the median number (IQR) of portal tracts was 14 (7, 32). The diagnostic yield was 91.7% with one patient having a non-diagnostic sample. Steatohepatitis was the commonest diagnosis (33.3%) followed by steatosis (16.7%) and drug-induced liver injury (16.7%).

Conclusions: EUS-LB is a technique with a high technical success rate, high diagnostic yield and a good safety profile.

Keywords: Endoscopic ultrasound, Liver biopsy, Endohepatology

POT-04

Long-term outcomes of EUS-guided CDS are better than HGS for malignant biliary obstructionSe Woo Park^{*1,2,3,4,5}¹Internal Medicine, University of Ulsan, Korea²Internal Medicine and Biomedical Research Institute, Pusan National University, Korea³Department of Internal Medicine and Liver Research Institute, Seoul National University, Korea⁴Internal Medicine, Yonsei University, Korea⁵Internal Medicine, Hallym University, Korea

Background/aims: Endoscopic ultrasound (EUS)-guided biliary drainage (BD), classified as choledochoduodenostomy (CDS) and hepaticogastrostomy (HGS), is a feasible and effective alternative for malignant biliary obstruction (MBO) in cases of failed endoscopic retrograde cholangiopancreatography. However, the preferred technique for better outcomes has not yet been evaluated. Therefore, we compared the long-term outcomes between the techniques.

Methods: We retrospectively reviewed consecutive patients who underwent EUS-CDS or EUS-HGS with transmural stent placement for MBO between 2009 and 2022. The primary outcome was the stent patency. The secondary outcomes were technical and clinical success, adverse events (AEs) of each technique, and independent risk factors for stent dysfunction.

Results: 171 patients were divided into EUS-CDS (n=56) and EUS-HGS groups (n=115). Among them, technical success was achieved in 98.2% of EUS-CDS and 95.7% of EUS-HGS groups. Furthermore, clinical success was 96.4% in EUS-CDS and 81.7% in EUS-HGS groups, with significant difference (P=0.016). The mean duration of stent patency for EUS-CDS was 770.3 days while that for EUS-HGS was 208.8 days (P=0.001). In addition, only independent risk factor for stent dysfunction was technique of EUS-BD (EUS-HGS vs. EUS-CDS; hazard ratio [HR] and 95% confidence interval [CI] 2.610 [1.061–6.420], P=0.0367). In the subgroup with only distal MBO, EUS-HGS showed higher stent dysfunction compared to EUS-CDS (HR 2.782, 95% CI [1.220–6.342], P=0.011), despite no significant differences in clinical outcomes and AEs.

Conclusions: EUS-CDS is technically safe for treatment of MBO. Furthermore, in cases of distal MBO, EUS-CDS may be better than EUS-HGS with longer stent patency.

Keywords: Endoscopic ultrasound, Hepatico-gastrostomy, Choledochoduodenostomy, Biliary obstruction, Patency

POT-05

The important role of liver impaction technique during EUS-HGS

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Background/aims: If the guidewire becomes kinked by the needle, guidewire manipulation may be difficult, and can cause complications such as guidewire shearing or injury during EUS-guided hepaticogastrostomy (HGS). To overcome this matter, we have previously described a technical tip for preventing guidewire injury, termed 'liver impaction technique'. However, its technical feasibility has been not reported in the setting of a large patient cohort. Therefore, the aim of this retrospective study was to evaluate the clinical usefulness of the liver impaction technique during EUS-HGS.

Methods: This retrospective study included consecutive patients who underwent EUS-HGS between April 2018 and September 2022. The primary outcome of this study was the technical success rate of guidewire insertion using the liver impaction technique. Technical success of the liver impaction technique was defined as successful guidewire advancement into the left hepatic bile duct or common bile duct without guidewire shearing or injury.

Results: A total of 166 patients were enrolled in this study. Among a total of 166 patients, initial successful guidewire insertion without using liver impaction technique was obtained in 108 patients (65.1%). Among 58 patients in whom guidewire insertion failed initially, guidewire advancement into the periphery of the bile duct was observed in 25 patients (55.2%) and into a bile duct branch not of interest was observed in 26 patients (44.8%). Liver impaction technique contributed to increasing the technical success rate of guidewire insertion from 65.1% to 95.8%. Adverse events were observed in 12 patients (7.2%; bile peritonitis n=9, cholangitis n=3), but no adverse event associated with liver impaction technique was observed in any patient.

Conclusions: In conclusion, the liver impaction technique may be helpful during EUS-HGS to obtain successful guidewire insertion into the biliary tract of interest. These results should be further evaluated in a prospective randomized controlled trial.

Keywords: EUS-HGS, Liver impaction technique

POT-06

Simultaneous establishment of pancreatic cancer organoid and cancer-associated fibroblast using a single-pass EUS-FNB

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Background/aims: Considering the critical roles of cancer-associated fibroblasts (CAFs) in pancreatic cancer, researchers try to incorporate stromal elements in their organoid models to recapitulate the human tumor microenvironment. This study aimed to evaluate the feasibility of patient-derived organoid (PDO) and CAF cultures using a single-pass endoscopic ultrasound-guided fine-needle biopsy (EUS-FNB) sample from pancreatic cancer patients.

Methods: This prospective trial enrolled patients with suspicious pancreatic cancer. EUS-FNB samples were split into two portions for organoid (80%) and CAF (20%) cultures, respectively.

Results: PDOs (≥ 5 passages; P5) and CAFs were cultured successfully in 54.4% (31/57) and 47.4% (27/57), respectively. Both components were established in 21 cases (36.8%). Various clinicopathologic factors including the tumor size, tumor location, clinical stage, histologic subtype, and tumor differentiation did not influence the P5 PDO establishment. However, the presence of necrosis in tumor samples was associated with initial organoid generation but no further propagation beyond P5 ($P=0.024$). The 'poorly cohesive cell carcinoma pattern' also negatively influenced the PDO establishment ($P=0.018$). Meanwhile, a higher stromal proportion in tumor samples was a decisive factor for the successful CAF culture ($P=0.005$). CAF cultures were not significantly influenced by the presence of necrosis ($P=0.476$).

Conclusions: The co-establishment of PDO and CAF is feasible even using a single-pass EUS-FNB sample. We hope that our results will expand the role of endoscopists in future precision medicine.

Keywords: Pancreatic cancer, Patient-derived organoid, Cancer-associated fibroblast, Endoscopic ultrasound-guided fine needle biopsy

POT-07



Experience-related factors in the success of beginner endoscopic ultrasound-guided biliary drainage: A multicenter study

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Background/aims: Endoscopic ultrasound-guided biliary drainage (EUS-BD) has become comparable to endoscopic retrograde cholangiopancreatography as one of the first-line management options for certain biliary obstructions. EUS-BD should be more widely and routinely employed. Analysis of experience-related factors may help achieve better outcomes and contribute to the procedure gaining wider popularity. However, no concrete evidence exists regarding the required operator or institutional experience levels. This study aimed to analyze experience-related factors at beginner multicenters.

Methods: Patients who underwent EUS-BD using self-expandable metal stents and/or dedicated plastic stents during the study period (up to the first 25 cases from the technique introduction) were retrospectively enrolled from seven beginner institutions with beginner operators. Overall, 90 successful cases (technical success without early adverse events) and 22 failed cases (technical failure and/or early adverse events) were compared. The number of EUS-BD-related procedures conducted by the time of applicable EUS-BD by each institution/operator was evaluated. The thresholds, which significantly divided successful and failed cases, were assessed using receiver operating characteristic curve analysis.

Results: Significant factors for successful procedures were the number of institution-conducted EUS-BD (≥ 7) and operator-conducted EUS screening (≥ 436), fine-needle aspiration (FNA) (≥ 93), and EUS-guided drainage (≥ 13) ($P=.022$, odds ratio [OR], 3.0; $P=.022$, OR, 3.0; $P=.022$, OR, 3.0; and $P=.028$, OR, 2.9, respectively). The number of operator-conducted EUS-BD procedures was not a significant factor in our thresholding.

Conclusions: Institution-conducted EUS-BD and operator-conducted EUS screening, EUS-FNA, and EUS-guided drainage yielded significantly better EUS-BD outcomes. Our threshold values may provide useful approximate indications for successful EUS-BD.

Keywords: Adverse events, Choledochoduodenostomy, Endoscopic ultrasound-guided biliary drainage, Experience, Hepaticogastrostomy

POT-08



The risk factors of malignant potential in pancreatic cystic lesions diagnosed by EUS-guided fine-needle aspiration

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Background/aims: EUS-FNA with cystic fluid analysis could examine mucin, biochemistry, tumor markers and cytology, which may provide guidance on cystic classification and provide a precise diagnosis of malignancy in some PCLs. This study aims to investigate the diagnostic performance of EUS-FNA in pancreatic cystic lesions and to find out the risk factors of malignant potential in PCLs after EUS-FNA.

Methods: This retrospective study was conducted between September 2019 and December 2022. The patients with PCLs on CT or MRI scan undergoing EUS-FNA procedures were enrolled. We collected baseline demographics, initial diagnosis based on CT/MRI image and the cystic characteristics under EUS and the results of cystic fluid analysis obtained from EUS-FNA.

Results: A total of 32 patients (mean age: 59.5 years; 18 females, 14 males) were analyzed with 81.3% of successful EUS-FNA procedures (6 failure, 26 success). Positive mucin string sign test was significantly higher in the failure group (83% vs 15%, $p=0.003$). The size of PCLs (2.7 vs. 3.1 cm, $p=0.769$), diameter of main pancreatic duct (2.5 vs. 2.9 mm, $p=0.935$), mural nodule showed no difference between the failure and success groups. We also analyzed the difference between the cystic CEA > 192 ng/ml and \leq 192 ng/ml groups for analysis of malignant potential in PCLs. Aged (65.2 \pm 10.9 vs. 56.9 \pm 15.5 years, $p=0.037$), malignant potential including malignancy based on EUS-FNA diagnosis (90 vs. 40%, $p=0.036$), and larger diameter of main pancreatic duct (median: 4.4 vs. 2.2mm, $p<0.001$) showed significant difference between these two groups. There was no significant difference in sex (male 60 vs. 20%, $p=0.087$), serum CA 19-9 (28.6 vs. 8.9 Unit/ml, $p=0.005$), size of PCLs (4.0 vs. 3.0 cm, $p=0.267$), mural nodule, enhancing mural nodule, and history of pancreatitis in these two groups. The diagnostic consistency before and after EUS-FNA was only 71.9%.

Conclusions: Mucin string sign test is the only factor that influences the success rate of EUS-FNA on PCLs. In our analysis, larger main pancreatic duct (diameter >3.3mm) is associated with higher risk of cystic CEA >192 ng/ml which considered as malignant potential in PCLs. EUS-FNA for PCLs including cystic fluid analysis could provide more information about malignant potential of PCLs. Therefore, we could give prompt suggestion about the treatment opinion of PCLs.

Keywords: Pancreatic cystic lesions, Malignant potential, Endoscopic ultrasound-guided fine-needle aspiration

POT-09

Diagnostic performance of endoscopic ultrasound elastography for differential diagnosis of gallbladder polyp

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Background/aims: Differential diagnosis between neoplastic and non-neoplastic gallbladder (GB) polyps is difficult before operation. Endoscopic ultrasound-elastography (EUS-EG) has emerged as a non-invasive complementary diagnostic method for differential diagnosis of pancreatobiliary diseases. Thus, we aimed to investigate the diagnostic performance of EUS-EG for differential diagnosis of GB polyps.

Methods: Patients with GB polyps were prospectively enrolled from June 2020. EUS-EG and semi-quantitative evaluation of the strain ratio (SR) had been performed for differential diagnosis of GB polyps. Patients were divided into two groups based on the final diagnosis after operation. Patient demographics, EUS characteristics, and SR value were compared. The receiver-operating characteristic curve with the maximum Youden index was analyzed to obtain the optimal cutoff SR value that discriminates neoplastic and non-neoplastic GB polyps.

Results: The median SR value for neoplastic polyp (32.17, IQR 20.64–64.88) is significantly higher than non-neoplastic polyp (5.32, 2.27–13.15; $p < 0.001$). There are also significant differences in SR values between non-neoplastic, benign neoplastic (21.36, 10.15–40.35), and malignant polyps (46.49 29.38–94.45). The optimal cut-off value for differential diagnosis between neoplastic and non-neoplastic polyp was 18.4. In univariate logistic regression analysis, age >50 years, male sex, polyp size (per 1mm increase), sessile shape, absence of hyperechoic foci and SR value >18.4 showed statistical significance in predicting neoplastic polyp. In multivariate logistic regression, SR value >18.4 (odds ratio 19.350, 95% confidence interval 2.021–185.225) was independent predictor of neoplastic polyp.

Conclusions: EUS-EG and SR value can be used as a supplementary diagnostic method in the diagnosis of GB polyps. (Clinical trial registration number: <https://clinicaltrials.gov>: NCT04416763)

Keywords: Endoscopic ultrasound, Elastography, Gallbladder polyp

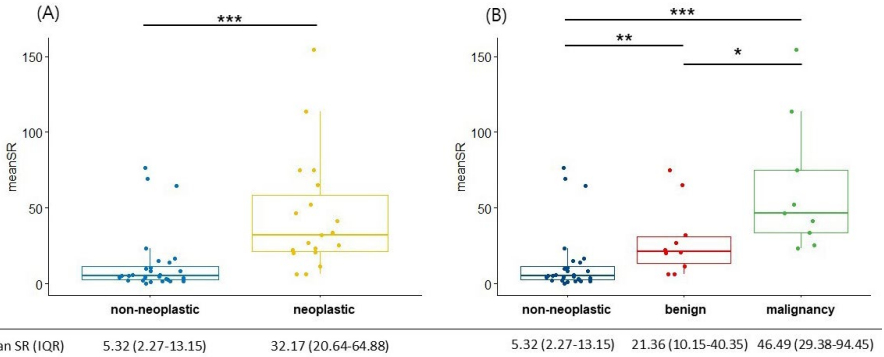


Figure 1. Boxplots with median SR value (horizontal bar) and interquartile range (box). (A) Comparison of SR values between non-neoplastic polyp and neoplastic polyp and (B) non-neoplastic polyp, benign neoplastic polyp and malignant neoplastic polyp (** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$)

Table 1. Baseline characteristics of all patients

Variables	Non-neoplastic (n=28)	Neoplastic	
		Benign (n=10)	Malignant (n=9)
Age	48 (41-64)	62 (41-70)	70 (63.5-76.5)
Sex			
male	6 (21.4%)	5 (50.0%)	5 (55.6%)
female	22 (78.6%)	5 (50.0%)	4 (44.4%)
Size of polyp (mm)	11 (10-13)	16 (10.5-20)	25 (12-29)
Echogenicity			
Hyperechoic spots	16 (57.1%)	2 (20.0%)	3 (33.3%)
Hypoechoic foci	7 (25.0%)	6 (60.0%)	4 (44.4%)
Shape			
Pedunculated	21 (75.0%)	6 (60.0%)	2 (22.2%)
Sessile	7 (25.0%)	4 (40.0%)	7 (77.8%)
Vascular stalk on doppler	3 (10.7%)	0 (0%)	4 (44.4%)
SR value	5.32 (2.27-13.15)	21.36 (10.15-40.35)	46.49 (29.38-94.45)

POT-10

Diagnostic accuracy and safety of endoscopic ultrasound-guided cytologic and histologic evaluation of solid liver lesion

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Background/aims: Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) and biopsy (EUS-FNB) are becoming popular methods for diagnosis of solid liver lesions. The aim of our study was to evaluate the diagnostic accuracy of EUS-FNA or EUS-FNB for solid liver lesions using cytology and histology.

Methods: Retrospective review of consecutive patient who underwent EUS-FNA or FNB for solid liver lesions from January 2015 to September 2022 at a single tertiary medical center was performed.

Results: A total of 62 patients underwent EUS-FNA/B for solid liver lesions. Diagnostic accuracy of cytologic and histologic examination were 90.2% (55/61) and 91.5% (54/59), respectively. When combined together, diagnostic accuracy was increased upto 96.8% (60/62). Diagnostic accuracy using cytologic and histologic examination were both 100% even in cases with liver lesions less than 2 cm in size. No procedure related adverse events were observed.

Conclusions: EUS-FNA and EUS-FNB are useful and safe methods for the diagnosis of solid liver mass. They may be especially useful in solid liver lesions less than 2 cm in size.

Keywords: Hepatic neoplasms, Endosonography, Biopsy

POT-11

Role of endosonography in the evaluation of suspected endoscopic subepithelial lesions of the upper digestive tract: Experience of 364 patients

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Background/aims: Subepithelial lesions (SELs) are frequent in upper gastrointestinal endoscopy (UGE) and can be potentially malignant.

Aims: To characterize the SELs recognized in UGE that are referred for evaluation by endoscopic endosonography (EUS).

Methods: EUS of patients referred for suspected SELs in the Endoscopy Unit, Hospital UC-Christus between 2017–2021 were analyzed. Patients where an ESL was ruled out or an epithelial lesion was concluded were excluded.

Results: 364 patients were evaluated by EUS. In 21.2% (n=77) it was not possible to demonstrate an LSE (extrinsic compressions and epithelial lesions). A total of 298 lesions were analyzed in 287 patients [mean age was 52.8 years (95% CI 51.1–4.5) and 63.8% (n=183) women]. 23.8% (n=71) of the lesions were esophageal, 69.5% (n=207) gastric, and 6.7% (n=20) duodenal. Significant differences were observed in the diagnoses according to their location ($p<0.001$). The lesions observed by location and their main characteristics are described in Table 1. 7.4% (n=22) of the lesions were biopsied. A higher diagnostic yield was observed when obtaining samples by advanced methods in contrast to the use of forceps or with biopsy on biopsy (76.9% vs 11.1%) ($p=0.002$).

Conclusions: Our study shows a distribution of LSE similar to that described in the literature, with low use of histology as a diagnostic resource. A low diagnostic yield of forceps biopsies or biopsies on biopsies was observed, so advanced methods should be preferred.

Keywords: Subepithelial lesions, Endosonography, Upper gastrointestinal endoscopy

POT-12

Incorporation of endoscopic ultrasound in decision making for elective ERCP in patients after gallstone pancreatitis

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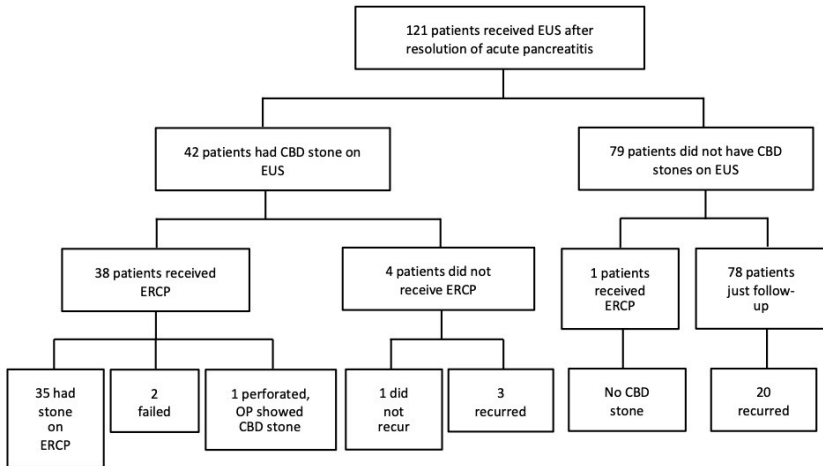
Background/aims: Endoscopic retrograde cholangiopancreatography (ERCP) is recommended to remove the common bile duct stones after resolution of gallstone pancreatitis in patients who do not have urgent ERCP indications such as acute cholangitis. However, how to identify patients with CBD stones in this situation remain unknown.

Methods: It is a single center retrospective study. The patients who received endoscopic ultrasound (EUS) for etiology survey after resolution of pancreatitis were included. We tried to find out the predictors of CBD stone.

Results: Between 2014 to 2021, 121 patients were included. CBD stones were found in 42 (35%) patients. The mean (standard deviation) duration from symptom onset to EUS and from presentation to EUS were 7.5 (5.7) days and 5.9 (4.4) days, respectively. Patients who had elder age, dilated CBD or higher BISAP score had a higher probability to have CBD stones.

Conclusions: EUS should be considered in patients with elder age, dilated CBD or higher BISAP score after resolution of gallstone pancreatitis for CBD stone detection.

Keywords: Gallstone pancreatitis, Endoscopic ultrasound, Common bile duct stone, Gallstone, Endoscopic retrograde cholangiopancreatography



Study Flowchart. CBD, common bile duct; EUS, endoscopic ultrasound; ERCP, endoscopic retrograde cholangiopancreatography; OP, operation.

TABLE 1. Demographics and Clinical Characteristics of the Study Participants

Variable	Total (N = 121)	No stone on EUS (N = 79, 65%)	Stone on EUS (N = 42, 35%)	P
Gender (female)	74 (62)	53 (68)	21 (50)	0.054
Age (year)	63 (15)	61 (14)	69 (14)	0.006
Febrile on presentation	62 (51)	36 (46)	26 (62)	0.087
T-bil (mg/dL)	2.7 (3.2)	2.3 (2.5)	3.4 (4.2)	0.112
Gallstone pancreatitis				
CBD dilatation	43 (36)	23 (29)	20 (48)	0.043
Biliary stone	108 (89)	69 (87)	39 (93)	0.539
ALT > 2X UNL	72 (60)	44 (56)	28 (67)	0.242
Alcoholism	6 (5)	4 (5)	2 (5)	0.942
Time from ED to EUS (days)	5.9 (4.4)	5.9 (4.3)	5.9 (4.5)	0.970
Time from symptom to EUS (days)	7.5 (5.7)	7.7 (6.3)	7.1 (4.5)	0.639
Severity of pancreatitis				
BISAP	1 [0-4]	2 [0-4]	1 [0-3]	0.019
WBC (k/ μ L)	11.1 (4.9)	10.9 (5.0)	11.6 (4.7)	0.417
CRP (mg/dL)	8.7 (9.0)	8.9 (9.5)	8.2 (8.3)	0.796
BUN (mg/dL)	15 (11)	15 (12)	17 (10)	0.488
Glucose (mg/dL)	152 (51)	154 (50)	148 (54)	0.535
Image				
CBD stone on initial images	24 (20)	13 (17)	11 (26)	0.201
CT severity index	3 [0-7]	3 [0-7]	1 [0-6]	0.087
Hospital stay (days)	11 (10)	10 (10)	13 (10)	0.153
Morbidity	10 (8)	6 (8)	4 (10)	0.729

The data were presented as mean (SD), median [range] or number (percentage). ALT, alanine aminotransferase; CBD, common bile duct; CT, computed tomography; ED, emergency department; EUS, endoscopic ultrasound; UNL, upper normal limit.

POT-13

Comparison of outcomes of EUS-guided choledochoduodenostomy and hepaticogastrostomy after a failed ERCP: A meta-analysis

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Background/aims: Endoscopic ultrasound (EUS)-guided choledochoduodenostomy (CDS) or hepaticogastrostomy (HGS) are two most commonly used methods of EUS-guided biliary drainage (EUS-BD) after a failed endoscopic retrograde cholangiopancreatography. However, there has been no agreement on the preference of the approach. The present meta-analysis was aimed to compare the outcomes of EUS-CDS and EUS-HGS.

Methods: A literature search of MEDLINE, Embase, and Scopus was conducted from 2005 to September 2022 for studies analyzing the outcome of EUS-BD. The primary outcomes included clinical success, incidence of overall adverse events (AE), serious AE, procedure-related mortality, and reintervention. The event rates were pooled using a random effects model.

Results: A total of 78 studies with 3673 patients were included in the final analysis. The clinical success rate was significantly higher with CDS than with HGS (97.2%, 95%CI: 96.1–98.3 vs. 92.3%, 95%CI: 90.2–94.3; $p=0.000$). The incidence of AE with HGS was significantly higher than CDS (15.5%, 95%CI: 12.9–18.0 vs. 11.9%, 95%CI: 9.9–14.0; $p=0.045$), with no difference in serious AE and procedure-related mortality. HGS was associated with a higher incidence of bile leak (3.1%, 95%CI: 2.0–4.1 vs. 0.4%, 95%CI: 0.0–0.8), while CDS was associated with a higher incidence of maldeployment or early migration (1.3%, 95%CI 0.6–2.0 vs. 0.3%, 95%CI: 0.0–0.6). The reintervention rate was also higher with HGS than CDS (20.9%, 95%CI: 16.3–25.6 vs. 15.8%, 95%CI: 12.2–19.5, $p=0.048$).

Conclusions: The present meta-analysis suggests that both EUS-CDS and EUS-HGS have a high clinical success. However, EUS-CDS has the benefit of a higher clinical success rate with a lower incidence of AE and reintervention.

Keywords: Endoscopic ultrasound, Choledochoduodenostomy, Hepaticogastrostomy

POT-14

Device malfunctions with use of endoscopic ultrasound-guided fine-needle biopsy devices: Analysis of the maude database

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Background/aims: The real world experience of Endoscopic ultrasound-guided fine-Needle biopsy devices is not known. We analyzed the post-marketing surveillance data from the food drug administration (FDA) Manufacturer and User Facility Device Experience (MAUDE) database to answer this question.

Methods: The FDA MAUDE database from January 2012 to June 2022 was accessed to evaluate for device malfunctions and patient-related adverse outcomes due to these malfunctions.

Results: There were 344 device-related issues. of which breakage of the device was the most common (n=185, 53.7%). The Cook Procore needle accounted for 174 (93.5%) of the breakages . The most common site of tissue biopsy at the time of needle breakage was the pancreas (44, 23.8%).

The most common patient-related adverse event was a retained foreign body (n=50,14.5%). Six (3.4%) patients required a second intervention for removal of the retained foreign bodies including surgery in two cases. The device breakage damaged the endoscope in three (1.7%) cases and there was one case of needle stick injury to the nurse.

Conclusions: FNB devices can be associated with needle breakage and bending that can result in retained foreign bodies which may require additional procedures including surgery. These findings indicate a need for improvement in device design.

Keywords: Endoscopic ultrasound, Fine needle biopsy, Device malfunction

Table 1. Device malfunctions reported according to the type of devices

	Cook Pro Core (N=314)	Boston Acquire (N=15)*	Covidien SharkCore (N=15)#
Breakage/ Detachment-- n(%)	174 (55.4%)	5 (33.3%)	6 (40%)
Advancement issues--n(%)	43 (13.7%)	4 (26.6%)	8 (53.3%)
Retraction problems--n(%)	92 (29.3%)	1 (6.6%)	0
Bent Needle--n(%)	75 (23.8%)	0	0
Safety lock dysfunction-- n(%)	0	1 (6.6%)	0
Contaminated needle-- n(%)	0	2 (13.3%)	0
*There was 1 reported issue of device malfunction but details are not available, 1 report of misassembled device. # One report of defective suction syringe.			

Table 2. Patient adverse events reported according to the type of devices

	Cook Pro Core (N=314)	Boston Acquire (N=15)	Covidien SharkCore (N=15)
Bleeding --n(%)	3 (0.9%)	0	13 (86.6%)
Foreign Body --n(%)	48 (15.3%)	0	2 (13.3%)
Inflammation/ Pancreatitis -- n(%)	1 (0.3%)	0	0
Perforation --n(%)	4 (1.3%)	0	0
Pain --n(%)	2 (0.6%)	0	0
Abscess --n(%)	1 (0.3%)	0	0

POT-15

Single-incision needle knife biopsy and EUS in upper gastrointestinal subepithelial lesions

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Background/aims: Evaluate the safety and efficacy of EUS combined with single-incision needle knife biopsy in diagnosing subepithelial lesions.

Methods: Between June 2018 and August 2022, we performed EUS on 223 patients at Hue University of Medicine and Pharmacy Hospital. SINK will be performed if the lesion is ≥ 10 mm and is suspicious on EUS. The safety and diagnostic yield of this method were assessed.

Results: 52.9% of SELs were in the stomach, 34.5% were in the esophagus, and 12.6% were in the duodenum. Based on EUS features, the presumed diagnosis was: 62.3% leiomyoma or cyst, 14.3% ectopic pancreas, 6.7% lipoma, 4.6% Brunner gland, and 25/223 (11.2%). Patients with suspicious EUS features underwent SINK, with the mean SEL size being 23.4 ± 9.3 mm. The pathological diagnoses were gastrointestinal stromal tumor (GIST; 13/25), leiomyoma (9/25), schwannoma (2/25), and ectopic pancreas (1/25). Tissue samples were of sufficient size to allow immunohistochemical staining. There were no severe complications after the procedure.

Conclusions: EUS combined with single-incision needle knife biopsy is an efficacy and safe technique in diagnosing SELs.

Keywords: Subepithelial lesion, Endoscopic ultrasound, Single-incision needle knife biopsy

POT-16

Forward viewing versus curved linear array echo-endoscopes for obliteration of gastric varices: A retrospective study

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Background/aims: Both forward viewing (FV) and curved linear array (CLA) echoendoscopes can be used for Endoscopic ultrasound (EUS) guided obliteration of gastric varices but studies comparing the two are lacking. Our study aimed to compare the differences in complete obliteration rate of gastric varices between FV and CLA EUS endoscopes.

Methods: We did a retrospective analysis of all procedures performed for the obliteration of gastric varices at our center between June 2020 and September 2022. The primary outcome was complete obliteration rate, and secondary outcomes were technical success and need for cross over.

Results: A total of 39 procedures were performed in the study period. A total of 27 (69.23%) procedures were performed with FV and 12 (30.77%) were performed with CLA echoendoscopes. The baseline characteristics are reported in Table 1. The complete obliteration rate was similar in both groups (FV - 76% vs CLA - 81.2%, $p = 1.00$). Technical success was 100% in both groups. There were three instances which required crossover from CLA to FV for obliteration whereas there were no instances where cross over from FV to CLA was required ($p < 0.05$).

Conclusions: Both FV and CLA echoendoscopes offer similar complete obliteration rates and technical success. Cross over from CLA to FV scopes may be required in some cases.

Keywords: Endoscopic ultrasound, Forward viewing echoendoscope, Gastric varices

Table 1. Baseline Characteristics

Variable		Overall	Scope type		P value
			FV	CLA	
Age (Mean +/- SE)		56.85 +/- 2.3	56.52 +/- 2.7	57.58 +/- 4.5	0.83
Male (%)		82.05	81.48	83.33	1.00
Diagnosis (%)	Cirrhosis	94.87	96.3	91.67	0.53
	EHPVO	5.13	3.7	8.33	
Child Pugh status (%)	A	43.24	50	27.27	0.53
	B	43.24	38.46	54.55	
	C	13.51	11.54	43.24	
MELD score (Mean +/- SE)		12.07 +/- 0.99	12.46 +/- 1.3	13.27 +/- 1.5	0.71

POT-17

Assessment of histologic scoring and safety of optimal endoscopic irreversible electroporation energy in the stomach

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Background/aims: Irreversible electroporation (IRE), a non-thermal ablation technique, is currently used for various tumors. However, the most adequate range of energy for stomach tumor treatment is still under-investigated. Our study aims to evaluate adequate electrical energy using histologic scoring and modeling within non-thermal conditions.

Methods: Before the experiment, the COMSOL Multiphysics program modeled an artificial stomach of a pig to investigate non-thermal electrical conditions. Nine pigs were used for IRE ablation. Each pig was electroporated applying needle-type electrodes from 500V to 2000V with pulse numbers of 20 to 80. Histologic scoring was compared to find a significant gap between the electrical energy.

Results: At the same voltage, the score increased as the number of pulses increased, and histologic scoring increased as the voltage increased. Modeling of the IRE electrical field on the stomach was correlated with histologic scoring and thermal distribution well. According to histologic scoring, Histologic damage increased significantly from 1000V with 80 pulses and 1500V 60 pulses ($p=0.042$).

Conclusions: Histologic scoring matches well with endoscopic and histologic changes. Histologic alteration warrants safe energy until electrical condition as 1000V/60.

Keywords: Safety, Irreversible electroporation, Stomach, Endoscopy, Histology

POT-18

The impact of sedation on cardio-cerebrovascular adverse events after upper endoscopy in patients with gastric cancer

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Background/aims: There is limited data on the impact of sedation on cardio-cerebrovascular disease (CCD) adverse events after esophagogastroduodenoscopy (EGD) in patients with gastric cancer (GC). We investigated the incidence rate and impact of sedation on CCD adverse events after surveillance EGD in patients with GC.

Methods: We performed a nationwide population-based cohort study using the Health Insurance Review and Assessment Service databases from January 1, 2018, to December 31, 2020. Using a propensity score-matched analysis, patients with GC were divided into two groups: sedative agent users and non-users for surveillance EGD. We compared the occurrence of 14-day CCD adverse events between the two groups.

Results: Of the 103,463 patients with GC, newly diagnosed CCD adverse events occurred in 2.57% of patients within 14 days after surveillance EGD. Sedative agents were used in 41.3% of the patients during EGD. The incidence rates of CCD adverse events with and without sedation were 315.4/10,000 and 173.6/10,000, respectively. Between sedative agent users and non-users (28,008 pairs), there were no significant differences in the occurrence of 14-day CCD adverse events (2.28% vs. 2.22%, $P=0.69$).

Conclusions: Sedation during surveillance EGD was not associated with CCD adverse events in patients with GC.

Keywords: Cardio-cerebrovascular adverse events, Gastric cancer, Esophagogastroduodenoscopy, Sedation, Health insurance review and assessment service databases

TABLE 1. CCD adverse events within 14 days of surveillance EGD in patients with gastric cancer

	Overall CCD		Major CCD*		Cardiac adverse event		Stroke/TIA		ATE/PE	
	Events, n (%)	Incidence rate per 10,000 persons	Events, n (%)	Incidence rate per 10,000 persons	Events, n (%)	Incidence rate per 10,000 persons	Events, n (%)	Incidence rate per 10,000 persons	Events, n (%)	Incidence rate per 10,000 persons
Total adverse events within 14 days	2,658 (2.57)	256.9	1,055 (1.02)	102.0	1,597 (1.54)	154.3	963 (0.93)	93.1	98 (0.09)	9.5
Without sedation	1,917 (3.15)	315.4	778 (1.28)	128.0	1,130 (1.86)	186.0	721 (1.19)	118.6	66 (0.11)	10.8
With sedation	741 (1.74)	173.6	277 (0.65)	64.9	467 (1.09)	467	242 (0.57)	56.7	32 (0.07)	7.5
Midazolam	387 (1.53)	152.9	138 (0.55)	54.5	249 (0.98)	98.4	123 (0.49)	48.6	15 (0.06)	5.9
Propofol	143 (2.01)	201.4	57 (0.80)	80.2	85 (1.20)	85	49 (0.69)	69.0	9 (0.13)	12.7
Midazolam + Propofol	206 (2.04)	204.4	78 (0.77)	77.4	132 (1.31)	131.0	66 (0.65)	65.5	8 (0.08)	7.9
Midazolam + lorazepam or diazepam	2 (2.15)	215.1	1 (1.08)	107.5	1 (1.08)	107.5	1 (1.08)	107.5	0 (0)	0.0
Propofol + lorazepam or diazepam	0 (0)	0.0	0 (0)	0.0	0 (0)	0.0	0 (0)	0.0	0 (0)	0.0
Midazolam + Propofol + lorazepam or diazepam	3 (4.76)	476.2	3 (4.76)	476.2	0 (0)	0.0	3 (4.76)	476.2	0 (0)	0.0

ATE, arterial thromboembolism; CCV, cardio-cerebrovascular; CI, confidence interval; EGD, esophago-gastro-duodenoscopy; PE, pulmonary embolism; TIA, transient ischemic attack.

*Major CCD adverse events were defined as acute myocardial infarction, cardiac arrest, ischemic stroke, hemorrhagic stroke, ATE, or PE.

TABLE 2. Outcomes of CCV adverse events in the unmatched and propensity score-matched groups

	Unmatched patients			<i>P</i> ^b	Propensity score-matched (1:1) patients			<i>P</i> ^b
	Total (N=103,463), n (%)	Received sedative agents (N=42,086), n (%)	Did not receive sedative agents (N=60,777), n (%)		Total (N=56,016), n (%)	Received sedative agents (N=28,008), n (%)	Did not receive sedative agents (N=28,008), n (%)	
CCV adverse events	2,658 (2.57)	741 (1.74)	1,917 (3.15)	<0.01	1,261 (2.25)	638 (2.28)	623 (2.22)	0.69
Cardiac adverse events	1,597 (1.54)	467 (1.09)	1,130 (1.86)	<0.01	770 (1.37)	402 (1.44)	368 (1.31)	0.23
Stroke/TIA	963 (0.93)	242 (0.57)	721 (1.19)	<0.01	442 (0.79)	207 (0.74)	235 (0.84)	0.20
ATE/PE	98 (0.09)	32 (0.07)	66 (0.11)	0.10	49 (0.09)	29 (0.10)	20 (0.07)	0.25

ATE, arterial thromboembolism; CCV, cardio-cerebrovascular; PE, pulmonary embolism; TIA, transient ischemic attack.

^b*P* values were determined using the χ^2 test or Fisher's exact test.

POT-19

Safety and efficacy of remimazolam-based sedation compared with propofol-based sedation in patients undergoing ERCP

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Background/aims: Remimazolam besilate is a short-acting GABA-A receptor agonist developed as a soft drug. Previous studies regarding outcomes of remimazolam in ERCP has been scarce. The aim of this study was to compare safety and efficacy between remimazolam and propofol-based sedation in patients undergoing ERCP.

Methods: Patients who underwent ERCP between June 2022 and August 2022 in Yeungnam University Hospital were included and analyzed retrospectively. Laboratory tests, sedation related adverse events, outcomes of ERCP were compared. Remimazolam group (66 patients (43.7%)) received remimazolam and/or pethidine and propofol group (85 patients (56.3%)) received propofol and/or pethidine and midazolam for sedation of ERCP.

Results: Mean age of remimazolam group was higher than propofol group without statistical significance (72.8 ± 12.7 vs 68.9 ± 16.3 years, $p=0.108$). Sex was not significantly different between two groups. Occurrence of hypoxemia was not significantly different between remimazolam and propofol group (9.1% vs 9.2%, $p=0.982$). No patients required airway interventions in both groups. Occurrence of hypotension and paradoxical movement was not significantly different between two groups. Recovery time was significantly shorter in remimazolam group than propofol group (25.3 ± 9.4 vs 29.8 ± 12.0 min, $p=0.013$).

Conclusions: Sedation related adverse events were comparable between remimazolam and propofol-based sedation for ERCP. Remimazolam-based sedation seems to shorten recovery time compared with propofol-based sedation.

Keywords: Remimazolam, Propofol, Endoscopic retrograde cholangiopancreatography, Sedation

POT-20

EUS-guided colo-colostomy for the treatment of benign complete occlusion of colonic anastomosis: A case series

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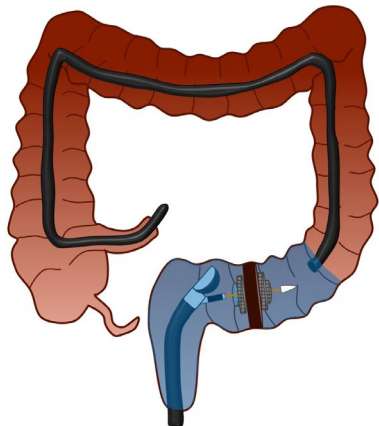
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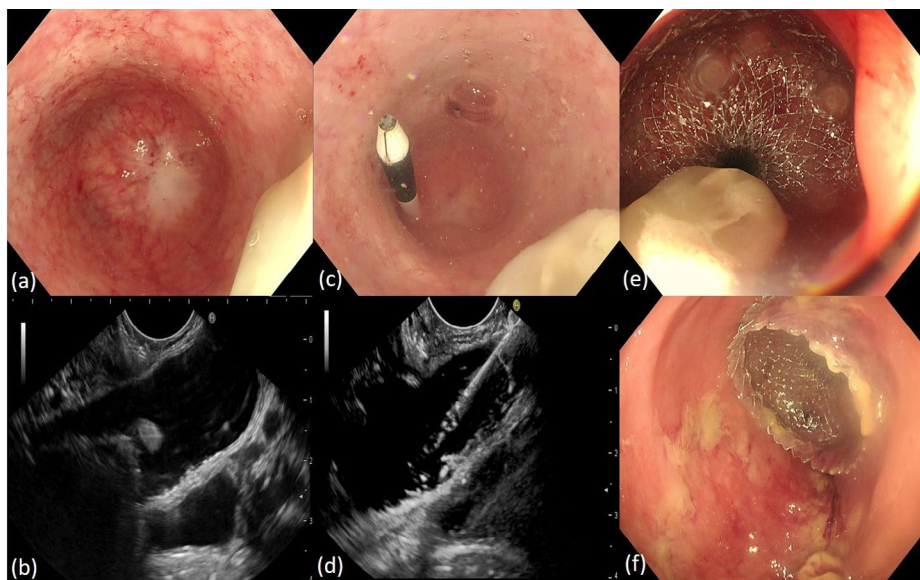
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Majority cases of benign colonic anastomotic stricture are stenosis rather than complete occlusion, which can be managed with endoscopically. In the less common scenario of a completely occluded colonic anastomosis, surgery is often required. In this paper, we describe three patients with benign complete occlusion of their colorectal anastomosis and how we managed them non-operatively with a colonic/rectal EUS anastomosis technique and lumen apposing metallic stent (Hot AXIOS). We have demonstrated that technical and clinical success for this technique is 100% in our three patients. We believe the technique we described is effective, safe and avoids an invasive surgical procedures. It should be widely reproducible in centres with expertise in interventional EUS, given the similarity to well-established procedures such as EUS guided gastroenterostomy. Patient selection and timing of reversal of ileostomy needs careful consideration, especially in patients with history of keloid formation. Given the shorter hospital stay and reduced invasiveness of this technique, we believe it should be considered for all patients that have complete benign occlusion of a colonic anastomosis.

Keywords: EUS-guided colo-colostomy, EUS-guided colonic anastomosis, Benign completely occluded colonic anastomosis, Benign colonic anastomotic stricture



Schematic diagram for EUS guided colo-colostomy



(a)Endoscopic of colonic anastomosis proximally (b)EUS view from rectum (c)Endoscopic view proximally after electrocautery with AXIOS (d)EUS view from the rectum after AXIOS deployed (e)LAMS viewed proximally, (f)LAMS viewed from rectum.

POT-21



Utilization of platelet count/spleen diameter ratio in predicting the presence of esophageal varices in Filipinos

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Background/aims: Upper endoscopy is the gold standard for screening of esophageal varices. However, in developing countries such as the Philippines, not all patients have access to this procedure. This study will provide validation of Platelet Count/Spleen Diameter ratio as an alternative to upper endoscopy in screening for esophageal varices in Filipino patients with liver cirrhosis.

Methods: We performed a single-center, prospective, cross sectional study in 88 adult patients with liver cirrhosis at East Avenue Medical Center from June 2022 to November 2022. Complete biochemical workup, upper endoscopy, and abdominal ultrasonography were done. Platelet count/spleen diameter ratio was calculated for all patients. Sensitivity, specificity, positive predictive value and negative predictive value of PC/SD ratio were determined.

Results: Seventy-eight (78) of the patients have esophageal varices in EGD. Mean ages were 56.32 ± 11.52 and 54.8 ± 9.58 for patients with and without varices, respectively. There is slight male preponderance among patients with varices. Alcoholic liver disease was the most common etiology in both study groups (30.77%, with varices; 40%, without varices). Majority of patients with esophageal varices were CTP B (46.15%). A PC/SD ratio of ≤ 909 has sensitivity and specificity of 42.30% and 90.0%, respectively. Positive predictive value is at 97.05% and negative predictive value is 16.60%.

Conclusions: In conclusion, PC/SD ratio of ≤ 909 may be used as an alternative noninvasive test to diagnose esophageal varices in cirrhotic patients who have no access to EGD. However, PC/SD ratio > 909 cannot substitute for upper gastrointestinal endoscopy in ruling out the presence of esophageal varices.

Keywords: Varices, EGD, Platelet count, Spleen diameter, Filipino

POT-22 

Computer-assisted detection with or without endocuff on detection of colorectal adenoma: A randomized controlled trial

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Background/aims: This study aims to determine whether the combined use of device that increase mucosal exposure (Endocuff) and CAD could further increase the ADR, as compared to CAD alone and white light (WLI) colonoscopy.

Methods: Consecutive patients aged 40 or above undergoing elective colonoscopy were recruited. Eligible patients were randomized in a 1:1:1 ratio to receive CAD (OIP-1, Olympus) with Endocuff (CAD-Endocuff; both by Olympus), CAD alone (CAD) or WLI under high definition colonoscope.

Results: This is the planned interim analysis of the first 300 patients with complete colonoscopy (Table 1). Among the three groups, the CAD-Endocuff group had the highest ADR (65.7%), PDR (80.8%), SDR (41.4%) and AADR (14.1%). The WLI group had the lowest ADR (46.8%), PDF (59.6%), SDR (23.4%) and AADR (10.5%), with the CAD group in the intermediate (Table 1 and Figure 1). On this interim analysis, there was already a significant difference in the ADR (ANOVA; P=0.03), PDR (P<0.01) and SDR (P=0.02) among the three groups.

Table 1. Summary of demographic and clinical outcomes among three groups

				P value (Bonferroni Correction)			
	CAD-Endocuff	CAD	WLI	ANOVA (Three Groups)	CAD-Endocuff vs CAD	CAD-Endocuff vs WLI	CAD Vs WLI
Number of patient (n)	99	106	95				
Age (Mean ± SD)	63.0±9.8	66.7±9.9	64.0±11.0	0.30	0.06	0.44	0.10
Male (% , n)	51.5% (51)	62.3%(66)	55.3%(52)	0.29	0.12	0.66	0.28
Experienced Endoscopist(% , n)	46.5% (46)	41.5%(44)	42.6%(40)	0.76	0.48	0.54	0.93
Screening colonoscopy(% , n)	21.2% (21)	17.9%(19)	19.1%(18)	0.84	0.56	0.70	0.85
BBPS (Mean ± SD)	7.4±1.3	7.2±1.5	7.3±1.6	0.63	0.34	0.45	0.90
Insertion time (mins) (Mean ± SD)	6.3±0.3	6.6±0.4	6.7±0.4	0.74	0.52	0.32	0.78
Withdrawal time (mins) (Mean ± SD)	8.6±0.4	9.6±0.6	8.6±0.4	0.25	0.16	0.96	0.16
ADR(% , n)	65.7% (65)	56.6%(60)	46.8%(44)	0.03	0.19	0.01	0.09
PDR(% , n)	80.8% (80)	75.5%(80)	59.6%(56)	<0.01	0.36	<0.01	0.02
SDR (% , n)	41.4%(41)	36.8%(39)	23.4%(22)	0.02	0.50	0.01	0.04
AADR(% , n)	14.1%(11)	11.3%(12)	10.5%(10)	0.16	0.37	0.44	0.85
Mean number of adenoma (Mean ± SD)	1.6±0.2	1.4±0.2	0.9±0.1	0.02	0.30	0.01	0.08
Mean number of polyp (Mean ± SD)	2.6±0.3	2.3±0.2	1.4±0.2	<0.01	0.38	<0.01	0.01
Mean number of advanced adenoma (Mean ± SD)	0.19±0.05	0.13±0.03	0.13±0.04	0.17	0.54	0.45	0.93

ADR, adenoma detection rate; BBPS, Boston bowel preparation scale; PDR, polyp detection rate; SDR, serrated lesion detection rate; AADR, advanced adenoma detection rate; CAD, computer-assisted detection; SD, standard deviation

Conclusions: Interim analysis of this ongoing randomized trial already showed a promising effect of the combined use of CAD and endocuff on enhancing colonic lesions detection, including adenoma and serrated lesions

Keywords: Artificial intelligence, Colonic polyp, Adenoma, Endocuff, Computer -assisted

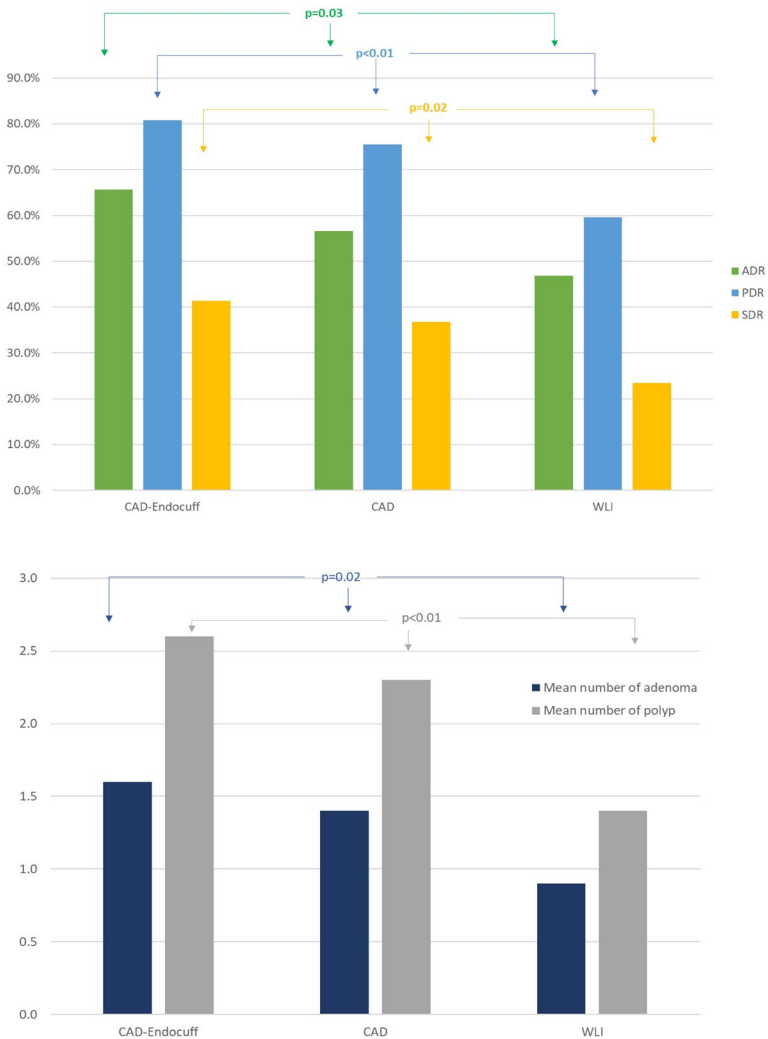


Fig. 1. The endoscopic outcomes of three groups

POT-23

Detection of gastritis related to *Helicobacter pylori* infection and premalignant gastric mucosa using high resolution NBI endoscopy (H-NBI)

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Background/aims: *Helicobacter pylori* related gastritis and premalignant gastric lesion can be reliably identified using Narrow Band Imaging endoscopy technique. In addition, we can also apply this technique to be adapted to collect the gastric tissue for diagnosis during gastrointestinal endoscopy. The purpose of the study was to determine the accuracy and correlation with the severity of gastritis, including *H. pylori* status.

Methods: A total of 500 patients who underwent gastroscopy for the investigation of dyspeptic symptoms. 250 patients were to perform site specific biopsy using H-NBI (Group1) and 250 patients were to perform standard biopsy (Group2). Sensitivity, specificity, positive and negative predictive value were evaluated. Efficacy of detecting *Helicobacter pylori* associated gastritis and premalignant gastric mucosa according to update Sydney classification was compared.

Results: In group 1:the sensitivity, specificity, positive and negative predictive values for predicting *Helicobacter pylori* positive were 95.42%, 97.29%, 98.82% and 90.0% respectively. In group 2:the sensitivity, specificity, positive and negative predictive values for predicting *Helicobacter pylori* positive were 92.92%, 88.60%, 83.24% and 76.08% respectively. Site specific biopsy show more effective than standard biopsy in term of *Helicobacter pylori* infection status and premalignant gastric mucosa detection ($P<0.01$).

Conclusions: Site specific biopsy by using H-NBI can improve detecting of *Helicobacter pylori* infection and premalignant gastric mucosa in daily clinical practice. However, there is a limitation on the experience of endoscopic physicians in using it to be widely used in endoscopic examination in general practice.

Keywords: *H. pylori*, NBI, Endoscopy



Figure 1 and Figure 2

Figure 3 and Figure 4

POT-24

Clinical usefulness of tube-assisted biopsy for indeterminate pancreaticobiliary strictures

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Background/aims: Single-operator cholangioscopy (SOC) provides an accurate diagnosis of indeterminate pancreaticobiliary strictures. However, the procedure is expensive and can be performed using only limited accessories. Thus, we evaluated the clinical usefulness of a novel tube-assisted biopsy (TAB) for indeterminate pancreaticobiliary strictures.

Methods: Medical records of patients who underwent TAB with indeterminate pancreaticobiliary strictures that were not amenable to conventional endobiliopancreatic duct biopsy were reviewed from September 2018 to September 2022. We evaluated the technical success rate, adverse event rate, sensitivity, specificity, and overall accuracy of TAB in differentiating malignant from benign lesions.

Results: A total of 349 endobiliopancreatic biopsies were performed during study period. TABs were performed in 47 patients (33 had biliary strictures, 14 had pancreatic strictures). The technical success rate was 97.9 % (46/47), and the sensitivity, specificity, and overall accuracy of TAB were 80 %, 86.7 %, and 91.3 %, respectively. No serious adverse events occurred either during or after the procedure in any of the patients.

Conclusions: TAB showed acceptable accuracy for the diagnosis of indeterminate pancreaticobiliary strictures and might represent a useful diagnostic method in cases before performing SOC or where SOC cannot be implemented.

Keywords: Tube-assisted biopsy, Digital SOC, Indeterminate stricture

POT-25



An Intelligent-c endoscopy module (iideas) for detection of colonic lesions - A prospective, non-randomized, study

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Background/aims: A more accurate optical diagnosis of colorectal polyps could make colonoscopy more cost-effective. We conducted a study with the aim to validate the performance of a novel state-of-the-art Artificial Intelligence model (AI-Model) for colorectal lesion detection during routine diagnostic colonoscopy.

Methods: The study is an ongoing prospective, non-randomized, single-center clinical evaluation of the real-time performance of the deep learning AI model for colorectal lesion detection in colonoscopy procedures. The primary endoscopist conducted the colonoscopic examinations using high-definition endoscopes (EVIS-EXERA 290 video system, Olympus Optical, Tokyo, Japan), both under white light and NBI. All polyps were marked for size (measured with biopsy forceps), location, and morphology according to the Paris classification and then removed or biopsy sampled for histologic examination (Fig.). The main goal of this study was to figure out the adenoma miss rate, which is the number of patients whose adenomas were missed by the endoscopists but found by the AI and then confirmed by the endoscopists on re-examination (and, as a gold standard, by histological examination). The mean and the total number of missed lesions were analyzed.

Results: Totally, 24 lesions were detected and removed from the 15 subjects, out of n=100 colonoscopies done between 1st March to 15th March 2023. Of the 24 lesions removed from subjects, 23 (96.3%) lesions were examined, including 7 (29.1%) neoplastic lesions and 16 (66.6%) non-neoplastic lesions, and the other 1 (4.1%) lesions were not examined after snaring. As for lesion detection, the AI module detected 24 (100.0%) while endoscopists detected 17 (70.8%) lesions. Based on final histology, there were 1 (4.16%) missed neoplastic lesions and 6 (25%) missed non-neoplastic lesions. An AI-based detection system found all the lesions. According to the power analysis, the estimated sensitivity was above 95% (with an alpha value of 0.05 and a power of 80%).

Conclusions: The diagnostic performance of CAD seems to be better than that of endoscopy for colon polyp detection. With recent breakthroughs in artificial intelligence, interest in CAD is gaining traction as a novel approach to improving the quality of colonoscopies. Large-scale use of this technology can be useful in community practice and service.

Keywords: Artificial intelligence, Colonic polyps, Polypectomy

POT-26



To evaluate the safety and efficacy of the Resolv® endoscopic hemostat system in achieving acute hemostasis

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Background/aims: There have been advances in endoscopic hemostasis in acute gastrointestinal bleeding, from the conventional injection of submucosal solutions of dilute epinephrine to the application of thermal energy and, more recently, mechanical hemostasis. There has been the development of non-contact hemostasis in the form of an endoscopically applied hemostatic powder spray. When applied, these inert compounds absorb water, which concentrates clotting factors on the surface of the particles, thus initiating the clotting cascade. These compounds enhance clot formation, and the coagulum sloughs off after 24 to 72 hours. The primary objective of the study is to evaluate the safety of the Resolv® Endoscopic Hemostat System. The secondary objective is to evaluate the efficacy of the use of the Resolv® Endoscopic Hemostat System in the control of non-variceal GI bleed.

Methods: This is a single-center, prospective, open-label, single-arm study to evaluate the safety and efficacy of a novel plant-based polysaccharide Hemostasis' Resolv® Endoscopic Hemostat System, from July 2022 to November 2022, in achieving acute hemostasis in adult subjects diagnosed with non-variceal upper gastrointestinal bleeding. Clinically known or confirmed GI bleeding nonvariceal UGIB with bleeding severity of Forrest 1b, such as post-EMR, ESD, or tumour bleed underwent standard endoscopy. Patients were evaluated for the proportion of subjects with AE or SAE within 72 hours after hemostat application, the proportion of subjects with device-related SAE within 30 days of the procedure, the proportion of subject mortality within 30 days of the procedure (all-cause) [Primary endpoints], the proportion of subjects with acute procedural hemostasis (index endoscopy), the proportion of subjects with recurrent bleeding within 72 hours of the index procedure/ application, and the need for surgery or an alternative hemostat for failure to achieve hemostasis within 72 hours [Secondary endpoints]. Blood sugars were closely monitored pre- and post-procedure, due to concerns regarding its effect on RBS since the powder is a plant-based polysaccharide.

Results: Forty-two patients (M: F: 25/17, Age: 52.513) underwent the procedure and were considered for an interim analysis. The device was used in the following indications: post-polypectomy (n=24), peptic ulcer bleed (n=7), malignant tumour bleed (n=4), post-EMR bleed (n=3), and others (n=4). The technical success rate was 100%. Within 72 hours of use, there were no adverse events or side effects related to the device, and there was no mortality (all-cause) secondary to device use (Primary endpoints). The index endoscopy hemostasis was 100%. Within 72 hours of hemostasis, n=1=1 patient had a rebleeding (malignant ulcer bleed), which was controlled using Argon plasma coagulation (Secondary endpoints). The mean RBS was 159.7 mg/dl in 12 of 42 (28.5%) diabetic patients. The mean RBS 2 hours and 4 hours post-procedure was 136 and 134 mg/dl.

Conclusions: Resolv® Endoscopic Hemostat System is a safe and highly efficacious device for achieving acute hemostasis in adult subjects diagnosed with non-variceal upper gastrointestinal bleeding.

Keywords: Upper gastrointestinal bleed, Non-variceal bleed, Endoscopic hemostasis

POT-27

Gastric cancer screening by transnasal endoscopy at a factory - Diagnosis of *H. pylori* infected gastritis by LCI

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Background/aims: In Japan, gastrointestinal endoscopic examination is performed by local governments as a countermeasure (once every two years for those over 50 years of age).

We have been actively recommending endoscopic examination as a voluntary examination at hospitals and physical checkups. Since 2008, we have been using the world's first "transnasal endoscopy-only vehicle" to conduct endoscopic examinations at factories and other locations. We have been exploring the possibility of not only detecting early gastric cancer but also diagnosing H.p infected gastritis and guiding the patient to infection testing and eradication treatment. In this study, we examined the diagnostic ability of Fujifilm's new diagnostic technology for H.p. infected gastritis, a pre-stage of gastric cancer, which is LCI (Linked Color Imaging).

Methods: We visited a plant with a dedicated nasal endoscopy vehicle and performed an average of 46 endoscopic examinations per day. For H.p. gastritis, we used the "Kyoto Gastritis Classification Method" and referred suspected cases of H.p. gastritis to nearby clinics for H.p. infection testing and eradication therapy. Endoscopic examinations were performed on 850 subjects in February and March 2022, and cases in which the diagnosis of H.p. gastritis was possible using LCI were reviewed.

Results: LCI has better diagnostic ability for H.p-infected gastritis, such as atrophy and diffuse redness of the gastric mucosa. The observation of LCI also allowed for a more reliable introduction of H.p. infected gastritis into the examination and eradication therapy. More than 10 patients were treated for eradication in this study.

Conclusions: LCI is more reliable than conventional endoscopic observation in the diagnosis of H.p. infected gastritis. In gastric cancer screening (endoscopic imaging), the diagnosis of H.p. infected gastritis, a risk factor for gastric cancer, is very important.

Keywords: Transnasal endoscopy, LCI

POT-28

Development of new endoscopic suture machine: The study of applicability to endoscopic therapy

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Background/aims: With rapid development of endoscopic surgical technique, numerous endoscopic procedures also had developed such as endoscopic submucosal dissection and endoscopic bariatric surgery. Such advanced procedures are mostly dependent on experiences of endoscopists, but with help of endoscopic devices, procedures could be more advantageous for both performers and patients. To make the procedure safer and convenient, several new endoscopic devices were invented, but only a few of them had demonstrated improvements in closure strength and reproducibility. We evaluated the feasibility and reproducibility of new endoscopic suture machine.

Methods: The new endoscopic suture machine was used to close a perforation in the stomach wall. Conventional endoscope has two working channels, where devices are inserted and manipulated during procedures. The suture device with a 19-gauge needle with thread attached is loaded at the end of the scope. Three porcine stomach models with perforation were tested.

Results: We performed three ex vivo experiments with porcine stomach. There were no technical difficulties nor immediate complications after suture was placed. It required average of 5 stitches in order to completely seal the artificial perforation. The thicker the gastric wall, the more stitches required to completely seal the defects. We tested for air leakage for different sizes of defects. The larger the defect, the more stitches it demands to securely close the defect.

Conclusions: Since colonic wall is much thinner compared to that of stomach, therapies performed in colon is more vulnerable to complications such as perforation and bleeding. Thus, if endoscopic suture machine is used for colon ESD, it is expected to reduce post endoscopic procedural complication. However, the number of stitches needed depends on the size of the mucosal defect. The consistent result demonstrated the reproducibility of the suture device and expected to reduce complications related to endoscopic procedures.

Keywords: Suture, Endoscopic therapy, Machine, GI tract

POT-29

Forecasting of lymph node metastasis in early gastric cancer with deep learning based approach

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Background/aims: When EGC shows high-risk features, surgery should be performed based on current guidelines because of the high-risk of lymph node metastasis (LNM). The aim of this study was to develop machine learning algorithm for predicting LNM status in patients with EGC using H&E-stained whole slide image.

Methods: In this study, a two-step machine learning (ML) algorithm was developed to extract key features of high-risk groups for LNM using three cohorts of different institutes; HGH, n=289; SSH, n=224; KBSMC, n=266. The trained model was externally validated on two independent datasets; ISH, n=66; KUMC, n=392. In the first step, SE-ResNext101 to segment differentiated and undifferentiated gastric cancer was trained on 43 WSI from three datasets of EGC. In the second step, Morphological features inferred by the trained segmentation network from 779 WSI of the primary EGC to predict LNM status. SGD, LGB and Sparse group lasso were used as ML model, and evaluated respectively.

Results: The patches for the development of tumor segmentation network was extracted and showed imbalanced class distribution. The deep learning model achieved a macro-average IoU of 0.77 in the second step, Each ML classifier of SGD, LGM, and sparse group Lasso achieved an AUROC of 0.71, 0.55, and 0.70, respectively.

Conclusions: Our study is the first proof of concept that machine learning trained with deep learning of whole slide images may be able to predict LNM in EGC.

Keywords: Computational pathology, Lymph node metastasis, Early gastric cancer, Machine learning

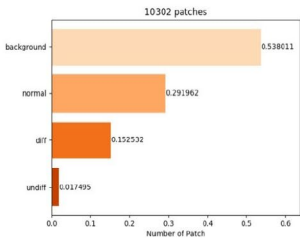


Fig. 1-1 Patch analysis

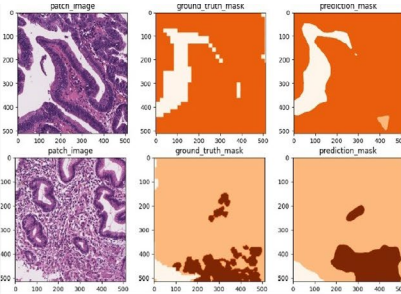


Fig. 1-2 Inference results of Tumor subtype segmentation

- Apricot color : Normal
- Orange color ; Differentiated gastric cancer,
- Brown color : Undifferentiated gastric cancer

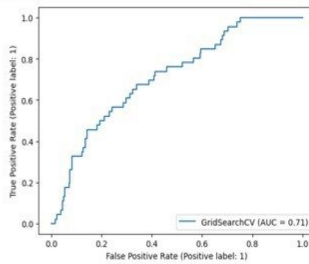
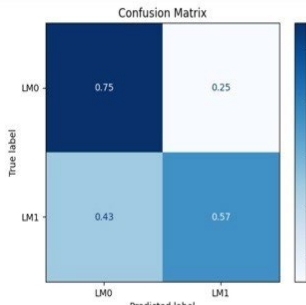
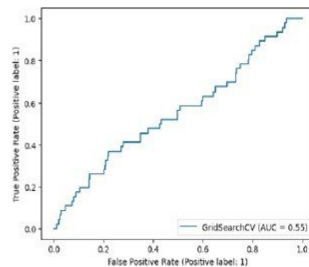
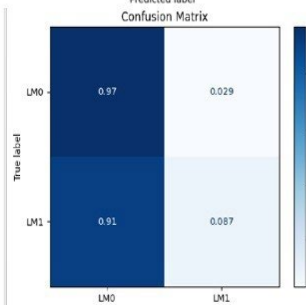
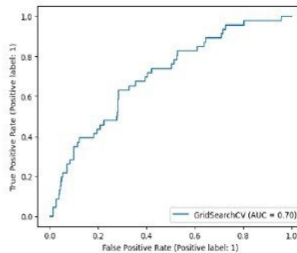
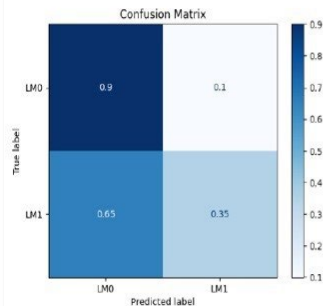


Fig. 2 AUC-ROC Curve
(a) SGD AUC-ROC Curve



(b) LGM AUC-ROC Curve



(c) Sparse group Lasso AUC-ROC Curve

POT-30



Hemostatic ability of spray coagulation in gastric endoscopic submucosal dissection: A multi-center study protocol

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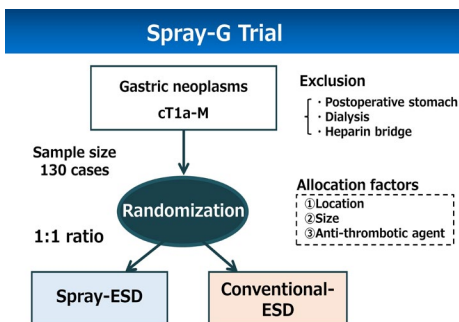
Background/aims: Intraoperative bleeding can pose difficulties in gastric endoscopic submucosal dissection (ESD). To address this issue, we have advanced ESD with a needle-type electro-surgical knife using spray coagulation mode (Spray-ESD), which has high hemostatic effects due to its high voltage and short duty cycle. In this prospective study (Spray-G trial), we aim to determine the efficacy of Spray-ESD for gastric neoplasms in comparison with that of conventional ESD (C-ESD) using forced coagulation mode.

Methods: This is a multicenter, randomized, open-label, parallel-group study. Patients with gastric neoplasms that meet the absolute indication for (EMR/) ESD will be enrolled. Patients will be randomly assigned to receive either Spray-ESD or C-ESD using a minimization method based on the tumor location, size and the presence of taking anti-thrombotic agents. The primary outcome is the completion rate of ESD with the knife alone without the usage of hemostatic forceps. Secondary outcomes include the number and time of hemostasis with the forceps, procedure time, curability, and safety. Sample size was calculated as 130 cases based on the previous study.

Results: The trial is ongoing.

Conclusions: Our trial aims to provide evidence that Spray-ESD can be a viable treatment option for the patients with gastric neoplasms.

Keywords: Endoscopic submucosal dissection, Spray coagulation, Early gastric neoplasms



POT-31

Differential diagnosis of gastritis, gastric dysplasia and gastric cancer using endoscopic Raman spectroscopy

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Background/aims: Endoscopic Raman spectroscopy enables in vivo and real-time biochemical-based characterization of tissues during endoscopy. We analyzed Raman spectra acquired from gastritis, gastric dysplasia, and gastric cancer tissues to see if Raman spectra could distinguish these lesions.

Methods: 2600 Raman spectral data was acquired in-vivo using SPECTRA IMDxTM (Endofotonics) from 64 patients with varying tissue histopathologies from Jul 2018 to Oct 2022. Several peaks with known biochemical origins were used to derive Raman peak ratios. Kruskal-Wallis H and Dunn's post-hoc test was then used to evaluate the statistical significance of changes in peak ratios across 3 histopathological states -cancer, dysplasia, and gastritis.

Results: We compared the peak ratios of gastritis-gastric dysplasia-gastric cancer at various wavenumbers. We found statistically significant consistent changes (increase or decrease) at some wavenumbers corresponding to biochemical changes reported to play a role in carcinogenesis. (Figure 1)

Conclusions: Our results show that the studied peak ratios from in-vivo Raman data can effectively distinguish between gastric tissue histopathology. This finding suggests the potential for using Raman spectroscopy in the in-vivo and real-time diagnosis of gastric cancer and precancerous states.

Keywords: Raman spectroscopy, Gastric cancer, Gastric dysplasia

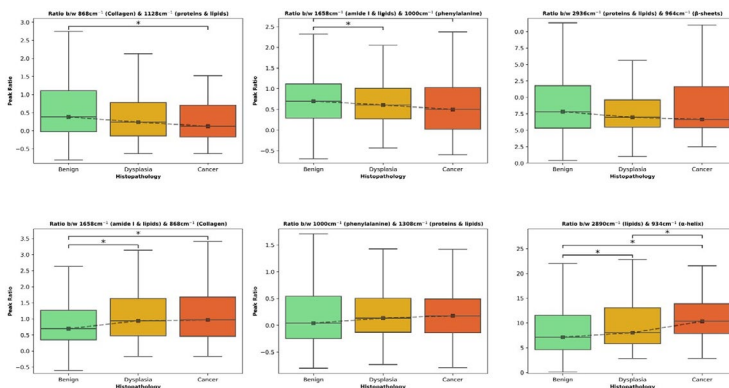


Figure 1.

POT-32

Proteomic and lipidomic analysis of gastric cancer for in vivo, real-time diagnosis using endoscopic Raman spectroscopy

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Background/aims: Endoscopic Raman spectroscopy distinguishes between cancer and non-cancer tissues by showing different spectrums. However, explaining the difference at the molecular level is still challenging. We performed lipidomic and proteomic analyses to determine the components that showed differences in biochemical composition.

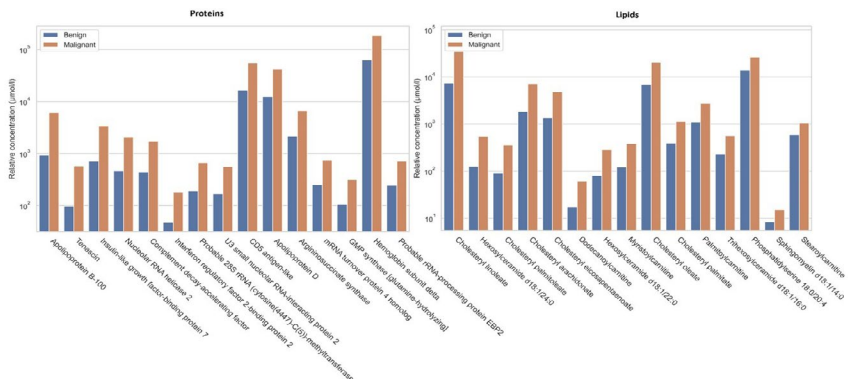
Methods: 10 cancer and non-cancer tissue pairs (20 tissue) were used for individual lipidomic and proteomic liquid chromatography-mass spectrometry analyses. Statistical tests were then used to compare the change in concentrations of biomolecules between the benign and malignant samples.

Results: Key biomolecules were compiled based on the statistical significance and the most significant change from benign to malignant. (Figure 1) In protein, apolipoprotein B-100, tenascin, and insulin-like growth factor-binding protein 7 were significantly increased in cancer tissue. In lipids, cholesteryl linoleate, hexosylceramide, and cholesteryl palmitoleate were significantly increased in cancer tissue.

Conclusions: Our study showed differences in biochemical composition between gastric cancer and non-cancer tissues, which appear to generate different Raman spectra. Further studies are needed to elucidate more sophisticated mechanisms.

Keywords: Raman spectroscopy, Gastric cancer, Proteomics, Lipidomics

Largest Change in Concentration of Biomolecules from Benign to Malignant Tissues



POT-33

Z-POEM in Izmir since 2018: A single center experience

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Background/aims: Surgical methods have been replaced by endoscopic methods in the treatment of Zenker's diverticulum. Z-POEM is a new endoscopic technique that has been performed in recent years and has been successful in terms of clinical and procedural efficiency. The aim of this study is to assess the efficacy and safety of Z-POEM in our clinic.

Methods: 30 patients with Zenker's diverticulum who underwent Z-POEM were included in the study. We performed the paired samples T-test on patients whose Kothari-Haber score was recorded before and after Z-POEM treatment.

Results: One patient excluded from the evaluation. In this patient, Z-POEM process was started but continued to open-POEM process. One patient required repeated process due to recurrence clinical symptoms. In this patient, diverticulum size was 8 cm. Mean patient age \pm standard deviation (SD) was 70 ± 13 years. Most of the patients were males (n: 23, 79,3%); 6 patients (20,7%) were females. The mean size of the diverticula was 4,4 cm (range 2–8 cm). The Kothari-Haber Score was used to assess clinical symptoms; values ranged from 4 to 12 (median 8). There is a significant reduction in the Kothari-Haber Score after Z-POEM ($P < 0,0001$). Clinical success was achieved in 28/29 (96,5%) of the patients with a median follow-up of 32 months (range 6- 64months).

Conclusions: Z-POEM is a safe and effective modality for treatment of ZD in our clinic.

Keywords: Zenker, POEM, Z-POEM, Diverticulum

POT-34

Development and preclinical evaluation of novel half-pigtail plastic biliary stents

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Background/aims: Biliary strictures can arise from various etiologies and result in significant morbidity and mortality. Plastic stents (PSs) are frequently utilized to alleviate cholestasis; however, their diverse configurations may impose differing indications and limitations. The objective of this study was to elucidate the preclinical performance of a domestic novel biliary PS.

Methods: A novel PS was designed with a proximal half-pigtail end to overcome the shortcomings of the double pigtail plastic stent (DPPS). A novel PS was designed with a proximal half-pigtail end to overcome the shortcomings of the double pigtail plastic stent (DPPS). The proximal sphere of the DPPS was unfurled to create a half-pigtail shape, while the distal (duodenal) portion of the pigtail was shaped into either a pigtail sphere (half-pigtail pigtail plastic stent, HPPPS) or a bending configuration (half-pigtail bend plastic stent, HPBPS).

Results: In vitro bile phantom study, which compared the materials of novel PS (7 Fr straight) to other commercially available polyethylene PSs (7 Fr straight), showed no significant differences in bile drainage velocity (0.19 vs 0.19 ml/min; $P < 0.99$). In the in vivo study of EB-RFA induced biliary stricture (DPPS 3, HPBPS 7, and HPPPS 4), there was no occurrence of PS occlusion at 4 weeks and migration rates did not differ among them (33%, 50%, 71%; $P = 0.51$). However, both HPBPS and HPPPS demonstrated enhanced visualization due to three radiopaque markers and had the ability to be repositioned for precise placement using a preloaded delivery system. Additionally, there were no differences in debris and biofilm formation among the three types of retrieved PSs during dissection.

Conclusions: New domestic plastic biliary stent offered the typical advantages of repositionability and enhanced visualization. Among them, HPBPS exhibited comparable preclinical outcomes to DPPS in terms of patency and migration rate. Further investigations are warranted to assess its performance in clinical settings.

Keywords: Stent, Plastic, Biliary stricture

POT-35

Clinical outcome of endoscopic hemostatic powder in gastrointestinal bleeding: A multicenter retrospective study

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Background/aims: There have been few multicenter studies on the efficacy of endoscopic hemostatic powder for gastrointestinal (GI) bleeding. We aimed to investigate the clinical outcome of hemostatic powder and independent factors affecting the rebleeding rates in patients who used hemostatic powder.

Methods: This was a retrospective multicenter study. We recruited patients who used endoscopic hemostatic powder (UI-EWD, Nex-powder TM, Next biomedical, Incheon, South Korea) with upper and lower GI bleeding from January 1, 2020 to March 1, 2023. We collected medical record data on the information of patients and bleeding lesion. The primary outcomes were clinical and technical success rates. Secondary outcomes were early (<72hr), delayed (>72hr) rebleeding rates, refractory bleeding, and mortality.

Results: A total of 135 patients (mean age: 67.7±13, male; 74.1%) from five hospitals were enrolled. The upper GI bleeding was 91.9%, and mean size of bleeding lesion was 28.9±19.3mm. The most common indication was peptic ulcer bleeding (51.1%), followed by post-endoscopic mucosal resection/endoscopic submucosal dissection bleeding (22.2%), and tumor bleeding (19.3%). The proportion of initial Forrest classification were as follows: FIa (15.8%), FIb (56.4%), FIIa (21%), and FIIb (6.8%). The clinical and technical success rates were 97%, respectively. The early and delayed rebleeding rates were 19.3% and 11.1%, respectively. The refractory bleeding was 12.6%, and the mortality rate was 8.1%. The factors affecting the early rebleeding rate were initial blood urea nitrogen (BUN) level (OR=1.06; 95% CI, 1.01–1.11; P=0.014), and initial Forrest classification (Forrest Ia, Ib vs. IIa, IIb; OR=5.13; 95% CI, 1.11–23.74; P=0.036).

Conclusions: In the Korean multicenter study, endoscopic hemostatic powder (UI-EWD) showed high clinical and technical success rates. However, we should be aware of rebleeding rates in patients with initial high BUN level and active bleeding in Forrest classification after hemostatic powder therapy.

Keywords: Gastrointestinal bleeding, Hemostatic powder, UI-EWD

POT-36

Systematic review of self-assembling peptides as topical agents in gastrointestinal bleeding

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Background/aims: Gastrointestinal bleeding is a significant and potentially lethal event. We aimed to review the efficiency and safety of self-assembling peptides in the treatment and prevention of bleeding in the gastrointestinal (GI) tract.

Methods: We conducted a systematic search for prospective and retrospective studies describing the endoscopic use of self-assembling peptides for treatment or prevention of bleeding in the GI tract in a parallel, independent fashion. The primary outcomes were the rates of successful initial hemostasis, delayed bleeding, and rebleeding. The secondary outcomes were: adverse events, ease of use, and volume of gel used.

Results: A total of 3 RCTs and 14 observational studies were retrieved for analysis. Overall success rate of SAP in GI bleeding was 87.7% (38–100%), regardless of etiology or associated treatments. Rebleeding rates ranged from 0–16.2%, with a mean of 4.7% and overall delayed bleeding rate was 5% (range 0 - 15.9%). Only 3 adverse events were reported for a pooled number of 815 patients. The volume of gel used varied (0.43 to 3.7 mL) according to indication (hemostasis or prophylaxis) and type of bleeding. Most authors noted the ease of use mainly in a qualitative fashion based on user experience and satisfaction.

Conclusions: The limited available data on use of self-assembling peptides in gastrointestinal endoscopy suggest high efficiency and a good safety profile.

Keywords: Bleeding, Topical agent, Hemostasis, Hemostatic gel

POT-37

Minimal invasive endoscopic method for gastric slow wave detection: In vivo animal study

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Background/aims: Gastric slow waves regulate peristalsis, and gastric dysrhythmias have been implicated in functional motility disorders. Until now, to accurately define slow wave patterns, it is necessary to measure high-resolution serosal recordings during open surgery, which is invasive and limit their application. We therefore devised a novel and noninvasive gastric slow wave mapping device. We aimed to assess feasibility of novel endoscopic device in porcine stomach.

Methods: The device consists of an endoscopic catheter constructed of multiple electrodes. The electrode was designed so that a specific metal was deposited on a substrate. Gastric slow wave signals were acquired using a modified ActiveTwo System (Biosemi, The Netherlands). We analyzed gastric electrical signals from mucosal surface of porcine stomach during endoscopic examination. The velocity and direction of gastric slow wave were measured and calculated.

Results: The catheter was deployed with endoscope and the electrode was modulated to contact gently on the gastric mucosa. Average of measured velocity was 3.45 ± 0.37 cm/s and average time difference was 2.46 ± 0.22 s. V_h was 7.24 ± 1.16 cm/s and V_s was 2.94 ± 0.27 cm/s. Circumferential propagation of slow wave was faster than longitudinal propagation.

Conclusions: It is expected to acquire basic data to study the correlation between the gastrointestinal movement and the flow of electrical signals. This new techniques and findings described here offer new opportunities for endoscopic gastric electrical signal acquisition method in patients with gastric motility disorder.

Keywords: Gastric slow wave, Endoscopic electrode, Functional dyspepsia

POT-38

Artificial intelligence assisted gastric lesion detection and diagnosis system for atypia and dysplasias

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Background/aims: In a real-world clinical setting, final pathologic diagnoses of gastric lesions may differ from initial biopsy results reported on upper gastrointestinal endoscopy. We developed an artificial intelligence (AI) based gastric lesion detection and diagnosis system to reduce the inconsistency.

Methods: We collected retrospective endoscopic images of early gastric cancers (EGCs), dysplasias, and benign lesions from 9300 patients at two tertiary university hospitals and one health promotion center from 2011 to 2021 to develop a gastric lesion detection and diagnosis AI system. We updated the module through various Vision Transformer architectures and evaluated the diagnostic performance of the AI system through two test sets. For the first test set, we evaluated still images of 160 patients with initial biopsy results of regenerative atypia reported from primary clinics or recommended for further evaluation. For the second test set, we newly evaluated stored video data of 139 patients who underwent endoscopic resection for either EGCs or dysplasias.

Results: In the first still image test set, the AI system diagnosed pre-diagnosed gastric lesions with atypia into EGCs, dysplasias, and benign lesions with an accuracy of 75.97% (95% CI: 67.06–84.88). In the second video test set (30 frames per second), the AI system identified dysplasias and cancers with diagnostic accuracy of 85.90% (95% CI: 78.20–93.60) compared to the initial biopsy results' accuracy of 60.28% (95% CI: 52.21–68.36). A total of 54 cases changed final diagnoses from dysplasia to cancer after pathologic review of endoscopic resections. 40 cases were correctly predicted as cancers with AI.

Conclusions: We tested our AI system on both still images and video data and have demonstrated higher accuracy over primary biopsy results.

Keywords: Endoscopic resection, Endoscopy, Artificial intelligence

POT-39

Relieving anxiety through virtual reality prior to endoscopic procedures

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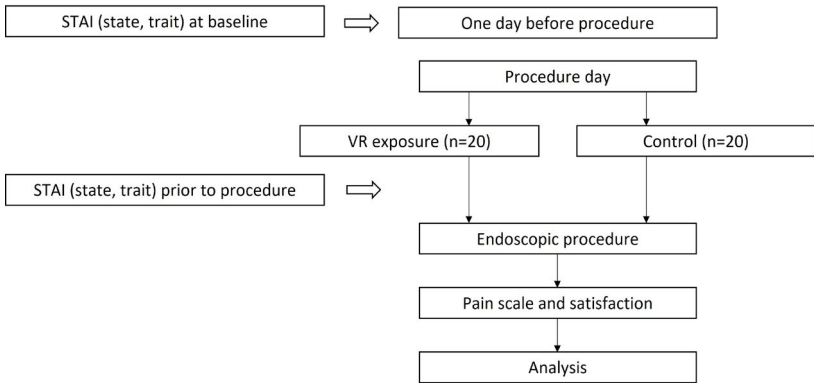
Background/aims: Endoscopic procedures can cause anxiety, which can lead to more uncomfortable, difficult, and incomplete procedures, in addition to greater sedative medication use. We investigate whether exposing patients to virtual reality (VR) prior to endoscopic procedures can reduce their anxiety.

Methods: Forty patients at Gangnam Severance Hospital were enrolled and divided into the VR group and the control group. Patients in the VR group were exposed to VR prior to their procedure to alleviate anxiety.

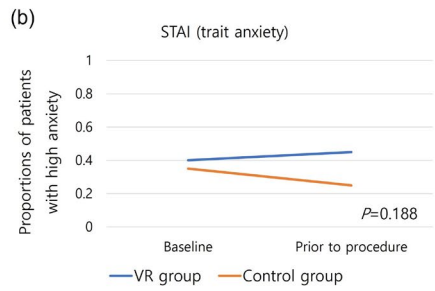
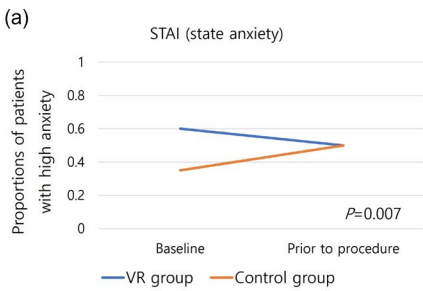
Results: While defining a high anxiety STAI score as ≥ 45 in an STAI-state, the proportion of patients with high anxiety at baseline was 35% and increased to 50% prior to the procedure in the control group. However, in the VR group, the proportion of patients with high anxiety at baseline was 60% and decreased to 50% prior to the procedure. The proportion changes of patients with high anxiety in the STAI-state exhibited a significant difference between the control and VR groups ($P=0.007$). The satisfaction with sedation was significantly greater in the VR group compared to the control group ($P=0.017$).

Conclusions: VR exposure may relieve patients' anxiety prior to endoscopic procedures. VR, an inexpensive, easily available, and non-invasive method, also improved the satisfaction with sedation of endoscopic procedures.

Keywords: Virtual reality, Endoscopy, Procedure, Anxiety, Sedation



Flow chart of the study design.



Comparison of the proportion changes in patients with high anxiety (STAI score ≥ 45) between baseline and prior to the procedure by group.

POT-40

Untutored start in ESD can be safe and successful - An initial, single operator experience from Romania

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Background/aims: ESD is a mainstay of therapeutic endoscopy but requires proper training with expert supervision. An endoscopist is considered competent in gastric ESD after at least 30 tutored procedures. Lack of mentorship or formal training programs in ESD is an ongoing problem in Western countries. We describe the initial experience of a single untutored and unsupervised endoscopist in practising ESD.

Methods: This is a retrospective report of the initial case series of ESD cases performed by a single unsupervised practitioner with 8 years experience of diagnostic and therapeutic endoscopy (complex EMR, ERCP) in a tertiary referral centre in Romania. The practitioner had previously undergone self-study and viewed over 30 live endoscopic procedures, observed 15 gastric ESD cases in a high-volume center, and had cumulated 10 hours of ex vivo porcine model self-training with no supervision. We compare the results with the common benchmarks for proficiency (>90% R0 resection rate, > 9 cm²/h resection speed), report adverse events and describe techniques employed.

Results: A total of 7 ESD cases were performed across 6 months (9.2022–3.2023): 4 in the rectum and 3 in the stomach. The gastric lesions were adenocarcinomas eCuraA and the rectal lesions comprised of 2 high-grade dysplastic serrated lesions and 2 adenocarcinomas of which one was sm2 and referred for further surgical treatment. 2 cases were performed in extremely fibrotic lesions due to excessive previous biopsies or attempted resections and 2 patients were high-risk patients with cirrhosis or anticoagulant treatment. The mean excised lesion size was 12.27 cm². All lesions were complete endoscopic en bloc 100% R0 resections. The mean resection time was 4 hours and the mean resection speed was 3.1 cm²/hour. There were no adverse events during follow-up.

Conclusions: Starting ESD in moderately difficult lesions can be successful and safe in well-controlled untutored environments but extremely long procedural time in initial cases is to be expected.

Keywords: ESD, Endoscopic training, Early cancer

POT-41

KEMA (Kinetic ergonomise based on movement analysis) program for long-term endoscopy practitioners

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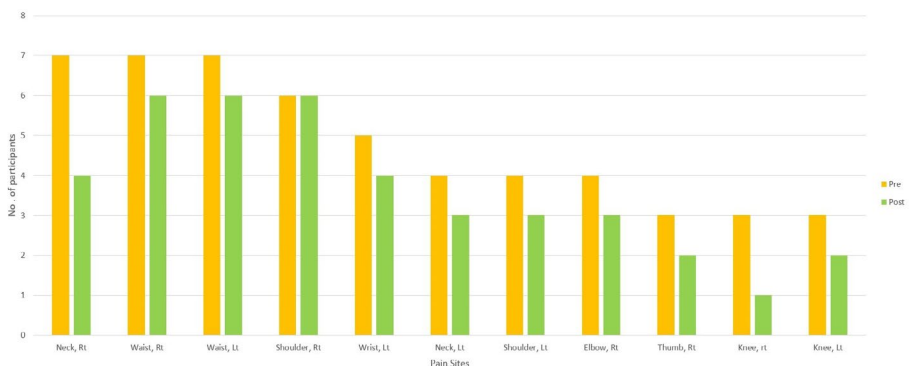
Background/aims: The prevalence and burden of ergonomic musculoskeletal injuries (MSI) among endoscopists are important issues. To evaluate the health status of the musculoskeletal system of long-term endoscopy practitioners. To figure out effectiveness of 16-week intervention of KEMA program, and to establish an individualized MSI restoration plan for endoscopy practitioners.

Methods: 15 endoscopists practicing more than 10 years from 4 tertiary medical centers participated. Comprehensive Static and Dynamic Posture Assessment by physical therapist during endoscopic procedures Each locations of pain on self-perception questionnaire were evaluated: Muscle strength and range of motion of each involved joint. Personalized KEMA program was provided one-on-one for 16 weeks by physical therapists. Re-evaluation at the end of 16 weeks' program: with same questionnaire on musculoskeletal pain and ergonomics understanding. Compared all the answers to the first and last questionnaires.

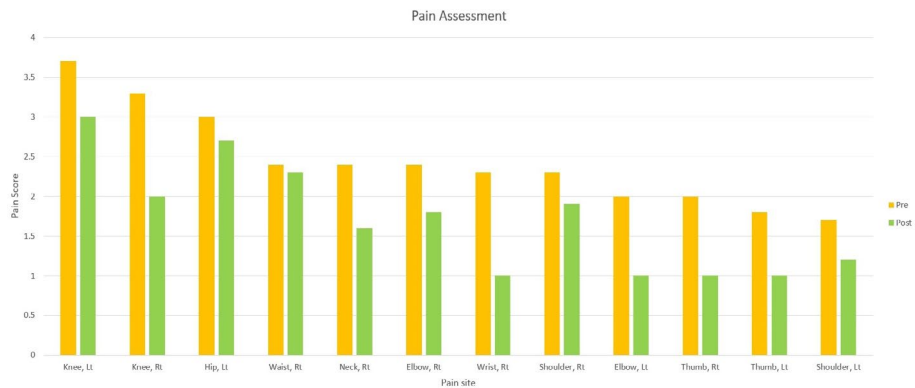
Results: Pre: pain were most commonly found in the right neck and right waist and left knee was the most severe pain site. Post: 60% of pain locations decreased in intensity.

Conclusions: The KEMA program helped GI endoscopists recover from MSI with management of 16 weeks.

Keywords: Musculoskeletal injury, Endoscopist, Ergonomic



Changes in the number of participants with pain



Pain score change

POT-42

Robot assisted gastric ESD significantly improves procedure time in difficult ESD locations

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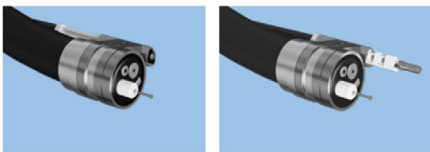
Background/aims: Since its introduction, endoscopic submucosal dissection (ESD) has become a standard treatment for early malignant lesions of stomach. However, ESD is technically demanding and it bears a high risk of complication for beginners. The difficulty of the ESD technique tends to depend on the location of the lesion. We compared and analyzed the efficacy of the ESD assistive robot and ESD simulator in the location where stomach ESD is considered difficult.

Methods: We have developed an automated simulator that can implement ESD locations. An EndoGel was attached to the simulator to implement a virtual gastric location. Robot-assisted ESD or conventional ESD was performed on difficult and easy positions by two ESD trainee endoscopists.

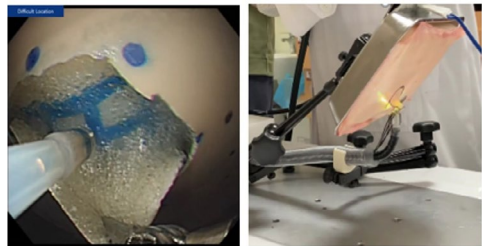
Results: Procedure time was remarkably shorter in robotic ESD than in conventional ESD in difficult positions (6.2 min vs. 10.2 min, $P < 0.05$), mainly because of the faster dissection speed. There was significantly lower blind dissection rate in RESED in difficult positions.

Conclusions: Procedure time was greatly shortened when assistive robots aided gastric ESD procedures in difficult locations. Our robotic device can thus provide simple, effective, and safe multidirectional traction during gastric ESD in difficult location. ESD simulator may be a promising tool for ESD training.

Keywords: ESD, ESD training, Robot, Simulator



ESD assistive robot



ESD simulator

POT-43



Impact of histologic grade of acute gastrointestinal GVHD on outcome in pediatric patients treated with allogeneic HCT

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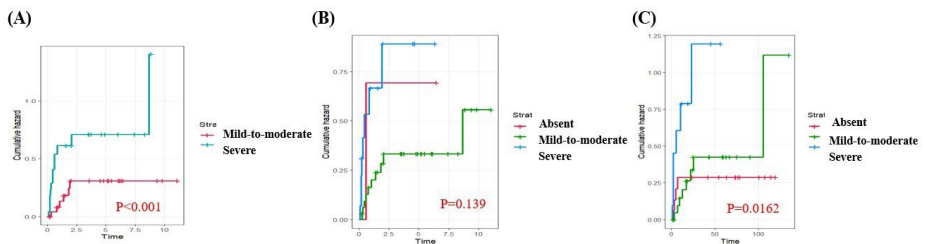
Background/aims: Acute gastrointestinal (GI) graft-versus-host disease (GVHD) after hematopoietic stem cell transplantation (HCT) is a common and life-threatening complication. We aimed to investigate outcomes according to clinical, endoscopic, and histologic GI GVHD grades in pediatric patients treated with allogeneic HCT.

Methods: We performed a retrospective cohort study of pediatric patients who underwent endoscopy for clinical acute GI GVHD within 180 days after allogeneic HCT between 2010 and 2020.

Results: Among 51 patients, 35 patients (68.6%) were male and the median age at HCT was 6.4 years. When patients were classified according to the severity of histologic GI GVHD, severe group showed earlier onset of symptoms, a higher proportion of patients with hematochezia compared to mild-to-moderate, or absent groups. More severe clinical and histologic GI GVHD groups showed higher risk of non-relapse mortality (NRM). The 5-year probabilities of overall survival (OS) rates were 75%, 54.2%, 27.3% in absent, mild-to-moderate and severe histologic GI GVHD groups, respectively. Patients with higher clinical and histologic grade of GI GVHD showed higher NRM.

Conclusions: Higher grade of clinical and histologic GI GVHD are risk factors NRM in pediatric patients treated with HCT. Furthermore, the severity of histologic GI GVHD is a relevant variable affecting OS rates and NRM.

Keywords: Graft-versus-host disease, Gastrointestinal, Hematopoietic stem cell transplantation, Histologic, Pediatric



Non-relapse mortality according to the severity of (A) clinical, (B) endoscopic, or (C) histologic grade

POT-44

Endoscopic band ligation as primary and secondary prophylaxis of esophageal varices in children with portal hypertension

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Background/aims: To study the efficacy and safety of primary and secondary endoscopic prophylaxis of esophageal variceal bleeding in children with extrahepatic portal vein obstruction (EHPVO).

Methods: Fifty-one children aged 3 to 18 years of age with EHPVO included in this study. Between December 2015 and February 2022 all children underwent endoscopic variceal band ligation (EBL). We compared the data on eradication of esophageal varices, incidence of variceal rebleeding, number of endoscopic sessions in two groups. Group A (n=14), children with no history of previous surgical interventions and group B (n=37) patients with unsatisfactory outcome of previously performed open surgical interventions.

Results: The mean age of children with EHPVO at the time of EBL was 11.3±0.55 years. There were no significant differences in the age of cohorts. Five children underwent portosystemic bypass surgery after primary EBL in group A. Rebleeding occurred in 4 (44.4%) patients. In Group B, 37 patients underwent a total of 68 sessions of EBL. Ten patients underwent a single session, 23 two sessions, and four children three sessions of EBL. At follow-up endoscopic examinations, there was a significant reduction of grade of varices between EBL session ($p=0.001$). In group B, 6 (16.2%) children had recurrences of variceal hemorrhages. In one case rebleeding occurred after third session, and in the remaining 5 within one month after endoscopic procedure. There was a significant correlation ($r=0.32$ $p=0.05$) of the presence of "cherry red spots" with rebleeding episodes in group B.

Conclusions: Children with EHPVO who had secondary prophylaxis with EBL had less rebleeding episodes. Presence of sign "cherry red spots" on esophageal varices on endoscopic examination is a risk factor for rebleeding after procedure.

Keywords: Portal hypertension, Endoscopic band ligation, Esophageal varices, Portal vein obstruction, Children

POT-45

A pediatric case of concomitant *H. pylori* infection and eosinophilic gastrointestinal disease

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A seven-year-old girl visited our clinic with chief complaint of severe recurrent vomiting. The vomiting developed several times a month and sometimes severe nausea developed also. She came to refuse to eat foods more and more and the body weight was losing. On physical examination, tenderness on epigastric and periumbilical area was noted without any palpable mass.

Considering the chronic severe gastrointestinal (GI) symptoms with weight loss and progressive anorexia, further evaluation for etiology was done. Urea breath test (UBT) showed positive result, and the esophagogastroduodenoscopy (EGD) showed a deep, active and large ulceration with duodenal deformity and mucosal edema in duodenal bulb. Multiple erosions, nodularities and hyperemic mucosa were noted in stomach. In esophagus, mild furrowing was noted and multiple biopsies were done in duodenum, stomach, and esophagus, respectively.

The pathologic finding showed positivity of *H. pylori* infection and klarithromycin-resistance test also positive (A2143G). The eosinophil count/HPF on endoscopic pathology revealed more than 20 eosinophils/HPF in duodenum, stomach, and esophagus, which meant eosinophilic esophagitis-eosinophilic gastrointestinal disease (EoE-EGID). The eosinophil count was 30 count/HPF in esophagus, >100 count/stomach, and 100 count/duodenum. The duodenal ulcer showed more than 100 eosinophil infiltration/HPF. Treatment started with *H. pylori* eradication with regimen of klarithromycin-resistance, along with food diary and step-up six-food elimination. On food diary investigation, we found out that egg, wheat, peach and apple developed nausea, vomiting and abdominal discomfort. IgE-mediated allergic reaction was also observed with egg, peach, and apple. After one month of treatment, GI symptoms improved and she gained body weight. The follow-up UBT showed negative result.

This case shows that *H. pylori* infection can be coexistent with EGID and manifested with atypical severe GI symptoms. It is not clear that *H. pylori* infection actually aggravated EGID symptom or contributed to the development of EGID initially or vice versa. More investigation is warranted about the related pathophysiology of the two disease entity.

Keywords: *Helicobacter pylori*, Eosinophilic gastrointestinal disease, Children

POT-46

A long-term complications of foreign bodies of the gastrointestinal tract in children

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Background/aims: Foreign bodies (FB) of the upper digestive tract in children is a current problem in the world. Purpose of the study: to study the analysis of the results of diagnostics, to study complications of the digestive tract.

Methods: During the period from 2021 to 2023 in children's surgery department of "Kostanay Regional Children's Hospital" 340 children were hospitalized with upper FB, aged from 6 months to 17 years. Of these, 35 (10.29%) children were diagnosed with Batteries. And 4 (1.18%) were found to have multiple magnetic globules.

Results: In two children with evidence of FB swallowing the history was studied, standard laboratory tests, overview X-ray, upper endoscopy were performed. Child B, 1 year 5 months old, has a FB of the upper third of the esophagus (electric battery (2.0 cm)), fixed. It was removed with a rigid endoscope. The complication was fibrinous ulcerative esophagitis. Granulation flap at the entrance of the esophagus. The second child M, 4 years old, had 25 magnetic globules in L1-L2 projection on X-ray. Endoscopy was performed, FB were found starting from the antral section to the pylorus. Due to magnetic attraction, the FB was removed endoscopically. A complication after discharge was "Endoscopic picture of posttraumatic antral ulcer".

Conclusions: Batteries and magnetic globules are dangerous FB in the gastrointestinal tract of children because they can cause severe, sometimes life-threatening complications. Overview X-ray of the thoracic and abdominal cavity organs should be used for diagnosing the level of metal FB.

Keywords: Metal foreign bodies, Batteries, Children, Complications, X-ray

POT-47

Automatic classification of GI organs in wireless capsule endoscopy using a no-code platform-based deep learning model

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Background/aims: In this study, we developed a deep learning algorithm to classify GI organs (esophagus, stomach, small bowel, and colon) using a no-code platform, applied it to capsule endoscopy (CE) videos, and proposed a novel method to visualize the transitional area of each GI organ.

Methods: We used training data (37,307 images from 24 CE videos) and test data (39,781 images from 30 CE videos) for model development. This model was validated using 100 CE videos that included "normal", "blood", "inflamed", "vascular", and "polypoid" lesions.

Results: Our model achieved overall 0.98 accuracy, 0.89 precision, 0.97 recall, and 0.92 F1 score. When we validated this model to the 100 CE videos, it produced average accuracies for the esophagus, stomach, small bowel, and colon of 0.98, 0.96, 0.87, and 0.87, respectively. Increasing the AI score's cut-off improved most performance metrics in each organ ($p < 0.05$). To locate a transitional area, we visualized the predicted results over time, and setting the cut-off of AI score to 99.9% resulted in a better intuitive presentation than the baseline.

Conclusions: In conclusion, the GI organ classification model demonstrated high accuracy in CE videos. The transitional area could be more easily located by adjusting the cut-off of the AI score and visualization of its result over time.

Keywords: Capsule endoscopy, Artificial intelligence, Automatic organ classification, Automated machine learning

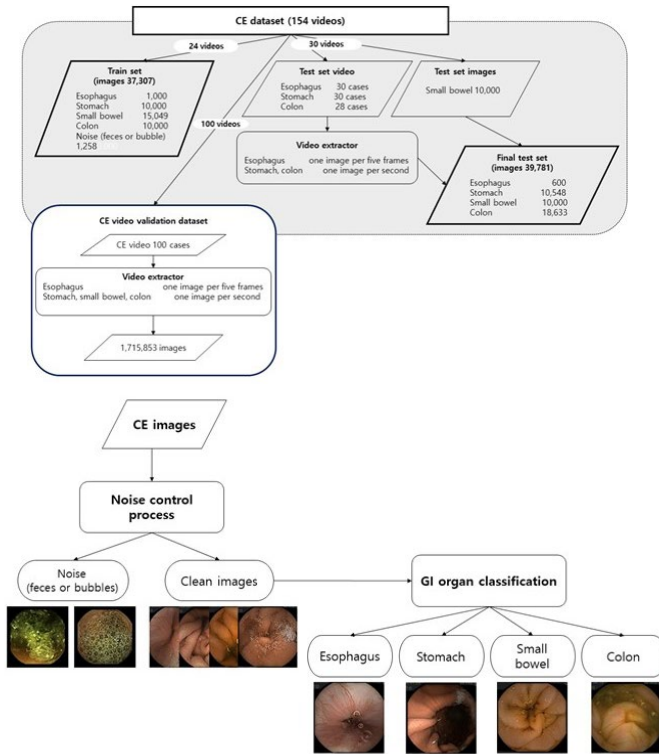
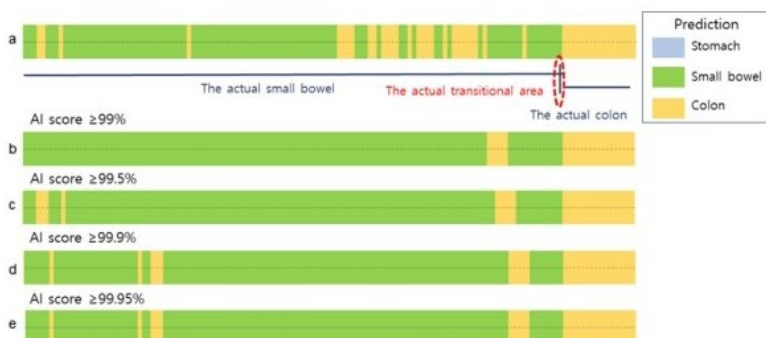


Figure 1. Data collection and model development flow chart

Table. Video application performance of the GI organ classification AI model

AI Score Threshold	GI organ	Accuracy	Sensitivity (Recall)	Specificity	PPV (Precision)	NPV	F1 score
0	Esophagus	0.98	0.98	0.98	0.26	1.0	0.34
	(n=5,340)	(0.97-0.99)	(0.96-0.99)	(0.97-0.99)	(0.20-0.33)	(1.0-1.0)	(0.27-0.41)
	Stomach	0.96	0.89	0.97	0.85	0.97	0.85
	(n=217,974)	(0.95-0.97)	(0.86-0.92)	(0.96-0.99)	(0.80-0.89)	(0.96-0.99)	(0.81-0.88)
	Small bowel	0.87	0.83	0.98	0.98	0.68	0.89
	(n=987,613)	(0.85-0.89)	(0.80-0.85)	(0.97-0.99)	(0.97-0.99)	(0.64-0.73)	(0.88-0.91)
	Colon	0.87	0.95	0.87	0.56	0.97	0.66
	(n=193,276)	(0.85-0.89)	(0.91-0.98)	(0.85-0.89)	(0.50-0.62)	(0.96-0.99)	(0.60-0.71)
	Total	0.92	0.90	0.95	0.63	0.91	0.69
	(n=1,404,203)	(0.91-0.93)	(0.88-0.91)	(0.94-0.96)	(0.59-0.67)	(0.89-0.92)	(0.66-0.72)
≥99.9%	Esophagus	0.99	0.99	0.99	0.72	1.0	0.77
	(n=4,135)	(0.98-1.0)	(0.97-1.0)	(0.98-1.0)	(0.65-0.80)	(1.0-1.0)	(0.70-0.84)
	Stomach	0.98	0.95	0.98	0.95	0.99	0.94
	(n=128,737)	(0.96-1.0)	(0.92-0.98)	(0.96-1.0)	(0.92-0.98)	(0.99-1.0)	(0.91-0.97)
	Small bowel	0.94	0.92	0.99	1.0	0.83	0.95
	(n=638,053)	(0.93-0.96)	(0.90-0.94)	(0.99-1.0)	(0.99-1.0)	(0.80-0.87)	(0.94-0.97)
	Colon	0.94	0.97	0.94	0.75	0.99	0.82
	(n=133,981)	(0.92-0.96)	(0.94-1.0)	(0.92-0.95)	(0.70-0.81)	(0.97-1.0)	(0.77-0.87)
	Total	0.96	0.95	0.98	0.80	0.95	0.87
	(n=904,906)	(0.96-0.97)	(0.93-0.96)	(0.97-0.98)	(0.77-0.84)	(0.94-0.97)	(0.85-0.90)

Figure 3. The transitional area between the stomach and small bowel**Figure 4. The transitional area between the small bowel and colon**

Video application performance of the GI organ classification AI model

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