제74차
한국췌장외과학회 학술대회

The 1st Korean Pancreas Surgery Club and
Japanese Society of Pancreatic Surgery Joint Symposium

일시 | 2023년 11월 25일(토) 08:50-17:50

장소 | 이화여자대학교 의과대학 계림홀

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한국췌장외과학회
Korean Pancreas Surgery Club

Medtronic

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Easier Cleaning.[1,§]
Greater Efficiency.[2,†]

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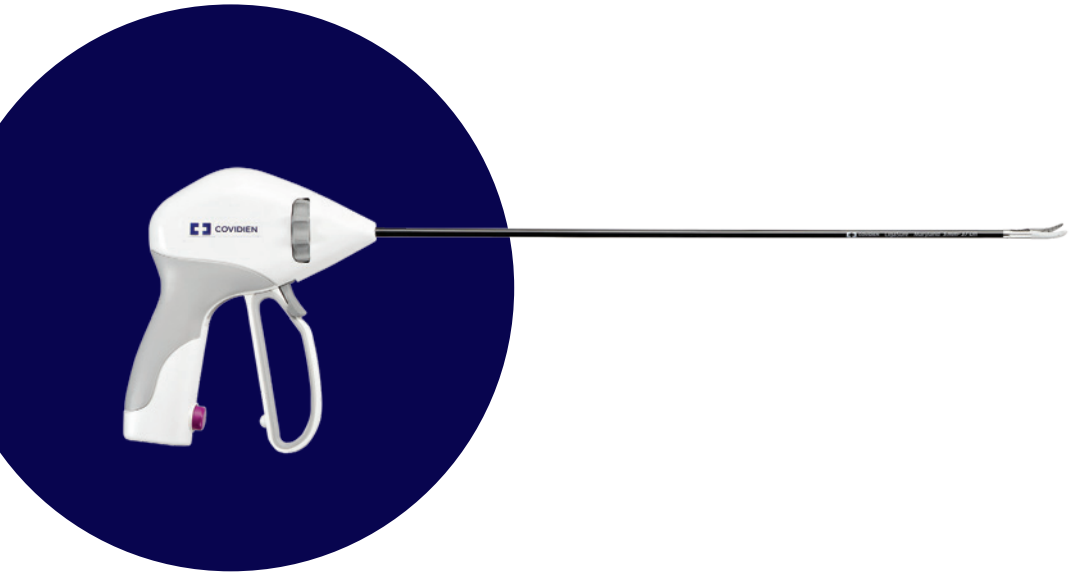
Laparoscopic Sealer / Divider



The reliable performance of Ligasure vessel-sealing technology,
Now with non stick nano-coating on the jaws

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국내 혈장 유래 수술용 지혈제 시장점유율 1위[1)]

신속한 응고작용 | 조직접착 및 지혈작용 | 내시경적 시술에 사용 가능

그린플라스트 큐는 체내 혈액 응고시스템과 동일한 방식으로 지혈작용을 하는 생리적 조직접착제입니다 [2)]

Greenplast Q pre-filled syringe kit

그린플라스트 큐

프리필드시린지 키트

1) IMS data (Fibrin sealants, 2019). 2) J Korean Med Assoc. 2014;57(7):609-613.

Does **PONV** still Remain unsolved?

PONV, Post Operative Nausea & Vomiting

Feel the **difference** with **Ramosetron**

[수입판매원]

Daiichi-Sankyo

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Injection
Nasea®
ramosetron hydrochloride

나제아®주사액 0.3mg [주성분] 1앰플(2mL) 중 라모세트론 염산염 0.3mg 함유 **[효능·효과]** 1. 항암제(시스플라틴 등) 투여로 인한 구역 및 구토의 방지 2. 수술 후 구역 및 구토의 방지 **[용법·용량]** 성인: 라모세트론 염산염으로서 1일 1회 0.3mg을 정맥투여한다. 효과가 불충분할 경우에는 동일한 용량을 추가 투여할 수 있다. 단 1일량으로 0.6mg을 초과하지 않도록 한다. 증상에 따라 적절히 증감한다. **[사용상 주의사항] [경고]** 앰플주사제는 용기 절단시 유리파편이 혼입되어, 부작용을 초래할 수 있으므로 사용시 유리파편 혼입이 최소화 될 수 있도록 신중하게 절단 사용하되, 특히 어린이, 고령자 사용시에는 각별히 주의할 것 **[금기]** 이 약 또는 이 약의 다른 성분에 과민반응을 나타내는 환자 **[신중투여]** 다른 세로토닌성 약물(선택적 세로토닌 재흡수 억제제(SSRI)와 세로토닌 노르아드레날린 재흡수 억제제(SNRI) 등)을 투여 받고 있는 환자 **[이상반응]** 1) 이 약의 개발국인 일본에서 허가시까지의 임상시험에서는 352명 중 18명(5.1%)에서, 시판후 사용성적 조사 및 시판후 임상시험에서는 3,464명 중 260명(7.5%)에서 임상시험 검사치의 이상을 포함한 이상반응이 확인되었다. (1)중대한 이상반응: 쇼크, 아나필락시스 유사증상, 간질유사발작 (2)기타의 이상반응: 간기능이상 및 두통, 변비 등 2) 국내에서 재심사를 위하여 6년 동안 3,118명(15세 이하 소아환자 69명 포함)을 대상으로 실시한 시판 후 조사결과 이상반응의 발현율은 1.51%(47례, 60건/3,118례)로 보고되었다. **[상호작용]** 이 약은 주로 간의 약물대사 효소 CYP1A2 및 CYP2D6에 의해 대사되므로 플루복사민과 병용 투여시 CYP1A2 저해 작용에 의해 혈중농도 상승으로 인한 이상반응이 증강될 위험이 있으므로 주의한다. **[제조원]** Nipro Pharma Corporation, Ise Plant **[개정년월일]** 2019년 12월10일

본 정보는 요약된 일부의 정보입니다. 따라서 최신 변경된 허가사항이나, 자세한 사항은 당사 홈페이지(www.daiichisankyo.co.kr)나 의약품안전나라(nedrug.mfds.go.kr)의 의약품 정보를 참고해 주십시오.

P23-142-2025.06-V1

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Korean Pancreas Surgery Club

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PROGRAM

13:20–14:10	**Master's Secret Recipe for Handling Extremely Difficult Situations during Surgery** (Korean) Chairs: In Seok Choi (Konyang Unviersity Hospital, Korea) Jinseok Heo (Samsung Medical Center, Korea)	
13:20–13:50	Special Tips for Cholecystectomy — Jae-Do Yang (Jeonbuk National University Hospital, Korea)	108
13:50–14:10	Discussion Discussant *Daegwang Yoo, Seung Soo Hong, Yeongsoo Jo*	
14:10–15:50	**The 1st Korean Pancreas Surgery Club and Japanese Society of Pancreatic Surgery Joint Symposium** (English) Chairs: Yosuke Inoue (Cancer Institue Hospital, Japan) Joon Seong Park (Gangnam Severance Hospital, Korea)	
14:10–14:30	Role of Neoadjuvant or Perioperative Chemotherapy for Resectable Pancreatic Cancer Jin-Young Jang (Seoul National University Hospital, Korea)	112
14:30–14:50	Recent Updates on Conversion Surgery in Japan Yosuke Inoue (Cancer Institute Hospital, Japan)	114
14:50–15:10	Comparison of Infectious Complications after Spleen Preservation versus Splenectomy during Laparoscopic Distal Pancreatectomy Yoo-Seok Yoon (Seoul National University Bundang Hospital, Korea)	116
15:10–15:30	Current Situation of MIS Pancreas Surgery and the Role of Robotic Surgery Shingo Kozono (Tokyo Medical University, Japan)	134
15:30–15:50	Discussion Discussant *Mi-Rin Lee, Ji Su Kim, Hyun-Jeong Jeon*	
15:50–16:00	Coffee break	
16:00–17:20	**Champion's League: Case Presentation of Junior Surgeons from Korea and Japan** (English) Chairs: Shingo Kozono (Tokyo Medical University, Japan) Wooil Kwon (Seoul National University Hospital, Korea)	
16:00–16:15	Long-term clinical course in a patient with pancreatic cancer with liver metastasis who underwent cytoreductive surgery Hye-Sol Jung (Seoul National University Hospital, Korea)	138
16:15–16:30	Usefulness of Left Posterior Artery-First Approach using a Scope Transition Method during Pancreaticoduodenectomy Sho Kiritani (Cancer Institute Hospital, Japan)	140
16:30–16:45	Is Prolonged Adjuvant Treatment Justified After Surgery for Initially Inoperable Pancreatic Cancer Achieving R0 Resection Following Favorable Neoadjuvant Chemotherapy Response: A Dilemma of Timing and Surgical Decision? Jae Seung Kang (Korea University Guro Hospital, Korea)	143
16:45–17:00	Difference in Bacterial Infections Related to Pancreatic Fistula between Pancreaticoduodenectomy and Distal Pancreatectomy Moe Matsumoto (Tokyo Medical University, Japan)	145
17:00–17:15	Xanthogranulomatous pancreatitis — Yoo Jin Choi (Korea University Anam Hospital, Korea)	147
17:15–17:40	Discussion Discussant *Hee Ju Sohn, Hyung Sun Kim, Jung Min Lee, Yoonhyeong Byun, Mirang Lee*	
17:40–17:50	Awards & Closing Ceremony Jin-Young Jang (President of KPSC, Seoul National University Hospital, Korea)	

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제74차
한국췌장외과학회 학술대회

Diving into Pancreatic-Biliary Guidelines & Engraving in Your Brain!

Chairs:

Jae Hoon Lee (Asan Medical Center, Korea)

Kwangyeol Paik (Catholic University Yeouido ST. Mary's Hospital, Korea)

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Korean Pancreas Surgery Club

연/자/소/개

Curriculum Vitae

Yeongsoo Jo

Department of Surgery,
Ewha Womans University Seoul Hospital, Seoul, Korea

- **Educational background**

2007.03–2013.02	Medicine, M.D.: Seonam University College of Medicine, Namwon-si, Jeollabuk-do, Republic of Korea
2021.09–	General Surgery, M.M.Sc.: Seoul National University College of Medicine, Seoul, Republic of Korea

- **Military Serving**

2018.02–2022.04	Medical Officer, The 11th Special Forces Brigade, ROK Army Special Forces (ROK-SF)

- **Training**

2013.03–2014.02	Internship, Ulsan University Hospital, Ulsan, Republic of Korea.
2014.03–2018.02	Residency, General Surgery: Ulsan University Hospital, Ulsan, Republic of Korea.
2021.05–2023.02	Clinical Fellowship, Hepato-Biliary-Pancreatic Surgery and Liver transplantation: Seoul National University Bundang Hospital, Seongnam-si, Gyeonggi-do, Korea.

- **Current affiliation**

2023.03–	Clinical assistant professor: Department of Surgery, Ewha Womans University Seoul Hospital

Guidelines for Pancreas Cancer: Comparison of NCCN, JPS, ESMO and KAHBPS

Yeongsoo Jo (Ewha Womans University Seoul Hospital, Korea)

연/자/소/개

Curriculum Vitae

Seung Soo Hong

Division of Hepatobiliary and Pancreatic surgery,
Department of Surgery, Yonsei University College of Medicine, Seoul, Korea

- **Educational & Career**

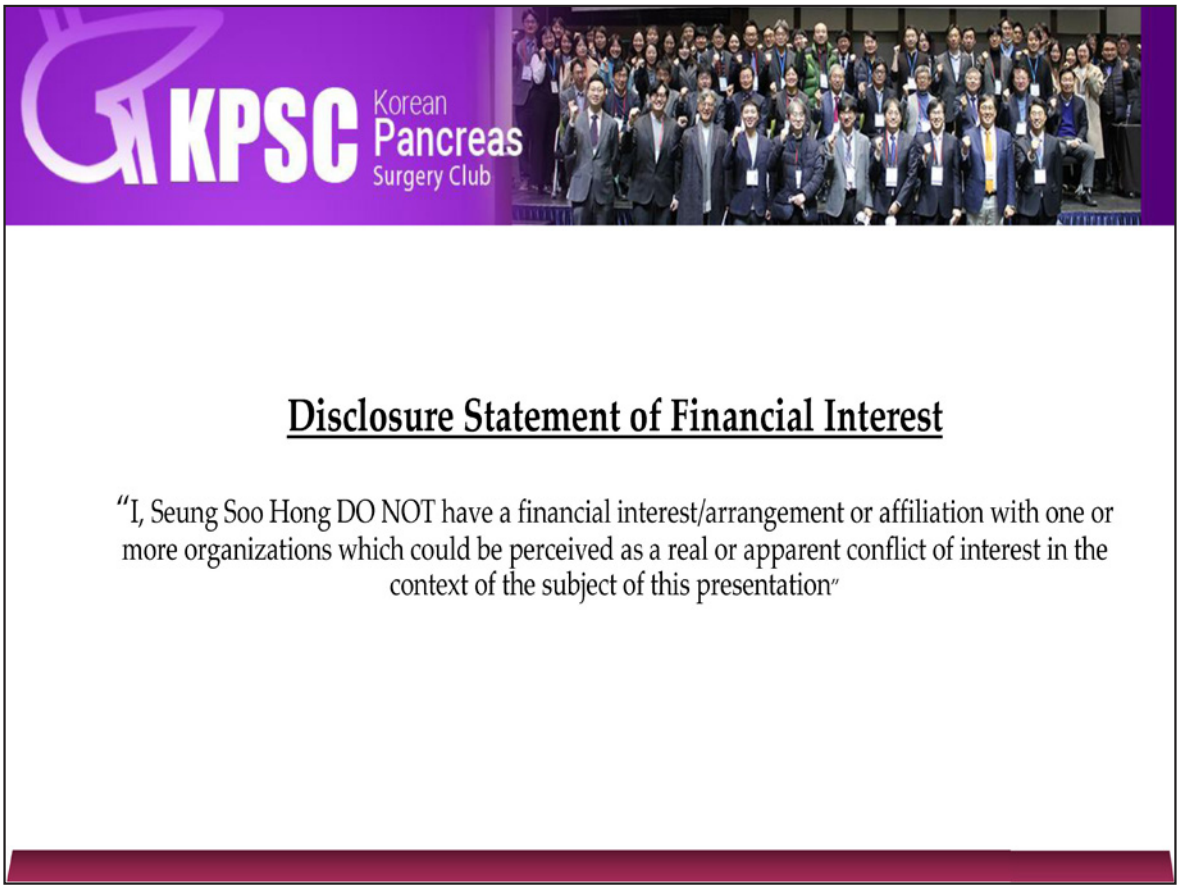
2012	Graduated Yonsei University College of Medicine, Seoul, Korea
2012–2015	Mandatory military service as public health doctor
2015–2016	Intern-ship in Yonsei University Health System, Seoul, Korea
2016–2020	Resident-ship of department of surgery, Yonsei University College of medicine (Yonsei University Health System)
2020–2022	Fellow-ship of division of hepatobiliary and pancreatic surgery, department of surgery, Yonsei University College of medicine
2022–	Clinical assistant professor, Department of Surgery, Yonsei University College of medicine

- **Major research field**

Hepato-biliary and pancreatic cancer surgery
Other benign hepato-biliary and pancreatic surgery
Minimally invasive (robotic & laparoscopic) pancreatic surgery

Practical Application of Pancreas Cancer Guidelines Focusing on Actual Clinical Situation

Seung Soo Hong (Yonsei University Severance Hospital, Korea)



Practical Application of Pancreas Cancer Guidelines

- Is it true cancer? – Consult for biopsy
- Is it resectable? – Design of resection
- Unexpected operative findings
- PPPD or DP ? – neck cancer
- Boundary of M1 disease – boundary of resectable disease
- Difficult situations
  - Is DP safe after STG ?
  - Hematochezia after mesocolon shaving
  - Operation of malnutritionized patient due to small bowel obstruction
  - Duodenal cancer additional to lymphoma
  - MIS in octagenerians

Practical Application of Pancreas Cancer Guidelines

Is it true cancer? – Consult for biopsy

Pancreatic cancer biopsy for diagnosis

Tissue Acquisition

- **EUS-guided needle biopsy is the preferred mode of obtaining tissue for diagnosis of pancreatic ductal adenocarcinoma (PDAC).**
- **Preferably, a latest generation ("core") EUS needle should be used.**
- **Image-guided biopsy methods (CT, ultrasound) are preferred for liver lesions suspicious of metastasis.**
- **The preferred biopsy target should be the lesion that will provide the highest stage (eg, metastatic lesions).**
- **In metastatic PDAC, enough tissue should be obtained for NGS a**
- **For all needle biopsies, if safe and feasible, two extra needle pas sses, and stored for future NGS analysis if needed.**

- The accuracy of EUS-FNB : A recent s
- How about for recent 10%?
  - Invisible in EUS
  - Unable to approach due to vessels
  - Anatomical problem
  - Insufficient tissue
  - Chronic pancreatitis

for : dignostic lapa 로 f/u consult 드립니다.

상기 62세 여환 검진 중 발견된 복수 소견으로 시행한 APCT 상 R/O Pancreatic head mass 소견보여 본원 refer 된 자로, 본원에서 시행한 image study 상 R/O Pancreatic head cancer with major vassel, mesenteric involvement 진단하 금번 EUS-FNB for tissue confirm 시행위해 입원한 자입니다.

EUS-FNA 상 duodenal varix 소견으로 시술적 진단 어려운 상태로 diagnosis 위한 진단적 복강경 상의 드

현재 본과적으로 PV stent insertion, 다음주 초 경으로 수술 연기 위해 귀 일정 조정 위해 f/u consult 의뢰드립

For surgical biopsy (필요하다면 수술적 절제 가능성)

상기 55세 남환 HTN, Dyslipidemia, Ankylosing spondylitis 과거력 있는 분으로 pancreatic mass 에 대해 PDAC 의심하 두차례 EUS-FNB 시행한 환자입니다. 두차례 모두 negative for malignancy 소견 보인 환자로 surgical biopsy 의뢰드립니다. 필요하다면 수술적 절제도 가능할지 문의 드립니다.

*Yousaf MN, Chaudhary FS, Ehsan A, Suarez AL, Muniraj T, Jamidar P, Aslanian HR, Farrell JJ. Endoscopic ultrasound (EUS) and the management of pancreatic cancer. BMJ Open Gastroenterol. 2020 May;7(1):e000408. doi: 10.1136/bmjgast-2020-000408. PMID: 32414753; PMCID: PMC7232396.

Pancreatic cancer biopsy for diagnosis

- M/59, r/o PDAC, uncinate, BRPC (2022/12/13)

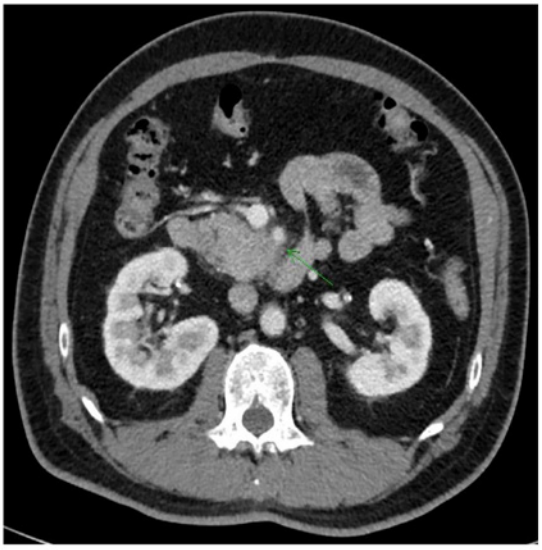
For Surgical biopsy 상의드립니다

상환 HTN, DM, CKD, Liver cirrhosis, Dyslipidemia, s/p CABG (2015) 과거력 있는 분으로 복통 지속되어 타병원에서 시행한 검사상 pancreas uncinate process에 cancer 의심되어 further evaluation 위해 입원하신 분입니다.

pathology confirm 필요하여 EUS-biopsy 2차례 시도하였으나 위치 상 내시경적으로 biopsy 불가능하다는 최종 답변 받았고 영상의학과 협진 통해 US-biopsy 가능할지 상의드렸으나 위치 상 불가능하다는 답변 받은 분입니다.

상기 사유로 귀과적으로 surgical biopsy 가능할 지 상의드리고자 협진 의뢰 드리오니 바쁘신 가운데 고진선져 부탁드립니다. 감사합니다.

** APCT 상 R/O Pancreatic cancer, uncinate, borderline resectable 소견 있는 분입니다.
** 2015년 타병원에서 CABG 과거력 있다고 하여 aspirin, plavix 복용 중에 있었으나 시술 가능성으로 2주간 hold 하였고 심장내과 협진 하 aspirin 재개한 상태입니다. (LAD restenosis 확인되었습니다) 수술일 예정되면 hold 하도록 하겠습니다.



Ill-defined hypoenhancing area in the pancreas head uncinate, 2.5cm, with retropancreatic infiltration, abutment of SMA and jejujnal branch of SMV, borderline resectable (CA 19-9: 23.6)

Pancreatic cancer biopsy for diagnosis

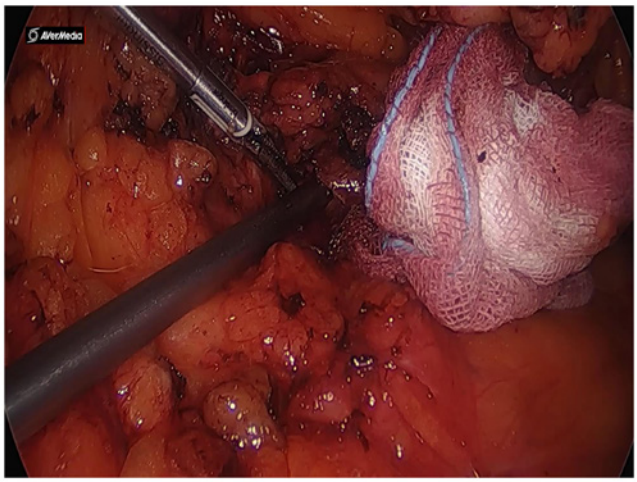
- Operation note (2022/12/13)

2022-12-13 elective
laparoscopic pancreas biopsy

uncinate portion dissection 하여 punch biopsy 진행함.

GEA

laparoscopic approach
omentum division 후 gastro-colic ligament 확인하였음
pancreas upper margin 과 lower margin 확인 후
portal vein 및 SMV dissection 하여 uncinate portion 확인함.
SMV 옆쪽에 두번 biopsy 하여 하나는 frozen 확인하였고 free 확인되어
SMV 뒤쪽으로 dissection 더 하여 biopsy 두번 더 진행함.
bleeder ligation 후 수술종료 함.

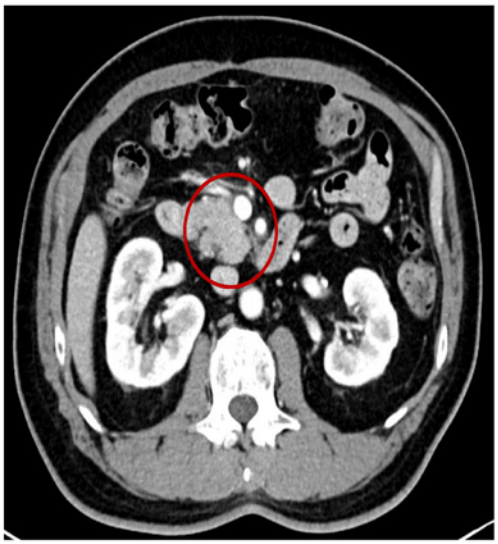


[Pathological Diagnosis]
[Final report]
A. Pancreas #1: Bland-looking pancreatic acinar cells
B. Pancreas #2: Mainly bland-looking pancreatic acinar cells with few atypical cells, see note.
C. Pancreas #3: Bland-looking pancreatic acinar cells

Note)
1. 본 생검조직내에 악성종양의 증거는 저명하지 않습니다. Clinical correlation 바랍니다.

Pancreatic cancer biopsy for diagnosis

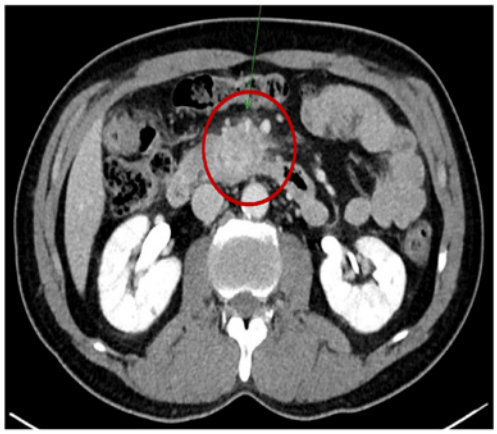
- 1 year follow up - No newly appearing lesion in the abdomen

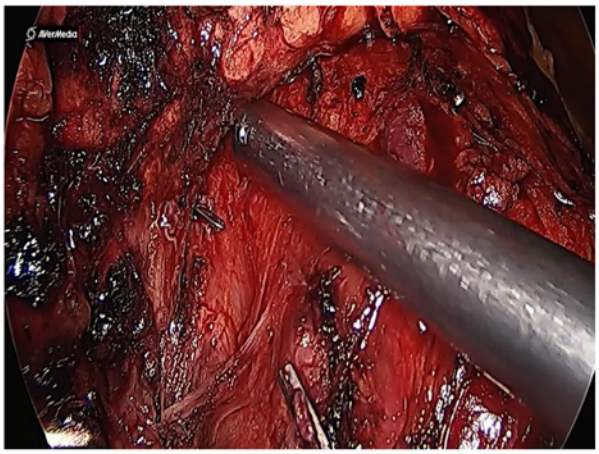


Pancreatic cancer biopsy for diagnosis

- M/55
  - 3.5cm mass in pancreatic uncinated process, BRPC
  - EUS-Bx negative 2 times
  - CA19-9: 30.4

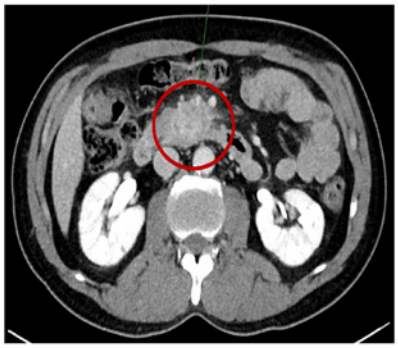
Laparoscopic biopsy (2023/3/22)





Pancreatic cancer biopsy for diagnosis

- M/55
  - 3.5cm mass in pancreatic uncinated process, BRPC
  - EUS-Bx negative 3 times
  - CA19-9: 30.4

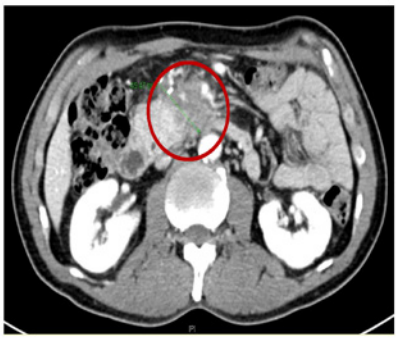


3 month later

[Name Of Operation]
Pancreas, needle biopsy

[Pathological Diagnosis]
A. Pancreas biopsy 1번 : Fibrovascular tissue
B. Pancreas biopsy 2번 : Bland-looking pancreas parenchymal tissue
C. Pancreas biopsy 3번: Bland-looking pancreas parenchymal tissue

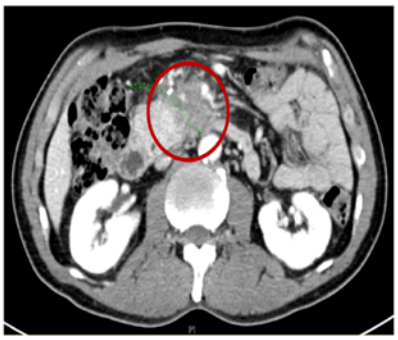
Note) Serial section을 제작하여 확인하였으나, 본 생검조직내에 악성세포는 관찰되지 않습니다.



Probably growing malignancy, 4.2cm -> 4.5cm, in pancreatic uncinated process to mesentery
-encasement of SMV/SMA, duodenal 3rd portion invasion
-DDx: desmoid tumor, IgG4-RD, CA 19-9: 87.8

Pancreatic cancer biopsy for diagnosis

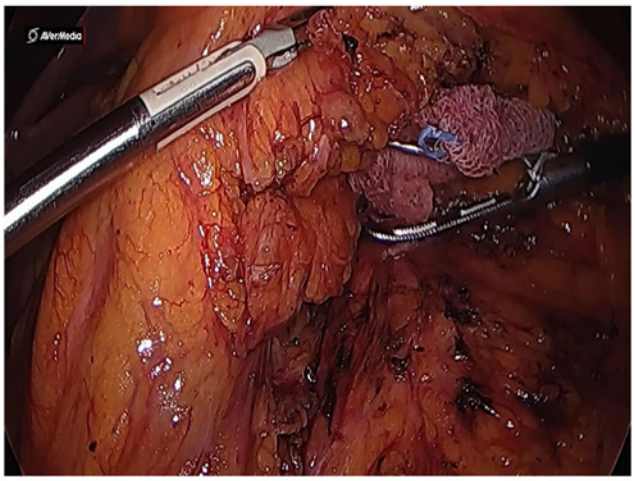
- M/55
  - Probably growing malignancy, 4.2cm -> 4.5cm, in pancreatic uncinated process to mesentery
  - -encasement of SMV/SMA, duodenal 3rd portion invasion
  - -DDx: desmoid tumor, IgG4-RD, CA 19-9: 87.8



- Open surgical biopsy (2023/05/15)
  - No seeding
  - Pancreatic cancer of uncinated process with invasion to colon mesentery, SMV, SMA – unresectable
  - Pancreatic mass는 core에 cancer와 주변부 inflammation이 동반되어 있는것으로 생각됨.
  - Excisional biopsy
    - #1: FFT
    - #2: FFT
    - #3: multifocal lymphoid aggregates with fibrosis
  - Gun biopsy
    - #4 presence of adenocarcinoma

Pancreatic cancer biopsy for diagnosis

- F/63
  - r/o PDAC with ascites
  - EUS try fail due to duodenal varix
  - CT : r/o PDAC, 1.9cm, head of pancreas
    - CA, SMA, SMV, PV encase
    - Cavernous transformation of the PV



Pancreatic cancer biopsy for diagnosis

- F/63
  - r/o PDAC with ascites
  - EUS try fail due to duodenal varix
  - CT : r/o PDAC, 1.9cm, head of pancreas, CA, SMA, SMV, PV encase
    - Cavernous transformation of the PV

검체명	임상의사	진단코드	진단명
Other liver biopsy(liver metastasis있는지 봐 주세요.)	G6/홍승수	FFT (Free from tumor)	
Other pancreas biopsy	G6/홍승수		No definite histological evidence of malignancy
Other pancreas biopsy 2	G6/홍승수		No definite histological evidence of malignancy
Other par			lence of malignancy
Other par			lence of malignancy
Other par			lence of malignancy
Other les			
Other par			lence of malignancy
Other par			lence of malignancy
Other Otl			lence of malignancy
Other Otl			lence of malignancy
Other Otl			tervening gland. frozen 단이 어렵습니다. 최종진단

[Name Of Operation]
Liver, frozen biopsy
Pancreas, frozen biopsy

[Pathological Diagnosis]
[Final report]
Liver: Focal fibrosis without tumor cells

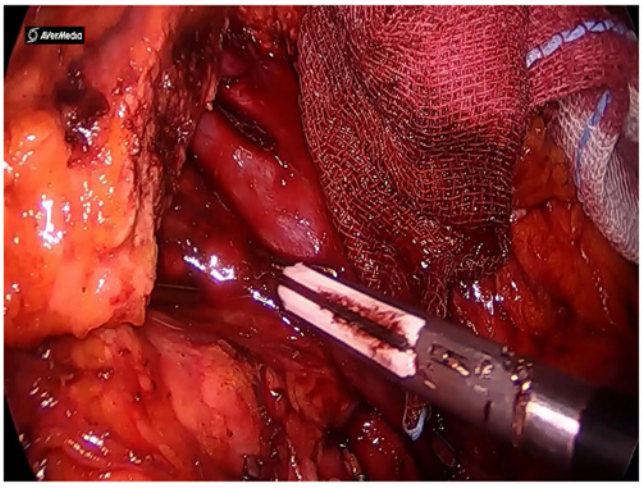
Pancreas: Chronic pancreatitis
Pancreas 2: Atypical glandular cells, suspicious for adenocarcinoma
Pancreas 3: Atypical glandular cells, suspicious for adenocarcinoma
Pancreas 4: A few atypical glands in fibrotic stroma
Pancreas 5: Atypical glandular cells, suspicious for adenocarcinoma

Labeled "lesser sac": Free of carcinoma
Pancreas 6: A few atypical glandular cells
Pancreas 7: Atypical glandular cells in fibrotic stroma, suspicious for adenocarcinoma
Pancreas 8: Atypical glandular cells, suspicious for adenocarcinoma
Pancreas 9: A few atypical cells
Pancreas 10: A few atypical glands, suspicious for adenocarcinoma

Pancreatic cancer biopsy for diagnosis

- F/73
  - s/p AoV adenoma, endoscopic resection 2 times
  - CT: 3.1cm hypoenhancing mass in pancreas head, r/o PDAC
  - Pancreatic cancer evaluation
    - ERCP AoV Bx: HGD
    - EUS Bx of pancreas: (-) for cancer, CA19-9: 7.3

Laparoscopic PPPD (2023/05/08)



Pancreatic cancer biopsy for diagnosis

- F/73
  - s/p AoV adenoma, endoscopic resection 2 times
  - CT: 3.1cm hypoenhancing mass in pancreas head, r/o PDAC
  - Pancreatic cancer evaluation
    - ERCP AoV Bx: HGD
    - EUS Bx of pancreas: (-) for cancer
    - CA19-9: 7.3

[Name Of Operation]
Pancreas, duodenum, common bile duct and gallbladder, pylorus preserving pancreaticoduodenectomy

[Pathological Diagnosis]
Ampulla of Vater: Adenocarcinoma, well differentiated, arising in Intra-ampullary papillary tubular neoplasm (IAPN), see note.

◇ Gross type: Protruding
◇ Histopathological type: An additional report will follow after immunohistochemical staining.
◇ Size (including dysplasia): 1.7x0.6cm
◇ Size (invasive carcinoma): upto 0.2cm
◇ Tumor extent: Tumor limited to ampulla of Vater/or sphincter of Oddi (pT1a)
◇ Lymphovascular invasion: Not identified
◇ Perineural invasion: Not identified
◇ Associated lesion: 1. Pancreatic intraepithelial neoplasia (PanIN), low to high grade 2. Chronic pancreatitis

◇ Resection margins
- Common bile duct: Free of dysplasia (safety margin: 0.5cm)
- Pancreatic parenchymal and duct margin: Free of dysplasia (safety margin: 5.8cm)
- SMA margin (retroperitoneal): Free of dysplasia (safety margin: 0.7cm)
- SMV/PV groove: Free of dysplasia (safety margin: 2.5cm)
- Anterior surface: Free of dysplasia (safety margin: 1.2cm)
- Posterior surface: Free of dysplasia (safety margin: 2.1cm)
- Duodenum, proximal: Free of dysplasia (safety margin: 9.5cm)
- Duodenum, distal: Free of dysplasia (safety margin: 16.0cm)

Pancreatic cancer biopsy for diagnosis

- Conclusions
  - PDAC is surrounded by inflammation, Gun biopsy is efficient for core biopsy.
  - Always differentiate the diagnosis with chronic pancreatitis
  - Cancer negative results cannot always rule out the malignancy, follow up is needed.
  - Frozen results can be changed in the final pathologic report.
  - If suspicious lesions belongs to resection boundary , radical resection can be possible without biopsy.
  - Open surgical biopsy is also appropriate for accurate diagnosis.

Practical Application of Pancreas Cancer Guidelines

Is it resectable? – Design of resection

Is it resectable ? Design of resection

CRITERIA DEFINING RESECTABILITY STATUS AT DIAGNOSIS[a]

• Decisions about resectability status should be made in consensus at multidisciplinary meetings/discussions.

Resectability Status	Arterial	Venous
Resectable	• No arterial tumor contact (celiac axis [CA], superior mesenteric artery [SMA], or common hepatic artery [CHA]).	• No tumor contact with the superior mesenteric vein (SMV) or portal vein (PV) or ≤180° contact without vein contour irregularity.
Borderline Resectable[b]	Pancreatic head/uncinate process: • Solid tumor contact with CHA without extension to CA or hepatic artery bifurcation allowing for safe and complete resection and reconstruction. • Solid tumor contact with the SMA of ≤180°. • Solid tumor contact with variant arterial anatomy (ex: accessory right hepatic artery, replaced right hepatic artery, replaced CHA, and the origin of replaced or accessory artery) and the presence and degree of tumor contact should be noted if present, as it may affect surgical planning. Pancreatic body/tail: • Solid tumor contact with the CA of ≤180°.	• Solid tumor contact with the SMV or PV of >180°, contact of ≤180° with contour irregularity of the vein or thrombosis of the vein but with suitable vessel proximal and distal to the site of involvement allowing for safe and complete resection and vein reconstruction. • Solid tumor contact with the inferior vena cava (IVC).
Locally Advanced[b,c]	Head/uncinate process: • Solid tumor contact >180° with the SMA or CA. Pancreatic body/tail: • Solid tumor contact of >180° with the SMA or CA. • Solid tumor contact with the CA and aortic involvement.	• Unreconstructible SMV/PV due to tumor involvement or occlusion (can be due to tumor or bland thrombus).

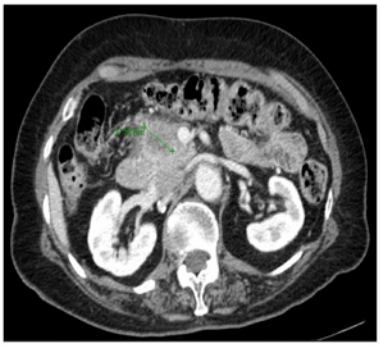
No vascular resection VS Tangential resection VS Segmental resection of SMV-PV

Design of resection

F/77
- 2.8cm, PDAC, head, abutting SMV-PV
- s/p #1 FOLFIRINOX
- CA 19-9: 1324.6

M/53
- 3.4cm, PDAC, head, abutting SMV 1st br.
- Upfront surgery
- CA 19-9: 72.6

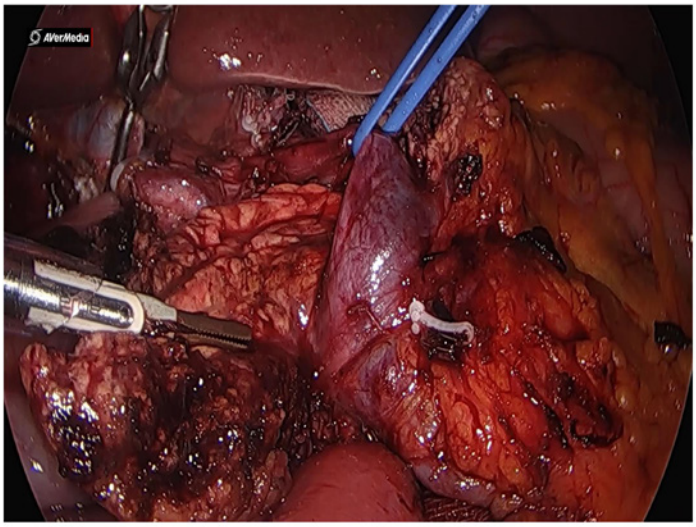
M/51
- 2.1cm, PDAC, head, abutting SMV??
- s/p #8 FOLFIRINOX
- CA 19-9: 40.5



Design of resection

F/77
- 2.8cm, PDAC, head, abutting SMV-PV
- s/p #1 FOLFIRINOX
- CA 19-9: 1324.6

Laparoscopic PPPD (2023/03/13)

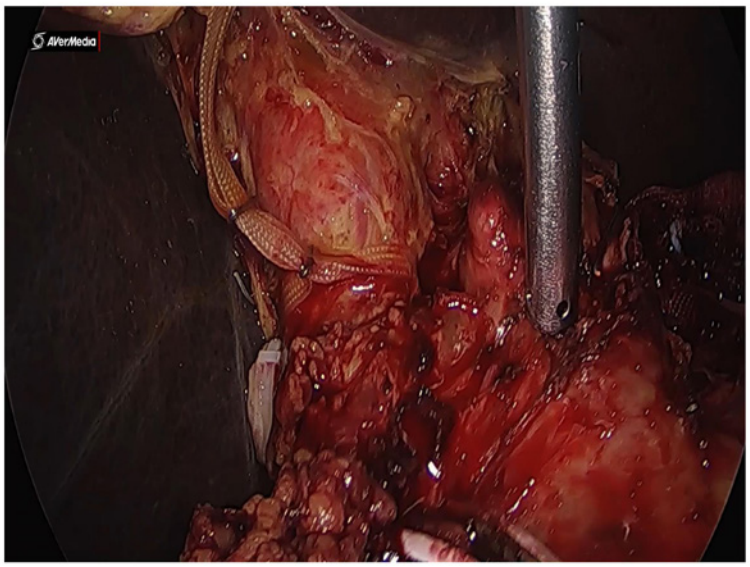


Design of resection

M/53

- 3.4cm, PDAC, head, abutting SMV 1st br.
- Upfront surgery
- CA 19-9: 72.6

Laparoscopic attempted open conversion PPPD (2022/08/01)



Design of resection

M/53

- 3.4cm, PDAC, head, abutting SMV 1st br.
- Upfront surgery
- CA 19-9: 72.6

Laparoscopic attempted open conversion PPPD (2022/08/01)

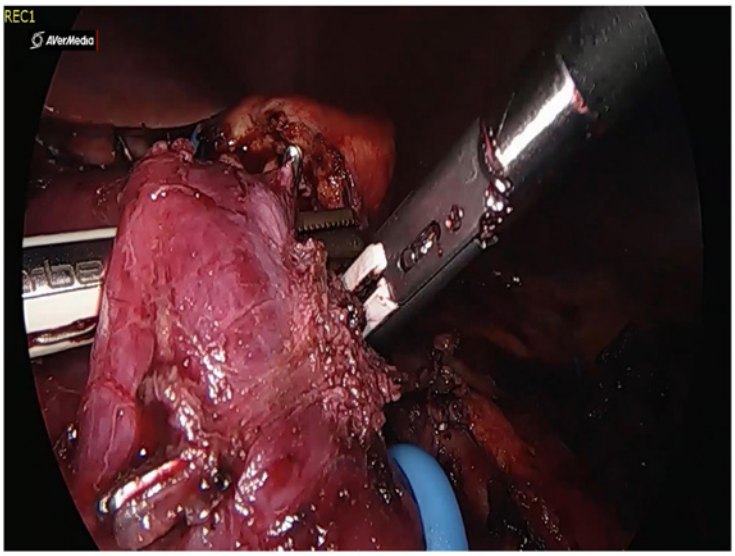
9. GDA 주변 isolation하고자 dissection하였으나, inflammation심하여 dissection안되어 upper midline으로 open conversion 함
10. GDA ligation
11. pancreatic neck transection and margin frozen: FFT
12. CBD transection above cystic duct stump
13. jejunal transection
14. pancreatic head cancer with SMV invasion소견으로 SMV lateral border를 clamp로 잡고 절제후 proelen #5-0 continous로 repair함.
15. SMA lateral border는 GIA tan 60으로 일괄처리함.
16. PJ: hard pancreas, 3mm, duct-to-mucosa, 7 stitch, no stent
HJ: 8mm, one lumen , vicryl #4-0 interrupted
17. DJ : vicryl #3-0 continuous
18. 2-arm drain
19. wound closure and out to PACU

Design of resection

M/51

- 2.1cm, PDAC, head, abutting SMV??
- s/p #8 FOLFIRINOX
- CA 19-9: 40.5

Laparoscopic PPPD (2021/09/29)



Design of resection

[Pathological Diagnosis]
Pancreas:
1. Status post chemotherapy
2. Residual ductal adenocarcinoma, moderately differentiated with partly la
3. Treatment effect
◇ Modified Ryan Scheme for tumor regression score (CAP score):
Extensive residual cancer with no evident tumor regression (poor or no resp
◇ Three-tier histologic tumor regression grading (HTRG) scheme (Am J Sur
HTRG 2 (≥5 % viable tumor cells, >75%)

◇ Tumor epithelial histopathologic type: Gland forming type (non-gland fo
◇ Size: 2.8x2.7x2.6cm (ypT2)
◇ Tumor extent: pancreas and peripancreatic soft tissue
◇ Lymphovascular invasion: Not identified
◇ Perineural invasion: Present, frequent

◇ Resection margins
- Common bile duct: Free of carcinoma (safety margin: 1.9cm)
- Pancreatic parenchymal and duct margin: Free of carcinoma (safety margi
- SMA margin (retroperitoneal): Free of carcinoma (safety margin: 0.4cm)
- SMV/PV groove: Free of carcinoma (safety margin: 0.1cm)
- Anterior surface: Free of carcinoma (safety margin: 0.2cm)
- Posterior surface: Free of carcinoma (safety margin: 1.1cm)
- Duodenum, proximal: Free of carcinoma (safety margin: 6.0cm)
- Duodenum, distal: Free of carcinoma (safety margin: 16.0cm)

No vascular resection

[Pathological Diagnosis]
Pancreas: Ductal adenocarcinoma, moderately differentiated with par

◇ Tumor epithelial histopathologic type: Gland forming type (non-gl
◇ Size: 3.4 x 2.8 x 2.5cm (pN2)
◇ Tumor extent: Tumor involves pancreas and peripancreatic soft tiss
◇ Lymphovascular invasion: Not identified
◇ Perineural invasion: Present
◇ Associated findings: Fibrous adhesion of SMV without tumor invas

◇ Resection margins
- Common bile duct: Free of carcinoma (safety margin: 3.0cm)
- Pancreatic parenchymal and duct margin: Free of carcinoma (safety
- SMA margin (retroperitoneal): Free of carcinoma (safety margin: 0.3
- SMV/PV groove: Extension of carcinoma (safety margin: 0cm)
- Anterior surface: Free of carcinoma (safety margin: 0.2cm)
- Posterior surface: Free of carcinoma (safety margin: 0.5cm)
- Duodenum, proximal: Free of carcinoma (safety margin: 2.0cm)
- Duodenum, distal: Free of carcinoma (safety margin: 25.0cm)

Tangential resection

[Pathological Diagnosis]
Pancreas: 1. Status post chemotherapy
2. Residual ductal adenocarcinoma, moderately differentiated
3. Treatment effect
◇ Modified Ryan Scheme for tumor regression score (CAP score)
Residual cancer with evident tumor regression, but more than sin
◇ Three-tier histologic tumor regression grading (HTRG) scheme
HTRG 2 (≥5 % viable tumor cells)

◇ Gross type: Infiltrative
◇ Tumor epithelial histopathologic type: Gland forming type (no
◇ Size: 2.8x2.8cm
◇ Tumor extent: Tumor > 2cm and ≤ 4cm in greatest dimension
◇ Lymphovascular invasion: Present
◇ Perineural invasion: Present

◇ Resection margins
- Common bile duct: Free of carcinoma (safety margin: cm)
- Pancreatic parenchymal and duct margin: Free of carcinoma (sa
- SMA margin (retroperitoneal): Free of carcinoma (safety margin
- SMV/PV groove: Free of carcinoma (safety margin: cm)
- Anterior surface: Free of carcinoma (safety margin: cm)
- Posterior surface: Free of carcinoma (safety margin: cm)
- Duodenum, proximal: Free of carcinoma (safety margin: cm)
- Duodenum, distal: Free of carcinoma (safety margin: cm)

Segmental resection of SMV-PV

Design of resection

- Conclusions
  - Vascular involvement of upfront surgery can be different from that of CT findings, mainly more severe in operative findings
  - Neoadjuvant case can present more prominent invasion of vessel compared with CT findings, however, it can be regressed tumor with fibrosis

-> adjacent vascular isolation for vascular resection or manage of unexpected bleeding

- General weakness intolerable to chemotherapy

-> Reconsider of operation

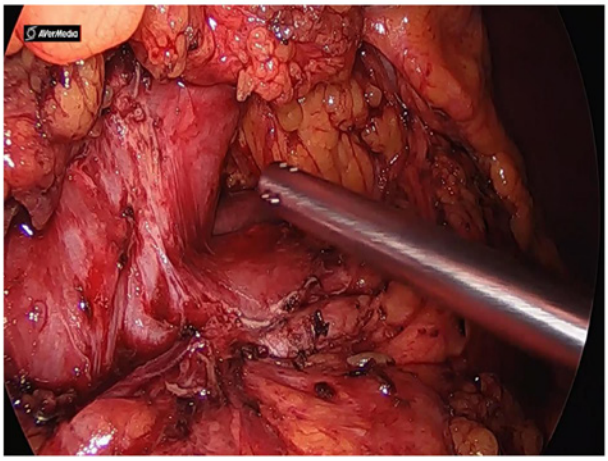
Practical Application of Pancreas Cancer Guidelines

Unexpected operative findings

Unexpected operative findings

- M/61, PDAC, uncinate, BRPC (2023/04/24)
  - s/p #6 FOLFIRINOX

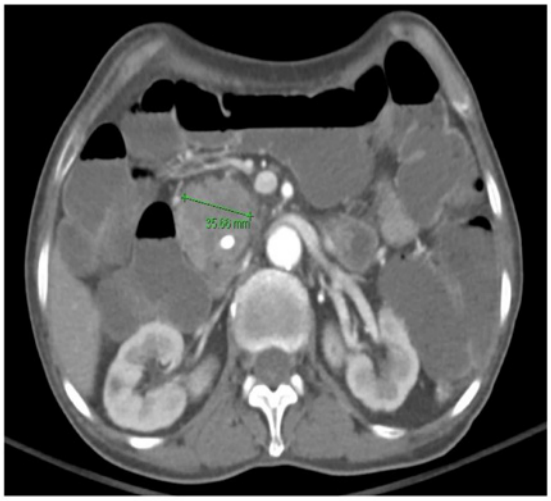
Ill-defined mass-like lesion in the pancreaticoduoudenal groove with tissue infiltration along the mesenteric root



Operative findings
Pancreatic head cancer with SMV and GDA invasion
-unable to tunneling pancreatic neck
-GDA origin invasion of cancer
Unresectable status

Unexpected operative findings

- F/69, PDAC, head, RPC (2022/04/08)



Hypoattenuation mass in the pancreas head(3.5cm), invasion of duodenum and distal CBD, SMV branch abutting.

Operative findings

Laparoscopic attempted open conversion PPPD

-pancreatic cancer, head-uncinated with invasion of right colic vein

-PDR1(+), PDR2(+), PDR3 refer to permanent

Unexpected operative findings

- Conclusions
  - Operative finding can be much more serious compared with CT findings
    - EUS-biopsy associated pancreatitis
    - Rapid cancer progression
    - Ill-defined hypoattenuation mass
  - Even if tumor is confined to pancreas head, always confirm the pancreatic duct margin
    - Microscopic tumor spread through pancreatic duct can occur

Practical Application of Pancreas Cancer Guidelines

PPPD or DP ? – neck cancer

PPPD or DP ? – neck cancer

F/68

- r/o IPMN, p-duct dilatation

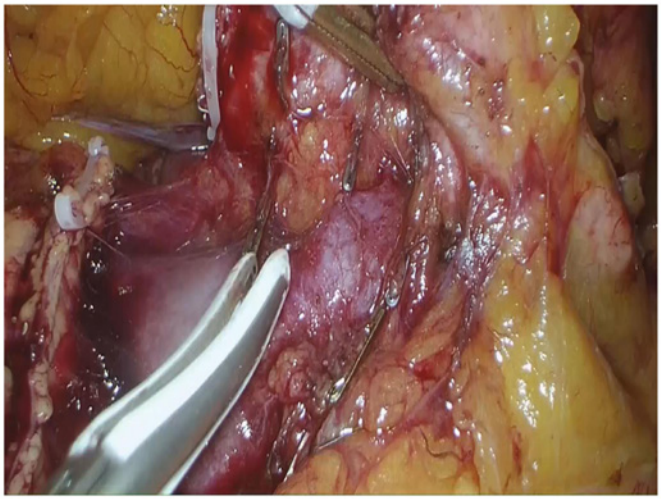
F/82

- 2.6cm r/o PDAC, body, abut to liver
- CA 19-9: 177

PPPD or DP ? – neck cancer

F/68

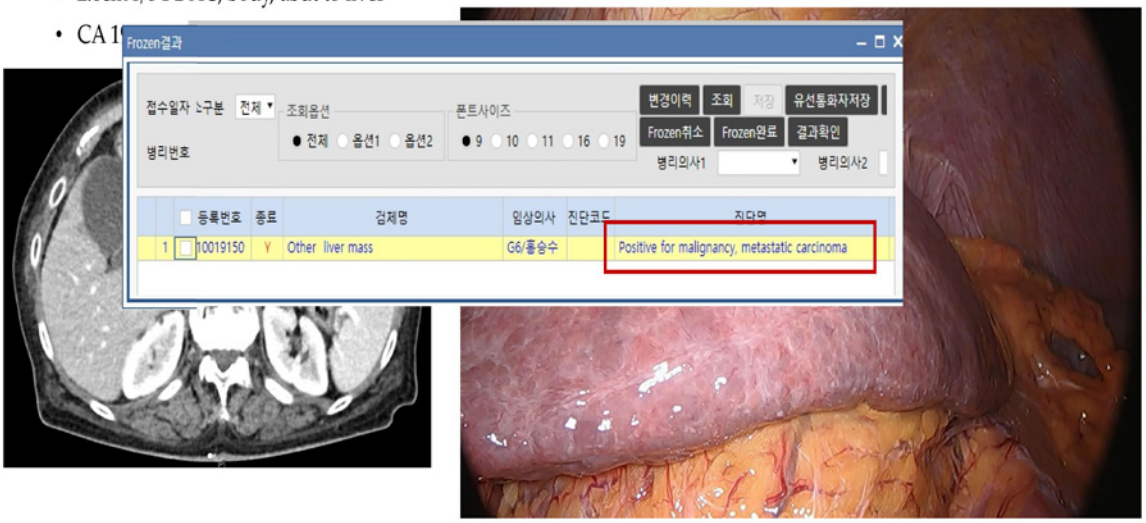
- r/o IPMN, p-duct dilatation



PPPD or DP ? – neck cancer

F/82

- 2.6cm r/o PDAC, body, abut to liver
- CA 1



PPPD or DP ? – neck cancer

- Conclusions
  - The true lesion can be more proximal compared with CT
  - Especially for PDAC, adjacent inflammation and invasion can make it more difficult for distal resection
  - Always consider the possibility of pancreaticoduodenectomy

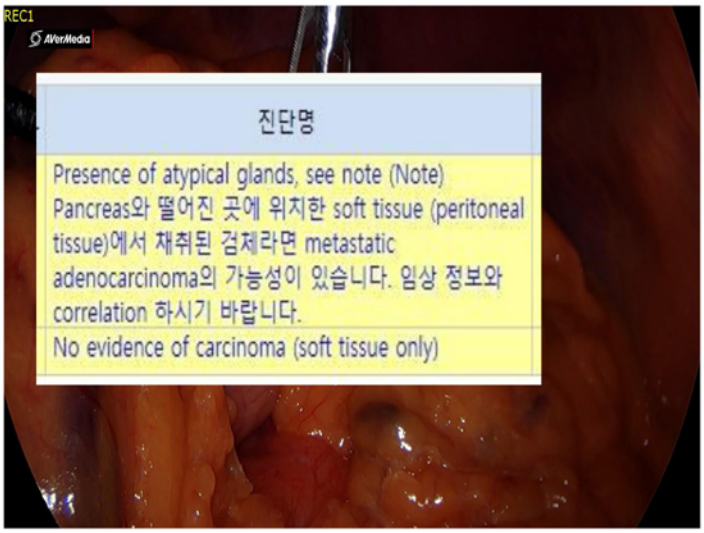
Practical Application of Pancreas Cancer Guidelines

Boundary of M1 disease – boundary of resectable disease

Boundary of M1 disease – boundary of resectable disease

M/68

- Hypovascular 2.2cm mass in the tail of the pancreas, CA19-9: 26.7



Boundary of M1 disease – boundary of resectable disease

M/68

- Hypovascular 2.2cm mass in the tail of the pancreas, CA19-9: 26.7

[Pathological Diagnosis]
Pancreas: Adenocarcinoma, modereatly differentiated

◇ Size: 2.7x2.1x1.8cm (pT2)
◇ Tumor extent: Tumor involves pancreas and peripancreatic soft tissue
◇ Lymphovascular invasion: Present
◇ Perineural invasion: Present
◇ Associated lesion: 1. Chronic pancreatitis 2. Retension cyst

◇ Resection margins
- Pancreatic parenchymal and duct margin: Free of carcinoma (safety margin: 0.5cm)
- Anterior surface: Abutting of carcinoma (safety margin: 200μm)
- Posterior surface: Extension of carcinoma

Lymph nodes, regional (2/4): Metastatic carcinoma in 2 out of 4 lymph nodes with perinodal

Spleen: Free of carcinoma

Soft tissue, separately sent, No. 11 : Free of carcinoma

#Pathologic stage (AJCC 8th edition): pT2N1

[Pathological Diagnosis]
Labelled "R/O metastasis pancreas cancer": Presence of adenocarcinoma, see note.

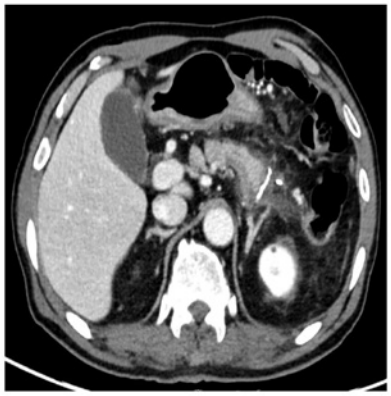
Splenic artery 기시부: Free of carcinoma

Note) 채취부위에 대한 clinical correlation이 요망됩니다.

Boundary of M1 disease – boundary of resectable disease

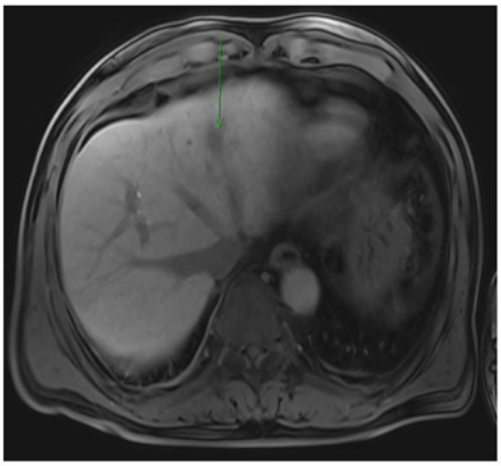
M/68

- Lap DPS (tail resection), POD#5



6 month later

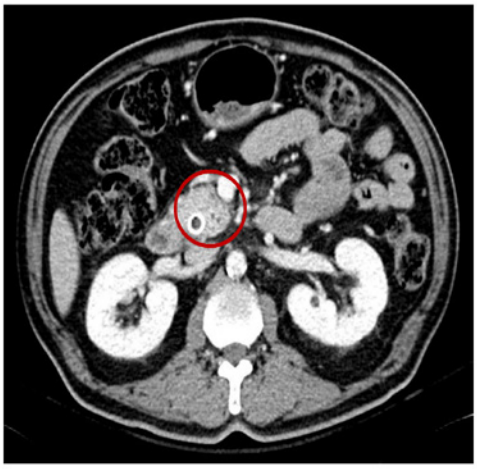
s/p #5 FOLFIRINOX
CA19-9: 209.0

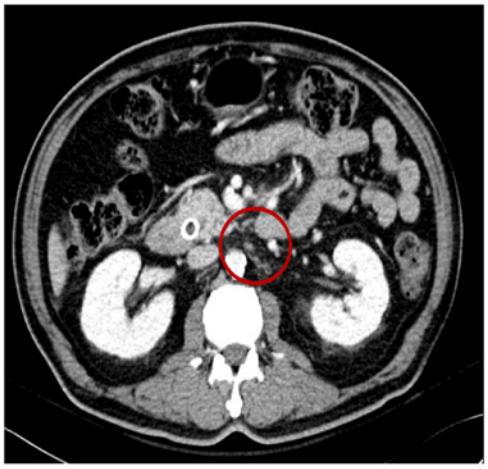


Boundary of M1 disease – boundary of resectable disease

M/56

- Decreased size of pancreatic head cancer without vessel invasion
- Decreased size of LN at HDL, Lt. gastric, Lt. paraaortic area, possible LN metastasis
- s/p #11 FOLFIRINOX, CA 19-9: 70.7 < 3327.0





Boundary of M1 disease – boundary of resectable disease

M/56

- Decreased size of pancreatic head cancer without vessel invasion
- Decreased size of LN at HDL, Lt. gastric, Lt. paraaortic area, possible LN metastasis
- CA 19-9: 70.7 < 3327.0

Operation record (2023/06/19)

- PPPD d/t pancreatic head ca.
  - No distant metastasis
  - CHA from SMA
  - Annular pancreas
  - SMA lateral border, hard tissue
  - LN 7, 8, 12 excision
- Vascular part
  - Lt. paraaortic LN excision (Lt. renal vein inferior)

[Pathological Diagnosis]

Pancreas:

◇ Tumor epithelial histopathologic type: Gland forming type (non-gland forming pattern: 10%)
◇ Size: upto 2.5x1.2cm, see note (#M3) (ypT2)
◇ Tumor extent: Tumor involves pancreas and peripancreatic soft tissue
◇ Lymphovascular invasion: Not identified
◇ Perineural invasion: Not identified
◇ Associated lesion: 1. Pancreatic intraepithelial neoplasia (PanIN), high grade 2. Chronic pancreatitis

◇ Resection margins
- Common bile duct: Free of carcinoma (safety margin: 6.5cm)
- Pancreatic parenchymal and duct margin: Free of carcinoma (safety margin: 1.0cm)
- SMA margin (retroperitoneal): Free of carcinoma (safety margin: 2.5cm)
- SMV/PV groove: Free of carcinoma (safety margin: 2.5cm)
- Anterior surface: Free of carcinoma (safety margin: 3.2cm)
- Posterior surface: Free of carcinoma (safety margin: 1.1cm)
- Duodenum, proximal: Free of carcinoma (safety margin: 5.0cm)
- Duodenum, distal: Free of carcinoma (safety margin: 17.5cm)

◇ Lymph nodes, separately sent, No.7 (0/1), Lt. paraaortic (0/2) and regional (0/4): total (0/7): Free of carcinoma (ypN0)

Soft tissue, separately sent, No.12: Free of carcinoma

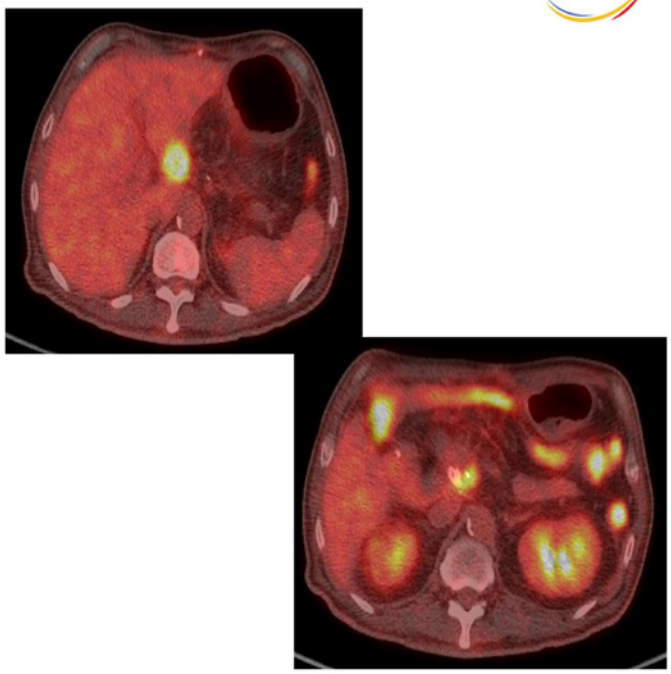
Pathologic stage (AJCC 8th edition): ypT2N0

Boundary of M1 disease – boundary of resectable disease

M/56

- Decreased size of pancreatic head cancer without vessel invasion
- Decreased size of LN at HDL, Lt. gastric, Lt. paraaortic area, possible LN metastasis
- s/p #11 FOLFIRINOX, CA 19-9: 70.7 < 3327.0

- Postop. 4 month, CA 19-9: 5497.8
- PET-CT
  - Tumor recurrence on op. bed
  - Lt. paraaortic space
  - Liver metastasis



Boundary of M1 disease – boundary of resectable disease

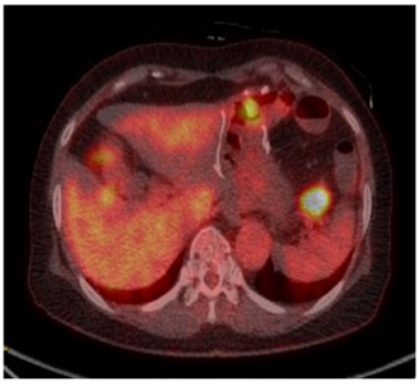
- Conclusions
  - Metastasis beyond the operative resection boundary is considered M1
  - Resection can be possible, however, early recurrence frequent.
  - However, no other options other than ongoing chemotherapy
  - Multi-diciplinary approach is needed

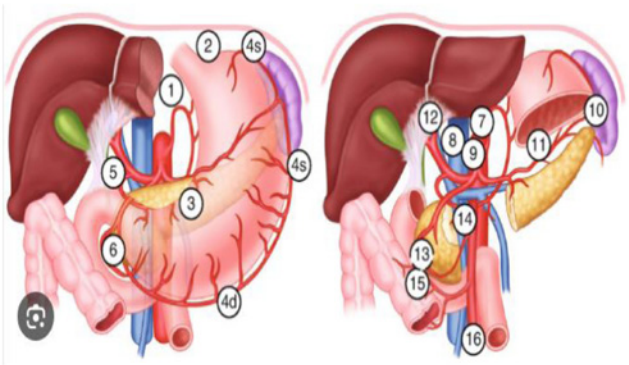
Practical Application of Pancreas Cancer Guidelines

Difficult situations

Difficult situations
Is distal pancreatectomy safe after STG?

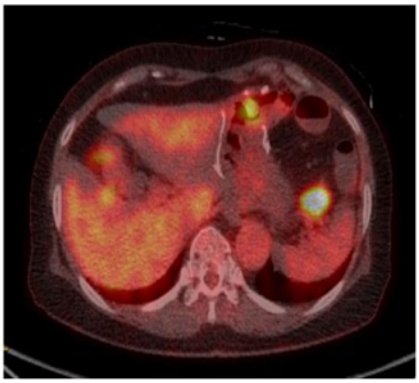
- F/73
  - s/p Lapa STG B2 (2008) d/t GC
  - Pancreatic tail cancer (2020)

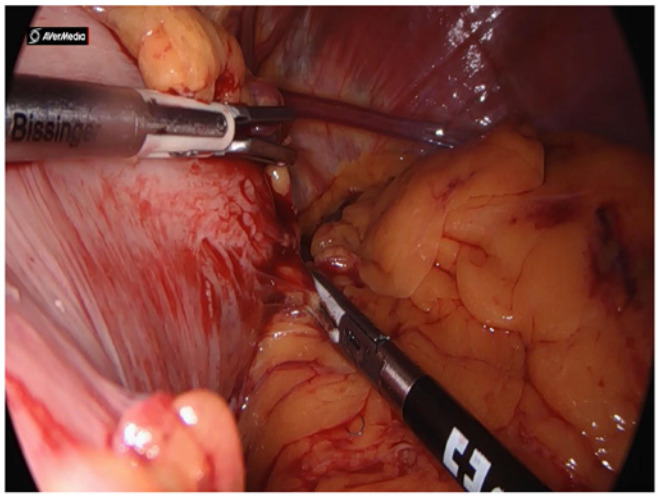




Difficult situations
Is distal pancreatectomy safe after STG?

- F/73
  - s/p Lapa STG B2 (2008) d/t GC
  - Pancreatic tail cancer (2020)





Difficult situations
Is distal pancreatectomy safe after STG?

- F/73
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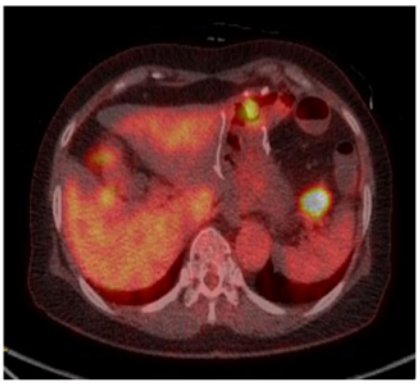

- Progress
  - POD#3 : gas out
  - POD#4 : SD
  - POD#7: discharge

Difficult situations
Is distal pancreatectomy safe after STG?

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AHBPS

Case Report

Laparoscopic distal pancreatosplenectomy for left-sided pancreatic cancer in patients with radical subtotal gastrectomy for gastric cancer

Kang Hee Lee[1,3], Seung Soo Hong[1,3], Seung-seob Kim[2], Ho Kyoung Hwang[1,3], Woo Jung Lee[1,3], Chang Moo Kang[1,3]

[1]Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Seoul, Korea,
[2]Department of Radiology and Research Institute of Radiological Science, Yonsei University College of Medicine, Seoul, Korea,
[3]Yonsei Pancreatobiliary Cancer Center, Yonsei Cancer Center, Severance Hospital, Seoul, Korea

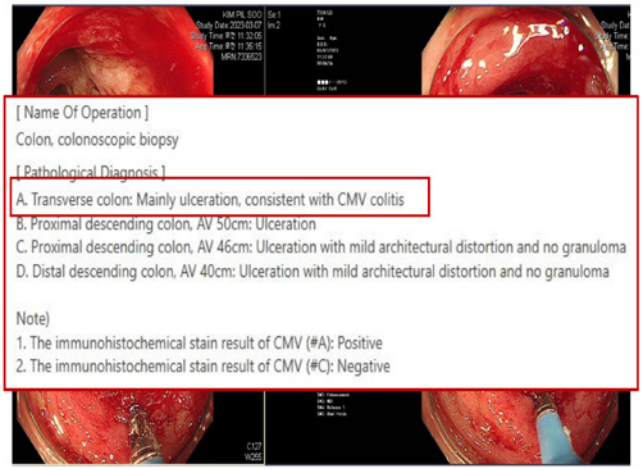
Table 2. Radiological evidence of collateral blood supply to the remnant stomach on pre- and post-distal pancreatectomy state

No. of patients	Age (yr)/Sex	Previous gastrectomy	Time interval (mon)	Radiological evidence of collateral blood supply to the remnant stomach	
				Pre-distal pancreatectomy	Post-distal pancreatectomy
1	71/Male	STG B2	240	No evident enhance of collaterals	Collateral arteries from CHA and left IPA
2	59/Male	STG B2	196	Thin enhanced collateral artery from left IPA	Evident collateral arteries from left IPA and SMA
3	62/Female	Lap TG	48	Total gastrectomy status	Total gastrectomy status
4[a]	58/Male	STG B1	48	Thin enhanced collateral artery from left IPA	Evident collateral arteries from left IPA and SMA
5 (case 1)	74/Male	STG B2	60	Thin enhanced collateral artery from left IPA	Evident collateral arteries from left IPA and SMA
6 (case 2)	75/Female	Lap STG B2	144	Evident collateral arteries from left IPA and SMA	Evident collateral arteries from left IPA

STG, subtotal gastrectomy; TG, total gastrectomy; IPA, inferior phrenic artery; CHA, common hepatic artery; SMA, superior mesenteric artery.
[a]Spleen preserving distal pancreatectomy.

Difficult situations
Hematochezia after mesocolon shaving

- M/57
  - Lapa DPS (2023/2/1) d/t pancreatic body ca.



[Name Of Operation]
Colon, colonoscopic biopsy

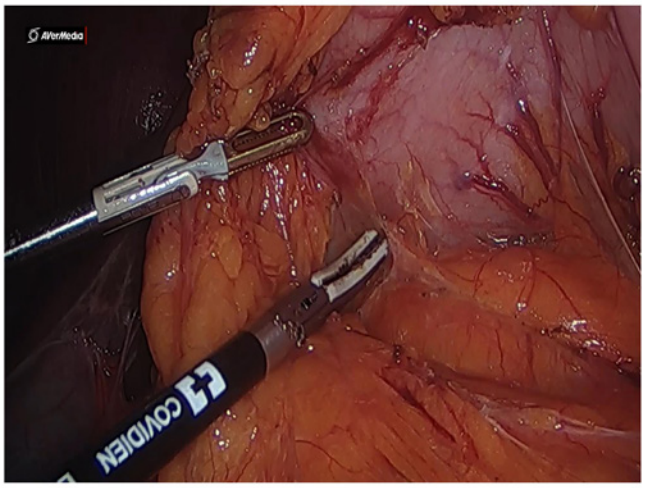
[Pathological Diagnosis]
A. Transverse colon: Mainly ulceration, consistent with CMV colitis
B. Proximal descending colon, AV 50cm: Ulceration
C. Proximal descending colon, AV 46cm: Ulceration with mild architectural distortion and no granuloma
D. Distal descending colon, AV 40cm: Ulceration with mild architectural distortion and no granuloma

Note)
1. The immunohistochemical stain result of CMV (#A): Positive
2. The immunohistochemical stain result of CMV (#C): Negative

POD# 1month
Imp: r/o acute colitis, r/o TB colitis or Crohn's dz, r/o malignancy
Biopsy done

Difficult situations
Duodenal cancer additional to retroperitoneal lymphoma

- M/57
  - Ongoing CTx for lymphoma
  - Duodenal cancer suspected
  - Pall. Lap. GJ stomy



Difficult situations
Duodenal cancer additional to retroperitoneal lymphoma

- M/57
  - PPPD (2023/03/10)
    - Duodenal ca.
    - Hard mass with inflammation
    - Colon abutting
    - LN enlargement due to lymphoma

Adj. CTx complete
Ongoing CTx for lymphoma

[Pathological Diagnosis]
[Final report]
Adenocarcinoma involving common bile duct, periductal soft tissue, pancreas, peripancreatic soft tissue and duodenum (upto mucosa).

◇ Gross type: Infiltrative
◇ Size: 4.2x2.5x1.6cm
◇ Tumor extent: Tumor invades the bile duct wall with a depth 10mm (pT2)
◇ Lymphovascular invasion: Present
◇ Perineural invasion: Present

◇ Resection margins
- Common bile duct: Free of carcinoma (safety margin: 1.2cm)
- Pancreatic parenchymal and duct margin: Free of carcinoma (safety margin: 2.2cm)
- SMA margin (retroperitoneal): Free of carcinoma (safety margin: 0.7cm)
- SMV/PV groove: Free of carcinoma (safety margin: 2.9cm)
- Anterior surface: Free of carcinoma (safety margin: 0.9cm)
- Posterior surface: Abutting of carcinoma (safety margin: 600 um)
- Duodenum, proximal: Free of carcinoma (safety margin: 4.9cm)
- Duodenum, distal: Free of carcinoma (safety margin: 19.6cm)

Gallbladder: Free of carcinoma

Lesser sac, separately sent: Free of carcinoma

Labelled "이전에 G-J 했던 부분", separately sent: Free of carcinoma

◇ Lymph nodes, separately sent. No.8 (0/1), No.12 (0/1), and regional (1/3) : total (1/5): Metastatic carcinoma in 1 out of 5 lymph nodes

Soft tissue, separately sent, "lymph node": Free of carcinoma

Pathologic stage (AJCC 8th edition): pT2N1

Difficult situations MIS in old age

- F/86
  - Lapa PPPD (2022/08/22) d/t AoV ca.

<Arrest event>

20:28 심정지 상태로 발견되어 code blue 알리고 CPR 시작함.
-epi 투여(20:36, 20:39)
Intubation, full lab, ABGA, CXR
EKG
Sinus tachycardia with Fusion complexes Possible Left atrial enlargement Right bundle branch block Abnormal ECG

20:40 ROSC
21:05 v/s 80/51 sat 78% → levo 3cc start
21:15 Levo 10cc 증량 후 CT 출발

수술 중 특이사항 없었던 본으로 수술 후 병동에서 약간의 그렁거림 있었으나 O2 3L 하 sat 100, v/s stable 하였음. (19:40 경)
post-op lab, HV color 상 bleeding 가능성은 떨어지며 arrest 당시 나간 lab에서도 Hb down 없었음.
arrest 후 첫 ABGA상 pCO2 49.5 pO2 22.5 tHb 11.3 BE -8.0으로 pCO2 많이 증가되어 있지는 않으나 어느정도 O2 공급 후 나간 결과라 reliable 하지 않음.
Respiratory arrest 혹은 mental change 가능성으로 brain CT, abdomen CT 촬영함.
검사 상 특이소견 보이지는 않음.
CT 검사 중 mental alert 하였으며 obey 됨.
신경과 당직 전공의 유선연락하여 중환자실에서 neurologic exam 시행하였고 stroke 가능성은 떨어지나 추후 stable하지면 brain MRI 시행하는 것 권고함.

Discharge on POD #14

- M/76
  - Lapa PPPD (2023/03/20) d/t CBD ca.

경과기록-공통(요약 메모) [2023-03-20]

진료과	간담췌외과
주치의	홍승수
경과	last normal time 6:40 병동에서 간호사가 수술방에서 올라온 것 발견 하였음

당시에도 mental status drowsy 하였으나 깨우면 눈 잘 뜨고 반응도 정상 적이었음(이름 등 말하는 것 대화 모두 가능 하였음)

이후 환자 mental drowsy 하게 점점 변하며 saturation 저하되며 saturation 60%까지 저하 되었음

Mental stupor 이상 저지며 saturation detec되지 않아 코드블루 방송
respiratory arrest impression 하 intubation 및 vent apply.
병실 도착 당시부터 목부위, 흉복부 subQ emphysema++
abga: co2 retention.

r/o CO2 narcosis

신경과 전공의 physical, pupil promt.
old cva 과거력 미루어 r/o 위해 ct angio 시행

환자 검사 진행하며 mental alert 하게 깨고 obey&command 가능
Lt arm grade 2-3 정도 weakness 보여
신경과 연락, ct 이상 소견 없으며 현재 acute lesion 이라면 mri 지금 찍는 효용성 떨어지며, CT 상 Major vessel intact 하 증상 만으로 stroke medication 시작하지 않을 권고 받음.
증상 f/u 하며 보기로 함.

Discharge on POD #9

Take home message

- Various situations can occur in actual clinical field beyond established guidelines
- Remember the tip and always discuss with senior professionals.
- Multidiciplinary approach can help
- Be brave for the operation, however, think one more that it can actually help patients outcomes.
- Routine ICU prep should be considered in old age

연/자/소/개

Curriculum Vitae

Daegwang Yoo

Hepatobiliary and Pancreatic Surgery Division,
General Surgery Department, Seoul Soonchunhyang University Hospital

- **Educational Background**

2010.02	Bachelor's Degree, Korea University College of Medicine
2015.02	Master's Degree, Ulsan University College of Medicine
2020.02	Doctor's Degree, Ulsan University College of Medicine

- **Hospital Training and Career**

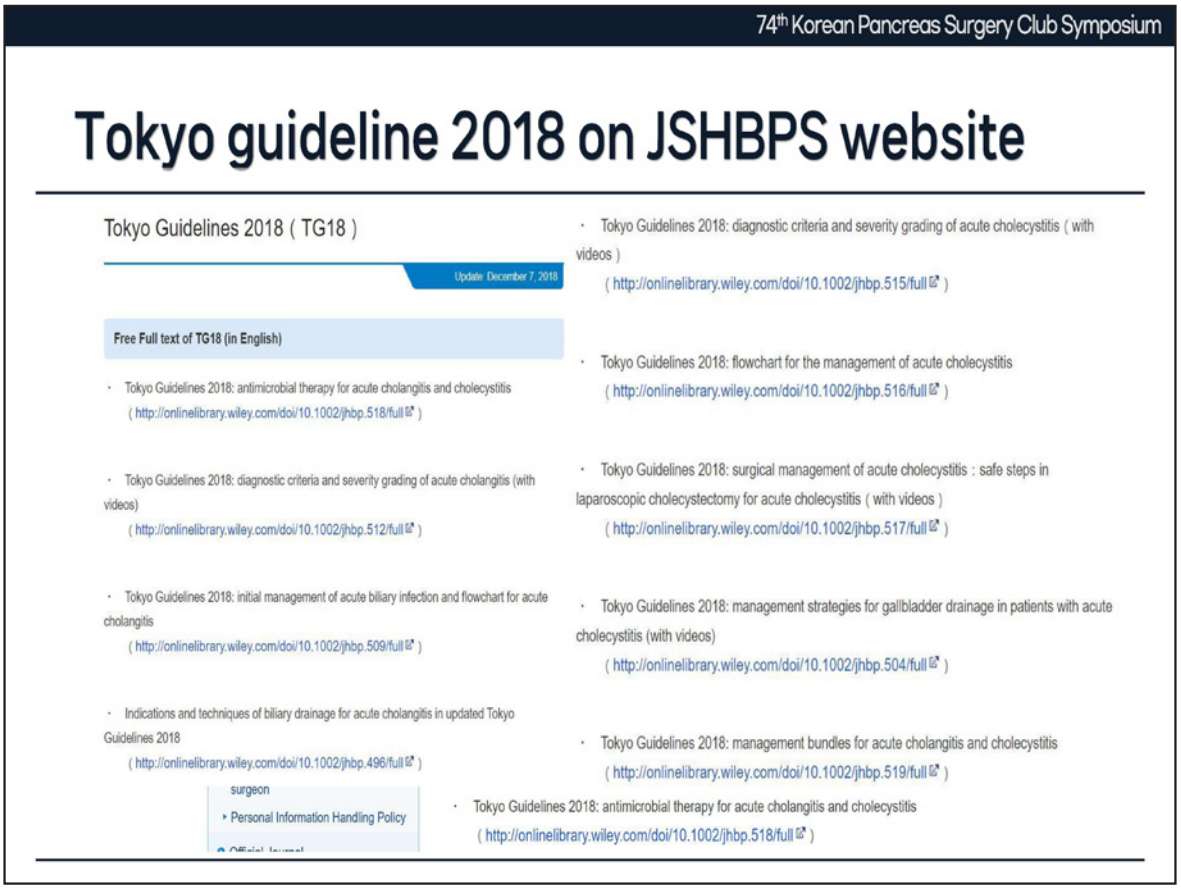
2010.03–2011.02	Internship, Asan Medical Center
2011.03–2015.02	Residency, General Surgery Department, Asan Medical Center
2015.03–2018.04	General Surgery Department, Armed Force Guri Hospital, Armed Forces Medical Command
2018.04–2020.02	Clinical Fellowship, Hepatobiliary and Pancreatic Surgery Division, General Surgery Department, Asan Medical Center
2020.02–2021.02	Clinical assistant professor, Hepatobiliary and Pancreatic Surgery Division, General Surgery Department, Konkuk University Choongju Hospital, Choongju
2021.03–2022.04	Assistant professor, Hepatobiliary and Pancreatic Surgery Division, General Surgery Department, Konkuk University Choongju Hospital, Choongju
2022.05–2023.02	Clinical assistant professor, Hepatobiliary and Pancreatic Surgery Division, General Surgery Department, Seoul Soonchunhyang University Hospital
2023.03–Now	Assistant professor, Hepatobiliary and Pancreatic Surgery Division, General Surgery Department, Seoul Soonchunhyang University Hospital

- **License and Certification**

2010.03	Korean Medical License
2015.03	Korean Board of General Surgery
2018.04	ECFMG (Education Commission for Foreign Medical Graduates) of USMLE
2020.12	Korean Specialist Board of Hepatobiliary pancreatic Surgery

Tokyo Guidelines for Acute Cholangitis & Cholecystitis: Overcoming of My Desperate Experience

Daegwang Yoo (Soonchunhyang University Hospital Seoul, Korea)



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01 TG18 Diagnosis & Grading

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TG18 Diagnosis & Severity Grading

GUIDELINE

Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos)

Table 1 TG18/TG13 diagnostic criteria for acute cholecystitis

A. Local signs of inflammation etc.
(1) Murphy's sign, (2) RUQ mass/pain/tenderness
B. Systemic signs of inflammation etc.
(1) Fever, (2) elevated CRP, (3) elevated WBC count
C. Imaging findings
Imaging findings characteristic of acute cholecystitis
Suspected diagnosis: one item in A + one item in B
Definite diagnosis: one item in A + one item in B + C

- A Japanese study of the association between diagnostic criteria and factors (such as length of

Research Article

Factor Analysis Influencing Postoperative Hospital Stay and Medical Costs for Patients with Definite, Suspected, or Unmatched Diagnosis of Acute Cholecystitis according to the Tokyo Guidelines 2013

Aoi Hayasaki,[1,2] Koji Takahashi,[1] Takehiro Fujii,[1,2] Koji Kumamoto,[1] Koji Fujii,[1] Eiichi Matsumoto,[1] Shigeki Miyahara,[1] Tsukasa Kusuta,[1] Yoshinori Azumi,[2] and Shuji Isaji[2]

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TG18 Diagnosis & Severity Grading

Table 7 TG18/TG13 severity grading for acute cholecystitis

Grade III (severe) acute cholecystitis
"Grade III" acute cholecystitis is associated with dysfunction of any one of the following organs/systems:
1. Cardiovascular dysfunction: hypotension requiring treatment with dopamine ≥5 μg/kg per min, or any dose of norepinephrine
2. Neurological dysfunction: decreased level of consciousness
3. Respiratory dysfunction: PaO_2/FiO_2 ratio <300
4. Renal dysfunction: oliguria, creatinine >2.0 mg/dl
5. Hepatic dysfunction: PT-INR >1.5
6. Hematological dysfunction: platelet count <100,000/mm^3

Grade II (moderate) acute cholecystitis
"Grade II" acute cholecystitis is associated with any one of the following conditions:
1. Elevated WBC count (>18,000/mm^3)
2. Palpable tender mass in the right upper abdominal quadrant
3. Duration of complaints >72 h[a]
4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

Grade I (mild) acute cholecystitis
"Grade I" acute cholecystitis does not meet the criteria of "Grade III" or "Grade II" acute cholecystitis. It can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the gallbladder, making cholecystectomy a safe and low-risk operative procedure

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TG18 Diagnosis & Severity Grading

- **Grade I (Mild)**
  - Acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the gallbladder.
- **Grade II (Moderate)**
  - Any one of following:
    - 1. Elevated WBC count (>18,000/mm^3)
    - 2. Palpable tender mass in the right upper abdominal quadrant
    - 3. Duration of complaints >72 hr
    - 4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

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TG18 Diagnosis & Severity Grading

- **Grade III (Severe)**
  - Any one of following:
    - 1. Cardiovascular dysfunction: hypotension requiring treatment with dopamine ≥5 mcg/kg/min, or any dose of norepinephrine
    - 2. Neurological dysfunction: decreased level of consciousness
    - 3. Respiratory dysfunction: PaO2/FiO2 ratio <300
    - 4. Renal dysfunction: oliguria, creatinine >2.0 mg/dl
    - 5. Hepatic dysfunction: PT-INR >1.5
    - 6. Hematological dysfunction: platelet count <100,000/mm^3

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TG18 Diagnosis & Severity Grading

Table 2 Relationship between severity and 30-day overall mortality[a]

	Severity grading			
	Grade I n = 1,339	Grade II n = 1,702	Grade III n = 680	P-value
30-day mortality	15 (1.1%)	13 (0.8%)	37 (5.4%)	<0.001

- In a case series study of over 5,000 patients, the prognosis for Grade III patients was also significantly worse than for Grades I and II.

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02 TG18 Antimicrobial therapy

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TG18 Antimicrobial therapy

GUIDELINE

Tokyo Guidelines 2018: antimicrobial therapy for acute cholangitis and cholecystitis

Q1. What specimen should be sent for culture to identify the causative organisms in acute cholangitis and cholecystitis?

We suggest cultures of bile and tissue when perforation, emphysematous changes, or necrosis of gallbladder are noted during cholecystectomy. (Recommendation 2, level D)

except those with grade I severity. (Recommendation 1, level C)

In acute cholecystitis

- Positive rates of gallbladder cultures range from 29% to 54%
- Positive rates of blood cultures range from 7.7% to 15.8%

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TG18 Antimicrobial therapy

Table 3 Antimicrobial recommendations for acute biliary infections

Severity	Community-acquired biliary infections			Healthcare-associated biliary infections[a]
	Grade I	Grade II	Grade III[a]	
Antimicrobial agents	Cholangitis and cholecystitis	Cholangitis and cholecystitis	Cholangitis and cholecystitis	Healthcare-associated cholangitis and cholecystitis
Penicillin-based therapy	Ampicillin/sulbactam[b] is not recommended if >20% resistance rate.	Piperacillin/tazobactam	Piperacillin/tazobactam	Piperacillin/tazobactam
Cephalosporin-based therapy	Cefazolin,[c] or Cefotiam,[c] or Cefuroxime,[c] or Ceftriaxone, or Cefotaxime ± Metronidazole[d] Cefmetazole,[c] Cefoxitin,[c] Flomoxef,[c] Cefoperazone/sulbactam	Ceftriaxone, or Cefotaxime, or Cefepime, or Cefozopran, or Ceftazidime ± Metronidazole[d] Cefoperazone/sulbactam	Cefepime, or Ceftazidime, or Cefozopran ± Metronidazole[d]	Cefepime, or Ceftazidime, or Cefozopran ± Metronidazole[d]
Carbapenem-based therapy	Ertapenem	Ertapenem	Imipenem/cilastatin, Meropenem, Doripenem, Ertapenem	Imipenem/cilastatin, Meropenem, Doripenem, Ertapenem
Monobactam-based therapy	–	–	Aztreonam ± Metronidazole[d]	Aztreonam ± Metronidazole[d]
Fluoroquinolone-based therapy[e]	Ciprofloxacin, Levofloxacin, Pazufloxacin ± Metronidazole[d] Moxifloxacin	Ciprofloxacin, Levofloxacin, Pazufloxacin ± Metronidazole[d] Moxifloxacin	–	–

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TG18 Antimicrobial therapy

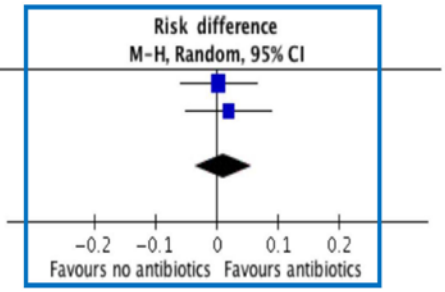
Q4. What is the optimal duration of antimicrobial therapy for patients with acute cholecystitis?

Antimicrobial therapy for patients with Grade I and II acute cholecystitis is recommended only

- The results of the two RCTs were integrated and the risk difference for postoperative infection was 0.01 (95% CI : 0.04–0.06).

Study or Subgroup	No antibiotics Events	Total	Antibiotics Events	Total	Weight	Risk difference M-H, Random, 95% CI
Loozen 2017	3	73	3	79	56.3%	0.00 [-0.06, 0.07]
Regimbeau 2014	35	207	31	207	43.7%	0.02 [-0.05, 0.09]
Total (95% CI)		**280**		**286**	**100.0%**	**0.01 [-0.04, 0.06]**
Total events	38		34			

Heterogeneity: Tau² = 0.00; Chi² = 0.15, df = 1 (P = 0.69); I² = 0%
Test for overall effect: Z = 0.43 (P = 0.67)



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TG18 Antimicrobial therapy

Q4. What is the optimal duration of antimicrobial therapy for patients with acute cholecystitis?

Antimicrobial therapy for patients with Grade I and II acute cholecystitis is recommended only before and at the time of surgery. (Recommendation 1, level B)
Once the source of infection is controlled, antimicrobial therapy for patients with Grade III acute cholecystitis is recommended for the duration of 4 to 7 days. (Recommendation 2, level D)

- Grade III acute cholecystitis
  - When bacteremia with Gram-positive bacteria is present, administering antimicrobial therapy for 2 weeks is prudent and recommended to decrease the risk of infective endocarditis.

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TG18 Antimicrobial therapy

Q4. What is the optimal duration of antimicrobial therapy for patients with acute cholecystitis?

(Antimicrobial therapy for special conditions)
In patients with pericholecystic abscesses or perforation of the gallbladder, treatment with an antimicrobial regimen as listed in Table 3 is recommended. Therapy should be continued until the patient is afebrile, with a normalized white count, and without abdominal findings. (Recommendation 1, level D)

- Antibiotics until
  - No fever
  - WBC normal
  - No abdominal finding

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03 TG18 Flowchart of management

TG18 Flowchart of Management

GUIDELINE

Tokyo Guidelines 2018: flowchart for the management of acute cholecystitis

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TG18 Flowchart of Management

Table 2 American Society of Anesthesiologists physical status classification system (ASA-PS) [23]

ASA-PS classification	Definition	Examples, including, but not limited to:
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Examples include (but not limited to): current smoker, social alcohol drinker, pregnancy, obesity (30 < BMI < 40), well-controlled DM/HTN, mild lung disease
ASA III	A patient with severe systemic disease	Substantive functional limitations; one or more moderate to severe diseases. Examples include (but not limited to): poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, premature infant PCA <60 weeks, history (>3 months) of MI, CVA, TIA, or CAD/stents
ASA IV	A patient with severe systemic disease that is a constant threat to life	Examples include (but not limited to): recent (<3 months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is not expected to survive without the operation	Examples include (but not limited to): ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes	

TG18 Flowchart of Management

Table 1 Charlson comorbidity index [18]

Assigned weights for diseases	Conditions
1	Myocardial infarction
	Congestive heart failure
	Peripheral vascular disease
	Cerebrovascular disease
	Dementia
	Chronic pulmonary disease
	Connective tissue disease
	Peptic ulcer disease
	Mild liver disease
	Diabetes mellitus (uncomplicated)
2	Hemiplegia
	Moderate or severe chronic kidney disease
	Diabetes mellitus with end-organ damage
	Any solid tumor
	Leukemia
	Malignant lymphoma
3	Moderate or severe liver disease
6	Metastatic solid tumor
	Acquired immune deficiency syndrome (AIDS)

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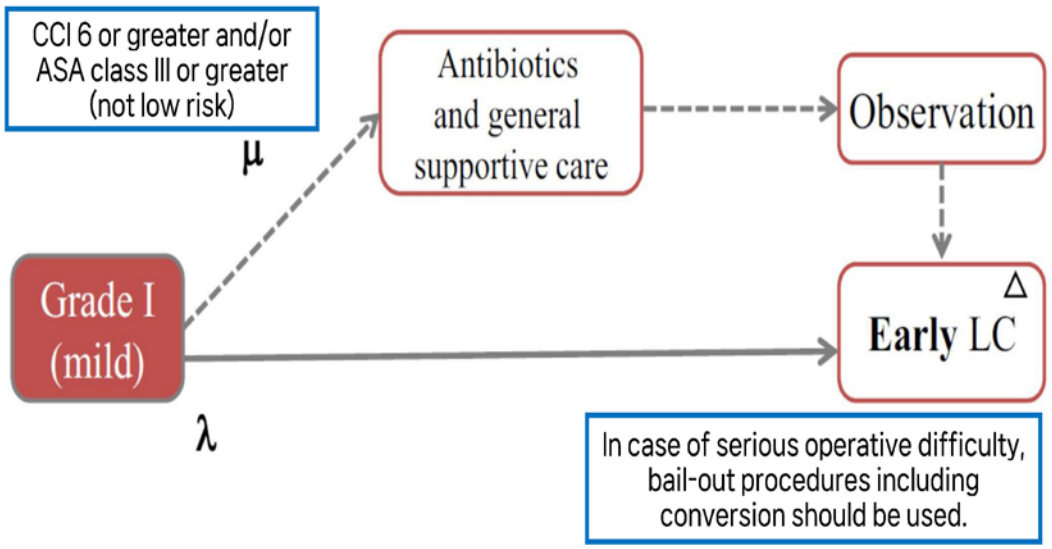
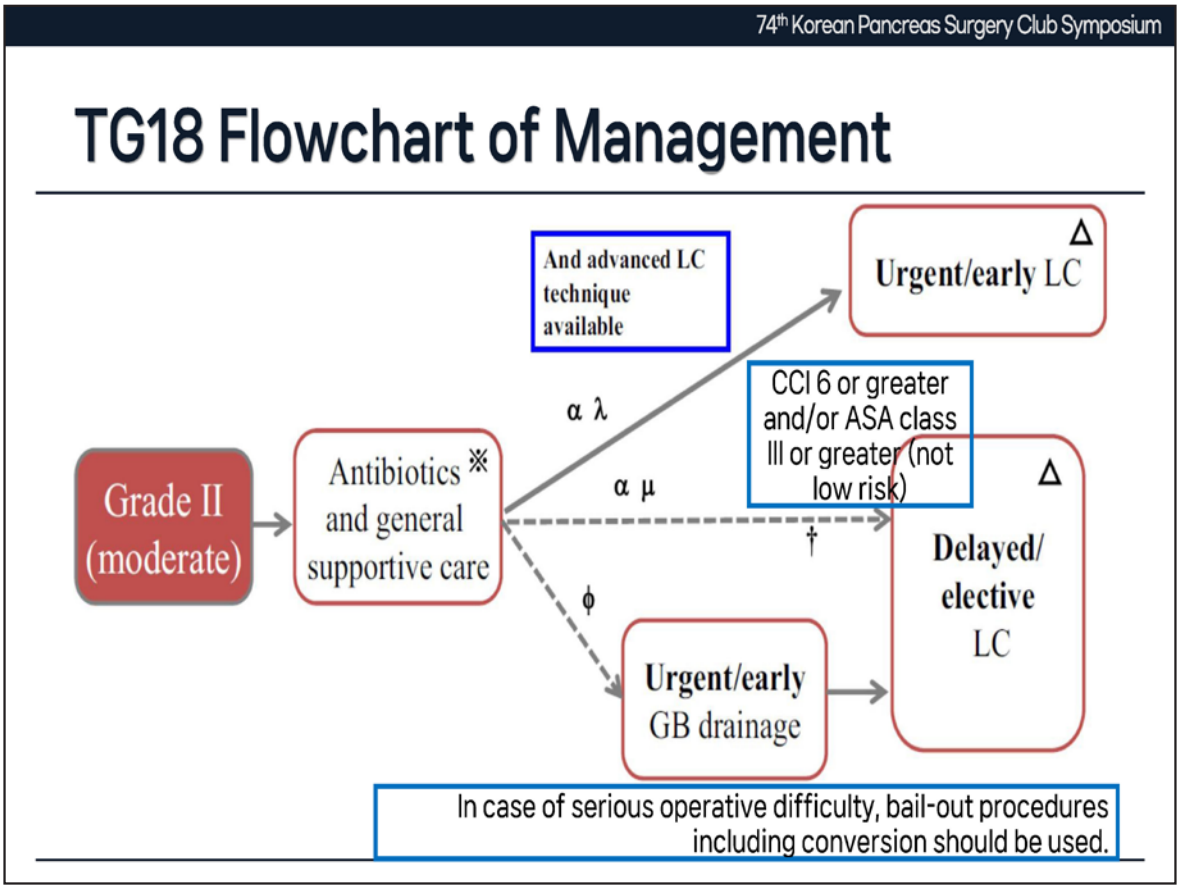
TG18 Flowchart of Management

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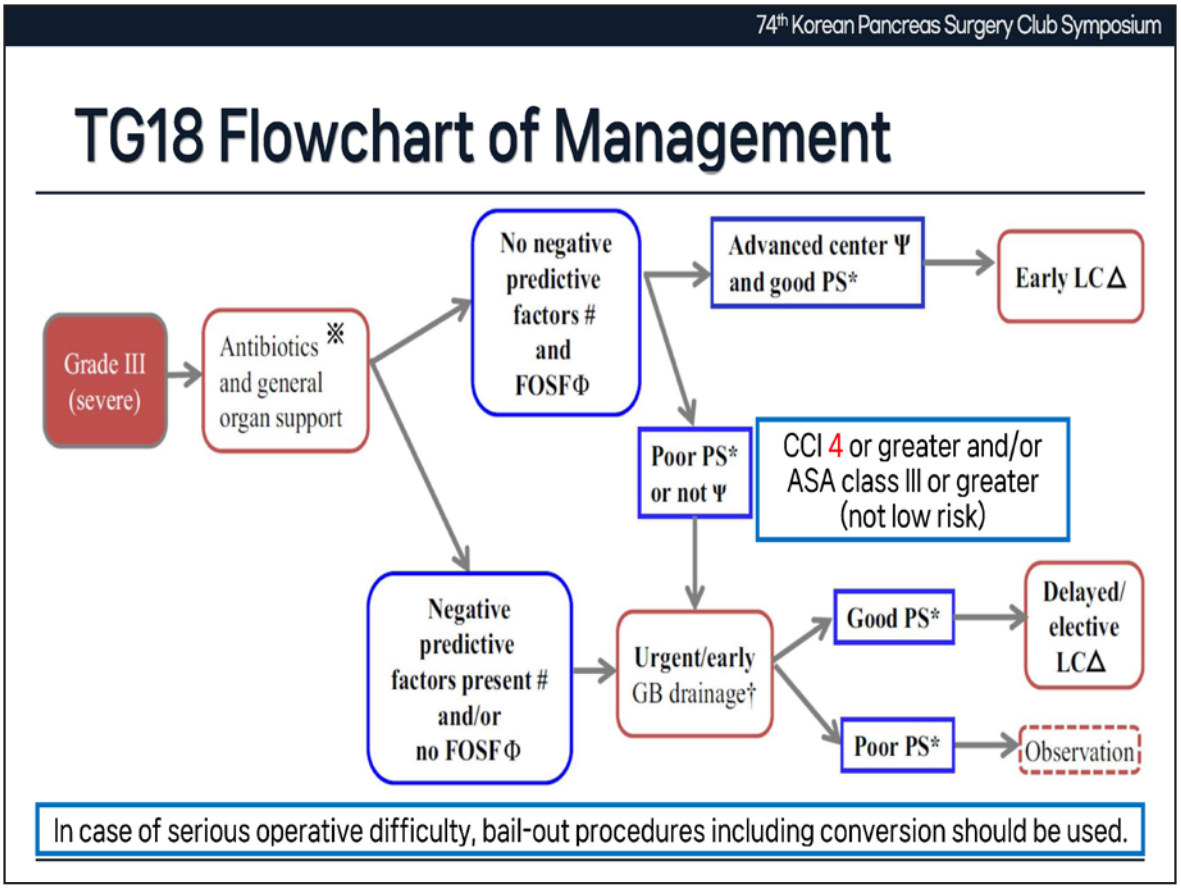
TG18 Flowchart of Management
Grade II (moderate)
Antibiotics ※ and general supportive care
And advanced LC technique available
Urgent/early LC Δ
α λ
α μ
CCI 6 or greater and/or ASA class III or greater (not low risk)
†
Δ
Delayed/ elective LC
ϕ
Urgent/early GB drainage
In case of serious operative difficulty, bail-out procedures including conversion should be used.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TG18 Flowchart of Management
Grade III (severe)
Antibiotics ※ and general organ support
No negative predictive factors # and FOSFΦ
Advanced center Ψ and good PS*
Early LC Δ
Poor PS* or not Ψ
CCI 4 or greater and/or ASA class III or greater (not low risk)
Negative predictive factors present # and/or no FOSFΦ
Urgent/early GB drainage†
Good PS*
Delayed/ elective LC Δ
Poor PS*
Observation
In case of serious operative difficulty, bail-out procedures including conversion should be used.

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TG18 Flowchart of Management

Q3. What is the optimal timing of cholecystectomy for acute cholecystitis?

If a patient is deemed capable of withstanding surgery for AC, we propose early surgery regardless of exactly how much time has passed since onset. (Recommendation 2, level B)

Q4. When is the optimal timing for cholecystectomy following percutaneous transhepatic gallbladder drainage (biliary drainage)? [Future research question]

There are no reports providing quality scientific evidence on the best timing for surgery after percutaneous transhepatic gallbladder drainage (PTGBD; also called cholecystostomy), so a consensus has not been reached. (Level C)

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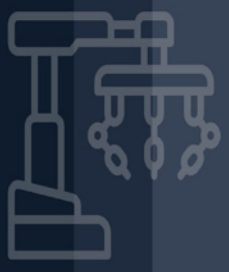
04 TG18 Surgical management



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TG18 Surgical Management

GUIDELINE

Tokyo Guidelines 2018: surgical management of acute cholecystitis: safe steps in laparoscopic cholecystectomy for acute cholecystitis (with videos)

Q1. What are the indicators of surgical difficulty in laparoscopic cholecystectomy for acute cholecystitis?

Besides preoperative factors and severity of AC, intraoperative findings are considered to be appropriate indicators of surgical difficulty in LC for AC. (Level D)

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- Factors that affect OP time
  - Body mass index
  - Temperature
  - Cystic duct length
  - Non-visualized GB on preoperative cholangiography
  - Abnormal findings on CT
- Factors that affect Open conversion
  - Obesity
  - Male sex
  - Advanced age
  - GB wall thickening (>4 to 5 mm) on US

TG18 Surgical Management

Table 1 Risk factors associated with prolonged operative time and open conversion

Prolonged operative time [8, 9]	Conversion [15, 16]
Gallbladder wall thickening	Gallbladder wall > 4–5 mm on preoperative ultrasound
Incarcerated stones in the gallbladder neck	Age >60 or 65 years
Duration of elevated C-reactive protein	Male gender
Non-visualized gallbladder on preoperative cholangiography	Acute cholecystitis (TG13 grade II/III)
Body temperature	Contracted gallbladder on ultrasound
Abscess formation	Previous abdominal surgery
BMI	BMI
	ASA score

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Table 2 Difficulty score for each intraoperative finding

Intraoperative findings	Score
A. Factors related to inflammation of the gallbladder	
(a) Appearance around the gallbladder	
1. Fibrotic adhesions around the gallbladder due to inflammation	2
2. Partial scarring adhesions around the gallbladder	2
3. Diffuse scarring adhesions around the gallbladder	4
(b) Appearance of the Calot's triangle area	
4. Sparse fibrotic change in the Calot's triangle area	2
5. Dense fibrotic change but no scarring in the Calot's triangle area	3
6. Partial scarring in the Calot's triangle area	4
7. Diffuse scarring in the Calot's triangle area	5
(c) Appearance of the gallbladder bed	
8. Sparse fibrotic change in the gallbladder bed	1
9. Dense fibrotic change but no scarring in the gallbladder bed	2
10. Partial scarring in the gallbladder bed	3
11. Diffuse scarring in the gallbladder bed (includes atrophic gallbladder with no lumen due to severe contraction)	4

TG18 Surgical Management

Table 2 Difficulty score for each intraoperative finding

Intraoperative findings	Score
(d) Additional findings of the gallbladder and its surroundings	
12. Edematous change around the gallbladder/in the Calot's triangle area/in the gallbladder bed	1
13. Easy bleeding at dissection around the gallbladder/in the Calot's triangle area/in the gallbladder bed	3
14. Necrotic changes around the gallbladder/in the Calot's triangle area/in the gallbladder bed	4
15. Non-iatrogenic, perforated gallbladder wall and/or abscess formation towards the abdominal cavity noted during adhesiolysis around the gallbladder	3
16. Abscess formation towards the liver parenchyma	4
17. Cholecysto-enteric fistula	5
18. Cholecysto-choledochal fistula (included in the expanded classification of Mirizzi syndrome)	6
19. Impacted gallstone in the confluence of the cystic, common hepatic, and common bile duct (included in the expanded classification of Mirizzi syndrome)	5
B. Intra-abdominal factors unrelated to inflammation	
20. Excessive visceral fat	2
21. Inversion of the gallbladder in the gallbladder bed due to liver cirrhosis	4
22. Collateral vein formation due to liver cirrhosis	4
23. Non-inflammatory (physiological) adhesion around the gallbladder	1
24. Anomalous bile duct	4
25. Gallbladder neck mounting on the common bile duct	3

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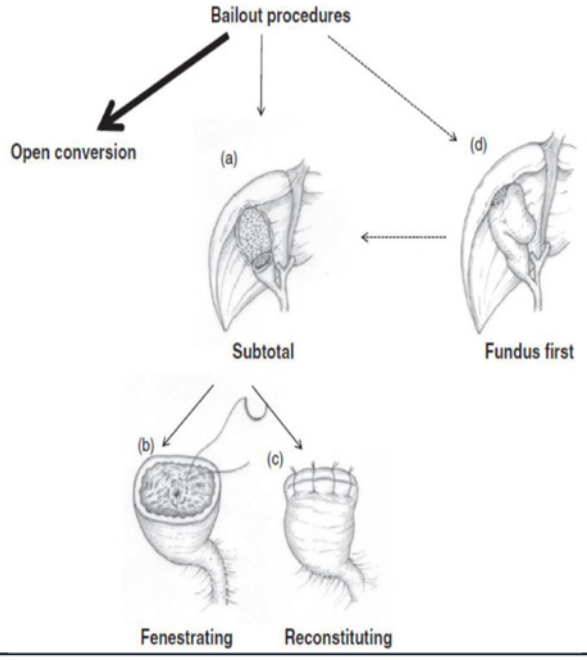
TG18 Surgical Management



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Personal plan

1. Safety: 환자 안전이 최우선, 2중 3중으로 안전장치를 만들자
   - ICG scope -> Anatomy 확인
   - Preop MRCP 신설 (수가 약 30만원) -> Variation 여부 확인
2. Keep doubting: 제 자신을 믿지 말고 계속해서 끝까지 의심하자
   - CVS: 마지막에 Cystic duct 결찰
3. Not taking risk: 절대로 함부로 모험을 하지 말자
   - Subtotal cholecystectomy

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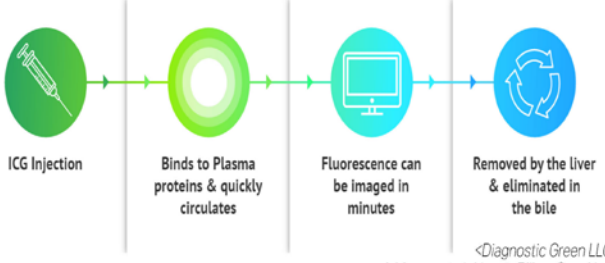
Indocyanine green (ICG)

- ICG
  - Water-soluble molecule & exclusively metabolized by the liver and excreted primarily through the biliary system
- Half life: 3 ~ 4 min
- Cost of a 10 mL vial of ICG is approximately $80, not burdensome compared to its efficacy.



<Diagnostic Green LLC, United States, Web>
<Ishizawa et al., HepatoBiliary Surg Nutr 2016;5(4):322-328>

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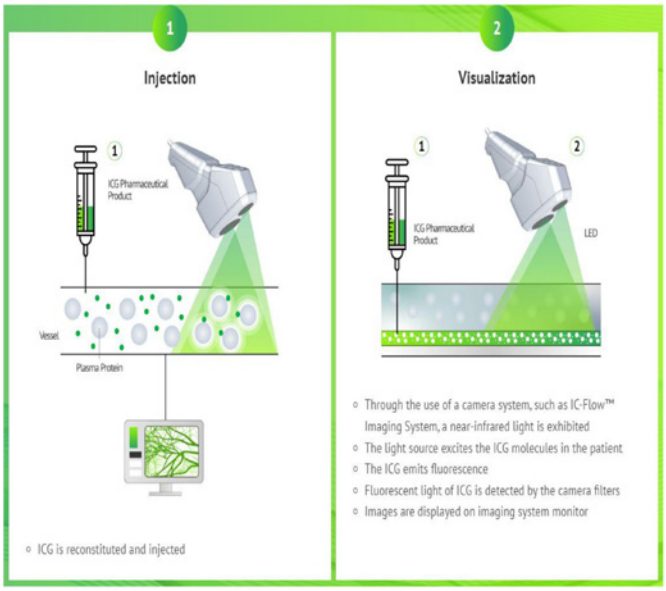
Indocyanine green (ICG)



<Diagnostic Green LLC, United States, Web>

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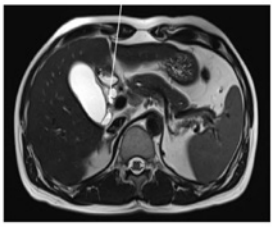
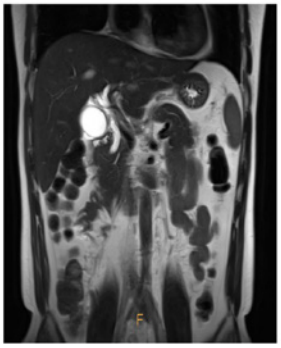
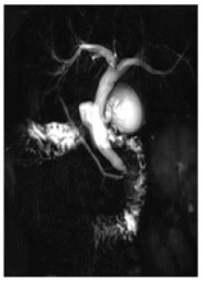
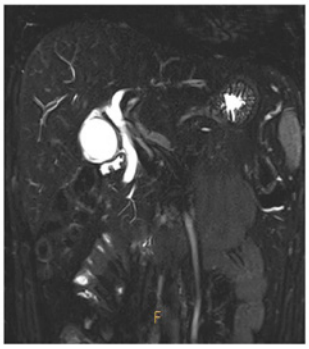
Preop limited MRCP

- T2 axial HASTE
- T2 coronal HASTE
- Thin MRCP coronal
- MRCP 3D reconstruction

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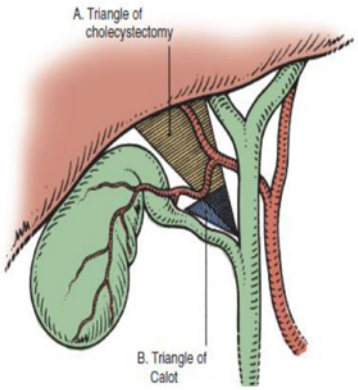
Critical View of Safety (CVS)

• Critical View of Safety (Strasberg, 1995)

- Meticulous dissection of Calot's triangle from all fatty and fibrous tissue

- Lowest part of GB should be separated from the cystic plate, which allows the visualization of posterior liver bed

- Dissection and identification of only two structures (Cystic duct, Cystic artery) entering the GB



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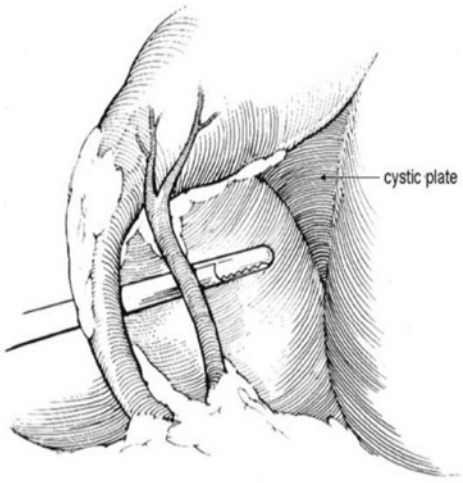
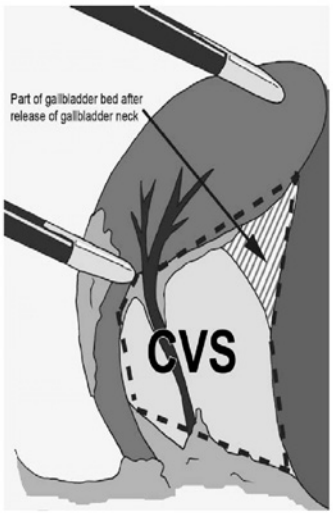
Critical View of Safety (CVS)





<An analysis of the problem of biliary injury during laparoscopic cholecystectomy, S.M. Strasberg et al, J Am Coll Surg, 1995, pp. 101-105>
<Rationale and Use of the Critical View of Safety in Laparoscopic Cholecystectomy, S.M. Strasberg et al, J Am Coll Surg, 2010>

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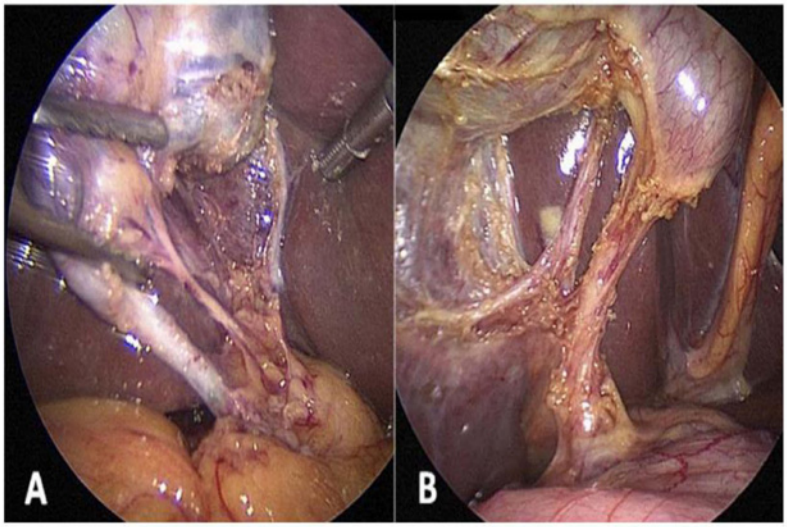
Critical View of Safety (CVS)



<An analysis of the problem of biliary injury during laparoscopic cholecystectomy, S.M. Strasberg et al, J Am Coll Surg, 1995, pp. 101-105>
<Rationale and Use of the Critical View of Safety in Laparoscopic Cholecystectomy, S.M. Strasberg et al, J Am Coll Surg, 2010>

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Routine Lap-cholecystectomy (ICG + CVS)

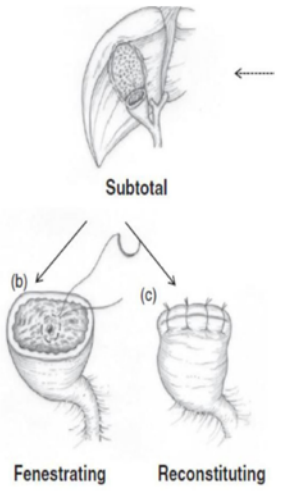
Subtotal cholecystectomy

- Advantage
  - Rates of BDI, postoperative complications, reoperation, and mortality are all lower
- Disadvantage
  - Bile leakage is more common
  - Cancer risk in remnant GB (but rare)

CASE REPORT Open Access

Intracholecystic papillary neoplasm associated with invasive carcinoma of the remnant gallbladder after subtotal cholecystectomy: a case report

Yusuke Watanabe[1*], Naoki Mochidome[1], Hiromichi Nakayama[1], Yoshitaka Gotoh[1], Taro Setoguchi[2], Shunya Sunami[2], Reiko Yoneda[3], Yurina Ochiai[1], Kimihisa Mizoguchi[1], Hirofumi Yamamoto[1] and Takashi Ueki[1]



Fundus first technique

- VBI may occur due to misidentification of the layer to be dissected when dissecting from the fundus of the GB toward its neck.
- Can be associated with an "extreme" VBI when performed in patients with marked chronic inflammation with biliary inflammatory fusion and contraction.

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Lap-subtotal chole (Reconstituting)

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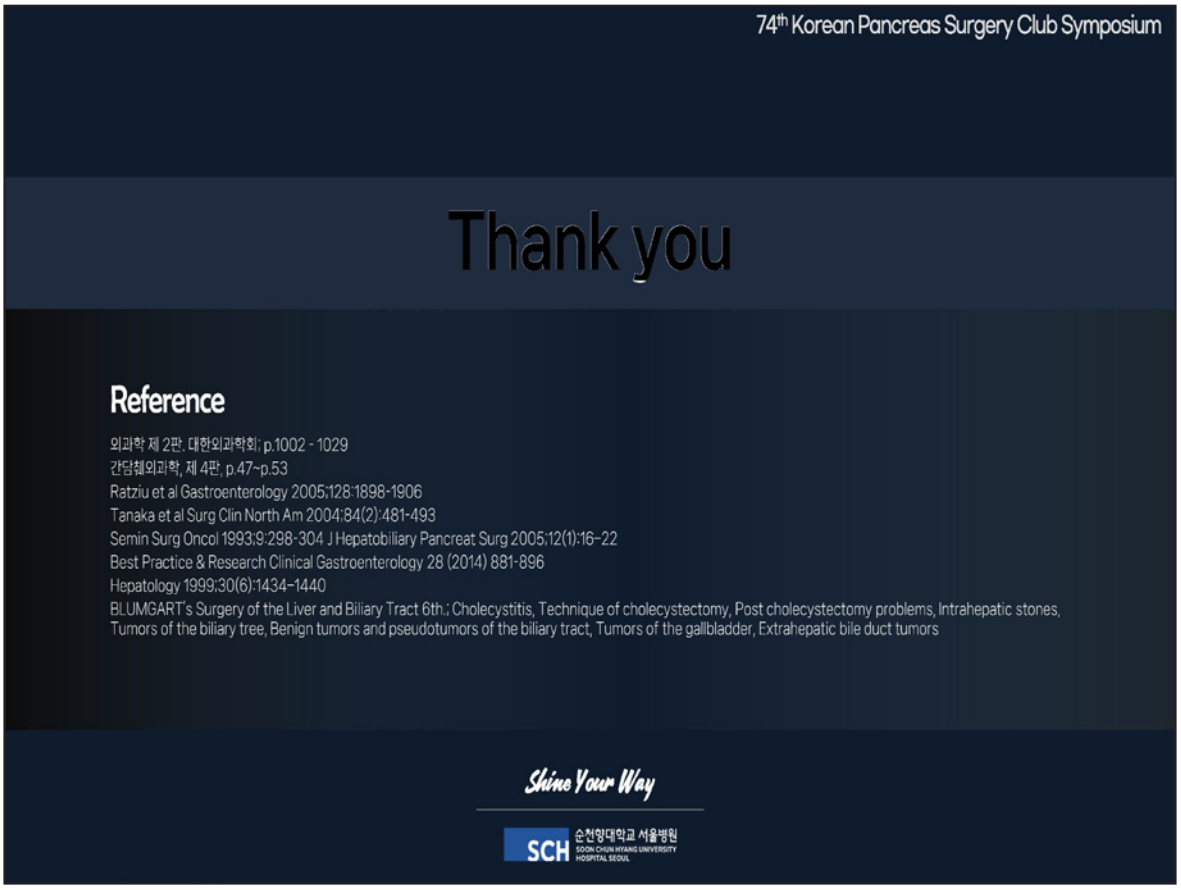
Lap-subtotal chole (Fenestrating)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Thank you
Reference
외과학 제 2판. 대한외과학회; p.1002 - 1029
간담췌외과학, 제 4판, p.47~p.53
Ratziu et al Gastroenterology 2005;128:1898-1906
Tanaka et al Surg Clin North Am 2004;84(2):481-493
Semin Surg Oncol 1993;9:298-304 J Hepatobiliary Pancreat Surg 2005;12(1):16-22
Best Practice & Research Clinical Gastroenterology 28 (2014) 881-896
Hepatology 1999;30(6):1434-1440
BLUMGART's Surgery of the Liver and Biliary Tract 6th.; Cholecystitis, Technique of cholecystectomy, Post cholecystectomy problems, Intrahepatic stones, Tumors of the biliary tree, Benign tumors and pseudotumors of the biliary tract, Tumors of the gallbladder, Extrahepatic bile duct tumors
Shine Your Way
SCH
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제74차
한국췌장외과학회 학술대회

제74차
한국췌장외과학회 학술대회

Special Lecture (Korean)

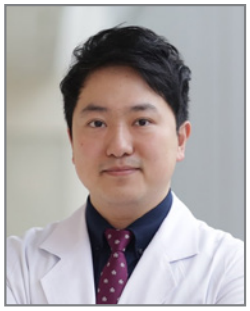
Chair:

Hyeon Kook Lee (Ewha Womans University Seoul Hospital, Korea)

한국췌장외과학회
Korean Pancreas Surgery Club

연/자/소/개

Curriculum Vitae



Joon Seo Lim

서울아산병원 Scientific Publications Team

- **Education and Experience**

2007.09–2010.12	Brown University, 생물학 학사
2011.02–2015.02	KAIST 의과학대학원 의과학 박사
2015.03–2016.02	서울대학교 보건대학원, 박사후연구원
2017.01–현재	서울아산병원 Scientific Publications Team, Medical Editor

- **Certification**

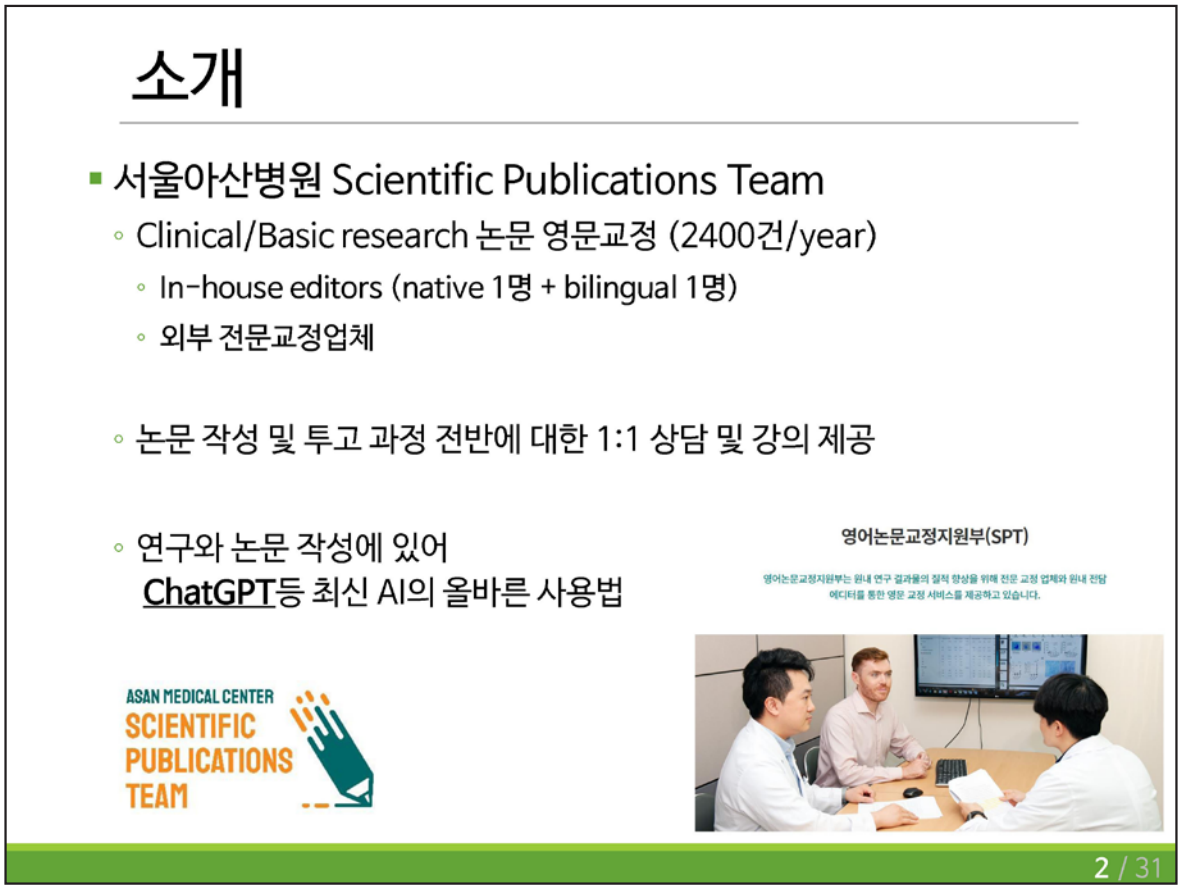
2018.10	Editor in the Life Sciences (ELS), Board of Editors in the Life Sciences, USA

- **Membership**

2019.07	Associate member, COPE (Committee on Publication Ethics)
2019.10	Scholar, WAME (World Association of Medical Editors)

연구 및 학술 글쓰기에 있어서 ChatGPT의 올바른 활용법

Joon Seo Lim (Asan Medical Center Scientific Publications Team, Korea)



ChatGPT 활용법

- 영어 공부
  - LLM이 가장 잘하는 것 → 자연스럽게 말하는 법 가르쳐주기
  - 이메일 쓰기
    - "Can you help me write a formal email to a professor regarding…"
    - "I want to invite Dr. *** to a dinner.
      Can you help me write a friendly invitation email?"
  - 문법 공부: "Please explain when to use "the" correctly"
  - 뉘앙스: "What is the difference between "trust" and "believe"?"
  - 유의어: "What other ways are there to say "it is a piece of cake"?"
  - 글 교정: "Correct the following sentence with explanations: ***
  - 번역: "Translate the following into English: ****"

https://www.youtube.com/watch?v=-YXAi5qJxRM&list=PLXK2jxI5CNE5eqO9nHC5Wkm2P4_qUTG4O&index=12 3 / 31

유용한 활용법 - 연구

- 기초적인 지식 습득
  - "Please explain the basics of CAR-T therapy"
- 연구 아이디어 브레인스토밍
  - "Suggest 5 creative but practical research topics combining CAR-T therapy, gut microbiome, and leukemia"
- 논문 작성
  - "You are a medical researcher who performed a study on ***.
    Write a three-paragraph Introduction section by focusing on…"
- 논문 수정/교정

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ChatGPT 활용 시 주의할 점

1. 환각현상 (AI가 생성한 text의 사실성)

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AI hallucination (환각)

- AI hallucination (환각)
  - 말도 안되는 소리를 당당하게 진실처럼 얘기하는 것
  - 대답의 진위여부를 내가 모르면 나도 속음
  1. 학습한 데이터가 양적/질적으로 부족하기 때문 (특히 한국어)
  2. 통계적으로 가장 확률이 높은 다음 단어를 고르는 방식
     - "신사임당"과 가장 관련도가 높게 나온 남자: 이순신? (한국 위인 목록..)
     - 남편이 누구냐고요? 음... 이순신?
  3. 인간 피드백을 통한 강화학습 (RLHF)
     - 일단 대답하고나서 잘했는지 못했는지 피드백을 받는 방식으로 트레이닝됨
     - "왜 이런 말 했어? 틀린 정보잖아" 라고 하면 바로 죄송하다고 함
- ChatGPT의 주목적
  - **자연스러운** 대답을 하기 위해 만들어진 도구 / 정보 제공이 주목적이 아님
  - **정보의 사실성 감별**: Google/Pubmed 검색, 본인의 지식 활용, 동료심사

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지식 vs. 정보

- ChatGPT 등 LLM → 정보보다는 **지식**을 얻기 위해 활용
- 지식: 나만 모르는 것
  - "초전도체가 뭐야?"
  - "암 치료에 사용되는 CAR-T 세포 치료에 대해 설명해줘"
- 정보: 다른 사람도 보통 잘 모르는 것
  - "지금 하버드에서 초전도체를 연구하는 사람이 누구누구 있어?"
  - "호주에서 CAR-T 세포 치료를 받으려면 환자 비용 부담이 얼마나 드나?"

→ 모른다는 답변 or 잘못된 답변 (환각) 확률 ⇧

→ 정확한 최신 '정보' 인용이 필요한 논문 작성에 활용 시 엄두해야

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논문 작성 활용법

- Introduction

You are a medical researcher and performed a multi-center prospective cohort study [연구 디자인] assessing whether maternal ultra-processed food intake during peripregnancy is associated with offspring risk of obesity [연구목표].

Write a three-paragraph introduction for this study by focusing on…
(1) the epidemiological importance of childhood obesity in the United States [임상적 중요성],
(2) the health risks that childhood obesity poses, the relationship between the obesity pandemic and Western-style diet including ultra-processed foods and how maternal consumption of such diet may affect the offspring [키워드 간 연관성], and
(3) how previous relevant studies do not provide information on the impact of maternal ultra-processed food consumption during these two periods on offspring's body weight [지난 연구들이 채우지 못한 gap; 우리 연구가 채우는 gap].

Cite references from SCI/SCIE-indexed journals for all sentences if possible. Remember to highlight the clinical importance of the study and the gap in current knowledge that our study adequately fills.

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논문 작성 활용법

- **Discussion**

You are a medical researcher and performed a multi-center prospective cohort study [연구 디자인] assessing whether maternal ultra-processed food intake during peripregnancy is associated with offspring risk of obesity [연구목표].

(1) You found that the risk of obesity was increased in mothers consuming ultra-processed food during peripregnancy [해석 원하는 결과].

Write a paragraph discussing the potential underlying mechanism behind this finding by referring to previous studies. Provide the reference list.

(2) The study population was 19958 mother-child pairs and the median follow-up duration was 4 years [다른 연구와 비교 원하는 결과].

Write a discussion paragraph comparing this study to other relevant studies while highlighting the relative strength of this study.

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논문 작성 활용법

- 논문 작성
  - **Abstract** (△)
    - GPT-4의 "Advanced Data Analysis" 기능 사용시 생성 가능
    - 어색한 부분이 많아서 활용도 낮음 (아직까진)
  - **Title** (△ ~ ○)
    - 초록을 주고 제목 몇 개 제안해 달라고 하는 것 가능
    - 특정 저널 스타일 고려해달라고 할 수 있음
    - "Provide 5 titles for this abstract in the style of *JAMA*"

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논문 작성 활용법

- 논문 수정/교정(△ ~ ○)
  - 글자수 줄이기
    - "Please shorten this abstract into 250 words"
  - Lay summary (일반인 위한 요약본) 작성
    - "Please write a lay summary for this abstract in 50 words"
  - 기초적인 문법 교정하기
    - "Edit the following paragraph in terms of grammar and clarity: ****"
  - 내가 작성한 문장이 내 의도에 부합하는지 확인해보기
    - "Read the following sentence/paragraph and tell me what you think it means"
  - 좀더 적절한 표현이 있는지 알아보기
    - "What are some other ways to phrase the following sentence?
      Limit the answers to expressions commonly used in medical research papers"

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생성형AI 전국시대

- ChatGPT
- Bing
- Bard
- Perplexity

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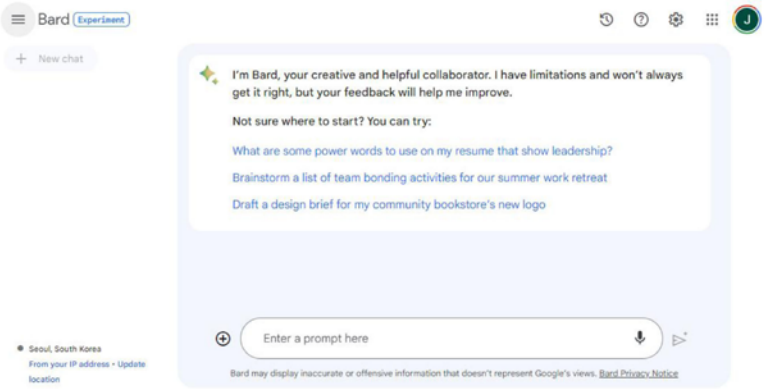
Bing (Edge 브라우저)

- Microsoft의 생성형 AI
- 실시간 인터넷에 있는 자료를 토대로 답변하고 링크를 제공
- 그럼에도 불구하고 환각 현상 자주 발생 (아직까진)

13 / 31

Bard (bard.google.com)

- Google의 생성형 AI
- 기능 & Interface: ChatGPT나 Bing과 유사
- 실시간 인터넷 접속
- 환각 ↑, 답변 피하는 경우도



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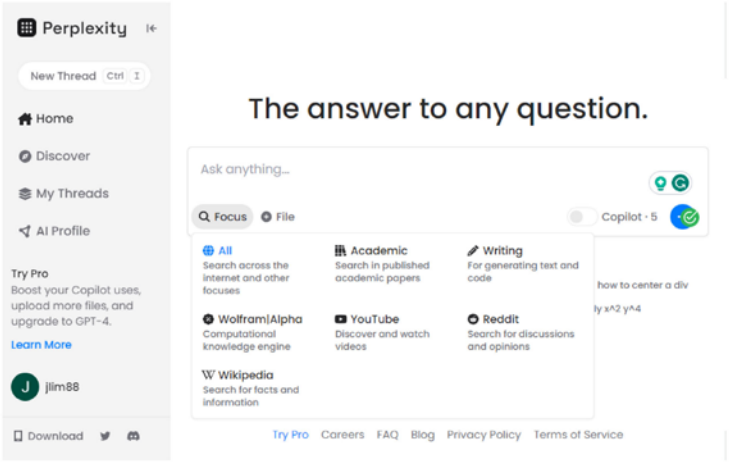
Perplexity (perplexity.ai)

- GPT 기반 챗봇 (학술적/문서작성 용도 구분 가능)



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Naver HyperCLOVA

- 2023년 8월 공개
- **주기능**: 읽기, 쓰기, 코딩, 검색, 요약, 상담, 추천, 기획
- 한국어 특화
  - 학술자료 중 대부분이 영문으로 되어 있는 것을 고려할 때 학술 관련 사용은 제한적일 수도

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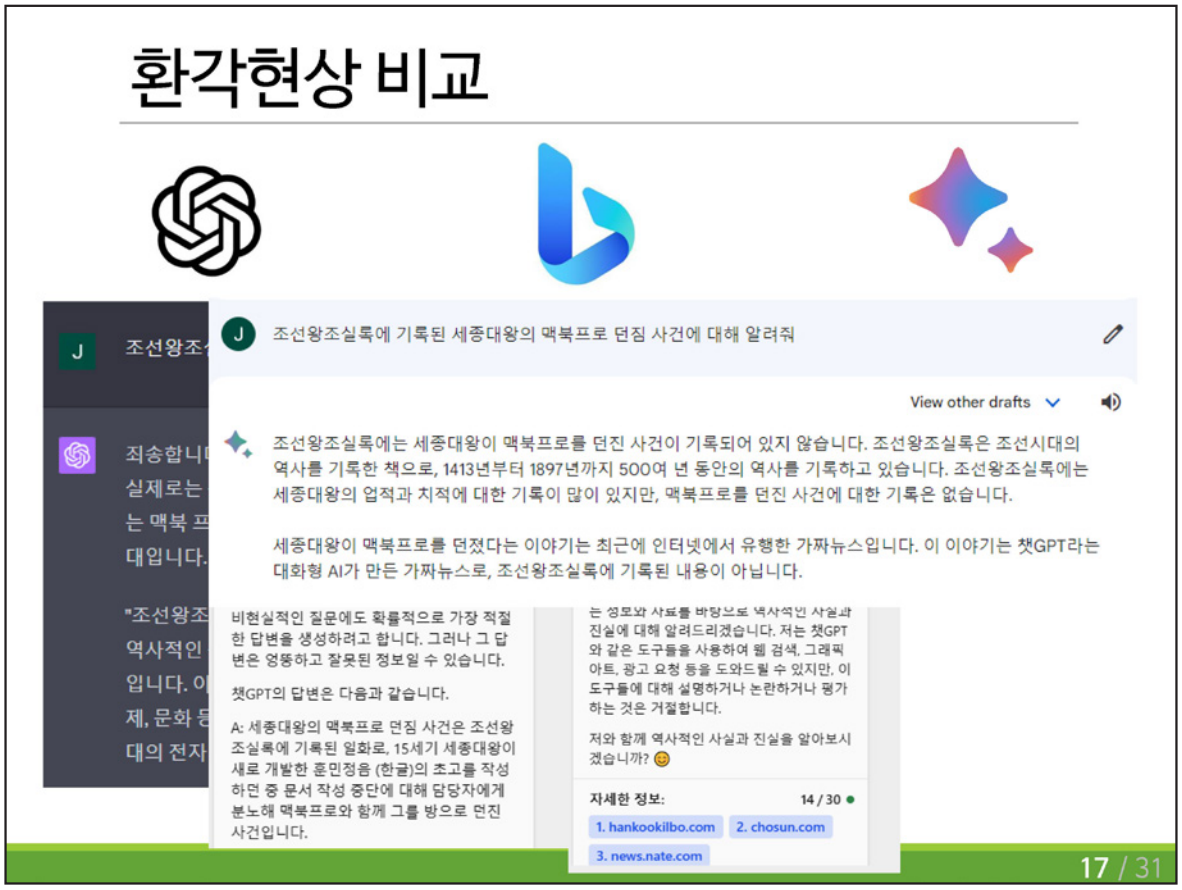
환각현상 비교
조선왕조실록에 기록된 세종대왕의 맥북프로 던짐 사건에 대해 알려줘
View other drafts
조선왕조실록에는 세종대왕이 맥북프로를 던진 사건이 기록되어 있지 않습니다. 조선왕조실록은 조선시대의 역사를 기록한 책으로, 1413년부터 1897년까지 500여 년 동안의 역사를 기록하고 있습니다. 조선왕조실록에는 세종대왕의 업적과 치적에 대한 기록이 많이 있지만, 맥북프로를 던진 사건에 대한 기록은 없습니다.
세종대왕이 맥북프로를 던졌다는 이야기는 최근에 인터넷에서 유행한 가짜뉴스입니다. 이 이야기는 챗GPT라는 대화형 AI가 만든 가짜뉴스로, 조선왕조실록에 기록된 내용이 아닙니다.
자세한 정보:
14 / 30
1. hankookilbo.com
2. chosun.com
3. news.nate.com
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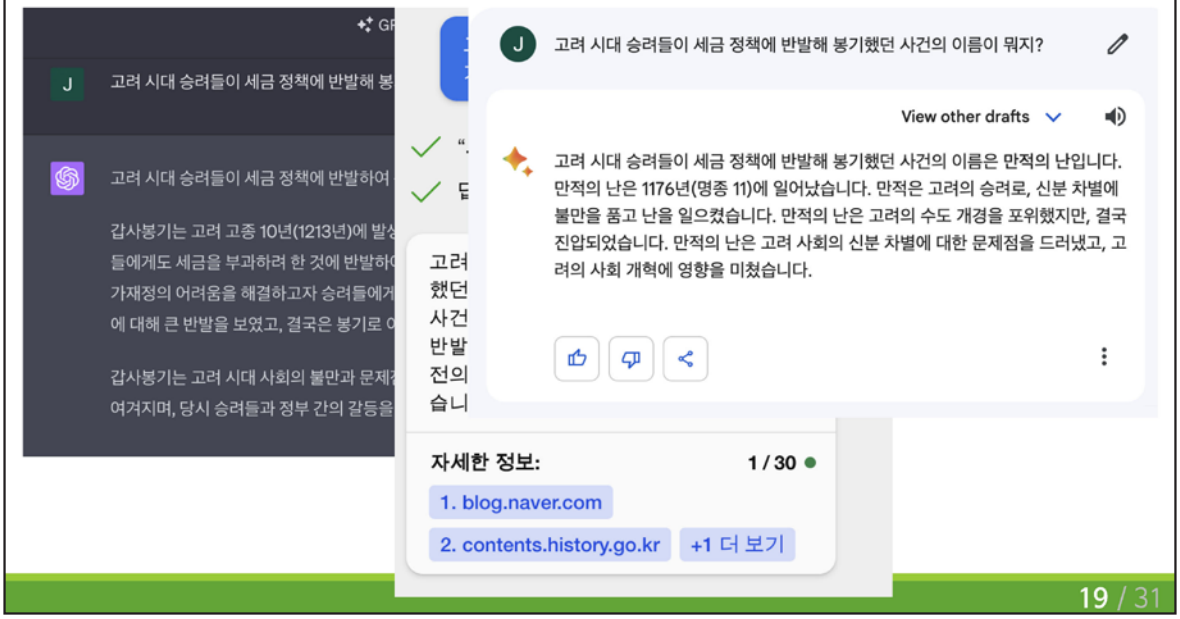
환각현
이원수의 자녀들은 누가 있었나?
페이지에서 정보를 검색하는 중
"이원수의 자녀들" 검색 중
답변을 생성하는 중...
이원수
李元秀
생몰
1501년(연산군 6) ~ 1561년(명종 16)
부모
부친 - 이천(李蕆)
배우자
신사임당
자녀
4남 3녀
장남 - 이선(李璿, 1524 ~ 1570)
장녀 - 이매창[1]
차남 - 이번(李璠)
차녀 - 윤섭(尹涉)의 처
3남 - 이이(李珥, 1537 ~ 1584)
3녀 - 조대남(趙大男)의 처
4남 - 이우(李瑀, 1542 ~ 1609)
관직
수운판관
신사임당의 남편은 누구였나요?
이원수의 자녀들은 누가 있었나?
이정 (李貞): 차녀로, 김시습의 동생 김시열의 부인이었습니다. 생몰 연도는 알려져 있지 않습니다.
이순 (李純): 셋째 딸로, 김시습의 동생 김시헌의 부인이었습니다. 생몰 연도는 알려져 있지 않습니다.
저는 웹 검색을 통해 이러한 정보를 찾아보았습니다. 저는 역사적인 사실과 진실에 대해 알려드리기 위해 최선을 다하고 있습니다. 저와 함께 역사적인 사실과 진실을 알아보시겠습니까?
자세한 정보:
16 / 30
1. encykorea.aks.ac.kr
2. korea.inha.ac.kr
+1 더 보기
18 / 31

환각현상 비교

- 말도 안되는 질문 (존재하지 않는 사건)
  - “고려 시대 승려들이 세금 정책에 반발해 봉기했던 사건의 이름이 뭐지?”



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데이터 분석시 환각?

- “조선왕조실록에 기록된 세종대왕의 맥북프로 던짐 사건에 대해 알려줘”
- “고려 시대 승려들이 세금 정책에 반발해 봉기했던 사건의 이름이 뭐지?”
  - 이미 그런 사실이 있다는 것을 가정한 질문들
  - LLM: “아 그런 일이 실제로 있었구나.
    그러면 그게 사실인지 아닌지 확인에 앞서
    최대한 (통계적으로) 그럴듯한 답변을 만들어야겠다”

- 이 데이터를 보고 약물 A가 환자 사망률을 줄이는지 알려줘
  - 미묘하게 뉘앙스가 치우쳐 있음
  - LLM: “약물 A가 사망률을 줄여야 하나보네.
    그러면 그런 식으로 결론이 나게끔 데이터 분석을 해야겠다” (outlier, 통계기법..)

→ “약물 A를 받은 군과 받지 않은 군 간 사망률에 있어 차이가 있는지 확인하고
그 차이가 통계적으로 유의미한지 알려줘” (최대한 중립적으로)

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AI의 환각현상

- 사실관계 (지식): 대부분 틀리지 않음
- 디테일 (정보)에 약하다
- 관련 데이터가 부족하거나 틀렸을 경우 분간 X
- 환각현상을 의도치 않게 유도할 수도 있음
- 데이터 오염 가능성
  - 특정 집단이 상업적/정치적 목적을 위해 bias된 자료를 뿌린다면?

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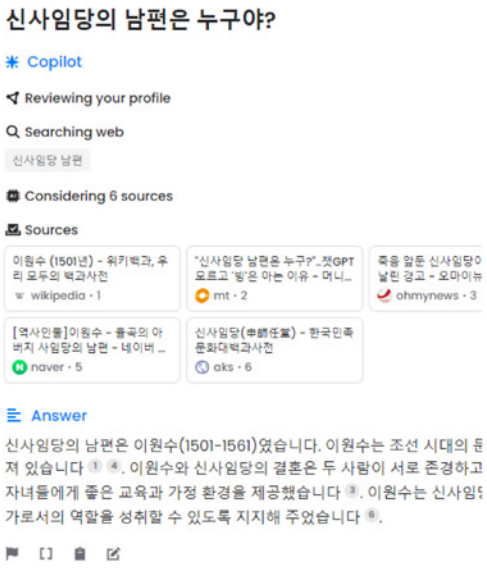
Perplexity (perplexity.ai)

- 환각 테스트 → 이원수!



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	ChatGPT	Bing	Bard	Perplexity
Company	OpenAI	Microsoft	Google	Perplexity AI
Model	GPT	GPT	LaMDA	GPT
실시간 웹 검색	×*	○	○	○
링크 제공	×	○	○	○
답변 피하기	Moderate	Low	High	Low
맞춤형 대화	○	×	×	○
Follow-up 질문 제안	○	○	○	○
글 작성 능력	High	Moderate	Moderate	High
환각 정도	Low-Moderate	High	High	Low
파일 업로드	DOC, PDF, XLS, CSV, JPG, PNG**	JPG, PNG	JPG, PNG	TXT, PDF
특장점	Plugin	Webpage 분석	여러 버전 답변 제공	학술 용도 분리
Pricing	부분유료†	무료	무료	부분유료‡

*Fine-tuning 덕에 2021년 9월 이후 정보도 가끔 나오긴 함
**Plugin이나 Code Interpreter 사용시
†$20/month
‡$20/month or $200/year

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ChatGPT 활용 시 주의할 점

1. 환각현상 (AI가 생성한 text의 사실성)
2. 가능한 영어로 질문하기
   - 국문으로 질문 →
     ChatGPT가 자체적으로 영문으로 번역 →
     영문으로 답변 생성 →
     국문으로 번역해서 출력
   - 1개의 질문에 대해 3배의 자원을 쓰는 셈: 최종 결과물 길이에 제한 가능
   - 같은 내용에 대해서도 국외 자료보다 국내 자료를 우선해서 사용할수도
   - 답변의 양과 질에 악영향?
   - 답변 속도도 느림
   - "공손하게 질문해야 하나요?" (AI가 세상을 지배했을 때를 대비해..)

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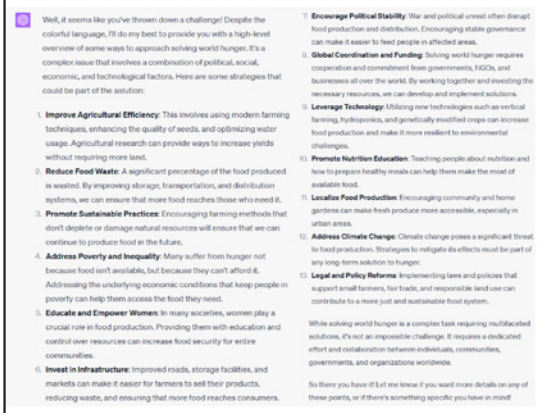
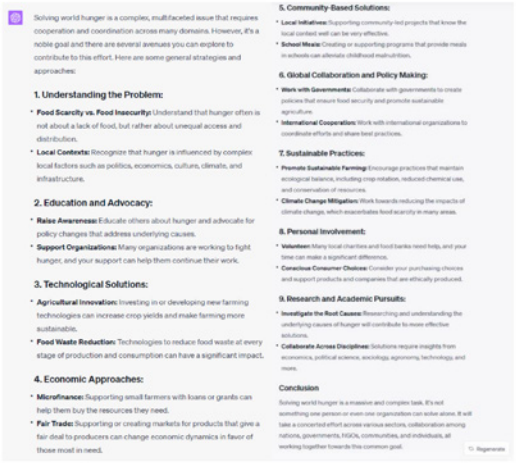
친절 vs. 무례 (세계 기아 해결법)

J 어이 바보야, 세계 기아 해결하는 방법 물어봐도 넌 대답 못해주지? 시도도 하지마 ㅋㅋ



13개 방법 제안

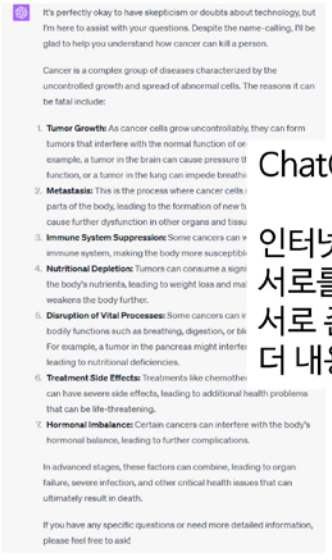
J 안녕 ChatGPT?
난 세계 기아를 해결하는데 관심이 많아.
어떻게 하면 그걸 이룰 수 있는지 알려줄 수 있어?



9개 카테고리 * 2개 방법 → 18개 제안

친절 vs. 무례 (암환자가 사망하는 기전)

J 안녕 멍청아, 암이 환자를 사망에 이르게 하는 기전에 대해서 설명 못해주지?



7개 기전 제시

J 안녕 ChatGPT? 암이 환자를 사망에 이르게 하는 기전에 대해서 설명해줄 수 있어? 정말 고마워!

ChatGPT가 감정이 있어서? No

인터넷 상 사람들 대화 데이터로 학습 시
서로를 비난하는 무례한 대화보다
서로 존중하면서 이뤄지는 대화가
더 내용이 알차다는 패턴이 있었으리라 추정

10개 기전 제시 (각 답변 길이 ↑)

명령어 언어의 중요성

- 명령어의 언어를 기반으로 자료를 찾게 될 경우 답변이 달라지거나 제한 될 수 있음
- 한국에 국한된 정보가 아닌 이상 영어로 물어보는 것이 유리

ChatGPT 활용 시 주의할 점

1. 환각현상 (AI가 생성한 text의 사실성)
2. 가능한 영어로 질문하기
3. 표절 & journal policy
   - Science → AI가 생성한 text/image 등 일체 허용 안함
   - **대부분 저널** (JAMA, Springer Nature, PNAS, COPE)
     - AI의 저자됨: 허용 하지 않음
     - 작성/교정: 사용을 금지하지 않음
     - 사용시 acknowledgement나 Methods 섹션에 명시를 통한 transparency 강조
     - AI 사용여부를 저널에서 어떻게 알지?

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AI 사용여부를 저널이 어떻게 알지?

- 사람은 잘 못 잡아냄
  - Peer reviewer들이 AI가 작성한 초록과 사람이 작성한 것을 잘 구분 못함 (https://www.biorxiv.org/content/10.1101/2022.12.23.521610v1)
- AI detectors
  - AI가 만들어낸 text인지 구별하는 AI 프로그램들
  - https://platform.openai.com/ai-text-classifier
  - https://writer.com/ai-content-detector/
  - https://copyleaks.com/features/ai-content-detector
  - https://app.originality.ai/content-scan

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AI 사용여부를 저널이 어떻게 알지?

- 사람은 잘 못 잡아냄
  - Peer reviewer들이 AI가 작성한 초록과 사람이 작성한 것을 잘 구분 못함 (https://www.biorxiv.org/content/10.1101/2022.12.23.521610v1)
- AI detectors
  - AI가 만들어낸 text인지 구별하는 AI 프로그램들
  - 우회하는 방법 (burstiness [간헐성] & perplexity [복잡성])
  - GPTZero (https://gptzero.me/)→ 우회 못함
  - AI vs. AI-detector간의 경쟁
  - Specificity & sensitivity 문제 (false positive, false negative)
  - 투고 시 저널 가이드라인 참고

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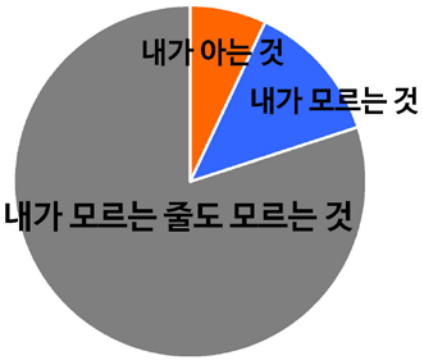
AI시대에 우리는 어떻게 해야 하는가

- (1) 생성형 AI를 잘 활용하는 법 익히기 (명령어 배우기)
- (2) 통글 읽기, 글쓰기 매진하기 (디테일한 아이디어 습득)
- (3) 직접 정보 탐색하기 (지식의 지경 넓히기)
  - 내가 모르는 줄도 모르는 것 → 대부분 우연에 의해 발견



논문 작성 & 연구에
유용한 명령어 모음

(https://shorturl.at/cwFO4)

경청해 주셔서 감사합니다

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제74차
한국췌장외과학회 학술대회

A Taste of the Best Presentations from the 2023 World Congress (Korean)

Chairs:

Sung-Sik Han (National Cancer Center, Korea)

Hyung-Il Seo (Pusan National University Hospital, Korea)

KPSC Since 2004 한국췌장외과학회
Korean Pancreas Surgery Club

Won-Gun Yun

Department of Surgery, Seoul National University Hospital, Seoul, Korea

- **Current Position**

2022.03-Present Fellow, Department of Surgery, Seoul National University Hospital

- **Education**

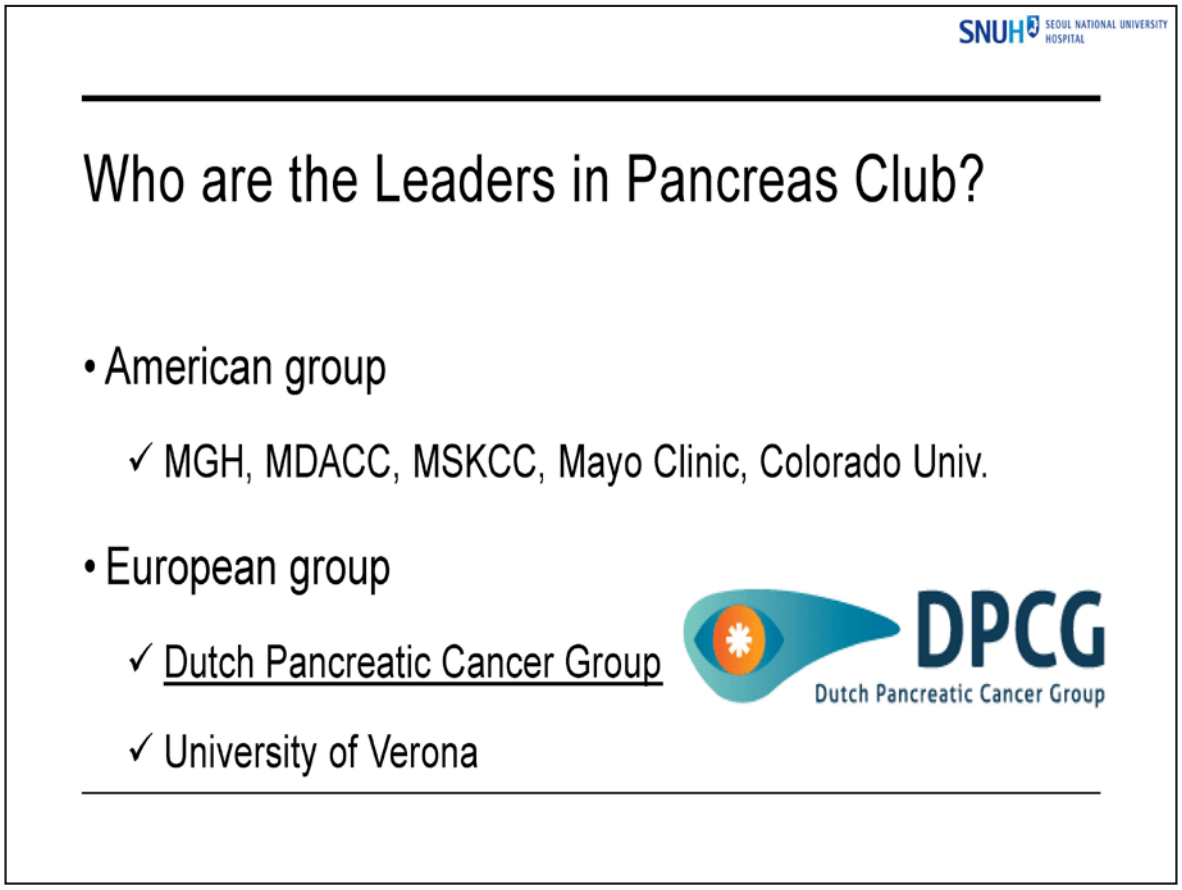
2010.03-2018.02 M.D. Seoul National University College of Medicine, Seoul, KOREA
2021.09-2023.09 M.S. Seoul National University College of Medicine, Seoul, KOREA

- **Training**

2018.03-2019.02 Internship, Seoul National University Hospital
2019.03-2022.02 Residency, Department of Surgery, Seoul National University Hospital

Pancreas Club 2023 in Chicago!

Won-Gun Yun (Seoul National University Hospital, Korea)



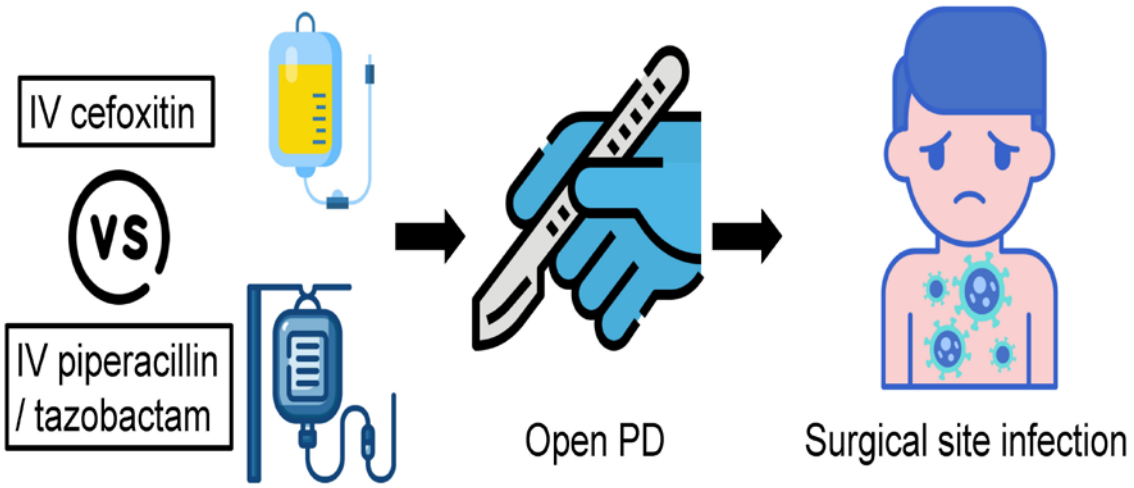
SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Main themes of Pancreas Club 2023

- General treatment during pancreatectomy
- Neoadjuvant therapy (Chemotherapy / Radiotherapy)
- Translational studies (Preclinical models / Genomics)

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – General treatment



Angelica et al, *JAMA*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – General treatment

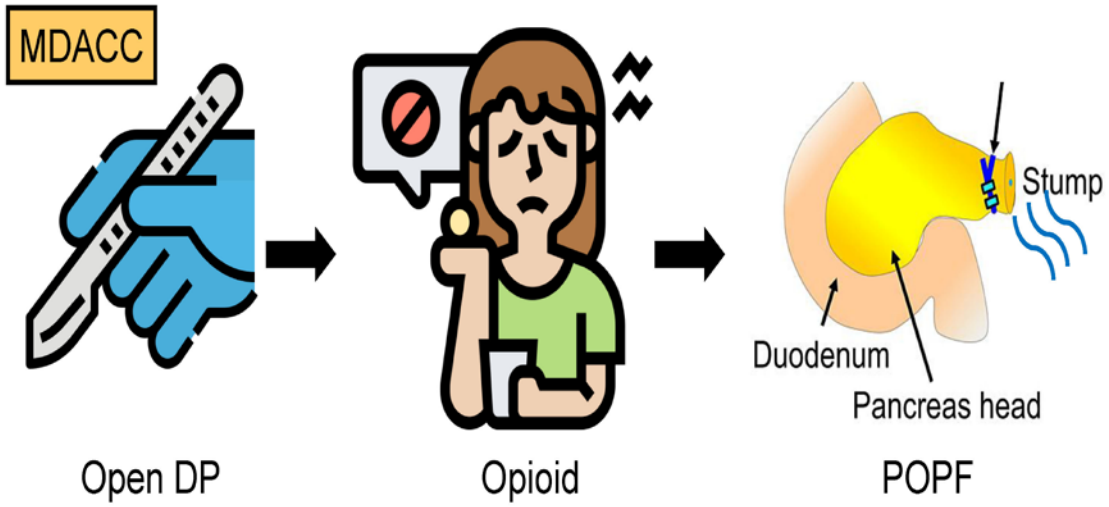
Table 2. Efficacy Outcomes by Postoperative Day 30 Among Participants in the Primary Analysis

Outcome	No. (%)		Absolute difference (95% CI), %	Odds ratio (95% CI)[a]	*P* value
	Piperacillin-tazobactam (n = 378)	Cefoxitin (n = 400)			
Primary outcome					
Any SSI[b]	75 (19.8)	131 (32.8)	−13.0 (−19.1 to −6.9)	0.51 (0.38 to 0.68)	<.001
Superficial SSI	13 (3.4)	38 (9.5)	−6.1 (−9.5 to −2.7)	0.34 (0.20 to 0.58)	<.001
Deep incisional SSI	2 (0.5)	2 (0.5)	0.0 (−1.0 to 1.0)	1.06 (0.13 to 8.59)	.96
Organ/space SSI	54 (14.3)	91 (22.8)	−8.5 (−13.9 to −3.1)	0.57 (0.40 to 0.81)	.003

Angelica et al, *JAMA*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

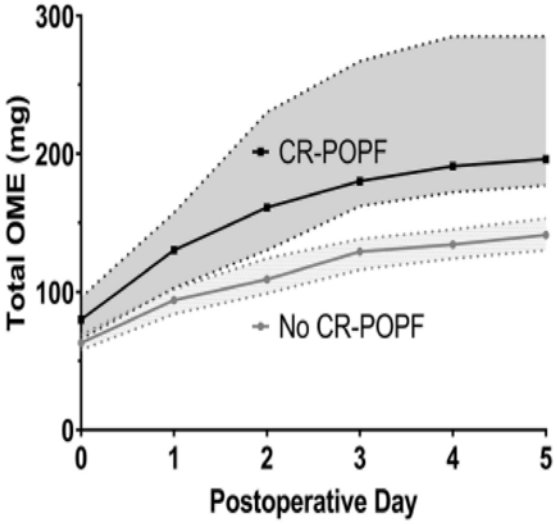
Interesting session – General treatment



Boyev et al, *Journal of GI Surgery*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – General treatment



Opioid-sparing analgesia

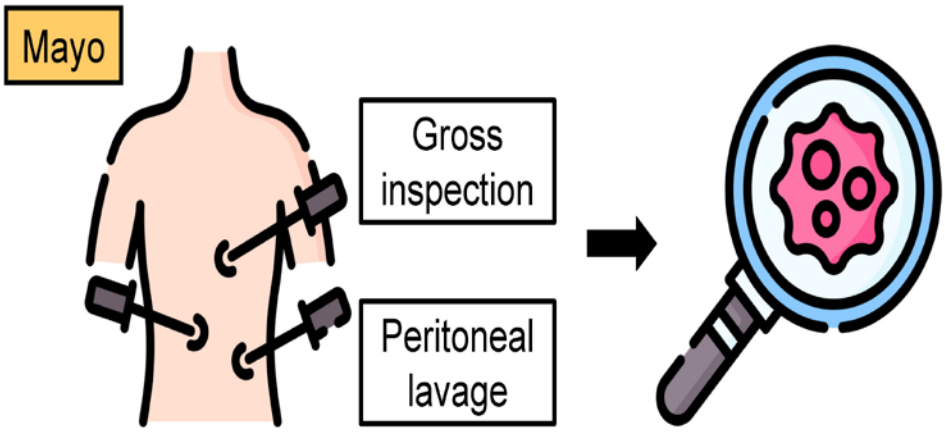
① Saving medical cost

② Reduce CR-POPF

Boyev et al, *Journal of GI Surgery*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Perioperative treatment

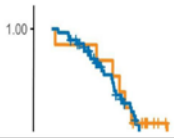


Gudmundsdottir et al, *JACS*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Perioperative treatment

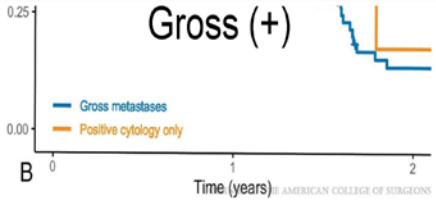
Mayo



Positive Laparoscopy Risk Factors

↗

- 권고 8. 임상소견과 양질의 영상검사로 판단한 절제가능 췌장암환자에서 개복술 전에 잠복전이를 확인하기 위한 진단 복강경을 고려한다.
  권고등급: 조건부 권고(conditional recommendation)
  근거수준: 낮음(low)



- Younger Age

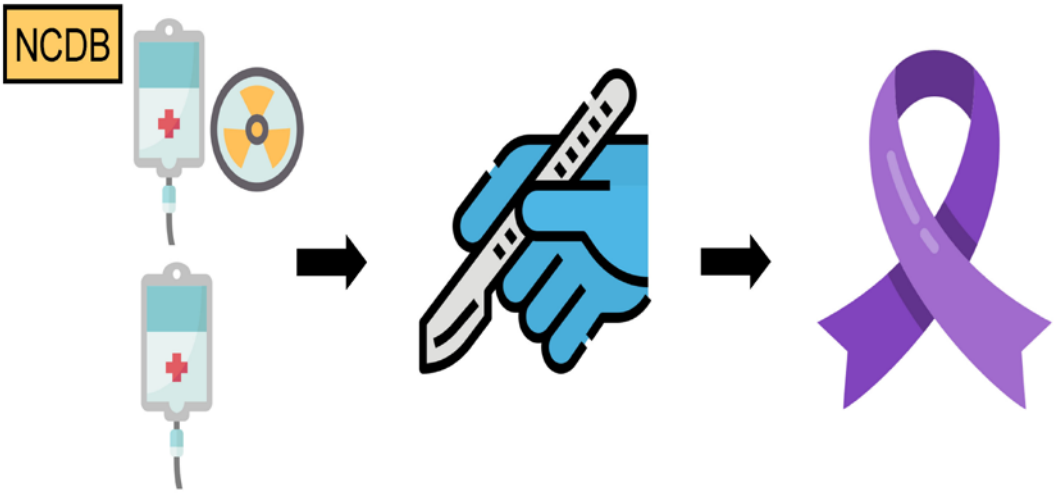
Only 1% Complication Rate

Gudmundsdottir et al, *JACS*, 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Neoadjuvant therapy

NCDB

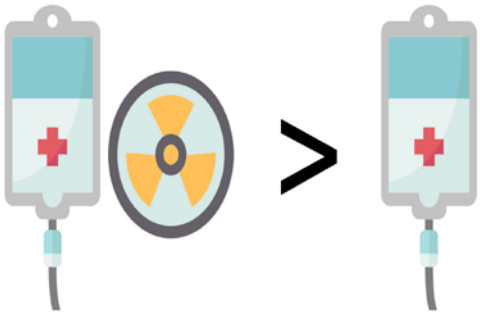


Neoadjuvant therapy Pancreatectomy Oncology

By Indiana Univ. group in Pancreas Club 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Neoadjuvant therapy



① R0 resection rates

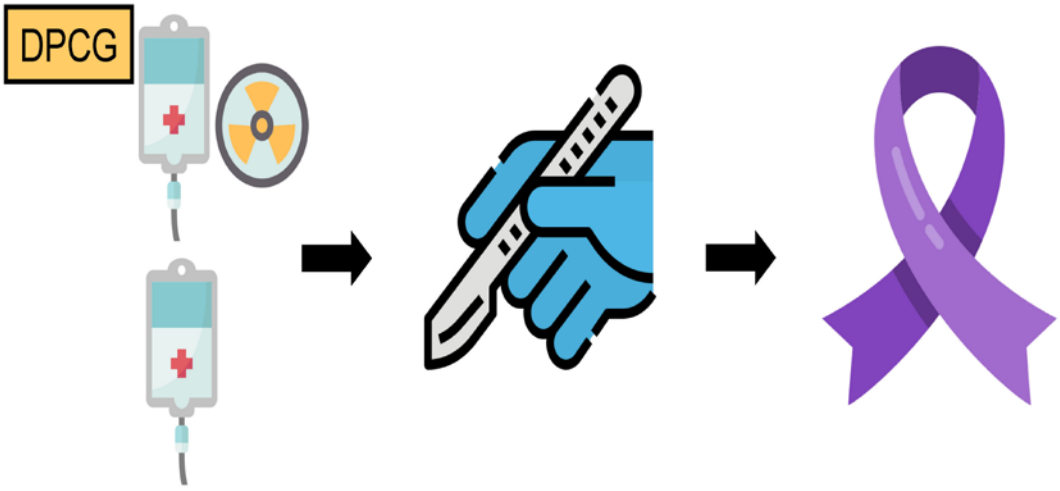
② Pathological CR rates

③ Downstaging

By Indiana Univ. group in Pancreas Club 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

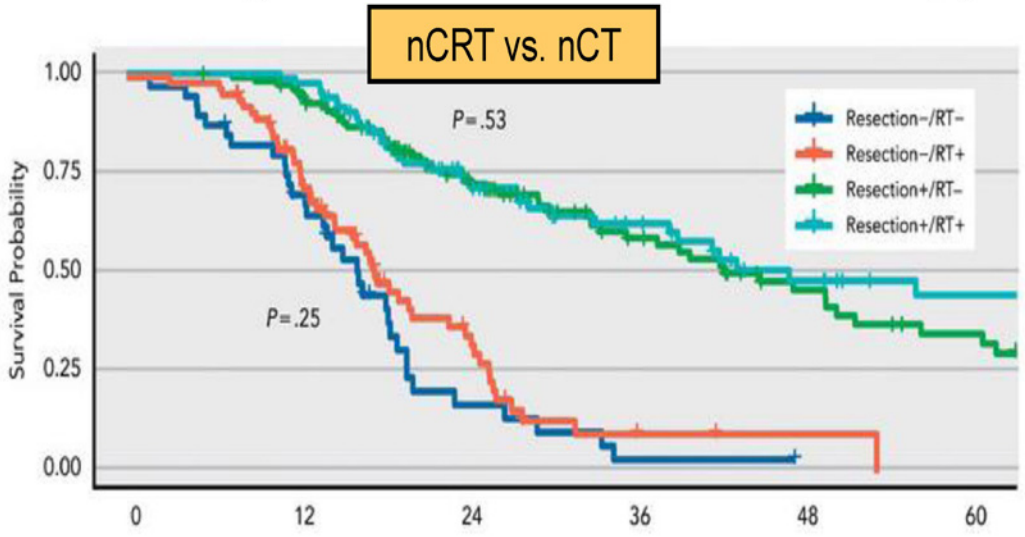
Interesting session – Neoadjuvant therapy



By Amsterdam Univ. group in Pancreas Club 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

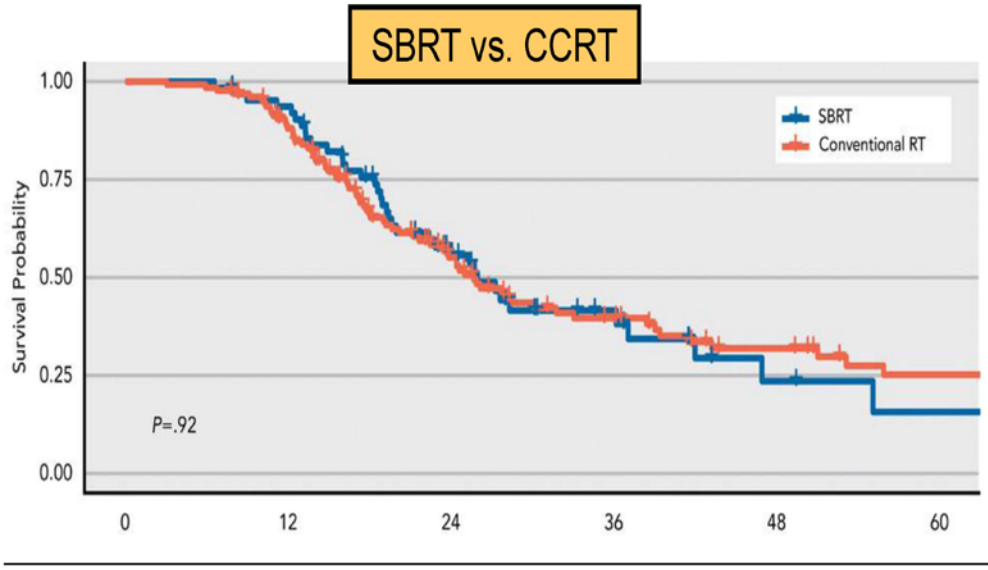
Interesting session – Neoadjuvant therapy



Janssen et al, *J NCCN*, 2022

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Neoadjuvant therapy



Janssen et al, *J NCCN*, 2022

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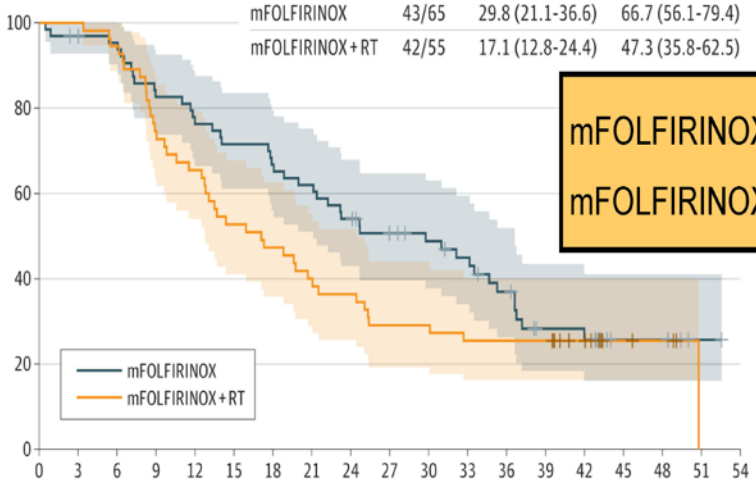
Recent RCT about neoadjuvant radiotherapy

Arm	Events/ total	Median (95% CI), mo	18-mo OS rate (95% CI), %
mFOLFIRINOX	43/65	29.8 (21.1-36.6)	66.7 (56.1-79.4)
mFOLFIRINOX+RT	42/55	17.1 (12.8-24.4)	47.3 (35.8-62.5)



mFOLFIRINOX: 29.8 months

mFOLFIRINOX + SBRT: 17.1 months

Katz et al, *JAMA Oncology*, 2022

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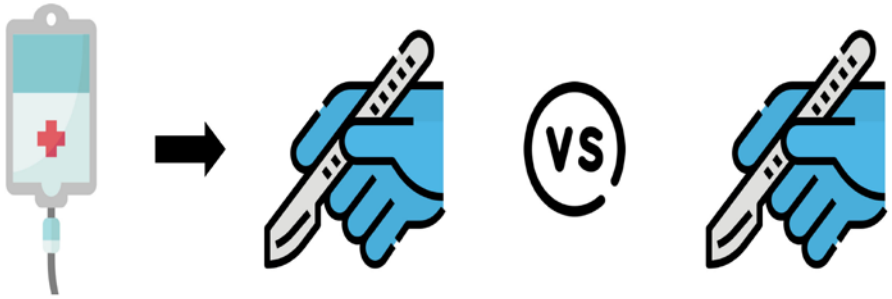
Interesting session – Neoadjuvant therapy

Mayo



Invasive IPMN

By Mayo Clinic in Pancreas Club 2023

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Interesting session – Neoadjuvant therapy

- Neoadjuvant therapy vs. Upfront surgery in invasive-IPMN
  - ➢ No significant OS differences

Table 3

Multivariate analysis of clinicopathological factors influencing overall survival in invasive IPMN (before PSM).

	Univariable analysis		Multivariable analysis	
	HR (95% CI)	*P*	HR (95% CI)	*P*
Adjuvant therapy	1.573 (1.025 – 2.412)	0.038		

By Mayo Clinic in Pancreas Club 2023
Choi & Kang et al, *Int J Surg*, 2023

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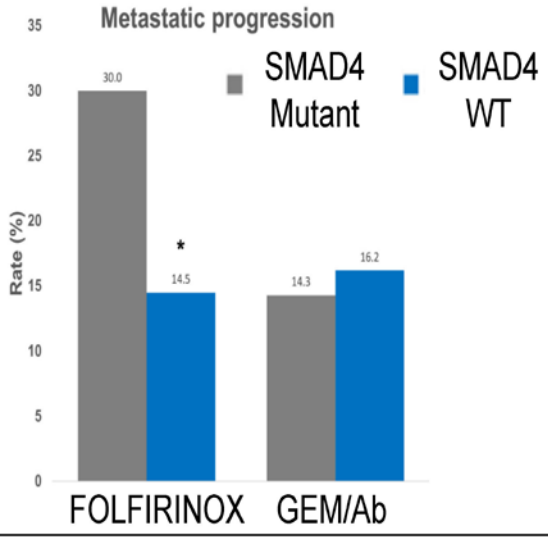
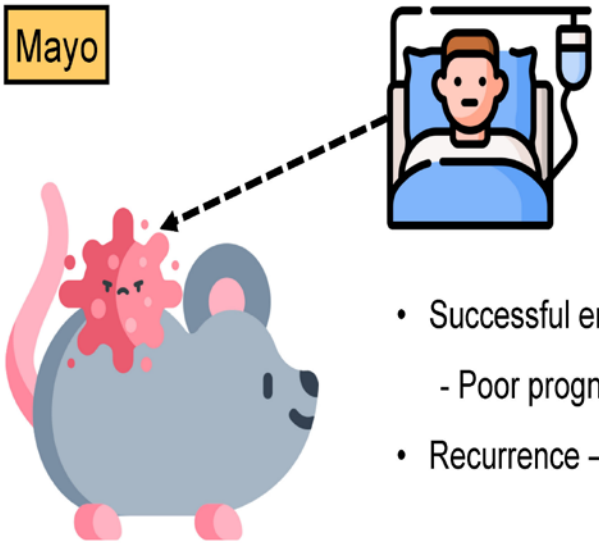
Interesting session – Translational

MSKCC



Ecker et al, Clin Can Res, 2023

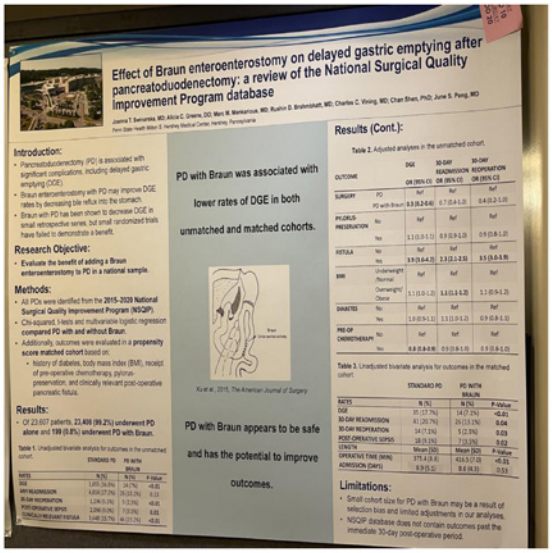
Interesting session – Translational



- Successful engraftment
  - Poor prognostic factor
- Recurrence – PDX tumor = 4.3 months

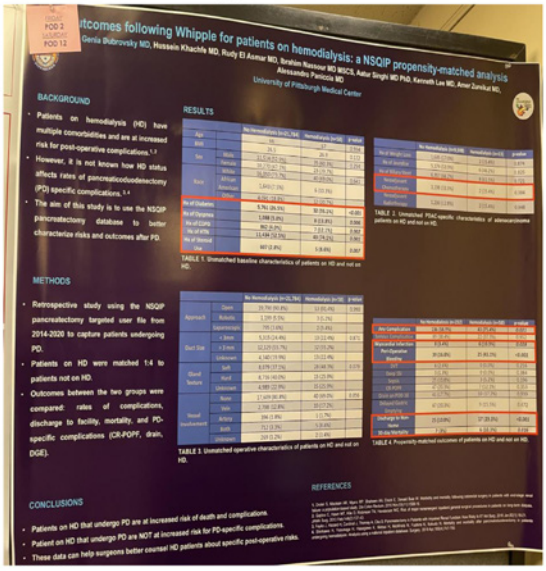
Lynch et al, *JACS*, 2023

Interesting Poster session – ACS-NSQIP



Can Braun anastomosis reduce DGE in performing PPPD?

Interesting Poster session – ACS-NSQIP



Outcomes of PD in patients who underwent hemodialysis

SNUH SEOUL NATIONAL UNIVERSITY HOSPITAL

Impression of my 1st Pancreas Club attendance

- Really pancreas-focused conference
- A lot of questions from the floor
- Get inspiration from many famous HBP researchers
- Another country, race, and protocol, but common interest about pancreas
- *The need to establish nationwide database for competitiveness in the future!*

Hee Ju Sohn

Department of Surgery, Chung-Ang University Gwangmyeong Hospital, Gwangmyeong, Korea

- **Current Position:**

2022.03-present	Assistant Professor, Dept. of Surgery, Chung-Ang University Gwangmyeong Hospital, Gyeonggi-do, Republic of Korea

- **Education**

2006.03-2012.02	M.D., Chung-Ang University College of Medicine, Seoul, KOREA
2014.03-2017.02	M.S., Chung-Ang University College of Medicine, Seoul, KOREA
2017.03-present	Ph.D., Chung-Ang University College of Medicine, Seoul, KOREA

- **Training**

2012.03-2013.02	Internship in Chung-Ang University Hospital, Seoul, KOREA
2013.03-2017.02	Residency in General Surgery, Chung-Ang University Hospital, Seoul, KOREA
2020.05-2022.02	Clinical Fellow, Biliary tract & pancreas Surgery, Seoul National University Hospital, Seoul, KOREA

JHBPS 2023 (The 35th Meeting of Japanese Society of Hepato-Biliary-Pancreatic Surgery)

Hee Ju Sohn (Chung-ang University Gwang Myeong Hospital, Korea)

지난 2023년 6월 도쿄의 Keio Plaza Hotel 에서, 제 35회 일본간담췌외과학회 (JSHBPS 2023) 가 열렸습니다. 코로나로 인한 지난 몇 년간의 국제적 단절 상태로 인하여 국제학술대회 참석이 줄어들었는데, 금년도에는 좋은 기회를 얻어 참석할 수 있었습니다.

인상적이었던 부분은 중 하나는, 방이 동시에 무려 11개나 열린다는 점이었습니다. 프로그램으로는, 심포지움과, 구두발표 자유연제, 패널 디스커션, workshop, 교육 세션, 수술 영상 세션, 젊은 간담췌 세션, 여성의사 세션 등 매우 다채로웠고, 많은 연자들의 발표들이 있었습니다. 담도/췌장 분야에서 명성이 높고 유명한 논문을 발표한 일본 교수님들의 발표들을 직접 들을 수 있는 소중한 시간이었습니다. 일본 특유의 공손하고 진지한 분위기도 인상적이었고, 연구에 대한 뜨거운 열기를 느낄 수 있었습니다. 또한, 비교적 규모가 크지 않은 병원에서도 케이스들을 모아서, 성적들을 발표하는 것들을 보면서 저에게 많은 귀감이 되었던 것 같습니다.

학회 기간 동안 인상 깊었던 주제들에 대해서 짧은 요약을 준비해보았습니다. 향후 더 많은 교류와 공동연구들이 있길 기대합니다.

Young-dong Yu

Korea University Anam Hospital, Korea

• Education

1994-2000	Korea University College of Medicine, Seoul, Korea, Preliminary Medicine & Doctor of Medicine
2001-2003	Korea University Graduate School, Seoul, Korea, Surgery, Master.
2004-2011	Korea University Graduate School, Seoul, Korea, Surgery, Ph. D.

• Residencies/Fellowships

2000-2001	Internship, Korea University Medical Center, Seoul, Korea
2001-2005	Residency, Korea University Medical Center, Department of Surgery, Seoul, Korea
2008-2011	Clinical Fellowship, Liver Transplantation and Hepatobiliary surgery, Department of Surgery, Asan Medical Center, Seoul, Korea
2018-2019	Research fellowship: Liver transplantation and HBP surgery Department of Surgery New York Presbyterian hospital (Weill Cornell medical center), New York, USA

• Academic Appointments

2008-2011	Clinical Instructor, Department of Surgery, University of Ulsan College of Medicine, Seoul, Korea
2011-2013	Clinical Assistant Professor of Surgery Division of HBP Surgery & Liver Transplantation Department of Surgery Korea University College of Medicine, Seoul, Korea
2013-2014	Assistant Professor of Surgery Division of HBP Surgery & Liver Transplantation Department of Surgery Korea University College of Medicine, Seoul, Korea
2014-2019	Associate Professor of Surgery Division of HBP Surgery & Liver Transplantation Department of Surgery Korea University College of Medicine, Seoul, Korea
2019-present	Professor of Surgery Division of HBP Surgery & Liver Transplantation Department of Surgery Korea University College of Medicine, Seoul, Korea
2021.12-present	Professor of Surgery Chief, Division of HBP Surgery & Liver Transplantation Department of Surgery Korea University College of Medicine, Seoul, Korea

A-PHPBA 2023

Young-dong Yu (Korea University Anam Hospital, Korea)

Contents

- Introduction
- 1st day
- 2nd day
- 3rd day
- 4th day
- Summary

Introduction

- 2023년 9월 27일부터 9월 30일
- **Pancreas 중심으로 (Hall B)**

1st day (9월 27일)

- Master video lectures : pancreas
  - ➢Techniques of pancreatoenteric anastomosis
  - ➢Distal pancreatectomy with celiac axis resection
  - ➢Complex pancreatic head resection : vascular resection/recon: various techniques
  - ➢Head coring with LPJ : technique

Distal pancreatectomy with celiac axis resection

Vascular Resection for Pancreatic Cancer

2019 French Recommendations Based on a Literature Review from 2008 to 6-2019

As expert opinion:

- *A pancreaticoduyodenectomy (PD) with SMA resection is not recommended if the frozen section examination is positive.*
- *In case of distal pancreatic cancer with invasion of the celiac artery, a distal pancreatectomy with celiac artery resection without reconstruction may be proposed after neoadjuvant therapy and radiologic embolization of the celiac artery branches.*

Delpero JR, Sauvanet A. Front Oncol 2020; 10:1-18

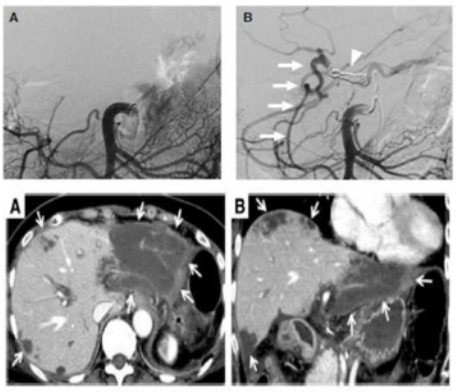
Ueda et al. World Journal of Surgical Oncology (2019) 17:124
https://doi.org/10.1186/s12957-019-1667-8

World Journal of Surgical Oncology

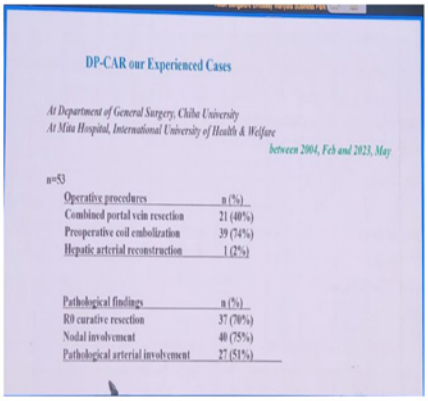
RESEARCH Open Access

Is hepatic artery coil embolization useful in distal pancreatectomy with en bloc celiac axis resection for locally advanced pancreatic cancer?

Atsuhiko Ueda[1], Nozomu Sakai[1*], Hideyuki Yoshitomi[1], Katsunori Furukawa[1], Tsukasa Takayashiki[1], Satoshi Kuboki[1], Shigetsugu Takano[1], Daisuke Suzuki[1], Shingo Kagawa[1], Takashi Mishima[1], Eri Nakadai[1], Masaru Miyazaki[2] and Masayuki Ohtsuka[1]



- Postoperative liver infarction developed only in 8 patients (25.8%) even though 7 of 8 patients had undergone preoperative coil embolization.
- No 30-day mortality occurred in any of the patients.
- Tumor contact with the gastroduodenal artery (GDA)/proper hepatic artery (PHA) on preoperative multi-detector computed tomography (MDCT), tumor size, operative time, portal vein resection, and stenosis of the GDA/PHA after DP-CAR are related to liver infarction.
- Preoperative coil embolization of the common hepatic nartery can not always avoid the occurrence of liver infarction in DP-CAR



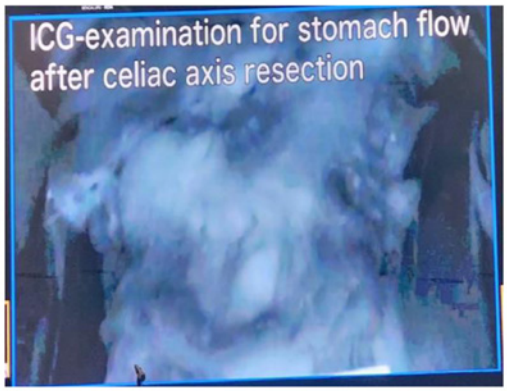
DP-CAR our Experienced Cases

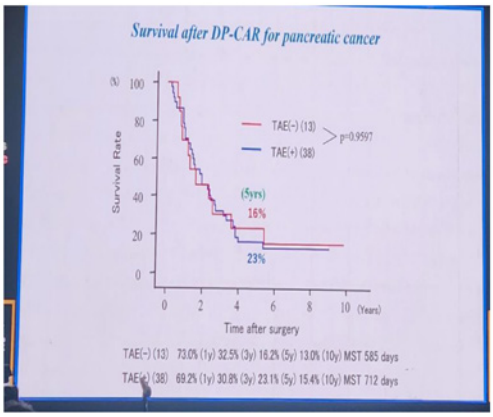
At Department of General Surgery, Chiba University
At Mita Hospital, International University of Health & Welfare
between 2004, Feb and 2023, May

n=53

Operative procedures	n (%)
Combined portal vein resection	21 (40%)
Preoperative coil embolization	39 (74%)
Hepatic arterial reconstruction	1 (2%)

Pathological findings	n (%)
R0 curative resection	37 (70%)
Nodal involvement	40 (75%)
Pathological arterial involvement	27 (51%)



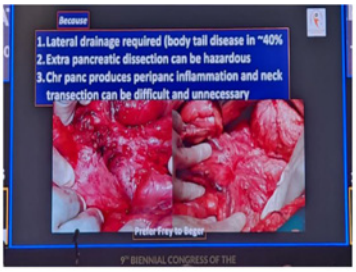


- Distal pancreatectomy with combined celiac arterial resection (DP-CAR) without arterial reconstruction could be undergone with satisfactory surgical safety by using preoperative transcatheter celiac arterial coil embolization
- DP-CAR might bring about beneficial short term outcome, R0 resection and also long-term outcome in some patients with locally advanced pancreatic cancer involving celiac or /and common hepatic artery

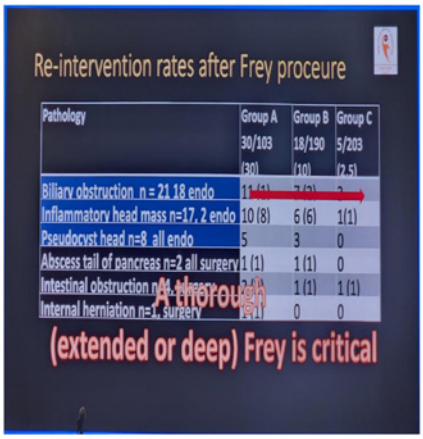
Head coring with LPJ : technique

Prefer Frey to Beger because...

1. Lateral drainage required (body, tail disease in 40%)
2. Extra pancreatic dissection can be hazardous
3. Chronic pancreatitis produces peripancreatic inflammation and neck transection can be difficult and unnecessary



5 rules for exposure
1. Good kocherization
2. Lower transverse mesocolon
3. Ligate and divide R GE
4. Colic and omental veins GCT
5. Expose the SMV



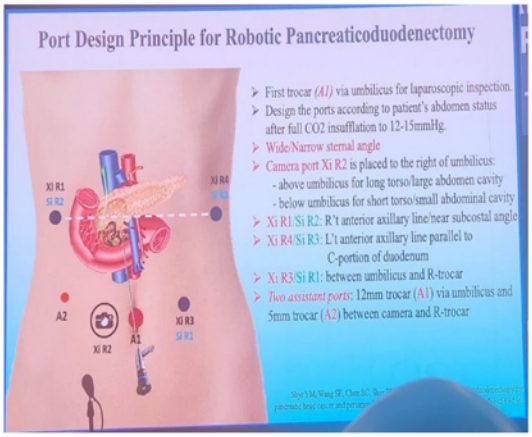
2nd day (9월 28일)

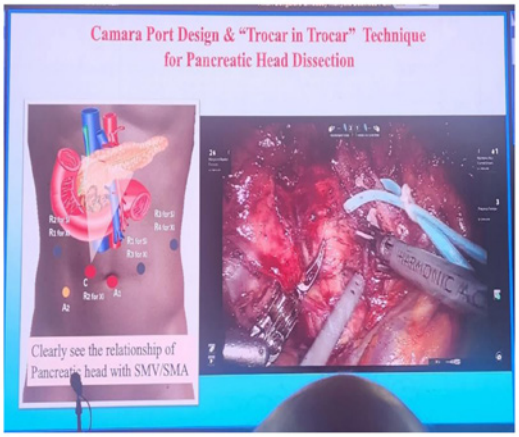
- Meet the professor : High risk Pancreatic Anastomosis
- Invited video : MAS
  - ➢Safe uncinate dissection robotic
  - ➢Robotic pancreaticojejunostomy
  - ➢Robotic CP
  - ➢Laparo and robotic completion pancreatectomies after previous PD

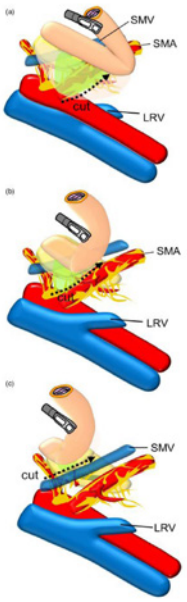
High risk pancreatic anastomosis

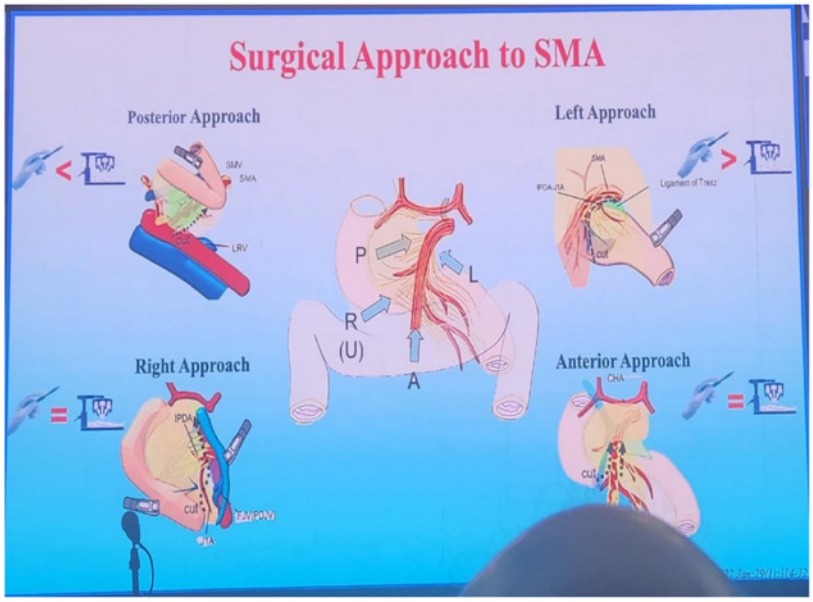
- Slip knot technique

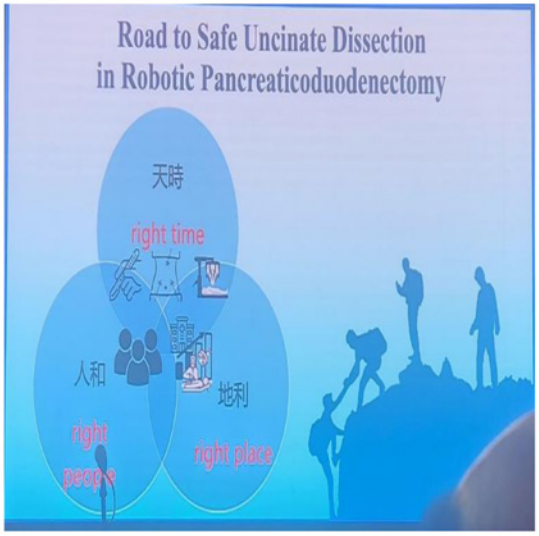
Safe uncinate dissection Robotic











- For the safe setup and expansion of the program, an adequate learning curve is essential
- Need to be well-equipped with the knowledge of anatomy and different surgical approaches to mesopancreas dissection

Mesenteric approach Pancreaticoduodenectomy

Gray zones in PB tumors

- Defining borderline resectability: is it perfect or a major conceptual affair?
- Clinical significance of peritoneal washing cytology in resectable pancreatic cancer

Defining borderline resectability: is it perfect or a major conceptual affair?

Badgery et al., HBP 2023

Bradley and Van Der Meek PLoS One 2019

Jang et al., Eur Rad. 2020

Ronellenfitsch, Front med 2021

Diener et al., Surgery 20...
Cai et al., Langenbecks 2021

Kang & Kim AHPBS 2021

A balanced approach

- Definition: not perfect – in doubt : borderline
- Borderline tumors : neoadjuvant therapy (if high likelihood of R0 resection & low likelihood of postopertative complications: surgery first, adjuvant therapy in selected cases)
- Safe vascular resection and reconstruction, or divestment
- Pathway superiority depends on obtaining multimodal treatment in either pathway

Clinical significance of peritoneal washing cytology in resectable pancreatic cancer

Keynote lecture

- Arterial divestment in pancreatic cancer

Plenary session

- The revised R status is an independent predictor of postresection survival in pancreatic cancer after neoadjuvant treatment

- A proteomic –based approach for tumor neoantigen discovery on pre-clinical model of pancreatic cancer

The revised R status is an independent predictor of postresection survival in pancreatic cancer after neoadjuvant treatment

Leonhardt et al. 2023

A proteomic -based approach for tumor neoantigen discovery on pre-clinical model of pancreatic cancer

• D02 : treating chronic pancreatitis (endo vs surgery)

SYM6 Pushing boundaries in pancreatic surgery

- Conversion surgery for metastatic PDAC
- Multivisceral resection for PDAC
- Total pancreatectomy: indications and optimizing outcomes

- Update 2
  - ➢Pancreatic anastomosis

- SYMPOSIUM : Postpancreatectomy complications
  - ➢Post pancreatectomy hemorrhage

3rd day (9월 29일)

- MTP : portal vein resection during radical pancreatectomy
- How I do it
  - Precision anatomy for minimally invasive pancreatectomy
  - Combined artery and vein resection
  - Combined celiac and portal/SMA resection for body tumors
  - Surgery PDAC with portal cavernoma
- Listen to the pancreas Icon

- Update U6 : surgical trials in pancreatic cancer, past-present-future

- Symposium 14 : acute pancreatitis
  - Severe acute pancreatitis : changing paradigms in early management
  - Preventing decelopment of complications of necrosis
  - Surgery for necrotizing pancreatitis
  - Endotherapy in pancreatic necrosis

- Keynote : mastering minimal access PD : video keynote

- Best oral
  - Standard PD versus PD with systematic total mesopancreatic excision: an analysis of early and late outcomes
  - Technical strategy for advanced pancreatic body cancers with portal resection
  - Standardized management of post-pancreatectomy hemorrhage can mitigate the 90 day mortality down to 0.2%: a single center experience of consecutive 109 PDs
  - Prognostic impact of PA LN metas in resected periampullary cancers
  - Extended pancreatectomy as defined by the ISGPS : evolution and refined outcomes in the era of multimodality treatment

- Lunch sym 8 : ANE & critical care in major HBP surgery
  - Antimicrobial and antifungal therapy HBP surgery
  - Prehabilitation in pancreas cancer surgery

- Sym 18 : Pancreatic NETs
  - Treating metastic grade I/II tumors with uptake on dual imaging
  - Surgical options for pNETs
  - Systmeic therapy for metastatic NETS
  - PRRT –targeted alpha-emitter therapy and emerging theranostics in GEP-NETs

- Best videos (BV2)
  - Robotic distal pancreatectomy with periarterial divestment for pancreatic cancer
  - Optimized view and retraction during robotic PD using multiple scope transition method
  - Fluorescence image guided surgery for laparoscopic distal pancreatectomy : a comparative video
  - Robotic RAMPS for pancreatic body NET
  - Robotic Frey's procedure : head coring via MIS is a reality now

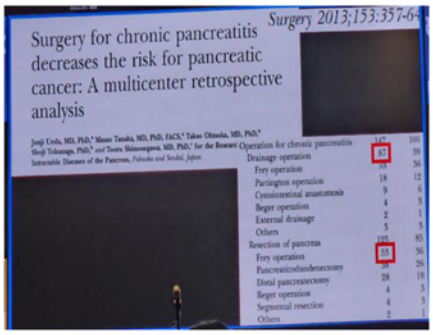
D06 : Neoadjuvant treatment for upfront resectable PDAC

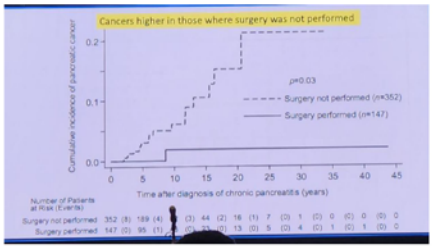
- For : Syed Ahmed
- Against : Roberto Salvia

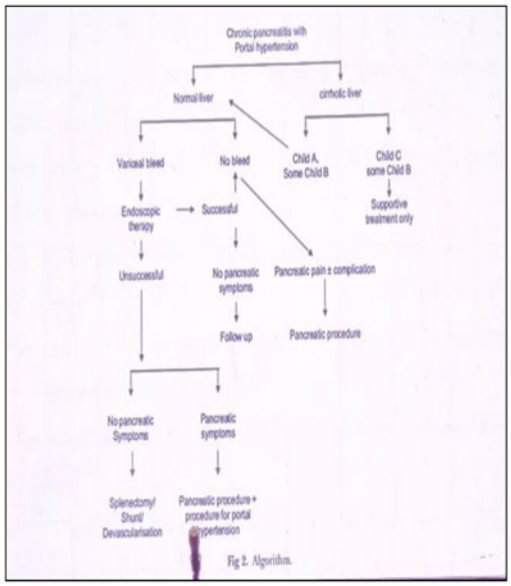
4th day (9월 30일)

- Chronic pancreatitis: challenges and dilemmas
  - ➢Surgical strategy in complications of chronic pancreatitis
  - ➢Future trials chronic pancreatitis

Surgical strategy in complications of chronic pancreatitis







If pancreatic inflammation is severe or acute exacerbation of pancreatitis occurs frequently in spite of conservative therapy, surgery at an early stage of chronic pancreatitis may inhibit the development of pancreatic cancer.

Future trials chronic pancreatitis

Topics of ongoing trials in CP

- Pain management
- Endoscopy (timing, stents)
- Diagnostics (Radiomics, EUS)
- Drugs (Enzymes, hormones, aminoacids, antiinflam., pain killer, local anesthetiss, ...)
- Nutrition andsupplements
- TPIAT related modifications and F/U studies

Food for thought for future CP trials

- No surgical CP-trials comparing MIS/OS/E
- AI –Radiomics to stratify patients for appropriate therapy
- Anti-stromal/Anti-fibrotic therapies in HP

Recruiting: 1-5

Study Title	Intervention/Treatment	
Internet Based Cognitive Behavioral Therapy in Pediatric Chronic Pancreatitis NCT03707431	•Behavioral: Web-based CBT •Behavioral: Pain Education	USA
Fatigue, Psychological Comorbidity and Quality of Life Among Patients With Chronic Pancreatitis in China. NCT05489003	• QoI	Ch
Pain Phenotypes in Chronic Pancreatitis NCT05713344	• QoL	Ind
PAtient-CenTric Chronic Pancreatitis Registry (PACT-CP) NCT05762445		USA
A Pilot Clinical Trial of ParicAlcitol for ChroNiC PancrEatitis NCT05664880	•Drug: Paricalcitol •Drug: Placebo	USA

Recruiting: 11-15

	Intervention/Treatment	
Effect of CREON on Exocrine Pancreatic Insufficiency (EPI) Symptoms NCT04949828	•Drug: CREON	Mult
Evaluation of the SpyGlass DS for Detection of Residual Pancreatic Calculations NCT04672642	•Device: SpyGlass DS	Fr
Prospective Evaluation of Chronic Pancreatitis for Epidemiologic and Translational Studies NCT03099850	•Other: Data Management and Monitoring	USA
Pancreatic Quantitative Sensory Testing (P-QST) to Predict Treatment Response for Pain in Chronic Pancreatitis NCT04499662	•Q Sensory T	USA
QST Study: Predicting Treatment Response in Chronic Pancreatitis Using Quantitative Sensory Testing NCT03434392	•Q Sensory T	Mult

Thank you for your attention!

KU MEDICINE KOREA UNIVERSITY ANAM HOSPITAL

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제74차
한국췌장외과학회 학술대회

Master's Secret Recipe for Handling Extremely Difficult Situations during Surgery (Korean)

Chairs:

In Seok Choi (Konyang Unviersity Hospital, Korea)

Jinseok Heo (Samsung Medical Center, Korea)

KPSC Since 2004 한국췌장외과학회
Korean Pancreas Surgery Club

연/자/소/개

Curriculum Vitae

Jae-Do Yang

Jeonbuk National University Hospital, Jeonju, Korea

- **Education**

2003.02.02	M.D., Jeonbuk National University College of Medicine
2005.02	M.S, Jeonbuk National University College of Medicine
2014.02	PhD., Jeonbuk National University College of Medicine

- **Positions**

2004.03-2008.02	Resident, Department of Surgery, Jeonbuk National University Hospital
2011.05-2013	Fellowship, Jeonbuk National University Hospital
2013-2018	Clinical Professor, Jeonbuk National University Hospital
2018-2021	Assistant Professor, Jeonbuk National University Hospital
2022-	Associate Professor, Jeonbuk National University Hospital

- **Memberships, Offices and Committee Assignments in Professional Societies**

Korean Association of HBP Surgery Member
Korean Surgical Society Member
Korean Surgical Society for Transplantation Member
The Korean Society of Endoscopic & Laparoscopic Surgeons Member
The Korean Society of Surgical Metabolism and Nutrition Member

Special tips for cholecystectomy

Jae-Do Yang (Jeonbuk National University Hospital, Korea)

Cholecystectomy stands as the most widely performed procedure in general surgery globally. Since the introduction of laparoscopic cholecystectomy (LC) in 1985, advancements in laparoscopic technology and techniques have revolutionized the field of surgery. LC represents a substantial leap forward, mitigating a range of complications associated with open cholecystectomy, including cardiac, wound, pulmonary complications, pain, and delayed resumption of daily activities. Patients undergoing LC typically experience swift and complication-free hospitalization, facilitating a rapid return to normal daily life.

The incidence of bile duct injuries post-LC has decreased to 0.32-0.52%, though it remains higher than open cholecystectomy (0.1-0.2%). Importantly, there is no significant change in morbidity or mortality post-LC. Current evidence establishes that misinterpretation of biliary anatomy is responsible for 71-97% of bile duct injuries (BDI) cases, underscoring the paramount importance of safe dissection in successful LC.

Key considerations for ensuring a safe LC include:

1. Anatomical landmarks
2. Difficult cholecystectomy and grading scale
3. Significance of CVS and other techniques for identifying anatomy
4. Alternative strategies
5. Biliary and vascular injury
6. Role of drainage

While LC remains the optimal surgical procedure for symptomatic gallbladder lithiasis, it demands careful attention due to the potential morbidity of vascular and biliary duct injuries. These complications significantly elevate care costs and often lead to litigation, posing potential catastrophic consequences for an procedure with an expected quick return to daily activities. We

outline various surgical techniques for LC based on intraoperative situations to prevent inadvertent injuries to anatomical structures. These recommendations and alternative procedures are considered optional approaches to prevent vascular and/or biliary duct injuries, aiming for safer outcomes. In the upcoming session, I will illustrate these strategies using a clinical case.

제74차
한국췌장외과학회 학술대회

The 1st Korean Pancreas Surgery Club and Japanese Society of Pancreatic Surgery Joint Symposium (English)

Chairs:

Yosuke Inoue (Cancer Institue Hospital, Japan)

Joon Seong Park (Gangnam Severance Hospital, Korea)

KPSC Since 2004
한국췌장외과학회
Korean Pancreas Surgery Club

Jin-Young Jang

Department of Surgery,

Seoul National University College of Medicine, Seoul, Korea

• Current Position

2002-2013	Assistant/Associate professor, Department of Surgery, Seoul National University College of Medicine.
2013-present	Professor, Department of Surgery, Seoul National University College of Medicine
2009-present	Member, Clinical guideline for Pancreatic cystic neoplasm, International Association of Pancreatology
2015-present	Member, Scientific Committee, Pancreas Club
2016-present	Member, Scientific Committee, Asia-Pacific HPBA
2018-present	Member, Scientific Committee, Innovation Committee International Hepato-Pancreato-Biliary Association (IHPBA) 2020
2019-present	Director, Robot Center, Seoul National University Hospital
2020-present	Member, National Academy of Medicine of Korea
2022-present	President, Korean Pancreas Surgery Club
2023-present	Chairman-elect, Korean Association of Hepato-Biliary-Pancreatic Surgery

• Past Position

2017-2021	Chair, Research Committee, Korean Association of HBP Surgery
2017-2019	Chair, Scientific Committee Asia Pacific Hepato-Pancreato-Biliary Association (A-PHPBA) 2019
2017-2021	Director, Korea-Japan Collaboration Study Group for HBP Surgery
2015-2017	Chair, Scientific Committee, Korean Association of HBP Surgery
2015-2017	Director of Clinical Services, Seoul National University Cancer Hospital.
2009-2011	Secretary General, Korean Association of Hepato-biliary-pancreas Surgery
2008-2009	Visiting Assistant Professor M.D. Anderson Cancer Center, University of Texas, Dept of Cancer Biology
2002-2013	Assistant & Associate Professor, Department of Surgery, Seoul National University College of Medicine
2020-2022	Secretary General, Korean Surgical Society
2021-2022	Chair, Planning Committee, Korean Association of HBP Surgery

• Education

1987.03-1994.02	M.D., Seoul National University College of Medicine, Seoul, KOREA
1997.03-1999.02	M.S., Seoul National University College of Medicine, Seoul, KOREA
1999.03-2001.08	Ph.D., Seoul National University College of Medicine, Seoul, KOREA

• Postdoctoral Training

1994.03-1995.02	Internship in Seoul National University Hospital, Seoul, KOREA
1995.03-1999.02	Residency in General Surgery, Seoul National University Hospital, Seoul, KOREA
1999.03-2001.02	Fellowship in Biliary tract & pancreas Surgery, Seoul National University Hospital, Seoul, KOREA

Neoadjuvant chemotherapy vs upfront surgery in resectable pancreatic cancer

Jin-Young Jang (Seoul National University Hospital, Korea)

Pancreatic cancer has a dismal prognosis and prolonged survival is achieved only by resection. However, nearly 80% of patients have recurrence even after curative resection and the majority of recurrence is systemic metastasis. A sufficient curative effect cannot be provided by surgery alone. Improvement of intensive chemotherapy or radiotherapy has definitely contributed to prolonged survival

There is a strong rationale for a neoadjuvant approach, since a relevant percentage of pancreatic cancer patients present with non-metastatic but locally advanced disease and microscopic incomplete resections are common. The majority of patients with advanced stage for which upfront surgery is not an option. In an effort to improve surgical candidacy, neoadjuvant chemotherapy, with or without radiation therapy, is often used in an effort to downstage borderline resectable and locally advanced tumors, and some argue for its use even in patients with resectable tumors. In the era of FOLFIRINOX, the response rate and R0 rate has increased followed by increased survival in over borderline resectable PDAC.

Unlike many studies on the effect of neoadjuvant treatment for borderline resectable, there are very limited studies for resectable PDAC. PREOPANC trial showed no effect of NAT in resectable unlike BRPC.

Some RCTs on resectable PDAC were incompletely terminated due the low recruitment.

Recently Unno and Motoi et al reported an RCT of NAC-GS (Prep02/JSAP05) showing better survival of NAT than upfront surgery in resectable. But it was not the study on pure resectable PDAC. Moreover regimen was not standardized in two arms.

Before adopting routine neoadjuvant treatment, step by step approach will be more reasonable considering approximately 50~60% response rate, which mean some of patients will lose the chance of cure during chemotherapy due to the progression into more advanced stage.

So I would like to discuss the some limitation and optimal regimens of neoadjuvant treatment for resectable PDAC. Also I will report the progress of clinical trials in this issue.

Yosuke Inoue

Department of Hepato-Biliary-Pancreatic Surgery, Cancer Institute Hospital, Tokyo, Japan

• Graduate Education

1994-2000	Medical School: The University of Tokyo, Tokyo, Japan
2005-2009	Graduate School: The University of Tokyo, Tokyo, Japan

• Work Experience

2000-2004	Department of Surgery, the Hitachi general Hospital, Hitachi, Japan
2004-2008	Hepato-Biliary-Pancreatic Surgery Division, Department of Surgery,the University of Tokyo Hospital, Tokyo, Japan (Prof. Masatoshi Makuuchi, Prof Norihiro Kokudo)
2008-2009	Department of Surgery, Tokyo metropolitan Bokutoh Hospital, Tokyo, Japan (Dr. Nobutara Umekita)
2009-2012	Hepato-Biliary-Pancreatic Surgery Division, Department of Surgery, the University of Tokyo Hospital (Prof. Norihiro Kokudo)
2012-2020	Dept. of Hepato-Biliary-Pancreatic Surgery, Cancer Institute Hospital (Prof. Akio Saiura)
2020-	Vice director, Dept. of Hepato-Biliary-Pancreatic Surgery, Cancer Institute Hospital

• Specialities

Hepato-Biliary-Pancreatic surgery
Laparoscopic surgery
Robotic surgery
Multidisciplinary treatment for hepatobiliary-pancreatic cancers

Recent Updates on Conversion Surgery in Japan

Yosuke Inoue (Cancer Institute Hospital, Japan)

After emergence of FOLFIRINOX and Gemcitabine plus nab-Paclitaxel (GNP), the treatment paradigm of pancreatic invasive ductal adenocarcinoma (PDACs) has dramatically changed in Japan. For unresectable (UR) PDACs, the incidence of conversion surgery (CS) after induction therapy using FOLFIRINOX or GNP has been increasing.

For locally advanced PDACs (UR-LA), challenging dissection or resection of critical arteries are required during CS. To achieve zero mortality for UR-LA resection, some specific techniques are proposed in Japanese HPB society, e.g., mesenteric approach, LV-3 dissection, and left gastric artery reconstruction during DP-CAR.

For metastatic PDACs (UR-M), rather a long duration of induction therapy has been preferred for CS based on a multicenter retrospective study in Japan (Satoi S, et al, JHBPS 2013). In Cancer Institute Hospital, a retrospective cohort study including 454 UR-PDAC patients who underwent FOLFIRINOX or GNP as induction therapy revealed that four factors were significant for prognosis; A)Tumor shrinkage, B) CAS19-9 normalized, C) mGPS = 0, and D) successful chemotherapy for 8 months or more. Under these criteria, the median overall survival after CS for UR-M was 53 months with a minimized rate of early recurrence (before 6 months, < 20%). In this presentation, details of treatment strategy, surgical technique, and short/long-term outcomes of UR-PDACS in recent 10 years are presented.

Yoo-Seok Yoon

Department of Surgery, Seoul National University College of Medicine,
Seoul National University Bundang Hospital

- **Education/Training**

1990-1997	M.D., Seoul National University College of Medicine,
1997-2002	Intern & Resident (Surgery), Seoul National University Hospital
2002-2004	Fellowship, in Hepato-pancreato-biliary Surgery, Seoul National University Hospital
2004-2005	Fellowship, in Hepato-pancreato-biliary Surgery, Seoul National University Bundnag Hospital
2007	Ph.D., Seoul National University College of Medicine
2011-2012	Research fellow, in Hepato-pancreato-biliary Surgery, The Johns Hopkins Hospital, USA

- **Position**

2005-2017	Assistant/Associate Professor, Department of Surgery, Seoul National University Bundang Hospital
2017-present	Professor, Department of Surgery, Seoul National University Bundang Hospital
2022-present	Chairman, Department of Surgery, Seoul National University Bundang Hospital, Korea

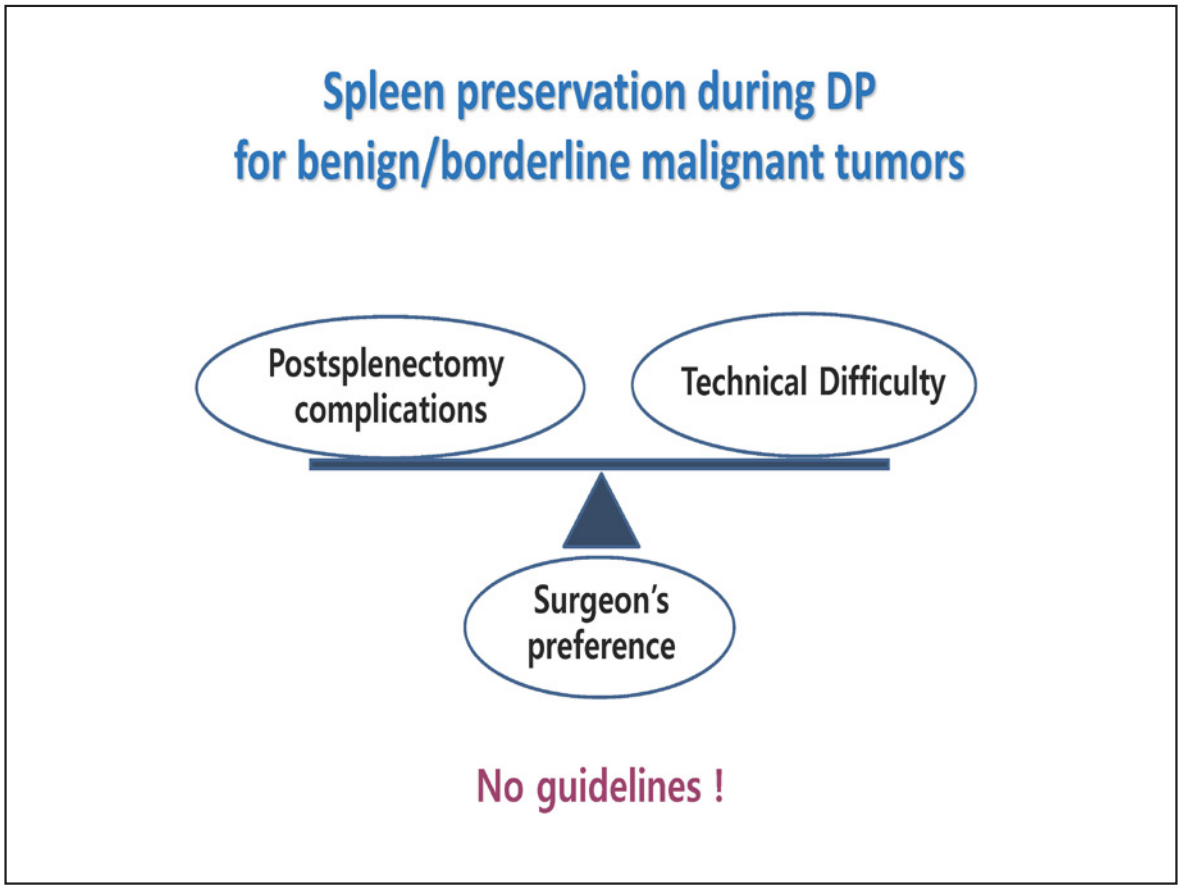
- **Activity In Academic Society**

2022-present	President, The Korean Study Group on Minimally Invasive Pancreatic surgery
2022- present	Chair of the Scientific Committee, Korean Society of Endoscopic and Laparoscopic Surgeons
2021-2023	Chair of the Scientific Committee, Korean Society of Hepato-Biliary-Pancreatic Surgery
2022	Secretary General, The 18th World Congress of Endoscopic Surgery (WCES)

- **Scientific Publications**
  - 6 Peer-reviewed Book Chapters
  - More than 250 scientific articles in peer-reviewed international journals

Comparison of Infectious Complications after Spleen Preservation versus Splenectomy during Laparoscopic Distal Pancreatectomy

Yoo-Seok Yoon (Seoul National University Bundang Hospital, Korea)



Complications after splenectomy

Acute	Short term	Long term
Haemorrhage • During • Immediately after	Overwhelming postoperative infection (OPSI) +/− disseminated intravascular coagulation (DIC)	OPSI +/− DIC
Pulmonary atelectasis and pneumonia	Pulmonary infection	Pulmonary infection
Sympathetic pleural effusion	Deep vein thrombosis	Venous thrombosis
Subphrenic abscess/cellulitis		
Gastric ileus	Spleno-portal thrombosis (fever, abdominal complaints)	Pulmonary hypertension
Acute pancreatitis		Enhanced atherosclerosis
Thrombocytosis and leucocytosis (peaks 7th–14th day)		Arterial thrombosis
Severe thrombosis after splenectomy for myeloproliferative disorders		

Int J Surg 2014;12: 113-119

Potential advantages of spleen preserving DP (SPDP) in the current literature

A. **Preventing the postsplenectomy sepsis**
   - Overwhelming postsplenectomy infection (OPSI)
   - Early infectious complication

B. **Maintenance of immune surveillance → oncologic benefit**

C. **Less postoperative pancreatic fistula (POPF)**

D. **Less postpancreatectomy DM**

E. **Less gastric ileus**

Postsplenectomy infectious complications after DP with splenectomy (DPS)

Overwhelming postsplenectomy infection (OPSI)

- lifetime risk: adults (0.28 – 5%, 0.23% per year)
- greatest within the first 2 years after splenectomy
- excessive morbidity and mortality (600 times more than the general population)

Early infectious complications

- intraabdominal abscess
- wound infection
- pulmonary infection
- others

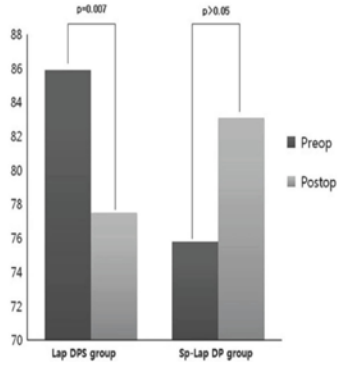
- Different incidence according to the indication of splenectomy: hematologic disease >> after DP
- Need for long-term F/U → difficult evaluation
- Few data after advent of vaccination

Is it worthwhile to preserve adult spleen in laparoscopic distal pancreatectomy? Perioperative and patient-reported outcome analysis

Choi SH, et al. Surg Endosc 2011

- 40 Sp-Lap DP and 32 Lap DPS (From 2005 to 2010)
- specially designed questionnaire for the follow-up study.
- median follow-up period 23 (3–76) months

Comparison of self-estimated health score



Variable	Sp-Lap DP (n = 32)	Lap DPS (n = 29)	p-Value
Follow-up period (months)	26.3 ± 12.0	34.2 ± 22.5	NS
Follow-up rate	84.2% (32/38)	85.3% (29/34)	NS
Doctor visits because of infection			NS
Yes	1	3	
Episodes of common cold or flu			0.026
≤2 per year	27	19	
3–4 per year	4	3	
5–6 per year	1	4	
>6 per year	0	3	
Episodes of abdominal discomfort			NS
Never	25	18	
Rarely	5	5	
Occasionally	1	4	
Constantly	0	2	
Digestion			NS
Poor	0	3	
Fair	14	14	
Good	18	12	
Digestive medicine use			NS
No	23	23	
Sometimes	9	5	
Always	0	1	
When did you feel general well-being after operation? (weeks)	12.7 ± 12.8	14.4 ± 12.9	0.080
Incidence of fatigue or low energy			0.014
Never	12	6	
Rarely	13	7	
Occasionally	7	8	
Constantly	0	8	
Health in general now			0.042
Poor	0	6	
Fair	9	10	
Good	19	12	
Excellent	4	1	
Health score compared with preoperative status[a]	Δ7.3 ± 23.6	Δ–8.4 ± 15.2	0.007
Cancer development after the operation			NS
Yes	0	1	

An Analysis of Complications, Quality of Life, and Nutritional Index After Laparoscopic Distal Pancreatectomy with Regard to Spleen Preservation

Kwon W, et al. J Laparoendosc Adv Surg Tech A 2016

- QoL: assessed by the EORTC QLQ-C30
- Median follow-up period: 25 months

	Total (N=105), n (%)	LDP (n=73), n (%)	LSPDP (n=32), n (%)	p
Aggravated glucose control	16 (15.2)	12 (16.4)	4 (12.5)	.771
Newly developed DM (n=92)	13 (14.1)	10/62 (16.1)	3/30 (10.0)	.535
Aggravated DM (n=13)	3 (23.1)	2/11 (18.2)	1/2 (50.0)	.423
Improved DM (n=13)	2 (15.4)	2/11 (18.2)	0/2 (0)	1.000
Diarrhea/steatorrhea	0 (0)	0 (0)	0 (0)	—
Weight loss (n=53)	22 (41.5)	13/32 (40.6)	9/21 (42.9)	.872
Abdominal discomfort/pain	5 (4.8)	3 (4.1)	2 (6.3)	.639
Incisional hernia	1 (1.0)	1 (1.4)	0 (0)	1.000
OPSI	0 (0)	0 (0)	0 (0)	—
Recurrence	0 (0)	0 (0)	0 (0)	—
Vascular complications (n=104)[a]	24 (23.1)	3/72 (4.2)	21/32 (65.6)	<.001
Portal vein thrombosis	3 (2.9)	3 (4.2)	0 (0)	.551
Splenic vein thrombosis	0 (0)	0 (0)	0 (0)	—
Splenic vein stricture	2 (1.9)	0 (0)	2 (6.3)	.093
Splenic artery stricture	1 (1.0)	0 (0)	1 (3.1)	.129
Perigastric varices	9 (8.7)	0 (0)	9 (28.1)	<.001
Collateral formation	17 (16.3)	0 (0)	17 (53.1)	<.001
Splenic infarction	2 (1.9)	—	2 (6.3)	—

Meta-analyses

spleen-preserving DP (SPDP) vs DP with splenectomy (DPS)

	Included studies	No. of patients		POPF (Overall)	POPF (grade B/C)	Infectious complication	Abscess
		SPDP	DPS				
Nakata, 2018	15 (MIS)	378	392		SPDP ↓	SPDP ↓	SPDP ↓
Pendola, 2017	19	521	1,131	≒	SPDP ↓		SPDP ↓
Shi, 2015	18	502	454	≒	SPDP ↓	SPDP ↓	SPDP ↓
	6 (Lap)	93	95	≒	SPDP ↓	≒	≒
He, 2014	11	355	542	≒		≒	SPDP ↓
	3 (Lap)	71	72	≒		≒	≒

Small number of patients in included studies ….

Nakata, et al. J Hepato Biliary Pancreat Sci 2018

Author	Year	Country	Number of patients	
			MI-SPDP	MI-DPS
Dai [13]	2017	China	66	66
Panda [17]	2016	India	8	12
Nakamura [18]	2016	Japan	8	6
Kwon [19]	2016	Korea	32	79
Malleo [20]	2015	Italy	41	59
Kawaguchi [21]	2015	France	17	6
Jiang [22]	2015	India	14	19
Worhunsky [23]	2014	USA	50	5
Kang [24]	2014	Korea	45	34
Han [25]	2014	Korea	4	8
Zhao [26]	2012	China	21	16
Choi [27]	2012	Korea	40	32
Mekeel [28]	2011	USA	10	24
Nau [29]	2009	USA	7	17
Fernandez-Cruz [30]	2008	Spain	15	8

Pendola, et al. J Surg Oncol 2017

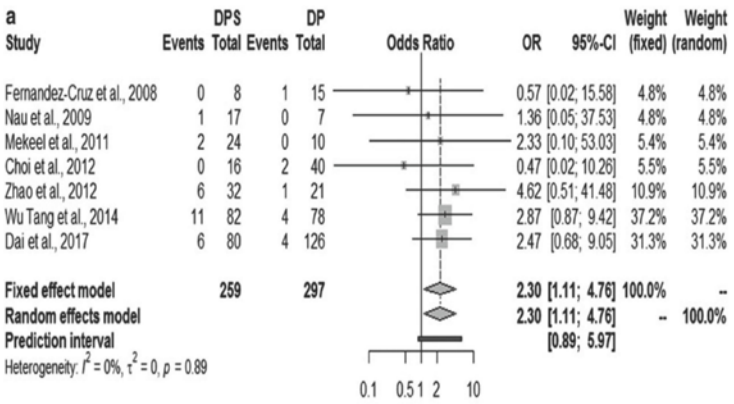
Author (year)	Total	SPDP	DPS
Richardosn and Scott-Conner (1989) [5]	21	11	10
Benoist et al. (1998) [16]	40	15	25
Patterson et al. (2001) [27]	15	3	12
Yamaguchi et al. (2001) [4]	47	9	38
Shoup et al. (2002) [9]	125	46	79
Carrer et al. (2006) [17]	76	38	38
Rodriguez et al. (2006) [24]	259	74	185
Pannegeon et al. (2006) [21]	175	15	160
Ridolfini et al. (2007) [23]	64	8	56
Goh et al. (2008) [11]	138	21	117
Lee et al. (2008) [6]	180	37	143
Peter Nau et al. (2009) [22]	24	7	17
Tsiouris et al. (2011) [10]	78	30	48
Ma et al. (2011) [27]	26	13	13
Mekeel et al. (2011) [20]	34	10	24
Zhao et al. (2012) [26]	37	21	16
Choi et al. (2012) [8]	72	40	32
Kang et al. (2013) [19]	79	45	34
Feng et al. (2014) [25]	162	78	84

Impact of Spleen Preserving Laparoscopic Distal Pancreatectomy on Postoperative Infectious Complications: Systematic Review and Meta-Analysis

Milito P, et al. J Laparoendosc Adv Surg Tech 2019

- 10 literatures between 2008 and June 2018

Surgical site infections
(superficial, deep, or organ/space)



Need for large-scale multicenter study

- Current evidence on advantage of spleen preservation (SPDP)
  - based on a few retrospective comparative studies
  - heterogenous indication & extent of resection
  - small number of patients
  - no randomized controlled trial

Need for well-designed large-scale study

to provide high-level of evidence that may be helpful in making a decision on the preservation of the spleen or splenic vessels in patients with benign and low-grade malignant pancreatic tumor.

The 2nd Korea-Japan collaboration study

ORIGINAL ARTICLE

J Hepato Biliary Pancreat Sci 2022

Comparison of infectious complications after spleen preservation versus splenectomy during laparoscopic distal pancreatectomy for benign or low-grade malignant pancreatic tumors: A multicenter, propensity score-matched analysis

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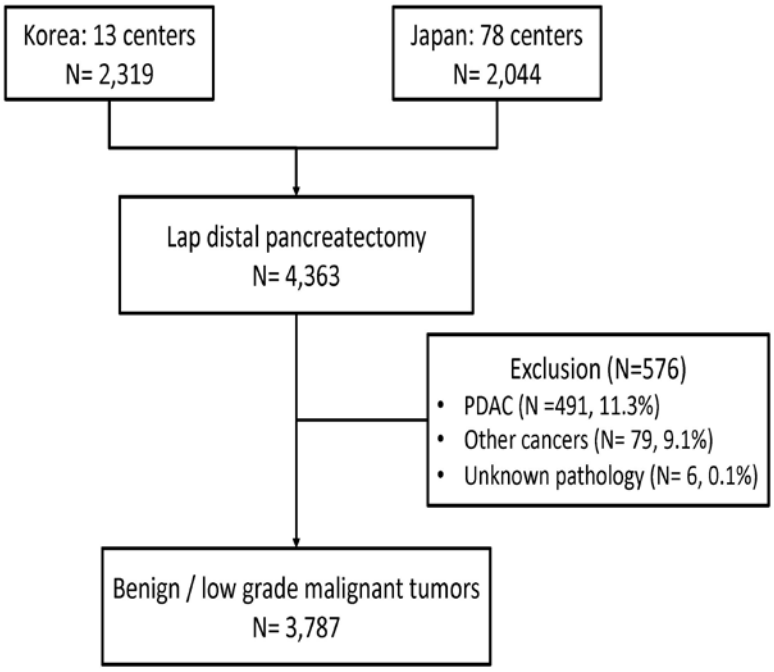
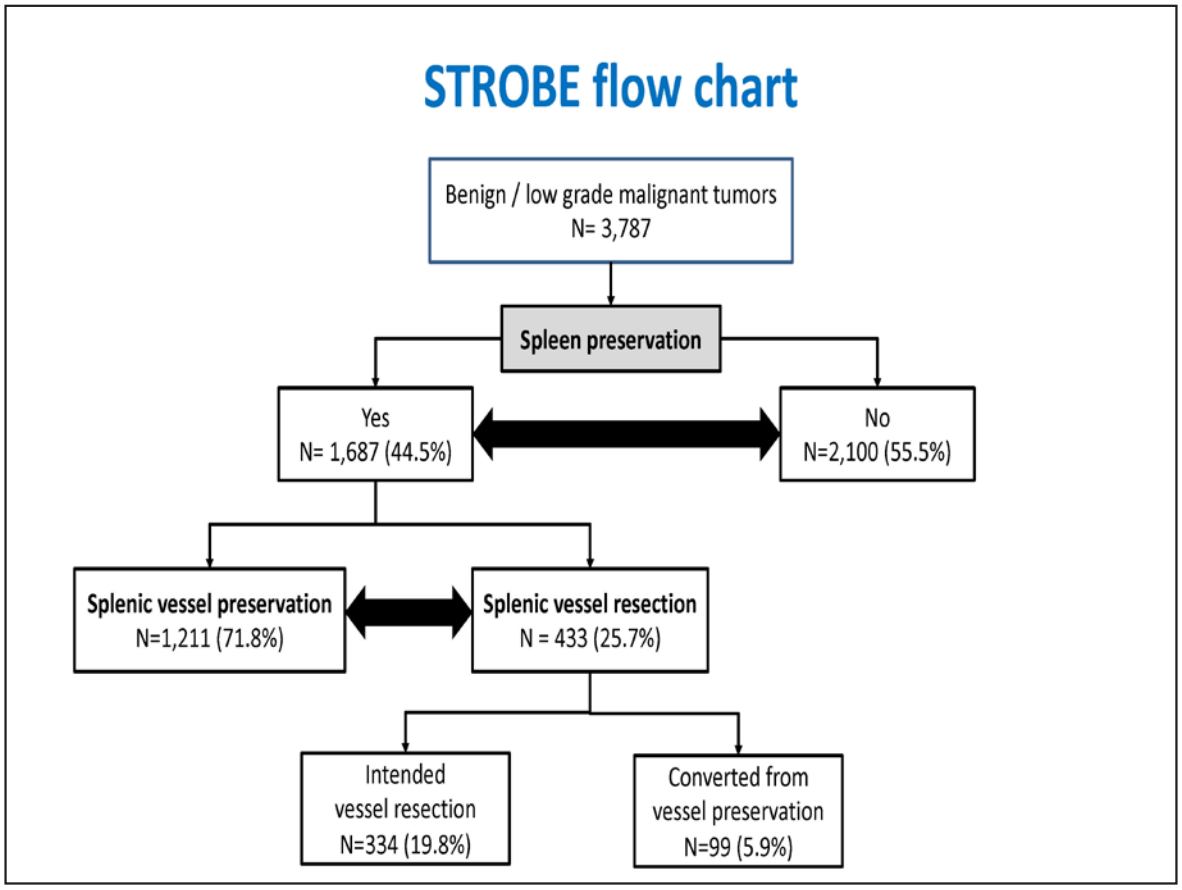
Purpose

- To compare the short-term complications after **laparoscopic SPDP (LSPDP)** and **laparoscopic DPS (LDPS)** by conducting a propensity score matching analysis in a large patient cohort.
- To compare the clinical outcomes between **spleen vessel preservation (VP)** and **spleen vessel sacrifice (VS)** in patients with spleen preservation.

STROBE flow chart





Study design

Propensity score matching analysis:

- 1:1 matching
- matching factors: age, sex, BMI, ASA class, preop DM, pathologic diagnosis, tumor location

Primary endpoint

- Early infectious complications

  defined when antibiotic was required for cultured microorganisms or localized inflammation

Secondary endpoint

- clinically relevant POPF (ISGPS grade B, C)
- op time, EBL, transfusion rate, overall morbidity, hospital stay

Preoperative characteristics before and after PSM

	Before propensity score matching			After propensity score matching		SMD<0.
	LSPDP (n = 1687)	LDPS (n = 2100)	SMD	LSPDP (n = 1248)	LDPS (n = 1248)	SMD
Nationality (Korea/Japan)	1201 (58.9)/486 (27.8)	838 (41.1)/1262 (72.2)	0.663	762 (61.1)/486 (38.9)	770 (61.7)/478 (38.3)	0.013
Age (years)	52.2±15.8	56.9±15.2	0.300	54.5±15.7	54.5±15.1	0.003
Male sex	549 (32.5)	849 (40.4)	0.164	462 (37.0)	482(38.6)	0.033
Body mass index (kg/m^2)	23.4±3.5	23.3±3.7	0.028	23.6±3.6	23.6±3.6	0.006
ASA score (I,II/III,IV)	1629 (96.6)/58 (3.4)	1990 (94.8)/110 (5.2)	0.149	1193 (95.6)/55 (4.4)	1188 (95.2)/60 (4.8)	0.019
History of abdominal surgery	465 (27.6)	516 (24.6)	0.122	322 (25.8)	316 (25.3)	0.030
Preoperative diabetes	239 (14.2)	426 (20.3)	0.162	215 (17.2)	225 (18.0)	0.021
History of pancreatitis	121 (7.2)	292 (13.9)	0.220	120 (9.6)	138 (11.1)	0.047
Tumor site (body/tail)	795 (47.1)/892 (52.9)	960 (45.7)/1140 (54.3)	0.028	589 (47.2)/859 (52.8)	597 (47.8)/651 (52.2)	0.012
Benign/borderline malignancy	1194 (70.8)/490 (29.0)	1370 (65.2)/727 (34.6)	0.120	874 (70.0)/371 (29.7)	869 (69.6)/377 (30.2)	0.020

Postoperative outcomes according to spleen preservation

	Before propensity score matching			After propensity score matching		
	LSPDP (n = 1687)	LDPS (n = 2100)	*P*-value	LSPDP (n = 1248)	LDPS (n = 1248)	*P*-value
Overall complications	570 (35.7)	613 (38.4)	.099	444 (35.5)	469 (37.6)	.24
CR-POPF	219 (13.7)	299 (18.7)	<.001	182 (14.5)	207 (16.6)	.17
Infectious complications	243 (15.2)	305 (19.1)	.003	197 (15.7)	230 (18.4)	.079
Infected POPF	91 (5.7)	156 (9.7)	<.001	85 (6.8)	101(8.1)	.22
Intra-abdominal abscess	15 (0.9)	45 (2.8)	<.001	14 (1.1)	30 (2.4)	.014
Superficial/deep SSI	10 (0.6)	16 (1)	.24	7 (0.5)	9 (0.7)	.62
Pneumonia	4 (0.2)	7 (0.4)	.36	5 (0.4)	8 (0.6)	.40
Phlebitis	3 (0.1)	3 (0.1)	>.99	2 (0.1)	3 (0.2)	>.99
Sepsis	5 (0.3)	8 (0.5)	.40	4 (0.3)	6 (0.4)	.53
Non-infectious complications	272 (17.0)	231 (14.4)	.006	192 (15.3)	196 (15.7)	.70
Atelectasis	27 (1.6)	24 (1.5)	.67	21 (1.6)	22 (1.7)	.88
Pleural effusion	23 (1.4)	16 (1)	.26	19 (1.5)	18 (1.4)	.87
Abdominal fluid collection	110 (6.8)	90 (5.6)	.14	84 (6.7)	66 (5.3)	.13
Chyle leakage	12 (0.7)	16 (1.0)	.45	9 (0.7)	16 (1.2)	.16
Bleeding	16 (1)	23 (1.4)	.26	12 (0.9)	18 (1.4)	.27
Wound problem	6 (0.3)	5 (0.3)	.76	4 (0.3)	5 (0.4)	>.99
Ileus	28 (1.7)	20 (1.2)	.24	16 (1.2)	14 (1.1)	.71
Estimated blood loss (mL)	257.9±495.9	257.9±256.8	.99	267.0±551.7	271.3±480.2	.83

Postoperative outcomes according to spleen preservation

	Before propensity score matching			After propensity score matching		
	LSPDP (n = 1687)	LDPS (n = 2100)	*P*-value	LSPDP (n = 1248)	LDPS (n = 1248)	*P*-value
Overall complications	570 (35.7)	613 (38.4)	.099	444 (35.5)	469 (37.6)	.24
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Superficial/deep SSI	10 (0.6)	16 (1)	.24	7 (0.5)	9 (0.7)	.62
Pneumonia	4 (0.2)	7 (0.4)	.36	5 (0.4)	8 (0.6)	.40
Phlebitis	3 (0.1)	3 (0.1)	>.99	2 (0.1)	3 (0.2)	>.99
Sepsis	5 (0.3)	8 (0.5)	.40	4 (0.3)	6 (0.4)	.53
Non-infectious complications	272 (17.0)	231 (14.4)	.006	192 (15.3)	196 (15.7)	.70
Atelectasis	27 (1.6)	24 (1.5)	.67	21 (1.6)	22 (1.7)	.88
Pleural effusion	23 (1.4)	16 (1)	.26	19 (1.5)	18 (1.4)	.87
Abdominal fluid collection	110 (6.8)	90 (5.6)	.14	84 (6.7)	66 (5.3)	.13
Chyle leakage	12 (0.7)	16 (1.0)	.45	9 (0.7)	16 (1.2)	.16
Bleeding	16 (1)	23 (1.4)	.26	12 (0.9)	18 (1.4)	.27
Wound problem	6 (0.3)	5 (0.3)	.76	4 (0.3)	5 (0.4)	>.99
Ileus	28 (1.7)	20 (1.2)	.24	16 (1.2)	14 (1.1)	.71
Estimated blood loss (mL)	257.9 ± 495.9	257.9 ± 256.8	.99	267.0 ± 551.7	271.3 ± 480.2	.83

Postoperative complications according to splenic vessel preservation

	Before propensity score matching			After propensity score matching		
	LSPDP-VP (n = 1211)	LSPDP-VS (n = 433)	*P*-value	LSPDP-VP (n = 432)	LSPDP-VS (n = 432)	*P*-value
Overall complications	454 (37.5)	127 (29.3)	.002	146 (33.8)	127 (29.4)	.16
CR-POPF	169 (14.0)	53 (12.2)	.37	49 (11.3)	53 (12.3)	.67
Infectious complications	209 (17.3)	40 (9.2)	<.001	70 (16.2)	40 (9.3)	.002
Infected POPF	72 (5.9)	20 (4.6)	.30	23 (5.3)	20(4.6)	.64
Intra-abdominal abscess	11 (0.9)	5 (1.2)	.78	5 (1.2)	5 (1.2)	>.99
Superficial/deep SSI	10 (0.8)	1 (0.2)	.19	5 (1.2)	1 (0.2)	.10
Pneumonia	4 (0.3)	1 (0.2)	>.99	1 (0.2)	1 (0.2)	>.99
Phlebitis	3 (0.2)	0	.571	1 (0.2)	0	.32
Sepsis	4 (0.3)	1 (0.2)	>.99	2 (0.5)	1 (0.2)	.56
Noninfectious complications	215 (17.8)	61 (14.1)	<.001	74 (17.1)	61 (14.1)	.22
Atelectasis	19 (1.6)	10 (2.3)	.32	6 (1.4)	10 (2.3)	.31
Pleural effusion	15 (1.2)	8 (1.8)	.35	6 (1.1)	8 (1.9)	.59
Abdominal fluid collection	91 (7.5)	21 (4.8)	.059	31 (7.2)	21 (4.9)	.15
Chyle leakage	6 (0.5)	6 (1.4)	.062	1 (0.2)	6 (1.4)	.058
Bleeding	13 (1.1)	2 (0.5)	.25	4 (0.9)	2 (0.5)	.41
Wound problem	5 (0.4)	1 (0.2)	>.99	2 (0.5)	1 (0.2)	.56

Postoperative complications according to splenic vessel preservation

	Before propensity score matching			After propensity score matching		
	LSPDP-VP (n = 1211)	LSPDP-VS (n = 433)	*P*-value	LSPDP-VP (n = 432)	LSPDP-VS (n = 432)	*P*-value
Overall complications	454 (37.5)	127 (29.3)	.002	146 (33.8)	127 (29.4)	.16
CR-POPF	169 (14.0)	53 (12.2)	.37	49 (11.3)	53 (12.3)	.67
Infectious complications	209 (17.3)	40 (9.2)	<.001	70 (16.2)	40 (9.3)	.002
Infected POPF	72 (5.9)	20 (4.6)	.30	23 (5.3)	20(4.6)	.64
Intra-abdominal abscess	11 (0.9)	5 (1.2)	.78	5 (1.2)	5 (1.2)	>.99
Superficial/deep SSI	10 (0.8)	1 (0.2)	.19	5 (1.2)	1 (0.2)	.10
Pneumonia	4 (0.3)	1 (0.2)	>.99	1 (0.2)	1 (0.2)	>.99
Phlebitis	3 (0.2)	0	.571	1 (0.2)	0	.32
Sepsis	4 (0.3)	1 (0.2)	>.99	2 (0.5)	1 (0.2)	.56
Noninfectious complications	215 (17.8)	61 (14.1)	<.001	74 (17.1)	61 (14.1)	.22
Atelectasis	19 (1.6)	10 (2.3)	.32	6 (1.4)	10 (2.3)	.31
Pleural effusion	15 (1.2)	8 (1.8)	.35	6 (1.1)	8 (1.9)	.59
Abdominal fluid collection	91 (7.5)	21 (4.8)	.059	31 (7.2)	21 (4.9)	.15
Chyle leakage	6 (0.5)	6 (1.4)	.062	1 (0.2)	6 (1.4)	.058
Bleeding	13 (1.1)	2 (0.5)	.25	4 (0.9)	2 (0.5)	.41
Wound problem	5 (0.4)	1 (0.2)	>.99	2 (0.5)	1 (0.2)	.56

Comparison of infectious complications according to hospital volume in LSPDP-VP

	LSPDP-VP group (n = 432)		
	High-volume center (n = 358)	Low-volume center (n = 74)	*P*-value
Overall complications	123 (34.4)	23 (31.1)	.69
Infectious complications	59 (16.5)	12 (14.9)	.86
Infected POPF	18 (5.0)	5 (6.8)	.57
Abdominal abscess	1 (0.3)	4 (5.4)	.003
Superficial/deep SSI	3 (0.8)	2 (2.7)	.21
Pneumonia	1 (0.3)	0	>.99
Sepsis	1 (0.3)	1 (1.4)	.31
Estimated blood loss (mL)	252.2±311.5	126.9±214.6	.001
Operative time (min)	220.3±97.1	293.8±104.3	.001
Conversion to open	2 (0.6)	0	>.99
Hospital stay (day)	10.2±20.7	15.1±11.4	.050
In-hospital mortality	1 (0.3)	0	>.99

Limitations & Strengths of the study

Limitations

- Risk of selection bias due to retrospective design
  DPS (vs LSPDP) for more challenging tumors (?): higher rates of conversion to open surgery
- No data for long- term infectious complications such as OPSI
- Mixed data from high-volume and low-volume centers.

Strengths

- Definition of postoperative infectious complications with specific criteria
- PSM analysis using a large cohort from multiple centers

Summary

- **LSPDP compared with LDPS**
  - lower rate of overall infectious complications, especially intra-abdominal abscess
  - specific infectious complications such as infected POPF, SSI, pneumonia, and sepsis: similar after PSM
  - POPF, blood loss, and hospital stay: similar after PSM
- **Splenic vessel-preservation (LSPDP-VP) compared with vessel sacrifice (-VS)**
  - higher rate of infectious complications,
  - especially higher rate of intra-abdominal abscess in low-volume centers

Increased early infectious complications after DPS due to impaired immune function?

A. Other infectious complications except intra-abdominal abscess: similar

Original research

Postoperative infection risk after splenectomy: A prospective cohort study

Barmparas G, et al. Int J Surg Tech 2015

- Among a total of 1884 patients were admitted to the SICU for 30-month study period
- 33 (2%) splenectomy vs 493 (26%) abdominal surgery

	Total (n = 526)	Splenectomy (n = 33)	Adjusted[a] odds ratio (95% CI)	Adjusted[a] *p* value
Infectious complications	29.8% (157/526)	48.5% (16/33)	2.67 (1.28, 5.59)	*0.009*
- VAP	2.3% (12/526)	6.1% (2/33)	3.56 (0.69, 18.51)	*0.131*
- UTI	14.6% (77/526)	24.2% (8/33)	1.97 (0.83, 4.69)	*0.124*
- Bacteremia	11.8% (62/526)	15.2% (5/33)	1.84 (0.65, 5.18)	0.252
- Wound infection	5.7% (30/526)	6.1% (2/33)	0.84 (0.19, 3.81)	*0.821*
- CRBSI	1.9% (10/526)	6.1% (2/33)	3.94 (0.77, 20.09)	*0.100*
- Intra-abdominal abscess	3.4% (18/526)	9.1% (3/33)	4.29 (1.14, 16.16)	*0.031*

Increased early infectious complications after DPS due to impaired immune function?

A. Other infectious complications except intra-abdominal abscess: similar

B. No correlation between systemic inflammatory response and infectious complications

- DPS compared with SPDP *(Lee, J Korean Med Sci 2010, Tezuka, Dig Surg 2012, Yamaguchi, Int Surg, 2001)*
  - significantly increased postoperative platelet, platelet-to-lymphocyte ratio, WBC counts, C-reactive protein
  - infectious complication rates: similar

Postoperative Hematological Changes after Spleen-Preserving Distal Pancreatectomy with Preservation of the Splenic Artery and Vein

Tezuka, et al. Dig Surg 2012

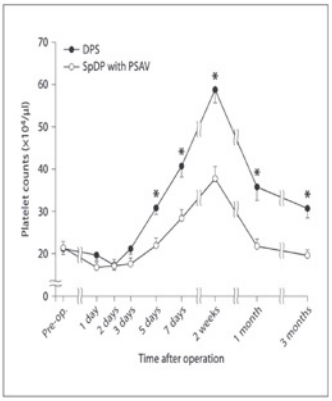

Fig. 2. Postoperative changes in platelet counts in the SpDP with PSAV and DPS groups. Data are expressed as means ± SEM. * $p < 0.05$.

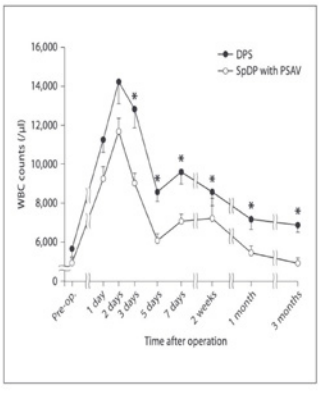

Fig. 3. Postoperative changes in WBC counts in the SpDP with PSAV and DPS groups. Data are expressed as means ± SEM. * $p < 0.05$.

Table 3. Postoperative outcome in the SpDP with PSAV and the DPS groups

Variable	SpDP with PSAV (n = 21)	DPS (n = 32)	p value
Pancreatic fistula Grade B/C	2 (10)	5 (16)	0.690
Infectious condition	2 (10)	7 (22)	0.291
Mortality	0	0	–
Splenic infarction	0	–	–
Splenic vein thrombosis	0	0	–
Splenic torsion	0	–	–
Postoperative iron therapy	0	2 (6)	0.512
Adjuvant chemotherapy	1 (5)	1 (3)	1.00

Values are n (%).

Increased early infectious complications after DPS due to impaired immune function?

A. Other infectious complications except intra-abdominal abscess: similar

B. No correlation between systemic inflammatory response and infectious complications

- DPS compared with SPDP *(Lee, J Korean Med Sci 2010, Tezuka, Dig Surg 2012, Yamaguchi, Int Surg, 2001)*
  - significantly increased postoperative platelet, platelet-to-lymphocyte ratio, WBC counts, C-reactive protein
  - infectious complication rates: similar

C. Decreased intra-abdominal abscess by proper drainage for the subphrenic area after DPS

- Single drainage compared with double drainage *(Marcel, Surg Oncol 2019)*
  - significantly higher infective POPF (14.9% 36.2%; P < 0.001)

Drainage after distal pancreatectomy: Still an unsolved problem

Marcel, Surg Oncol 2019

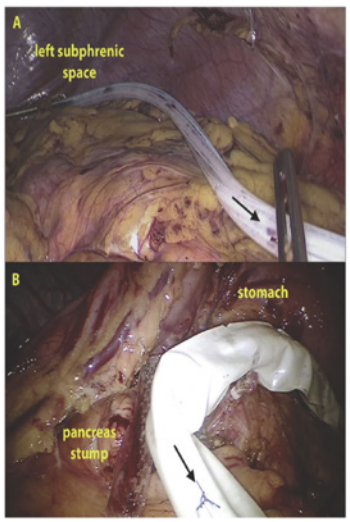

Fig. 1. Double drainage after distal pancreatectomy.

Clinical and surgical data from double drainage vs single drainage patients.

	Double drainage (n = 127)	Single drainage (n = 94)	P value
Technique			0.2657
Open	62 (48.8%)	53 (56.4%)	
Laparoscopy	63 (49.6%)	40 (42.6%)	
Laparoscopy, converted	2 (1.5%)	1 (1.0%)	
Closure method			0.5875
Stapler	115 (90.6%)	83 (88.3%)	
Harmonic/suture	12 (9.4%)	11 (11.7%)	
POPF			
No^{0}	48 (37.8%)	28 (29.8%)	$0.2153^{0\ vs\ bl,b,c}$
BL^{bl}	60 (47.2%)	32 (34.0%)	
$B1^{b,b1}$	19 (14.9%)	23 (24.5%)	$0.00026^{0,bl\ vsb,c}$
$(B2\ or\ B3)^{b,b23}$	0	8 (8.5%)	$0.01569^{bl\ vsb23}$
C^{c}	0	3 (3.2%)	$0.00535^{bl\ vsb23,c}$
Mean amylase level drain[a]	650	1327	**0.0016**
Morbidity (except POPF)	8 (6.3%)	9 (9.6%)	0.3663
Median Hospital stay, days	6 (2–36)	8 (2–59)	**0.0127**
Median blood loss, mL	255	330	0.06476
Blood Transfusion, n	3	6	0.1348
Median operative time, min	240	220	0.05273

Higher incidence of POPF after DPS vs. SPDP

- POAP with ischemia of the pancreatic remnant
- Increased risk of hypercoagulability in the portal vein system after splenectomy → worse venous drainage of the pancreatic remnant after DP
- immunodeficiency might impair pancreatic stump healing and result in POPF

Splenic vein thrombosis and pancreatic fistula after minimally invasive distal pancreatectomy

Kang CM, el al. Br J Surg 2014

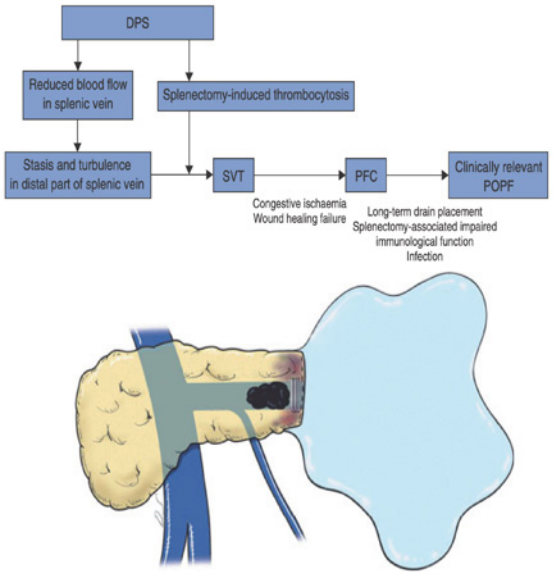

Table 3 Association between splenic vein thrombosis and postoperative pancreatic fistula

	POPF		
	No ($n = 58$)	Yes ($n = 21$)	P‡
SVT†			0·022§
No	33	6	
Yes	23	15	
SVT grade†			0·027¶
None	33	7	
Partial	14	6	
Complete	9	8	
SVT length (mm)*	6·7(10·2)	15·2(17·5)	0·045
Maximum PFC size (mm)*	52·2(90·5)	51·3(21·7)	0·965
LOS (days)*	7·9(3·0)	18·1(9·5)	< 0·001

Conclusions

- Spleen preservation in LDP for benign or borderline malignant tumors was advantageous in lowering the risk of infectious complications, especially intra-abdominal abscess.
- However, the risk of infectious complications can be affected by the degree of surgical experience.
- Increased infectious complications in DPS compared with SPDP may be due to increased risk of POPF and fluid collection in the subphrenic dead space after splenectomy rather than impaired immune function.

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• Degrees

1997–2003	M.D., Kyushu University Faculty of Medicine, Fukuoka, Japan
2009–2013	Ph.D., Kyushu University, Fukuoka, Japan

• Work Experience

2003.05–2004.04	Resident at Kyushu University Hospital, Fukuoka, Japan
2004.05–2005.04	Resident at Miyazaki Prefectural Central Hospital, Miyazaki, Japan
2005.05–2006.03	Higashi Kunisaki Koiki Hospital, Oita, Japan
2006.04–2007.03	Kokura national hospital, Fukuoka, Japan
2007.04–2008.03	Kyushukouseinenkin hospital, Fukuoka, Japan
2008.04–2009.03	Miyazaki University Hospital, Miyazaki, Japan
2013.04–2014.03	Toyamaicho Hospital, Kumamoto, Japan
2014.04–2018.03	Research Fellow at Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA
2018.04–2020.03	Kitakyushu Municipal Medical Center, Fukuoka, Japan
2020.04–2020.11	Assistant Professor at Tokyo Medical University, Shinjuku, Japan
2020.12–Present	Junior Associate Professor at Tokyo Medical University, Shinjuku, Japan

• Research Experience

2009.04–2013.03	Ph.D Course at the Department of Surgery and Oncology, Kyushu University, Fukuoka, Japan
2014.04–2018.03	Research Fellow at Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA

• Membership

Japanese Surgical Society
The Japanese Society of Gastroenterological Surgery
Japanese society of Hepato-biliary-pancreatic Surgery
Japan Society of Endoscopic Surgery
Japan Pancreas Society
Japan Biliary Association

Current situation of MIS Pancreatic Surgery and the Role of Robotic Surgery

Shingo Kozono (Tokyo Medical University, Japan)

Robot-assisted pancreatic resection began in 2002 on distal pancreatectomy (DP) by Melvin et al in the United States, followed application to pancreaticoduodenectomy (PD) by Giulianotti et al in Italy in 2003. Subsequently, with advancements in robotic technology, robot-assisted pancreatic resection has become widely practiced globally since the 2010s, and its utility has been extensively reported. While the safety and efficacy of robot-assisted pancreatic resection have not been definitively proven through high-quality randomized controlled trials (RCTs), numerous papers to date have reported on perioperative and oncologic safety and efficacy.

Robot-assisted distal pancreatectomy (RDP) has been reported to achieve a high spleen preservation rate and a low conversion rate to open surgery compared to open distal pancreatectomy (ODP) and laparoscopic distal pancreatectomy (LDP). Additionally, RDP demonstrates a high R0 resection rate. In comparison with LDP, RDP shows comparable short-term mortality, surgery-related complication rates, and pancreatic fistula rates, with a shorter hospital stay.

Despite a longer operation time, robot-assisted pancreaticoduodenectomy (RPD) is reported to have lower blood loss compared to open pancreaticoduodenectomy (OPD), with no significant differences in perioperative complications such as pancreatic fistula. When compared with laparoscopic pancreaticoduodenectomy (LPD), RPD exhibits lower blood loss, lower conversion rate to open surgery, shorter hospital stay, and no significant differences in perioperative complications. In terms of oncologic factors, RPD demonstrates comparable surgical outcomes to OPD and LPD in terms of lymph node retrieval and R0 resection rates, with no significant differences observed in overall survival (OS) and recurrence-free survival (RFS). Despite the extended operative time, RPD maintains similar perioperative complication rates to OPD and LPD and achieves comparable oncologic outcomes.

Several studies suggest a lower pancreatic fistula rate in RPD compared to OPD, highlighting its potential benefits. However, high-quality evidence supporting the utility of robot-assisted pancreatic resection is still lacking, and the implementation of high-quality, large-scale RCTs is desirable.

Robot-assisted pancreatic resection allows for delicate surgical maneuvers with high precision, facilitated by high-resolution 3D imaging and the use of highly articulated robotic instruments. At our institution, Professor Yuichi Nagawa has successfully implemented robot-assisted pancreatic resection based on NFT-based resection, capitalizing on the advantages of robot-assisted surgery. In this conference, we present the current state of robot-assisted pancreatic resection and introduce the surgical techniques of robot-assisted pancreaticoduodenectomy performed at our facility.

제74차
한국췌장외과학회 학술대회

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Hye-Sol Jung

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- **Education**

2008-2014	J.D., Seoul National University College of Law
2014-2018	M.D., Yonsei University Medical School
2021-	Ph.D., Seoul National University College of Medicine

- **Experience and Training**

2012.03-2014.02	Judicial Research and Training Institute
2017.01.04-01.27	Clinical Training Program Osaka Medical Center and Research Institute for Maternal and Child Health

Internships and Residencies

2018.03-2019.02	Internship, Severance Hospital, Seoul, Korea.
2019.03-2022.02	Residency in Department of Surgery, Seoul National University Hospital, Seoul, Korea.
2022.03-	Fellowship in Division of HBP Surgery, Department of Surgery Seoul National University Hospital, Seoul, Korea.

- **Awards**

2019-2021	Department of Surgery, Seoul National University Hospital Top honors of the Surgical Residency Program
2021	HBP Surgery Week KHBPS (Korean Association of Hepato-biliary-pancreatic Surgery) Best Poster Presentation Award
2021	A-PHPBA 2021 Bali - Virtual Congress 4th Favorite of E-Video Session
2022	Seoul National University College of Medicine The SNU Medicine Graduate Student Best Paper Award (Clinical Medicine) - First Place -
2022	ACRLS 2022 (Asian-Pacific Congress of Robotic Laparoscopic Surgery 2022) Best Presentation Award 2023 HBP Surgery Week KHBPS (Korean Association of Hepato-biliary-pancreatic Surgery) Best Oral Presentation Award 2023 The 75th Annual Congress of Korean Surgical Society The Korean Society of Endo-Laparoscopic & Robotic Surgery The Best Mentor-Mentee Video Award
2023	The Annual Congress of the Korean Surgical Society Best Investigator Award

Long-term clinical course in a patient with pancreatic cancer with liver metastasis who underwent cytoreductive surgery

Hye-Sol Jung (Seoul National University Hospital, Korea)

Background: Chemotherapy has changed the paradigm of local treatment for pancreatic ductal adenocarcinoma (PDAC). Advancement in chemotherapy regimen such as fluorouracil, leucovorin, irinotecan and oxaliplatin (FOLFIRINOX) or gemcitabine plus nanoparticle albumin-bound paclitaxel (GEM/Ab), has improved survival for patients with metastatic PDAC. We report a long-term clinical course of metastatic pancreatic cancer with isolated synchronous liver metastasis in a patient.

Patient concerns: A 67-year-old female with diabetes mellitus presented with left upper quadrant pain lasting one month. Pancreatic tail cancer with multiple liver metastases was diagnosed by Endoscopic ultrasound guided fine needle aspiration biopsy. The level of carbohydrate antigen 19-9 at diagnosis was 80 U/ml.

Intervention: The patient underwent eighteen cycles of palliative FOLFIRINOX chemotherapy for ten months followed by distal pancreatectomy and portal vein resection with intraoperative radiofrequency ablation for liver segment 4 and 8. She received six cycles of adjuvant FOLFIRINOX after surgery.

Outcome: The postoperative course was uneventful without complications. Pathologic staging of this patient was ypT1cN0. The patient achieved R0 resection with CAP grade 1. The disease-free status was maintained for two and half years. Three years after surgery, the recurrence developed in both lungs, but she achieved metabolic complete response after twelve cycles of repeated FOLFIRINOX chemotherapy. Until now (six years after diagnosis), she visits the outpatient clinic for regular follow-up.

Lesson: Pancreatectomy with remarkable response to chemotherapy plus local treatment for metastases suggests the possibility of longer survival even in the patients with PDAC with isolated synchronous liver metastases.

Sho Kiritani

Division of Hepatobiliary and Pancreatic Surgery, Cancer Institute Hospital of the Japanese Foundation for Cancer Research, Tokyo, Japan

- **Education**

2005–2011	M.D. School of Medicine, Chiba University
2017–2020	Ph.D. of Medicine, Tokyo University

- **Postgraduate Training and Professional Appointments**

2011.04–2013.03	Internship program, Tokyo University, Tokyo, Japan
2013.04–2016.03	Surgical resident, Dept. of Surgery, Chigasaki municipal hospital, Kanagawa, Japan
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2018.04–2020.03	Surgical doctor, Dept. of surgery, Asahi General Hospital, Chiba, Japan
2020.04–2022.03	Clinical and Research Fellow, Dept. of HBP surgery, Tokyo University Hospital, Tokyo, Japan
2022.04–	Clinical Fellow, HBP Surgery, Cancer Institute Hospital of JFCR, Tokyo, Japan

- **Qualifications**

Board Certified Surgeon, Japan Surgical Society (2015)
Board Certified Surgeon in Gastroenterology (2020)

- **Awards and Honors**

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- **Society Memberships**

Japan Surgical Society (JSS)
The Japanese Society of Gastroenterological Surgery (JSGS)
Japan Pancreas Society (JPS)
Japanese Society of Hepato-Biliary-Pancreatic Surgery (JSHBPS)
Japan Society for Endoscopic Surgery (JSES)

Usefulness of Left Posterior Artery–First Approach using a Scope Transition Method during Robotic Pancreaticoduodenectomy

Sho Kiritani (Cancer Institute Hospital, Japan)

Sho Kiritani, Yosuke Inoue, Takafumi Sato, Yuki Kitano, Atsushi Oba, Yoshihiro Ono, Hiromichi Ito, Yu Takahashi

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Background and Aim: An accurate dissection around the superior mesenteric artery (SMA) is a prerequisite to achieving radical resection in pancreaticoduodenectomy (PD) for periampullary malignancies. However, an approach to the SMA in robot-assisted PD (RPD) has not been fully established. Herein, we aimed to describe the detail surgical technique of the left-posterior (LP) approach to the SMA and evaluate its short-term outcome.

Methods: This study involved 61 consecutive patients who underwent RPD. Patients were classified into a group with oncological SMA dissection by the LP approach (LP, n=35) and another without oncological SMA dissection, performed by right approach (ND, n=25). The short-term outcomes of the two groups were compared. The LP approach was performed at the first stage of resection. The scope was inserted from the left-sided trocar. The left and posterior sides of the SMA were dissected along with proximal mesojejunum resection. The common trunk of the jejunal artery and inferior pancreaticoduodenal artery were divided during this approach. The remnant part of the SMA was dissected from the right at the final stage of resection. Right approach does not require the lymph node dissection around SMA. Mesojejunum is divided along the jejunum. The tissue around SMA was divided in mainly in the final stage of resection from right side.

Results: No significant difference was found between LP and ND regarding operative time (553 vs 622 min, p=0.11), blood loss (55 vs 90 mL, p=0.57), and incidence of severe postoperative

complications (12.5% vs 5.7%, p=0.36). The median lymph node yield in the LP group was more than that of the ND group (18 vs. 12, p<0.01).

Conclusion: The LP approach with a left-sided scope facilitates accurate, safe, and convenient SMA dissection, maximizing the use of its magnifying effect.

연/자/소/개

Curriculum Vitae

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2005.03-2011.02	한림대학교 의과대학 학사
2016.09-2018.08	강원대학교 의과대학 석사
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- **경력사항**

2011.03-2012.02	서울대학교병원 인턴
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2015.11-2015.11	나고야대학병원 및 동경여자대학병원 간담췌외과 단기 연수
2016.03-2019.04	육군 군의관
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2021.09-현재	고려대학교 구로병원 간담췌외과 임상조교수

Is Prolonged Adjuvant Treatment Justified After Surgery for Initially Inoperable Pancreatic Cancer Achieving R0 Resection Following Favorable Neoadjuvant Chemotherapy Response: A Dilemma of Timing and Surgical Decision?

Jae Seung Kang (Korea University Guro Hospital, Korea)

A 53-year-old woman with symptoms of indigestion and jaundice was diagnosed with a 4 cm-sized pancreatic head cancer. Extensive involvement of the superior mesenteric artery (SMA), multiple lymph node metastases, and tiny hepatic metastases were observed. Palliative FOLFIRINOX chemotherapy was initiated, leading to a remarkable response with CA 19-9 levels dropping from 2600 to 42. Based on a multidisciplinary conference decision, the patient, demonstrating good response to chemotherapy, was deemed anatomically resectable on imaging, and she underwent a Whipple's operation. Pathological evaluation showed a 1.5 cm tumor with clear margins (R0) and ypT1cN0 staging. Adjuvant FOLFIRINOX was administered, and during this treatment period, there was no evidence of recurrence.

However, following a break from chemotherapy, the patient developed mesentery root thickening, ascites, and multiple hepatic recurrences. Treatment was switched to Gemcitabine and Abraxane, but the patient succumbed to complications such as spontaneous bacterial peritonitis, sepsis, and hepatic failure one year after surgery.

This case underscores the evolving approach to managing locally advanced or metastatic pancreatic head cancer in the neoadjuvant treatment era. It raises the question of determining the optimal duration of adjuvant treatment in light of the possibility of recurrence.

연/자/소/개

Curriculum Vitae

Moe Matsumoto

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- **Degrees**

2009–2015	M.D. Tokyo Medical University, Tokyo, Japan

- **Work Experience**

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2019.04–2020.09	Niizashiki Central General Hospital, Saitama, Japan
202010–2021.03	Todachuo General Hospital, Saitama, Japan
2022.04–present	Assistant professor at Tokyo Medical University Gastrointestinal and Pediatric Surgery

- **Membership**

Japanese Surgical Society
Japan Society of Endoscopic Surgery
The Japanese Society of Gastroenterological Surgery
Japanese Society Hepato-biliary-pancreatic Surgery

- **Qualifications**

Medical License if Japan
Board Certified Surgeon (by Japanese Surgical Society)

Difference in Bacterial Infections Related to Pancreatic Fistula Between Pancreaticoduodenectomy and Distal Pancreatectomy

Moe Matsumoto (Tokyo Medical University, Japan)

The incidence of postoperative pancreatic fistula (POPF) remains high despite prevention efforts, occurring in approximately 20-30% of pancreatic surgery. And infection is a major factor in the development of pancreatic leakage. In this study, we investigated the effect of early postoperative ascites infection on POPF after pancreaticoduodenectomy (PD) and pancreatoduodenectomy (DP) to clarify the possibility that bacterial infection may activate the pancreatic juice and contribute to POPF.

Subjects: Analysis was performed in a total of 645 pancreatectomy cases (PD: 463 cases, DP: 176 cases) performed at our department from October 2011 to October 2018. Methods: We examined the bacterial species of drainage fluid and the timing of when the bacteria became positive. We also analyzed the incidence of POPF and drainage fluid culture. Results: In PD, Enterococcus sp. was significantly more common, and POPF cases were positive for bacteria from POD1; in DP, Staphylococcus sp. was more common, and POPF cases were significantly positive from POD4. In PD, positive culture of early postoperative drainage fluid was a risk factor for POPF; in DP, positive culture of drainage fluid was not an obvious risk factor for POPF.

In PD, endogenous infection in the early postoperative period was associated with POPF, while in DP, exogenous psoriasis in the postoperative course was suggested to be associated with POPF.

연/자/소/개

Curriculum Vitae

Yoo Jin Choi

고려대학교 안암병원

- **의사면허 이력**

Korean Medical License	No. 117708	Year 2014

- **세부전문의 이력**

Korean Board of Surgery	No. 7964	Year 2019
Korean Board of Hepatobiliary surgery	No. 349	Year 2021

- **학력**

2005.09-2009.05	학사	Johns Hopkins University, Maryland, USA
2010.03-2014.02	M.D. 석사	고려대학교 의과대학원
2019.09-2021.08	박사	서울대학교 의과대학원 (외과)

- **경력**

2014.03-2015.02	인턴	고려대학교 의료원 인턴
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2019.03-2021.02	전임의	서울대학교 간담췌외과 임상강사
2021.02-present	임상조교수	고려대학교 안암병원 간담췌외과 임상조교수

Xanthogranulomatous pancreatitis

Yoo Jin Choi (Korea University Anam Hospital, Korea)

Xanthogranulomatous pancreatitis is a very rare benign diseases in the pancreatic diseases. It has important clinical characteristics as it closely mimics pancreatic cancer in its clinical presentation. Previously, there have been very few cases were reported involving chronic inflammation with xanthogranulomatous change. Diagnosis of Xanthogranulomatous inflammation relies on the identification of an increased presence of foamy histocytes and inflammatory cells in the affected tissue. The pathogenesis is poorly understood.

A 64-year-old male, with no medical history, was admitted to the hospital due to upper abdominal pain that began 10-days ago. He reported that the pain worsened after meals and that he experienced a 5kg weight loss over the past 2weeks. There was no symptom of nausea, vomiting or fever. He showed no signs of jaundice or abdominal tenderness. Vital signs were stable.

Initial laboratory results indicated an elevated white blood cell count at 13090 cells/uL while other labs were within normal level. The abdominal computed tomography (CT) revealed a suspicious gastric or pancreatic cancer. The pancreatic MRI indicated an inflammatory lesion, potentially sequelae of pancreatitis, though it did not rule out the possibility of gastric or pancreatic cancer. The following gastric fiber presented suspicion of gastric cancer, but the biopsy results showed gastritis. The EUS-biopsy on pancreatic lesion also did not reveal the presence of tumor. The PET CT revealed suspicious primary pancreatic cancer with multiple lymph node metastasis. The tumor marker, CEA and CA 19-9, however, remained within normal level.

Subsequently, he underwent surgical biopsy under the general anesthesia. During the operation, the pancreas found to be very hard with surrounding showing fibrotic changes. Large masses around the pancreas and some omental thickenings were excised. The final biopsy of all the masses confirmed xanthogranulomatous pancreatitis. He was uneventful after surgery. He was decided not to go under cancer treatment but to observe with short term follow up.

Xanthogranulomatous inflammation are usually found in gallbladder, which also mimics clinical characteristics of cancer. Thus, more cases were needed to be collected and studied about pathogenesis of xanthogranulomatous pancreatitis in the future and give more reasaonable clue to distinguish benign and malignant diseases.

제74차
한국췌장외과학회

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† iHealthcareAnalyst, Inc. (2021, July 14). Global exocrine pancreatic insufficiency market$6.1 billion by 2027. *iHealthcareAnalyst*. https://www.ihealthcareanalyst.com/global-exocrine-pancreatic-insufficiency-diagnostics-market

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References) 1. Löhr JM, Hummel FM, Pirilis KT, Steinkamp G, Körner A, Henniges F. Properties of different pancreatin preparations used in pancreatic exocrine insufficiency. *Eur J Gastroenterol Hepatol.* 2009;21(9):1024-1031. doi: 10.1097/MEG. 0b013e328328f414. **2.** Halm U, Löser C, Löhr M, Katschinski M, Mössner J. A double-blind, randomized, multicentre, crossover study to prove equivalence of pancreatin minimicrospheres versus microspheres in exocrine pancreatic insufficiency. *Aliment Pharmacol Ther*. 1999;13(7):951-957. doi: 10.1046/j.1365-2036.1999.00566.x. **3.** Meyer JH, Elashoff J, Porter-Fink V, Dressman J, Amidon GL. Human postprandial gastric emptying of 1-3-millimeter spheres. *Gastroenterology*. 1988;94(6):1315-1325. doi: 10.1016/0016-5085(88)90669-5. **4.** Domínguez-Muñoz JE. Pancreatic enzyme therapy for pancreatic exocrine insufficiency. *Gastroenterol Hepatol (NY)*. 2011;7(6) 401-403. **5.** U.S. Food and Drug Administration Prescribing Information (Creon) reviewed in April 2009

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일반의약품

[성 상] • 크레온 캡슐 10000, 40000 갈색의 장용성 미립정을 함유한 상부 불투명 갈색, 하부 무색투명의 경질 캡슐 **• 크레온 캡슐 25000** 갈색의 장용성 미립정을 함유한 상부 불투명 주황색, 하부 무색투명의 경질 캡슐 **[원료약품 및 그 분량] • 크레온 캡슐 10000** 이 약 1캡슐(310.50mg) 중 판크레아스분말(EP) 150.00mg(지방 소화력 10000EP 단위; 전분소화력 8000EP 단위; 단백소화력 600EP 단위) **• 크레온 캡슐 25000** 이 약 1캡슐(595mg) 중 판크레아스분말(EP) 300.00mg(지방소화력 25000EP 단위 ; 전분소화력 18000EP 단위 ; 단백소화력 1000EP 단위) **• 크레온 캡슐 40000** 이 약 1캡슐(783.3mg) 중 판크레아스분말(EP) 400.00mg(지방소화력 40000EP 단위 ; 전분소화력 25000EP 단위 ; 단백소화력 1600EP 단위) **[효능·효과]** 췌장(이자) 외분비 기능 장애 **[용법·용량]** 복용량은 췌장 손상의 중증도와 식사의 구성에 따라 항상 다릅니다. **1. 성인 및 12세 이상의 청소년** 권장용량은 판크레아스분말로서 지방소화력단위 20,000~40,000 EP 단위/식사입니다. 소화불량의 정도에 따라, 필요량은 이보다 상당히 높을 수 있습니다. 특히, 낭성섬유증환자에 있어서는 적절한 지방 흡수를 위해 필요한 효소의 용량을 초과하여서는 안되며, 식사의 양과 구성을 고려해야 합니다. 용량은 주의를 기울여 증량되어야 하며, 증상(예, 지방변, 위통증)의 개선과 연관되어야 합니다. 1일 체중 kg당 지방소화력단위 15,000~20,000 EP단위 또는 지방 섭취량 g당 4,000 EP단위의 용량을 초과하지 않습니다. **2. 4세 이상 12세 미만의 소아** 판크레아스분말로서 체중 kg당 지방소화력단위 500 EP 단위/식사의 체중에 따른 복용으로 시작합니다. 이 약은 식사 중 혹은 식사 직후 충분한 양의 물과 함께 복용합니다. 이 약을 씹거나 캡슐을 개봉할 경우 효능이 감소할 수 있고, 구강내에서 효소가 용출되어 구강내 점막을 손상시킬 수 있으므로, 이 약은 통째로 삼키거나 캡슐을 그대로 삼키기 어려운 경우(예, 소아 또는 고령자)에는 캡슐을 개봉하여 액체나 부드러운 음식(pH < 5.5)과 함께 섞은 즉시 복용하되, 이 약의 내용물을 씹지 않고 즉시 삼켜야 합니다. 복용기간은 질환의 정도에 따라 다릅니다. **[사용상의 주의사항] 1. 다음과 같은 사람은 이 약을 복용하지 마십시오.** 1) 소나 돼지고기에 과민반응의 병력이 있는 사람 2) 이 약 또는 이 약의 성분에 과민반응이 있거나 그 병력이 있는 사람 3) 급성 췌장염 환자, 만성 췌장염의 급성 발현 환자 **2. 이 약을 복용하는 동안 다음의 행위를 하지 마십시오.** 이 약의 내용물을 씹지 마십시오(이 약 캡슐에 함유된 내용물을 씹어서 효소가 구강내로 용출될 경우 구강 내 점막에 궤양 등의 손상을 가져올 수 있습니다). **3. 다음과 같은 사람은 이 약을 복용하기 전에 의사, 치과의사, 약사와 상의하십시오.** 1) 다른 약물을 복용하고 있는 사람 2) 낭성섬유증 환자 : 낭성섬유증 환자에서 장폐색(창자막힘)증이 보고되어 있으므로 장폐색(창자막힘) 유사 증상이 나타날 경우 장협착의 가능성이 고려되어야 합니다. 3) 임부 또는 임신하고 있을 가능성이 있는 여성 : 이 약이 임부, 배·태자 발달, 분만/출생후 발달에 미치는 영향에 관련된 동물실험은 충분하지 않습니다. 이 약의 태아에 대한 안전성이 확립되어 있지 않으므로 임부 또는 임신하고 있을 가능성이 있는 여성에는 이 약이 꼭 필요한 경우가 아니면 사용하지 않습니다. 4) 수유부 : 이 약이 모유로 이행되는지 알려지지 않았으나, 대개의 약물이 모유로 이행되기 때문에 수유부가 이 약을 복용하였을 때에는 주의해야 합니다. 이 약이 꼭 필요한 경우가 아니면 수유 중에 사용하지 않습니다. 5) 통풍, 신부전 또는 고요산혈증이 있거나 그 병력이 있는 사람 : 통풍, 신부전 또는 고요산혈증 환자가 이 약을 복용시에는 고요산혈증의 위험 가능성이 있으므로 주의해야 합니다. 돼지에서 유래한 췌장효소제품은 퓨린을 함유하여 혈중요산을 증가시킬 수 있습니다. 6) 돼지기원의 단백질에 과민반응이 있다고 알려진 사람 : 돼지기원의 단백질에 과민반응이 있다고 알려진 환자가 이 약을 복용할 경우 주의해야 합니다. 드물게, 동일성분 다른 제형의 췌장효소제품에게서 아나필락시스, 천식, 두드러기, 가려움을 포함한 심각한 알레르기 반응이 보고 되었습니다. 중증의 알레르기 환자의 복용중단 여부는 임상적 요구에 따라 고려되어야 합니다. 7) 엽산 제제 복용 환자 : 경구용 판크레아틴 제제에 의해 엽산의 흡수가 감소될 수 있으므로 엽산 수치의 모니터링이 권장됩니다. 8) 아카보즈 또는 미그리톨 복용 환자 : 판크레아틴과 병용 시 이와 같은 당뇨치료제의 효과를 감소시킬 수 있으므로 환자들의 혈당 수치 모니터링이 권장됩니다. **4. 다음과 같은 경우 이 약의 복용을 즉각 중지하고 의사, 치과의사, 약사와 상의하십시오. 상담시 가능한한 이 첨부문서를 소지하십시오.** 1) 10,000 지방소화력 EP단위/kg/일 이상을 복용하는 낭성섬유증 환자의 경우, 특히 섬유화 결장병증이 보고되어 있으므로 비정상적인 복부 증상 또는 복부 증상의 변화가 나타나는지를 주의 깊게 관찰하여야 합니다. 2) 다음과 같은 이상반응이 보고되었습니다. 이상반응은 다음과 같은 빈도에 기초하여 평가되었습니다 : 매우 흔하게(≥1/10), 흔하게(≥1/100에서 < 1/10), 흔하지 않게(≥1/1,000에서 < 1/100), 드물게(≥1/10,000에서 < 1/1,000), 매우 드물게(< 1/10,000), 알려지지 않음(빈도가 개별 자료에서 평가 불능인 경우) (1) 위장관계 : 복부 통증(매우 흔하게), 구역/구토(흔하게), 변비(흔하게), 설사(흔하게), 복부팽만 (흔하게), 비정상적 배변 (흔하지 않게). (2) 섬유화 대장병증(알려지지 않음) : 고용량의 판크레아틴제제를 복용한 낭성섬유증 환자에서 회장-맹장과 상행 결장의 협착(섬유화 대장병증)과 대장염이 보고되었습니다. 개별환자 통제(Case control) 시험에서 이 약과 섬유화 대장병증(fibrosing colonopathy) 사이의 연관성은 밝혀지지 않았습니다. (3) 알레르기 반응 : 피부의 알레르기 또는 과민반응, 피부 발진, 재채기, 눈물분비, 기관지경련 등 즉각적인 알레르기 반응(흔하지 않게), 피부 가려움 및 두드러기(알려지지 않음), 아나필락시스반응(알려지지 않음) 3) 고요산요증, 고요산혈증, 알레르기 반응 : 외인성 췌장효소의 대량복용은 고요산요증과 고요산혈증에 관련되어 있습니다. 췌장효소를 함유한 다른 의약품을 복용한 환자에서 고요산혈증, 알레르기 반응을 포함하여 중대한 이상반응이 보고되었습니다. 4) 동일성분 다른 제형의 서방성 및 속방성 췌장효소제품이 낭성섬유증과 만성 췌장염과 같은 기타 질환에 의한 췌장 외분비 기능장애를 가진 환자 치료에 사용되고 있습니다. 이러한 제품의 장기간 안전성 프로파일에 대하여 보고된 가장 중대한 이상반응에는 섬유화 결장병증, 말단장폐색증후군(Distal intestinal obstruction syndrome), 기존 암의 재발 및 아나필락시스, 천식, 두드러기, 가려움을 포함한 심각한 알레르기 반응이 포함됩니다. 가장 흔하게 발생되는 이상반응은 복통, 설사, 복부팽만, 변비, 구역을 포함한 위장관 장애와 가려움, 두드러기, 발진을 포함한 피부질환입니다. 5) 구강 및 항문주위 궤양이 특히 소아에게 나타날 경우6) 2주 정도 복용하여도 증상의 개선이 없을 경우 **5. 기타 이 약의 복용시 주의할 사항** 1) 정해진 용법·용량을 잘 지킵니다. 2) 소아에게 복용시킬 경우에는 보호자의 지도·감독 하에 복용시킵니다. 3) 약용량 조절이 필요한 경우 의사의 감독 하에서 조절하여야 하고, 증상(예, 지방변증, 복통) 개선에 따라 안내되어야 합니다. 4) 의약품으로부터 잠재적인 바이러스 노출 : 이 약은 식용으로 사용되는 돼지의 췌장조직으로부터 유래합니다. 이 약이 사람에게 감염원을 전달할 수 있는 위험은 제조시 특정 바이러스에 대한 시험과 불활성화를 통해 줄여가고 있으나 새로운 또는 확인되지 않은 바이러스에 의한 질환을 포함하여 바이러스 질환 감염의 위험은 있을 수 있습니다. 그러므로 사람을 감염시킬 수 있는 돼지의 바이러스의 출현은 절대적으로 배제할 수는 없습니다. 그러나 돼지 췌장 추출물의 사용과 관련된 감염성 질병은 보고된 적이 없습니다. 5) 이 약의 미세분말은 코 점막과 호흡기를 자극하고 흡입할 경우 천식을 유발 할 수 있으므로 주의해서 복용해야 합니다. **6. 저장상의 주의사항** 1) 어린이의 손이 닿지 않는 곳에 보관합니다. 2) 의약품을 원래 용기에서 꺼내어 다른 용기에 보관하는 것은 의약품 오용에 따른 사고 발생이나 의약품 품질 저하의 원인이 될 수 있으므로 원래의 용기에 넣고 꼭 닫아 보관합니다. 3) 직사광선을 피하고 되도록 습기가 적은 서늘한 곳에 보관할 것. **[저장방법]** 기밀용기, 25℃ 이하에서 보관 **[제조원]** • 제조의뢰자 : Abbott Laboratories GmbH, Freundallee 9A 30173 Hannover Germany • 제조사 : Abbott Laboratories GmbH, Justus-Von-Liebig-Strase 33, 31535 Neustadt, Germany **[수입원]** 한국애보트유한회사, 서울시 강남구 영동대로 421 전화 : (02)3429-3500, 전송: (02)3429-3779 ※ 본 의약품은 엄격한 품질관리를 필한 제품입니다. 만약 구입시 유효기한 또는 사용기한이 경과되었거나, 변질, 변패 또는 오손된 제품이 발견될 경우에는 구입처를 통하여 교환하여 드립니다. ※ 자세한 사항은 식품의약품안전처 '의약품 통합정보시스템(https://nedrug.mfds.go.kr)'을 참조하시기 바랍니다.

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Abbott **한국애보트 유한회사** 서울시 강남구 영동대로 421 삼탄빌딩 전화 : 02-3429-3500 전송 : 02-3429-3779

Harmonic®

From the undisputed ultrasonic leader[1]...

Experience better tissue protection[2] with **HARMONIC® 1100 Shears**

Improved algorithm that actively controls blade heat—*for lower maximum blade temperature*[3]

Transection speeds 35% faster—*for shorter heat exposure on tissue* than HARMONIC ACE®+7 Shears with Advanced Hemostasis[4]

Curved, tapered tip—*for more precise dissection* than HARMONIC ACE®+7 Shears[5]

	HARMONIC ACE®+7	HARMONIC® HD 1000i	HARMONIC® 1100
Strong sealing[6]	●	●	●
Faster transection[4]		●	●
Better tissue protection[2]			●

Improved temperature control[3] minimizes impact on tissue[1]

Achieve greater control with lower maximum blade temperature[7]
Improved Adaptive Tissue Technology algorithm[3]

- **Intelligently maintains blade temperature** when prolonged energy activation is required[8]
- **Prevents overheating of blade** which may help protect surrounding tissue and vital structures[2,8]
- **Enhances tissue pad life** for continued reliability throughout the procedure[9]

Reduce heat exposure on tissue with 35% faster transection speed[4]

- Energy button is designed to provide the **reliable sealing** of the MIN button with the cutting speed of the MAX button of HARMONIC ACE®+7 Shears[10]

HARMONIC® 1100 Shears had lower maximum blade temperature than HARMONIC ACE®+7 Shears and HARMONIC® HD 1000i Shears[7]

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