

제69차 한국췌장외과학회 학술대회

일자 2022. 3. 12 (토) 장소 SETEC



한국췌장외과학회
Korean Pancreas Surgery Club



아데노피 주 / ADENO-P_{Inj.}
Adenosine Triphosphate Disodium 20mg/2mL

I AM YOUR ENERGY

Mitochondria



ADENO-P_{THERAPY}

01 내인성 물질인 Adenosine Triphosphate (ATP)로 구성되어 안전한 에너지 공급이 가능

02 수술 후 빠른 회복과 대사 기능 개선



[원료약품 및 분량] 유효성분 아데노신트라이포스페이트나트륨삼수화물 10.98 mg/mL [효능·효과] 다음 질환에 수반하는 여러 증상의 개선: 근육력증, 심부전, 만성간염에 있어서의 간기능의 개선, 두부의상 후유증, 조절성 안정피로 [용법·용량] 삼인산아데노신나트륨으로서 보통 성인 1회 5~20mg을 1일 1~2회 피하, 근육 또는 정맥주사 한다. 정맥주사인 경우 포도당주사액 10~20mL에 혼합한 후 3~5분간에 걸쳐 천천히 주사한다. 연령, 증상에 따라 적절히 증감한다. [저장방법 및 사용기한] 밀봉용기, 냉소(1~15℃)보관, 제조일로부터 24개월 ※보다 자세한 사항은 제품설명서 전문을 참조하시기 바랍니다.

Dermabond®

The success of nearly every surgical procedure relies on strong, dependable wound closure.

Don't compromise –
choose the only topical skin adhesive (TSA)
that has been tried, tested, and trusted for
nearly 20 years.



SUSTAINED INNOVATION HAS GIVEN RISE TO THE DERMABOND® PORTFOLIO,
A DIVERSE FAMILY OF SKIN CLOSURE SOLUTIONS FOR A WIDE VARIETY OF CLINICAL NEEDS



ETHICON
PART OF THE *Johnson & Johnson* FAMILY OF COMPANIES

Shaping
the future
of surgery

COPY-19011-ET



Addaven®

최신의 가이드라인에 가장 적합한
9종의 필수 미량원소 공급^{1,3}

9 in One to complete PN

- PN 요법 시 간단히 추가함으로써,
환자들에게 **균형 잡힌 미량원소 공급**
- 다양한 임상적 상황에서
미량원소 결핍증 예방 및 개선
- 편리하고 친환경적인 포장

To learn more please visit:

<http://www.fresenius-kabi.co.kr>

References

1. Braga M, et al. ESPEN Guidelines on Parenteral Nutrition: surgery, Clin Nutr. 2009;28:378-386.
2. Staun Michael et al., ESPEN Guidelines on Parenteral Nutrition: home parenteral nutrition. Clin Nutr. 2009;28:467-479
3. Vanek VW et al, ASPEN position paper: recommendations for changes in commercially available parenteral multivitamin and multi-trace element products, Nut Clin Pract 2012 August;27(4):440-91

프레지니우스 카비 코리아 [주]

서울특별시 송파구 백제고분로 69, 애플타워 8층,9층 / Tel. 02) 3484-0900, Fax. 02) 3484-0909 / www.fresenius-kabi.com



**FRESENIUS
KABI**

caring for life



- Quick onset of hemostasis
- Safe tissue sealing
- Easy handling
- Shorter operation time
- Minimize risk of re-bleeding
- Reduce the likelihood of blood transfusion

[원료약품 및 분량]

Tachosil contains per (1cm)

· Collagen (sponge)	2.1 mg
· Human Fibrinogen	5.5 mg
· Human Thrombin	2.0 IU
· Riboflavin	18.2 μm

[성상]

한면에 황색 약물이 도포된 백색 스폰지

[표능 및 효과]

1. 기존 치료법으로 조절할 수 없는 경우 또는 기존 치료법으로 불충분하다고 예상되는 경우의 출혈 또는 담즙, 림프, 액, 공기 누출
2. 간, 비장, 췌장, 신장, 폐, 부신, 갑상선, 림프절과 같은 실질적 기관 수술시의 지혈 및 조직접착, 또한 이비인후과, 부인과, 비뇨기과, 혈관계, 뼈(예를 들면 해면골)수술, 외상관련 수술시의 지혈
3. 림프, 담즙, 액의 누공의 예방적 처치
4. 폐수술시 일어나는 공기누출의 봉합

[포장단위]

(9.5X4.8X0.5)cm X 1매
(4.8X4.8X0.5)cm X 20매
(2.5X3.0X0.5)cm X 1매



충청남도 천안시 풍세면 남관리 200



레노실썸 — SPF 50+ PA+++

RENO THERAPHY FOR SCAR



Renosil

Protease Inhibitor



Pandict inj.

Nafamostat mesilate



GC 녹십자

제69차 한국췌장외과학회 학술대회

일자 2022. 3. 12 (토) 장소 SETEC



한국췌장외과학회
Korean Pancreas Surgery Club



제69차 한국췌장외과학회 학술대회

일자 | 2022년 3월 12일(토)

장소 | SETEC

PROGRAM

12:55 – 13:00	Opening Remarks	이현국 (회장, 이화의대)	
13:00 – 14:30	Scientific Session 1: Current Surgical & pathologic Issues in Neoadjuvant treatment for Pancreatic cancer: Opinions from Japan Pancreas Society Chairperson: 장진영(서울의대), 장기택(성균관의대)		
13:00 – 13:30	Surgical strategies in multidisciplinary treatment for pancreatic cancer including neoadjuvant treatment Tsutomu Fujii (University of Toyama, Japan)		02
13:30 – 14:00	Is minimally invasive surgery could be applied to pancreatic cancer after NAT? Limitation and pitfall Yuichi Nagakawa (Tokyo Medical University, Japan)		05
14:00 – 14:30	Current pathologic grading system to predict chemo responsiveness after NAT in PDAC. It's implication and Limitation Yoko Matsuda (Kagawa University, Japan)		07
14:30 – 14:50	Coffee Break		
14:50 – 16:05	Scientific Session 2: Chylous ascites; What is it and how do we manage? Chairperson: 최인석(건양의대), 허진석(성균관의대)		
14:50 – 15:10	Anatomy, physiology, definition and current treatment for chylous ascites	이옥주 (순천향의대)	10
15:10 – 15:30	Radiologic diagnosis and intervention for postoperative chylous ascites	구현정 (울산의대 영상의학과)	12
15:30 – 15:50	Surgical treatment for chylous ascites with case	홍사량 (울산의대)	31
15:50 – 16:05	Discussion		
16:05 – 17:05	Case Presentation Chairperson: 이현국(이화의대), 박준성(연세의대), 이재훈(울산의대)		
16:05 – 16:15	If the common hepatic artery has to be resected during pancreaticoduodenectomy, what will happen next?	이재훈 (울산의대)	34
16:15 – 16:25	Successful endoscopic management of gastrojejunostomy (GJ) perforation after hepatopancreatoduodenectomy (HPD)	정혜정 (성균관의대)	35
16:25 – 16:35	How deep can we dissect into intrapancreatic area while laparoscopic choledochal cyst excision?	유동도 (가톨릭의대)	36
16:35 – 16:45	Rare malignant neoplasm of pancreas : carcinosarcoma	이미량 (서울의대)	38
16:45 – 16:55	Discussion		
16:55 – 17:00	Closing Remarks		

제69차 한국췌장외과학회 학술대회



Scientific Session 1

Current Surgical & pathologic Issues in Neoadjuvant treatment for Pancreatic cancer: Opinions from Japan Pancreas Society



장진영(서울의대), 장기택(성균관의대)



한국췌장외과학회
Korean Pancreas Surgery Club



Tsutomu Fujii

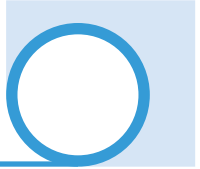
University of Toyama, Japan

학 력 사 항

2010-	Fellow of American College of Surgeons
2003-2006	Graduate School and Faculty of Medicine, Nagoya University Degree: Ph.D. 2006
1993	Graduation from Nagoya University School of Medicine, Nagoya, Japan Degree: M.D. 1993

경 력 사 항

2020.6-	Vice Director, Comprehensive Cancer Center, Toyama University Hospital (concurrent)
2020.2-	Director, Breast Cancer Advanced Treatment and Reconstruction Center, Toyama University Hospital(concurrent)
2019.4-	Deputy director of the Toyama University Hospital (concurrent)
2018.9-	Director, Pancreas and Biliary Center, Toyama University Hospital (concurrent)
2017.4-	Professor and Chairman, Department of Surgery and Science, University of Toyama
2013-	Associate Professor, Department of Gastroenterological Surgery (Surgery II), Nagoya University
2011-	Chief of the Division of Pancreatic Surgery
2008-	Assistant Professor, Department of Surgery II, Nagoya University
2006-2008	Research Fellow, Massachusetts General Hospital Cancer Center and Harvard Medical School, Boston, USA
2003-2006	Graduate School and Faculty of Medicine, Nagoya University Degree: Ph.D. 2006
2000-2003	Staff member, Department of Surgery II, Nagoya University
1994-2000	Staff member, Department of Surgery, Komaki City Hospital
1993-1994	Postgraduate surgical training, Komaki City Hospital



Surgical strategies in multidisciplinary treatment for pancreatic cancer including neoadjuvant treatment

Tsutomu Fujii (University of Toyama, Japan)

The number of annual deaths due to pancreatic cancer is increasing every year, and a cure is achieved in less than 10% of patients. In pancreatic cancer, which is an incurable disease, improved results have begun to be reported due to the advancement of multidisciplinary treatment, including state-of-the-art chemotherapy regimens and improvements in perioperative procedures and management.

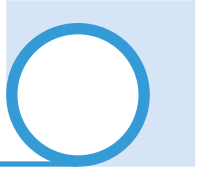
In resectable pancreatic cancer, neoadjuvant treatment and upfront surgery were compared in the Prep-02/JSAP-05 trial, a multicenter, randomized, controlled phase 3 trial in Japan. This trial showed that patients who underwent neoadjuvant chemotherapy using gemcitabine and S-1 had significantly longer overall survival (OS) than patients who underwent upfront surgery (median OS, 36.7 months vs. 26.6 months, respectively) (Unno M, et al., ASCO-GI 2019). Neoadjuvant treatment is the new standard even for patients with resectable pancreatic cancer.

In borderline resectable (BR) pancreatic cancer, neoadjuvant treatment followed by surgery is typically performed because the prognosis is poor in patients who undergo upfront surgery. In a Korean phase II/III study of neoadjuvant chemoradiation with gemcitabine in patients with BR pancreatic cancer, the prognosis in the upfront surgery group was significantly poor, and the study was stopped early (Jang JY, et al. Ann Surg 2018). The type of regimen, duration of treatment, and timing of surgery require further study.

In the treatment of unresectable (UR) pancreatic cancer, the most innovative recent change is the introduction of FOLFIRINOX and nab-paclitaxel as an effective protocol. By multidisciplinary treatment using them, there are increasing cases in which resection is possible in pancreatic cancer which was unresectable at the time of initial diagnosis. This additional surgical resection is called “Adjuvant surgery” or “Conversion Surgery”, implying strategy-conversion. There is still no clear evidence on the validity and usefulness of this option; however, good prognosis has been reported in

locally advanced UR (UR-LA) pancreatic cancer patients little by little. However, a multidisciplinary treatment including regimen, duration of treatment, and timing of surgery require further study as well in UR-LA pancreatic cancer. In addition, surgery for UR-LA pancreatic cancer requires advanced techniques such as portal vein and arterial resection. In conversion surgery for metastatic (UR-M) pancreatic cancer, a thorough verification will be required in the future.

I will review previous reports, especially about conversion surgery for initially unresectable locally advanced pancreatic cancer following multidisciplinary treatment, and state the experience including combined radiotherapy and surgical results in our institution.



Yuichi Nagakawa

Department of Gastrointestinal and Pediatric Surgery,
Tokyo Medical University, Japan



학 력 사 항

1994	School of Medicine, Tokyo Medical University, Tokyo, Japan
2002	Doctor of Medical Science, Tokyo Medical University, Tokyo, Japan



경 력 사 항

1994–	Tokyo Medical University Hospital, Surgery, Resident
1996–	Tokyo Medical University Hachioji Medical Center, Surgery, Clinical fellow
1998–	Tokyo Medical University Hospital, Surgery, Clinical fellow
2002–	Johns Hopkins University, Surgery, Research Fellow
2004–	Toda central Hospital, Surgery
2006–	Tokyo Medical University Hospital, Surgery, Assistant Professor
2017–	Tokyo Medical University Hospital, Surgery, Associate Professor
2021–	Tokyo Medical University Hospital, Surgery, Professor



특 이 사 항

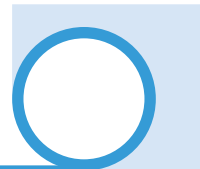
2004	Society for Surgery of the Alimentary Tract Residents and fellows research Award
2008	Japanese College of Surgeons Award
2016	Japanese Society for Endoscopic Surgery Karl Storz Award
2019	Japanese Society of Hepato–Biliary–Pancreatic Surgery Award
2021	Japanese Society of Hepato–Biliary–Pancreatic Surgery Award



Is minimally invasive surgery could be applied to pancreatic cancer after NAT? Limitation and pitfall

Yuichi Nagakawa (Tokyo Medical University, Japan)

Patients with resectable and borderline resectable pancreatic cancer considered to already have microdistant metastasis, because most of the recurrence patterns postoperatively are distant metastases. Multimodal treatment dramatically improves prognosis; thus, pre- and post-operative chemotherapy is essential for long term survival. Therefore, surgery considering multimodal treatment is needed. Recently, minimally invasive surgery has become more common for various digestive disease. Minimally invasive pancreatic resection (MIPR) for pancreatic cancer, including pancreaticoduodenectomy and distal pancreatectomy, is now a treatment option for pancreatic cancer. However, the indications of MIPR after neoadjuvant chemotherapy (NAT) for resectable and borderline resectable pancreatic cancer remains unclear. Considering indication of the MIPD, there seem to be two issues; 1) What is the appropriate dissection range for resectable and borderline resectable pancreatic cancer after NAT? 2) What are the surgical skills of MIS required to safely dissect the range? MIPR expert discussion may be needed because of the lack of evidence for these issues.



Yoko Matsuda

Oncology Pathology, Department of Pathology and Host-Defense,
Faculty of Medicine, Kagawa University, Japan



경력 사항

4/2019-	Professor, Department of Pathology and Host-Defense, Faculty of Medicine, Kagawa University
12/2013-3/2019	Chief pathologist, Department of Pathology, Tokyo Metropolitan Geriatric Hospital and Institute of Gerontology,
10/2015-11/2015	Observer fellow, Massachusetts General Hospital, USA
4/2007-11/2013	Assistant Pathologist, Pathology, Nippon Medical University Hospital, Tokyo, Japan
7/2003-3/2007	Assistant Pathologist, Pathology, Kagawa University Hospital, Kagawa, Japan
4/2002-6/2003	Clinical Staff, Internal Medicine, Maoka Hospital, Kagawa, Japan
4/1998-2002	Clinical Staff, Internal Medicine, Kagawa University, Kagawa, Japan



특이 사항

Age-related pathological changes (telomere, telomerase)
Treatment-related pathological changes of the cancer



Current pathologic grading systems to evaluate chemoradiation responsiveness after NAT in PDAC. It's implication and Limitation

Yoko Matsuda (Kagawa University, Japan)

Recently, neoadjuvant therapy (NAT) has been increasingly used to control local tumor spread and micrometastasis of pancreatic ductal adenocarcinoma (PDAC). Volume reduction by NAT contributes to the increased number of curative resections with fewer complications and provides better clinical outcomes in PDAC patients. NAT has improved the survival rates in patients with both resectable and borderline resectable/locally advanced PDAC. Pathological features of the tumor after NAT are critical for improving prognostic stratification in these cases. For instance, marked fibrosis, perineural invasion, muscular vessel invasion, and tumor stage have been associated with prognosis. In addition, the extent of tumor regression after NAT has been reported as a predictor of clinical outcomes after resection; thus, it is important to establish a pathological grading system to assess the extent of tumor regression that is clinically relevant and practical. Currently, there are multiple tumor regression grading systems available for post-neoadjuvant pancreatic resections, and only few studies have compared the clinical relevance and practicality of these systems. The most commonly used tumor regression grading system worldwide is the College of American Pathologists (CAP) system. Recently, a new system was introduced by The University of Texas M.D. Anderson Cancer Center (MDA). Furthermore, Evans' grading system has been commonly used in Japan, and the Japan Pancreas Society (JPS) has recently introduced other grading systems. The MDA system is similar to the CAP system, but the former is three-tiered system instead of being four-tiered. The CAP and MDA grading systems require estimating the tumor bed (considered to reflect treatment-related fibrosis secondary to tumor cell death) and evaluating the proportion of the residual tumor. Evans' and JPS require estimating the proportion of necrosis. There are conflicting reports regarding the reproducibility and prognostic performance of the tumor regression grading systems. Furthermore, appropriate tissue sampling from surgically resected pancreatic cancer after neoadjuvant therapy has not been elucidated. Further studies are warranted to determine appropriate methods of the pathologic evaluation for PDAC patients after NAT.

제69차 한국췌장외과학회 학술대회



Scientific Session 2

Chylous ascites; What is it and how do we manage?



최인석(건양대의), 허진석(성균관의대)



한국췌장외과학회
Korean Pancreas Surgery Club



이옥주

순천향대학교 부천병원 외과

학 력 사 항

2005.3-2011.2	순천향대학교 의과대학 의학과 학사
2012.3-2016.2	순천향대학교 대학원 외과학 석사

경 력 사 항

2011.3-2012.2	순천향대학교 부천병원 인턴
2012.3-2016.2	순천향대학교 부천병원 외과 전공의
2016.5-2019.2	국군의무사령부 의료민원장교
2019.5-2021.2	삼성서울병원 이식외과 임상강사
2021.3-2022.2	삼성서울병원 간담췌외과 임상강사
2022.3-현재	순천향대학교 부천병원 외과 임상조교수



Anatomy, physiology, definition and current treatment for chylous ascites

이옥주 (순천향의대)

Chyle은 장세포에서 형성된 lymphatic fluid 로, emulsion 형태의 lymph 액과 triglyceride fat (chylomicrons) 으로 구성되어 있다. Chyle 은 장에서 mesentery 의 lymphatic vessel 으로 이동하고 이들이 합쳐져 cisterna chyli 로 유입되며, thoracic duct 를 통하여 정맥 순환계로 배액된다. Cisterna chyli 와 그 major branch 들은 주로 1st 및 2nd 요추 앞에 위치하고 있으며, 이는 pancreas head 및 neck 과 같은 level 에 위치하고 있어 특히 pancreatoduodenectomy 를 시행할 때 손상을 받을 가능성이 커질 수 밖에 없다. 이런 Chylous acites, Chylous leak 은 잘 알려진 췌장 수술 후의 주요 합병증이며, 드물지만 심한 임상양상으로 이어질 수 있는 잠재성을 갖고 있다. 최근 연구에서는 췌장절제술 후 10% 정도의 chylous ascites 발생을 보고하고 있으며, 과거에 비하여 보다 근치적인 수술이 시행되는 추세로 그 발생은 더욱 증가할 것으로 예상된다. Chylous ascite 의 임상양상으로는 수술 후 복강에 chyle이 축적되면서 drain에 탁한 유백색 액체가 나타나고, triglycerides 수치가 상승하는 것이 일반적이다. Chylous leak 의 치료방법으로, 저지방 식이 또는 총 비경구 영양(TPN)에 의한 Long chain-triglycerides 의 제한은 림프 흐름을 감소시켜 결국 Chylous leak 의 부피를 감소시킬 것을 예상해 볼 수 있다. 아울러 medium chain-triglycerides (MCT) 를 저지방 식단에 도입하기도 하는데, 이러한 MCT는 장 림프관을 통해 흡수되지 않으면서 환자의 칼로리 섭취량을 증가시키는 데 도움이 된다. MCT는 장세포를 가로질러 장간막 정맥 순환으로 수송될 수 있고, 이 과정은 장간막 림프관으로의 수송을 필요로 하지 않기 때문이다. 이러한 Chylous leak 은 영양실조 및 면역 저하 상태로 이어질 수 있고 입원 기간을 연장시키며, 상당한 경제적 문제를 야기할 수 있다. 하지만 이러한 복강 내 Chylous leak 의 보고된 발생률은 매우 다양하며, Chylous leak 에 대한 균일하고, 객관적인 정의가 존재하지 않으며 Chylous leak 및 Chylous ascites 에 대한 최적의 치료 전략에 대한 합의는 아직 없는 상황이다. International Study Group of Pancreatic Surgery (ISGPS) 에서는 췌장 수술 후 Chylous leak 에 대한 객관적인 정의, 분류 및 등급 시스템 등을 논의하고 있다. 이러한 노력은 Chylous ascite 와 관련한 합병증의 감소, 더 빠른 회복, 짧은 입원 기간 및 비용 절감을 그 목표로 하고 있다. 그러나 이를 실제 임상에 적용하기까지는 많은 노력이 필요할 수 밖에 없는 것이 현실이다. 이에, 위 내용들과 다양한 임상경험을 바탕으로 이 자리에서 Chylous leak 및 Chylous ascites 의 발생과 치료에 대하여 논의하고자 한다.



구현정

서울아산병원 영상의학과

학 력 사 항

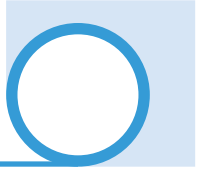
2004-2010	Ewha Womans University
2012-2014	Post-graduate School, College of Medicine, University of Ulsan, Degree of Master of Medical Science
2015-2017	Post-graduate School, College of Medicine, University of Ulsan, Degree of Doctor of Philosophy

경 력 사 항

2010-2011	Internship, Asan Medical Center
2011-2015	Residency, Department of Radiology, Asan Medical Center
2015-2017	Clinical Fellow, Chest and Cardiovascular Section, Dep. of Radiology, Asan Medical Center
2017-2020	Clinical Instructor, Chest and Cardiovascular Section, Dep. of Radiology, Asan Medical Center
2020-Present	Assistant Professor, Chest and Cardiovascular Section, Dep. of Radiology, Asan Medical Center

특 이 사 항

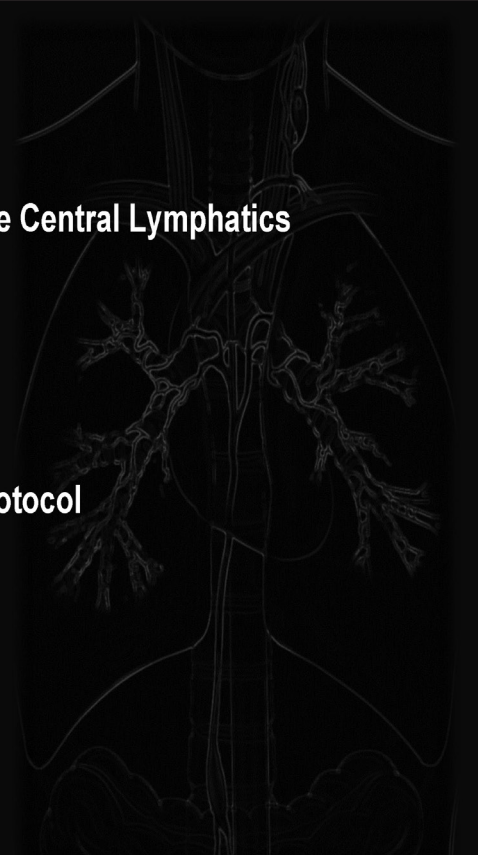
Research field:	Lymphatic disorder, Valvular heart disease, Coronary artery disease, Aorta disease Computed tomography, Cardiac magnetic resonance imaging, Dynamic MR lymphangiography
-----------------	--



Radiologic Diagnosis and Intervention for Postoperative Chylous Ascites

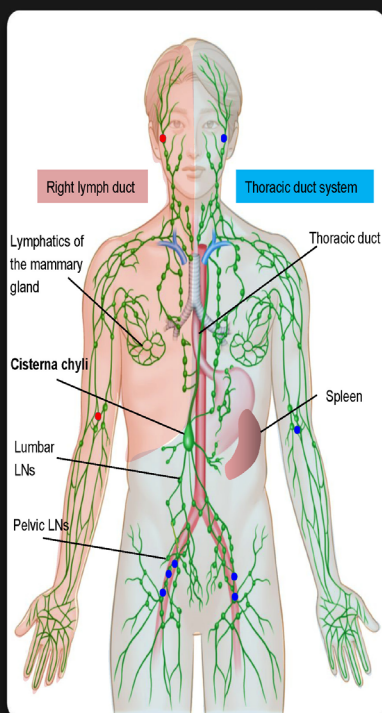
구현정 (울산의대 영상의학과)

Table	
I	Normal Anatomy and Function of the Central Lymphatics
II	Postoperative Chylous Ascites <ul style="list-style-type: none">• Risk factors
III	Dynamic MR Lymphangiography Protocol
IV	Cases



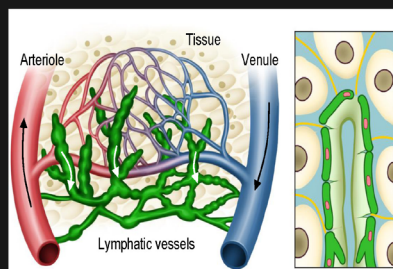
I Normal Anatomy and Function of the Central Lymphatics

I Normal Anatomy of the Lymphatics



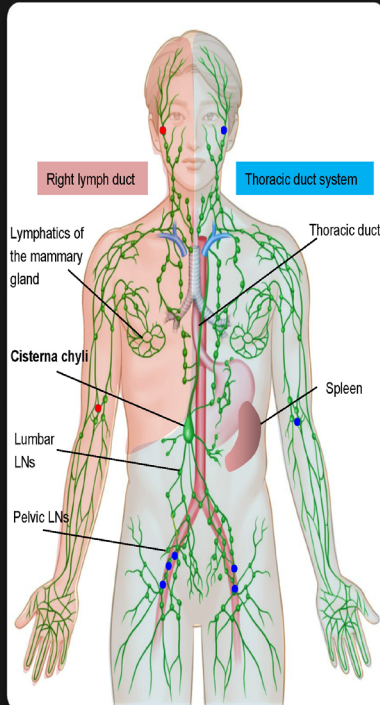
Lymphatic system

- A circulatory system that drains lymphatic fluid from the blood vessels
- A linear network of lymphatics and secondary lymphoid organs (lymph nodes, spleen, Peyer's patches and mucosal tissues- the nasal associated lymphoid tissue, adenoids, and tonsils)
- Return lymph fluid to the bloodstream by the subclavian veins
- **Lymph vessels:** fluid drainage and pump lymph fluid using smooth muscles and skeletal muscle contractions
- Larger lymph vessels: have valves to prevent backflow
- **Lymph node:** an organized lymphoid tissue where the lymph passes, located at intervals along the lymphatics



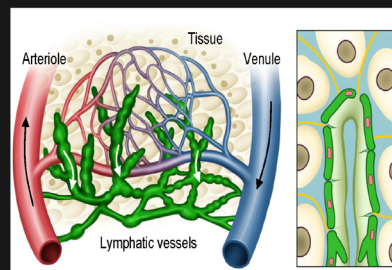
From the interstitial space of tissues, accumulated fluid from capillaries or protein leakage enters lymph vessels.

I Normal Anatomy of the Lymphatics



Lymphatic system

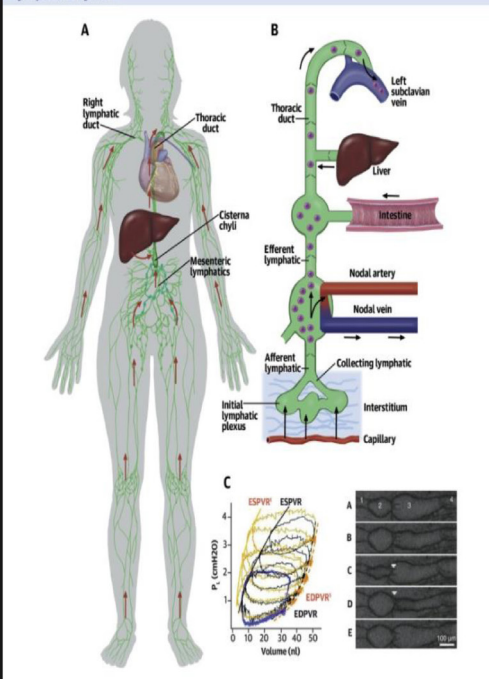
- A circulatory system that drains lymphatic fluid from the blood vessels
- A linear network of lymphatics and secondary lymphoid organs (lymph nodes, spleen, Peyer's patches and mucosal tissues- the nasal associated lymphoid tissue, adenoids, and tonsils)
- Return lymph fluid to the bloodstream by the subclavian veins
- **Lymph vessels:** fluid drainage and pump lymph fluid using smooth muscles and skeletal muscle contractions
- Larger lymph vessels: have valves to prevent backflow
- **Lymph node:** an organized lymphoid tissue where the lymph passes, located at intervals along the lymphatics



From the interstitial space of tissues, accumulated fluid from capillaries or protein leakage enters lymph vessels.

I Normal Anatomy of the Lymphatics

CENTRAL ILLUSTRATION: Macroscopic and Microscopic Organization of the Lymphatic System

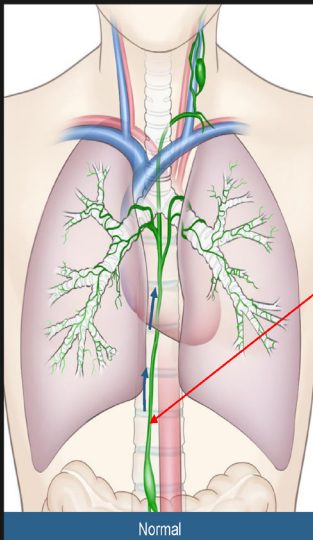


Itkin, M. et al. J Am Coll Cardiol. 2021;78(3):278-90.

Lymph vessels of the lower body and abdominal organs drain into the cisterna chyli, which, in turn, transitions into the thoracic duct that runs through the mediastinum.

I Normal Anatomy of the Lymphatics

Thoracic duct

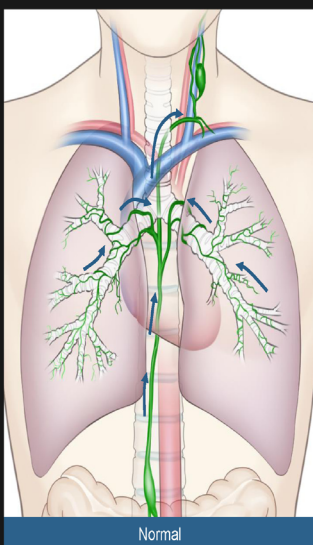


- Enters the posterior mediastinum through the diaphragmatic hiatus
- Starts from the right anterior part of the spine, between the azygos vein and the aorta, behind the esophagus of the thoracic cavity (covered by the right mediastinal pleura)

- Cisterna chyli: defined as a 200 % dilatation of the thoracic duct

I Normal Anatomy of the Lymphatics

Thoracic duct

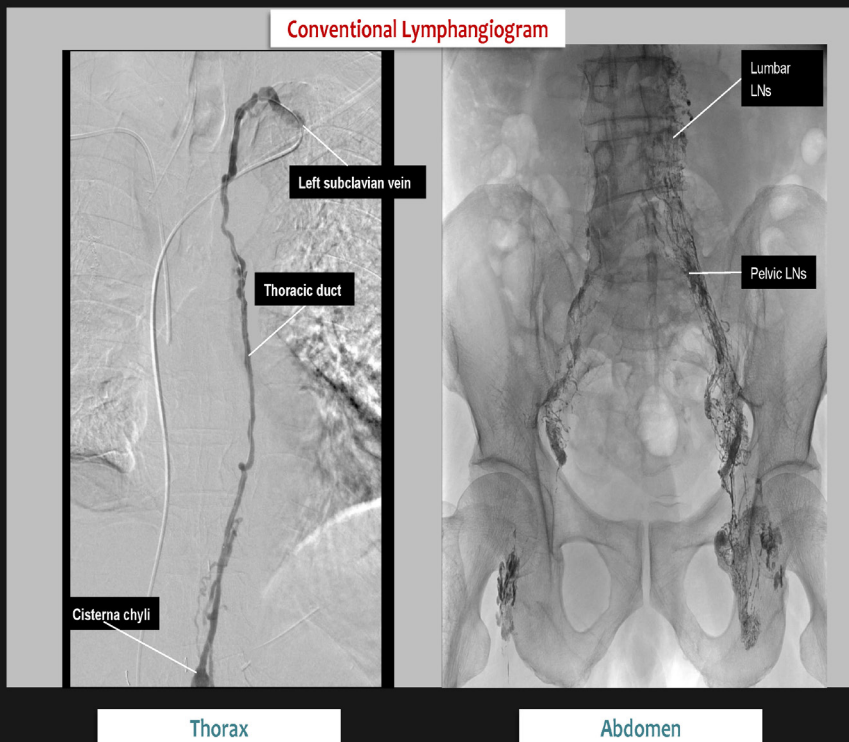


- Gradually passes through the middle line (the level of thoracic vertebra 4–5) from the posterior thoracic aorta and esophagus to the left anterior spine
- Located in the left upper mediastinal segment of the esophagus, posterior to the left subclavian artery, and connected to the left mediastinal pleura
- Finally, from the superior thoracic foramen goes out of the jugular root and enters the left venous angle

- Cisterna chyli: defined as a 200 % dilatation of the thoracic duct

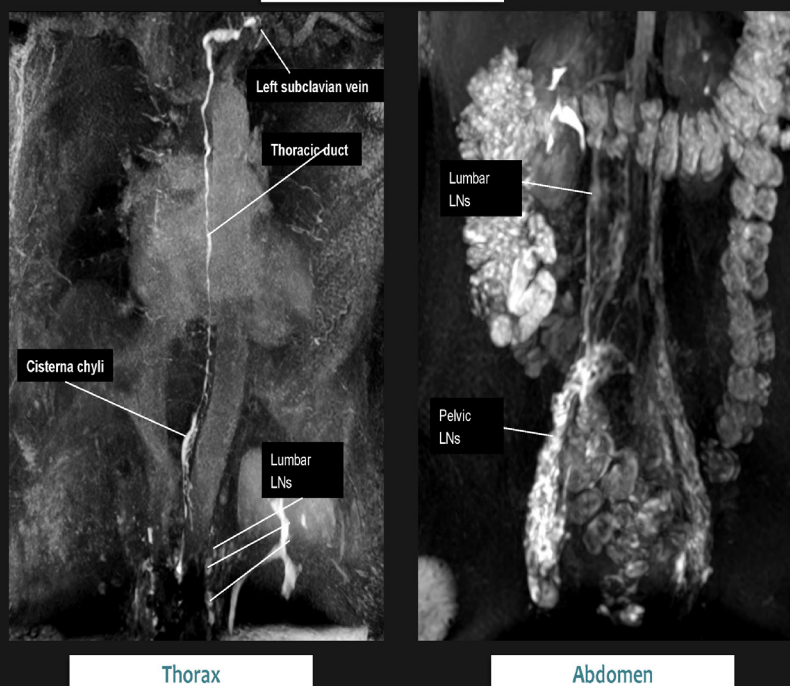
I Normal Anatomy of the Lymphatics

Conventional Lymphangiogram



I Normal Anatomy of the Lymphatics

MR Lymphangiography



I Function of the Lymphatics

	Description of function	When lymphatics impaired
1. Fluid transport	Removal of interstitial fluid from tissue into lymph fluid	Edema accumulates in tissues when inflammation occur
2. Fat and protein transport	Absorbs and transports fatty acids, fats (chylomicrons) and proteins from the digestive system	Edema, ascites, feeding intolerance (infant or child), diarrhea (protein losing enteropathy), malnutrition
3. Immune cell transport	Transports white blood cells (primarily lymphocytes) and dendritic cells to lymph nodes (adaptive immune responses) Immune system encounters pathogens, microbes, and other immune elicitors that are filtered from the lymph fluid	Impaired adaptive immune responses
4. Cancer spread	One of the main ways that tumors can spread to distant parts of the body	

II

Postoperative Chylous Ascites



II Postoperative Chylous Ascites

Incidence of chylous ascites after abdominal surgery

Gynecological pelvic surgery: 0.17% to 2%

Colorectal surgery: 1.0% to 6.6%

Hepatic surgery including liver transplantation: 4.7%

Nephrectomy: 3.8% to 5.1%

Pancreatic surgery: 1.0% to 11%

Am J Surg, 211 (2016), pp. 206-213

Laboratory findings typical for chylous ascites

Amylase-poor, bilirubin-poor, and chylomicron-rich
drainage fluid with a triglyceride concentration greater
than 110 mg/dL or greater than 1.2 mmol/L

May cause significant morbidity including malnutrition, dehydration,
immunosuppression, or septic complications because of superinfection.

Table 2 Incidence of chylous ascites differentiated by type of surgery

	Patients	Patients with chylous ascites	Percentage
Gynecological surgery			
Han et al ⁴	4,119	7	.17
Zhao et al ⁵	997	9	.90
Tulunay et al ⁶	1,514	24	2.00
Urological surgery			
Evans et al ⁸	329	23	7.0
Colorectal surgery			
Nishigori et al ¹³	907	9	1.00
Matsuda et al ¹⁴	135	9	6.50
Baek et al ¹⁵	727	48	6.60
Hepatic surgery			
Yilmaz et al ¹⁶	516	24	4.70
Pancreatic surgery			
van der Gaag et al ¹	609	66	11.0
Kuboki et al ³	2,002	21	1.00
Noji et al ¹⁷	138	11	8.00
Aoki et al ¹⁸	65	5	7.70
Assumpcao et al ¹⁹	3,532	47	1.30
Malik et al ²⁰	105	7	6.70
Madanur et al ²¹	138	3	2.20
Kaas et al ²²	163	12	7.40
Nephrectomy			
Capocasale et al ²⁵	208	8	3.80
Kim et al ²⁶	622	32	5.10
Gastrectomy with D3 lymph node dissection			
Yol et al ²⁷	34	3	8.8
Gastrectomy with D1 or D2 lymph node dissection			
Bo et al ²⁸	302	1	.33
Kunisaki et al ²⁹	152	1	.66
Gastrectomy and pancreaticosplenectomy			
Lo et al ³⁰	127	3	2.40
Hyperthermic intraperitoneal chemotherapy			
Cotte et al ³¹	12	1	8.00

II Postoperative Chylous Ascites

Risk factors of postoperative chylous ascites

Higher age	Increased intraoperative blood loss
Female	Right-sided hemicolectomy
Preoperative ascites	Early enteral feeding (via feeding
Low preoperative albumin	tube or feeding jejunostomy within
Chronic pancreatitis	48 hours postoperatively)
Preoperative chemotherapy	
Retroperitoneal tumor invasion	
Tumors fed by the SMA	
Number of lymph nodes removed	
Manipulation of the paraaortic area	
Concomitant vascular resection	

Am J Surg, 211 (2016), pp. 206-213

Table 3 Summary of risk factors for postoperative chylous ascites with the respective ORs or HRs

	OR/HR	P value
Higher age		
Baek et al ¹⁵	No data	.017
Female sex		
van der Gaag et al ¹	1.78 (OR)	.034
Surgeon		
Baek et al ¹⁵	No data	<.01
Preoperative ascites		
Yilmaz et al ¹⁶	2.8 (HR)	.04
Low preoperative albumin		
Yilmaz et al ¹⁶	No data	.04
Chronic pancreatitis		
van der Gaag et al ¹	2.52 (OR)	.016
Preoperative chemotherapy		
Evans et al ⁸	1.24 (OR)	.027
Retroperitoneal tumor invasion		
Kuboki et al ³	5.19 (OR)	.031
Tumors fed by the superior mesenteric artery		
Nishigori et al ¹³	No data	<.01
Number of lymph nodes removed		
Tulunay et al ⁶	No data	.001
Assumpcao et al ¹⁹	1.07 (OR)	.007
Manipulation of the paraaortic area		
Kuboki et al ³	11.74 (OR)	<.001
Concomitant vascular resection		
Assumpcao et al ¹⁹	8.25 (OR)	.004
Increased intraoperative blood loss		
Evans et al ⁸	1.33 (OR)	<.001
Right-sided hemicolectomy		
Baek et al ¹⁵	No data	.013
Early enteral feeding		
Kuboki et al ³	14.13 (OR)	<.001
Noji et al ¹⁷	No data	.004

HR = hazard ratio; OR = odds ratio.

II Postoperative Chylous Ascites

- In pancreatic cancer surgery, where extensive soft tissue and lymph node clearance is indispensable
- Chyle leak after pancreatic cancer surgery (pancreaticoduodenectomy, total pancreatectomy): incidence up to 11-16%
- In 609 patients with pancreaticoduodenectomy,
 - Postoperative day 6 (median; interquartile range 5 to 8), generally after introduction of a normal (polymeric low-chain-triglyceride) diet
 - Female gender (odds ratio, 1.79; 95% CI, 1.05 to 3.03) and chronic pancreatitis at pathology (odds ratio, 2.52; 95% CI, 1.19 to 5.32) were independently associated with development of isolated chylous ascites
 - Significantly associated with prolonged hospital stay ($p = 0.002$)

J Am Coll Surg, 207 (2008), pp. 751-757
World J Surg, 37 (2013), pp. 2918-2926

II Postoperative Chylous Ascites

Criteria	Grade A	Grade B	Grade C
Clinical conditions	Well	Often well	Ill appearing
Signs of infection	No	No	Yes
Ultrasound/CT (if obtained)	Negative	Negative/positive	Positive
Duration of CA production	< 7 d	7–14 d	> 14 d
Dietary measure	Yes/no*	Yes*	Yes†
Persistent drainage	No	Usually yes	Yes
Surgical intervention	No	No	Yes/no‡
Prolongation of hospital stay§	No	Yes	Yes
Readmission§	No	No	Yes/no

CA, chylous ascites.

Chylous ascites after pancreaticoduodenectomy is 11%, but clinically significant chylous ascites occurs in 4% (grades B and C).

J Am Coll Surg, 207 (2008), pp. 751-757

II Postoperative Chylous Ascites

Extensive lymphadenectomy ($P = 0.002$) and postoperative portal/mesenteric venous thrombosis ($P = 0.009$) were independently linked with a higher incidence of chyle leak after pancreatic surgery.

World J Surg, 37 (2013), pp. 2918-2926

Pre-existing diabetes, resection for malignancy, distal pancreatectomy, duration of surgery 180 min or longer, and concomitant pancreatic fistula or abscess were independent risk factors for chyle leak after pancreatic surgery.

87% of isolated chyle leaks and 70% of coincidental chyle leaks resolved with conservative management within 14 days. Initial and maximum drainage volumes were associated with duration of hospital stay and success of therapy by 14 days.

Br J Surg, 104 (1) (2016), pp. 108-117

II Postoperative Chylous Ascites

A good outcome with conservative treatment

Treatments

Conservative management

- Oral cessation of TPN

- Medium chain triglyceride diet

Peritoneovenous shunt

Radiological intervention

Surgical ligation (direct or indirect)

Table 4 Conservative treatment in chylous ascites

	Patients	Patients cured	Percentage	Duration (days)
MCT diet alone				
Kaas et al ²²	12	9	75.0	6
TPN alone				
Noji et al ¹⁷	11	11	100	5
Malik et al ²⁰	7	6	85.7	7.5 (median)
Evans et al ⁸	21	16	76.1	29 (median)
Kuboki et al ³	9	9	100	19 (median)
TPN or MCT diet (no differentiation)				
van der Gaag et al ¹	66	66	100	3.5 (median)
Zhao et al ⁵	9	9	100	7 (median)
Tulunay et al ⁶	24	17	71.0	28 (median)
Matsuda et al ¹⁴	9	9	100	No data
Baek et al ¹⁵	48	48	100	7.4 (mean)
Assumpcao et al ¹⁹	47	40	85.1	13 (median)
Madanur et al ²¹	3	3	100	28 (median)
Nishigori et al ¹³	8	8	100	4 (median)
TPN + primary addition of octreotide				
Kuboki et al ³	11	11	100	12 (median)
TPN or MCT diet + primary addition of octreotide				
Capocasale et al ²⁵	8	8	100	12.3 (mean)

MCT = medium chain triglyceride; TPN = total parenteral nutrition.

II Postoperative Chylous Ascites

Treatments

Surgical and interventional approaches: for cases that are refractory to conservative treatment

Bipedal lymphangiography with lipiodol: a promising tool with occlusion rates of the chylous leakage reaching up to 70%.

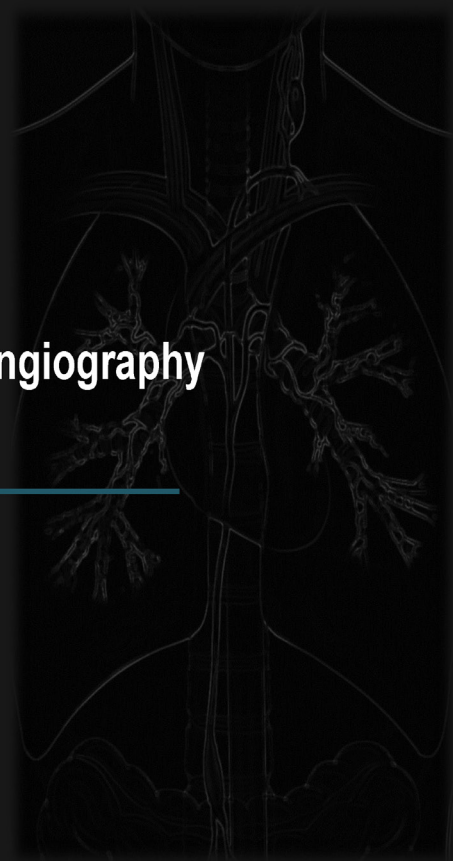
Acta Radiol 2011;52:305-11.

The evidence for treatment of chylous ascites not amenable to conservative treatment or lymphangiography is extremely scarce. In these cases, open surgical ligation of the leaking vessels or the im-plantation of a peritoneovenous shunt are an option, although they carry a higher rate of morbidity.

J Gastrointest Surg 2008;12:1915-23.

III

Dynamic MR Lymphangiography Protocol



III Lymphatic Images

• Traditional techniques

- Method: Intradermal lymphoscintigraphy and surgical cannulation of lymphatic vessels followed by injection of an oil-based contrast material

○ - Limitation: contrast material dilution, venous contamination, prolonged imaging duration, and insufficient anatomic detail due to overlapping structures

→ Do not provide sufficient evaluation of the central lymphatics

• MR imaging with T2 weighted sequence only

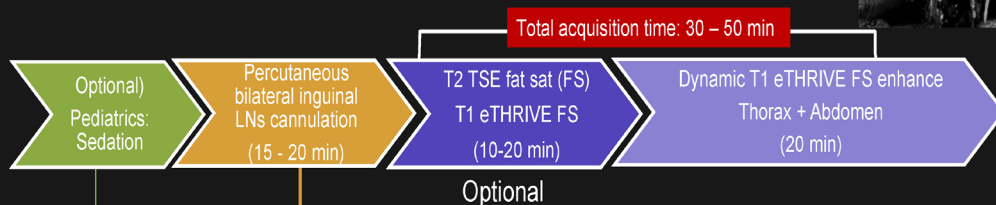
○ - Artifacts related to other fluid filled organs, breathing, peristalsis, cardiac pulsation

→ Not definite information of lymphatic anatomy including the leak site,
but visualize the location of accumulated fluid

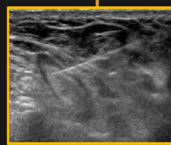
Lack of dynamic information (reflux or collaterals)

III Dynamic MR Lymphangiography Protocol

- 3-T MR machine, body coil
- Scan range: Whole thorax and abdomen
- Noninvasive MR lymphangiography (T2WI, static information), optional
- Dynamic MR lymphangiography with groin intranodal injection
- Post-processing: Maximal intensity projection (MIP)



Under the supervision
of a pediatric
anesthesiologist



Under US guidance

** If the patient has been controlling the diet (low fat) for a long period of time, eating ice cream 2 hours before the MRI (also for conventional lymphangiography) will help increase the lymph fluid.



III Dynamic MR Lymphangiography Protocol



Different enhancement timing

- Adults: contrast media reaches the thorax about 3 min after the injection of the mixture of saline and contrast media (3-4 cc, each side, 1-2 cc/kg)
- Pediatrics: shot simultaneously while injecting the mixture of saline and contrast media (1-2 cc, each side, contrast media amount: 1-2 cc/kg)

If the lymphatic anatomy is not clear, repeat the injection of contrast media

Abdomen

- Evaluation of cisterna chyli for pre-interventional planning
- Dynamic acquisition with breath-hold, if chylous ascites is suspected.



IV

AMC experiences



12 patients with chylous ascites among 62 patients who underwent dynamic MR lymphangiography

	Underlying disease	Prior surgery	Category
1	Liver cirrhosis	None	Non-traumatic
2	RCC	Right nephrectomy	Postoperative
3	Lymphoma	None (chemotherapy)	Non-traumatic
4	Lymphoma (DLBCL)	Laparoscopic lymph node excision biopsy	Postoperative
5	Ovarian cancer	TAH & BSO PLND PALND(paraaortic lymph node dissection) Total omentectomy, appendectomy, low anterior resection	Postoperative
6	Angioinvasive paraganglioma of retroperitoneum	Open excision, retroperitoneal tumor	Postoperative
7	Colon cancer	Laparoscopic right hemicolectomy	Postoperative
8	Pancreas cancer	PPPD	Postoperative
9	Pancreas cancer	PPPD	Postoperative
10	Pancreas cancer	Total pancreatectomy with splenic vein resection	Postoperative
11	LAM	Uterine myomectomy	Postoperative (probably)
12	Liver cirrhosis	None	Non-traumatic

Dynamic MR lymphangiography findings

	Abdominal lymphatics	Cisterna chyli	Thoracic duct	Leak site detection
1	+	+	+	No leak (possible peripheral leak)
2	+	+	+	Abdominal central lymphatics injury
3	Partly + (iliac chain)	-	NA	Fail to visualize probably d/t large lymphoma
4	+	-	NA	Fail to visualize probably d/t large LNs
5	+	-	NA	Fail to visualize, due to prior radiological lymphatic embolization
6	+	-	+	No leak (possible peripheral leak)
7	+	+	+	No leak (possible peripheral leak)
8	+	-	NA	Fail to visualize
9	+	-	NA	Abdominal central lymphatics injury
10	+	+	+	No leak (possible peripheral leak)
11	+	NA	NA	Abdominal (iliac) central lymphatics injury
12	+	+	+	No leak (possible peripheral leak)
Total	11/12	5/12	6/12	

Treatment

	Radiologic Intervention	Surgical Intervention	Resolution (duration of prolonged ascites)	Outcome
1	-	Liver transplantation	Improved	
2	+ (twice)	None	Fail	Expire
3	+	None	Improved	
4	-	None	Improved	
5	+ (3 times)	None	Improved	
6	-	None	Improved	
7	-	None	Improved	
8	-	None	Improved	
9	-	None	Improved	
10	+ (3 times, hepatic)	Ligation of lymphatics	Improved	
11	+	Lymphovenous anastomosis	Partially improved (still PCD +)	
12	-	Planning	NA	
Total	5/12	3/12	NA	

Chylous ascites secondary to liver cirrhosis

Case No. 1

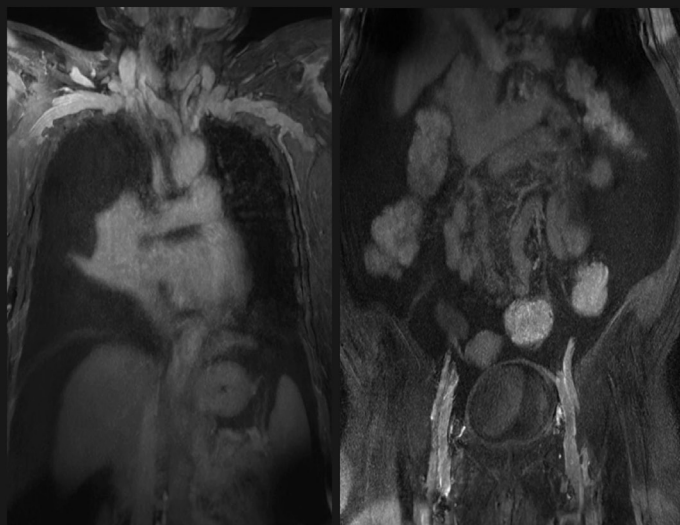
The mechanism for chylothorax secondary to cirrhosis is due to portal hypertension causing rupture of small lymphatics and leakage of whole intestinal lymph into ascitic fluid, which then passes through diaphragmatic recesses.

Romero S et al. CHEST 1998;114(1):154-9.

Marl Nau et al. CHEST 2017;152(4) A512.



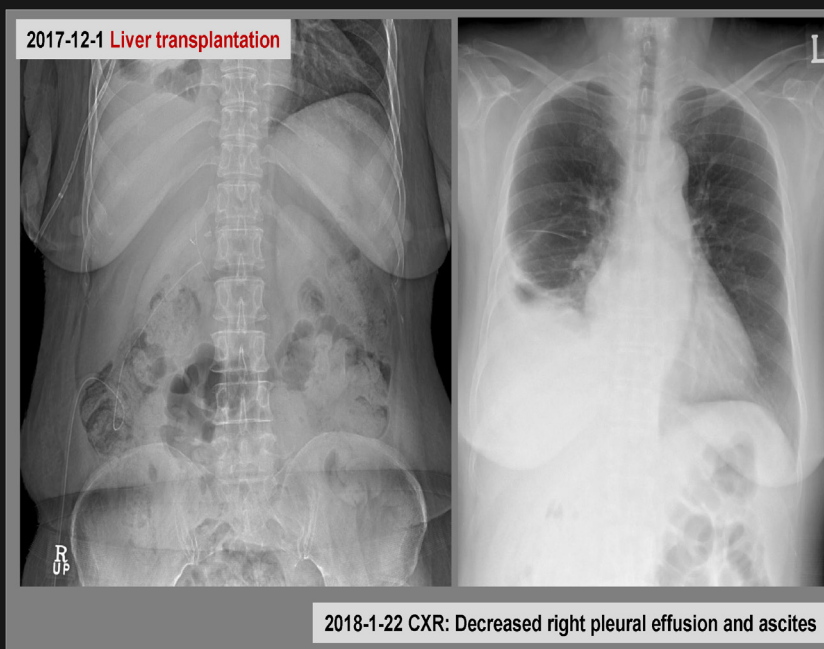
Chylothorax and chylous ascites



No visible rupture or leakage of the large lymphatic structures.

Chylous ascites secondary to liver cirrhosis

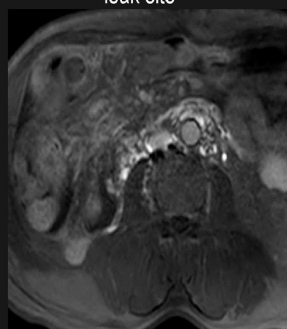
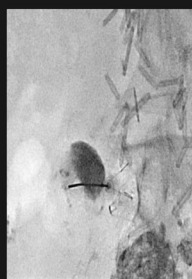
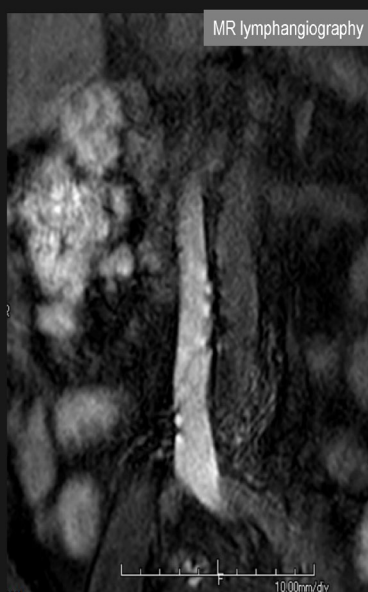
Case No. 1



Iatrogenic Abdominal Lymphatic Injury

Case No. 2

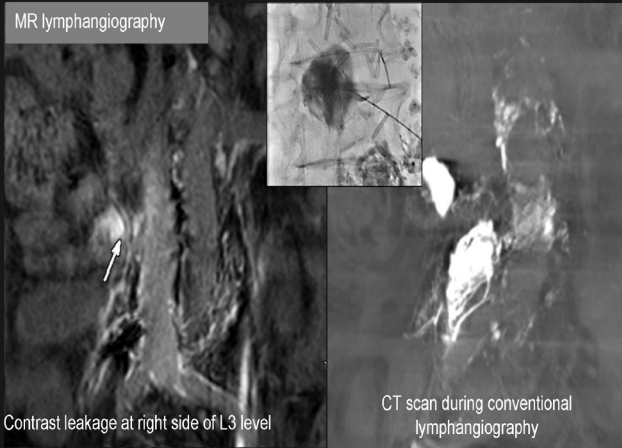
73/M S/P Right nephrectomy (2 years ago)



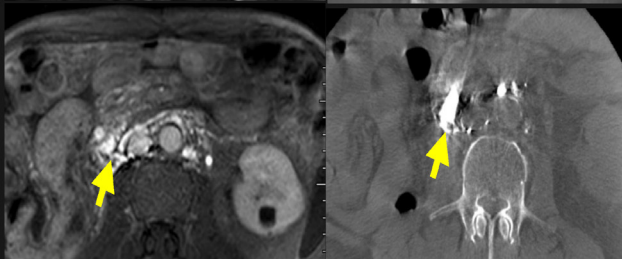
Iatrogenic Abdominal Lymphatic Injury

Case No. 2

MR lymphangiography



CT scan during conventional lymphangiography



Post-procedural abdominal radiograph



Direct puncture of the leakage site and injection of n-butyl-2-cyanoacrylate (NBCA)

Retroperitoneal lymphoma presenting chylous ascites

Case No. 4

47/F DLBCL, chemotherapy (no prior surgery)



2020-3-14, DLBCL
Persistent chylous ascites for 3 months

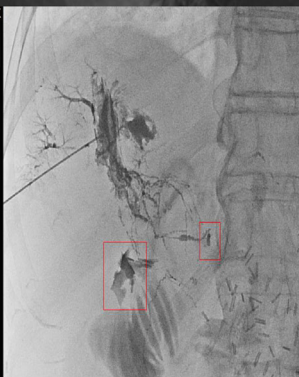
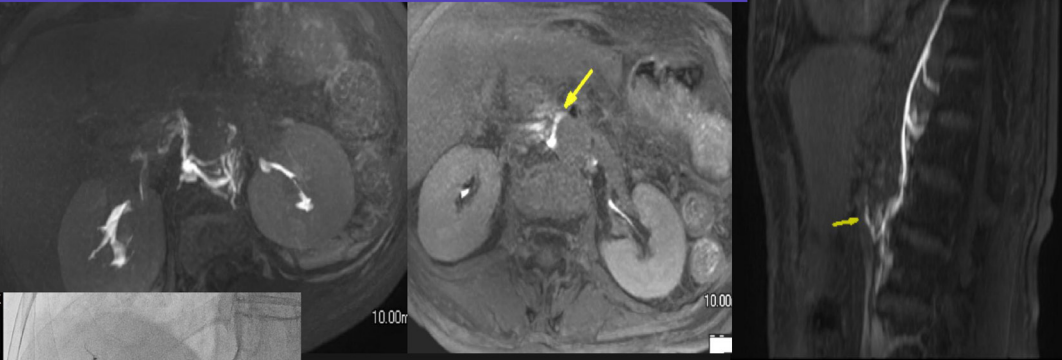


2020-9-3, Resolution

Chylous ascites after pancreas surgery

Case No. 10

67/F S/P Pancreas, small intestine, (duodenum, jejunum), common bile duct, completion total pancreatectomy with splenic vein resection: RESIDUAL MUCINOUS (COLLOID) CARCINOMA

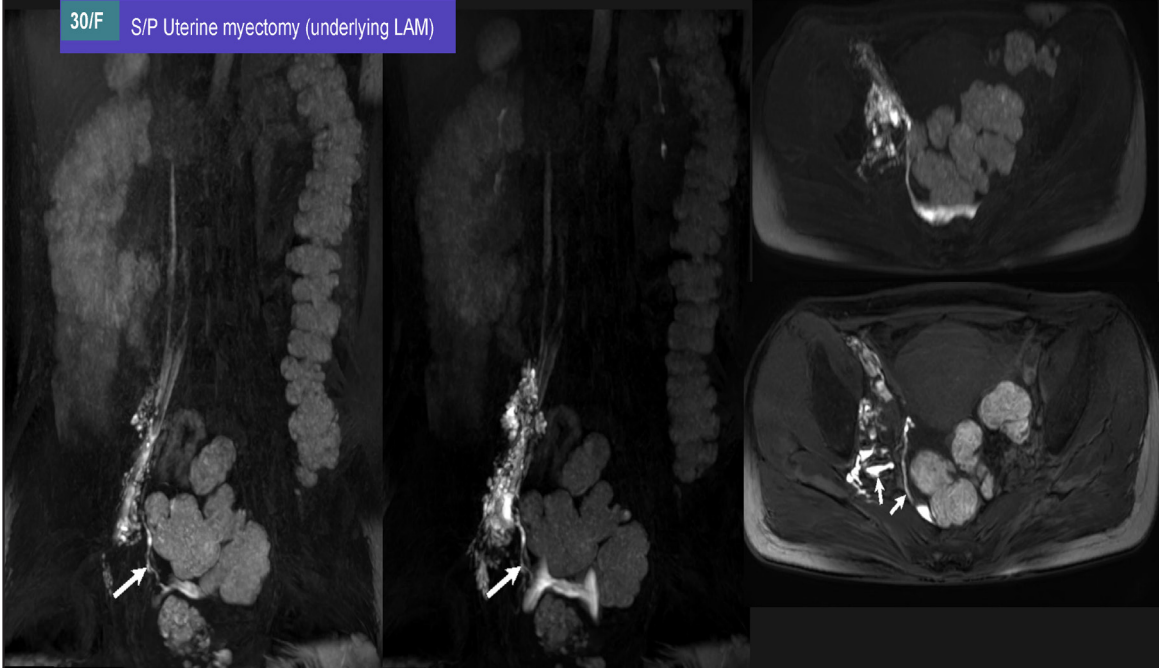


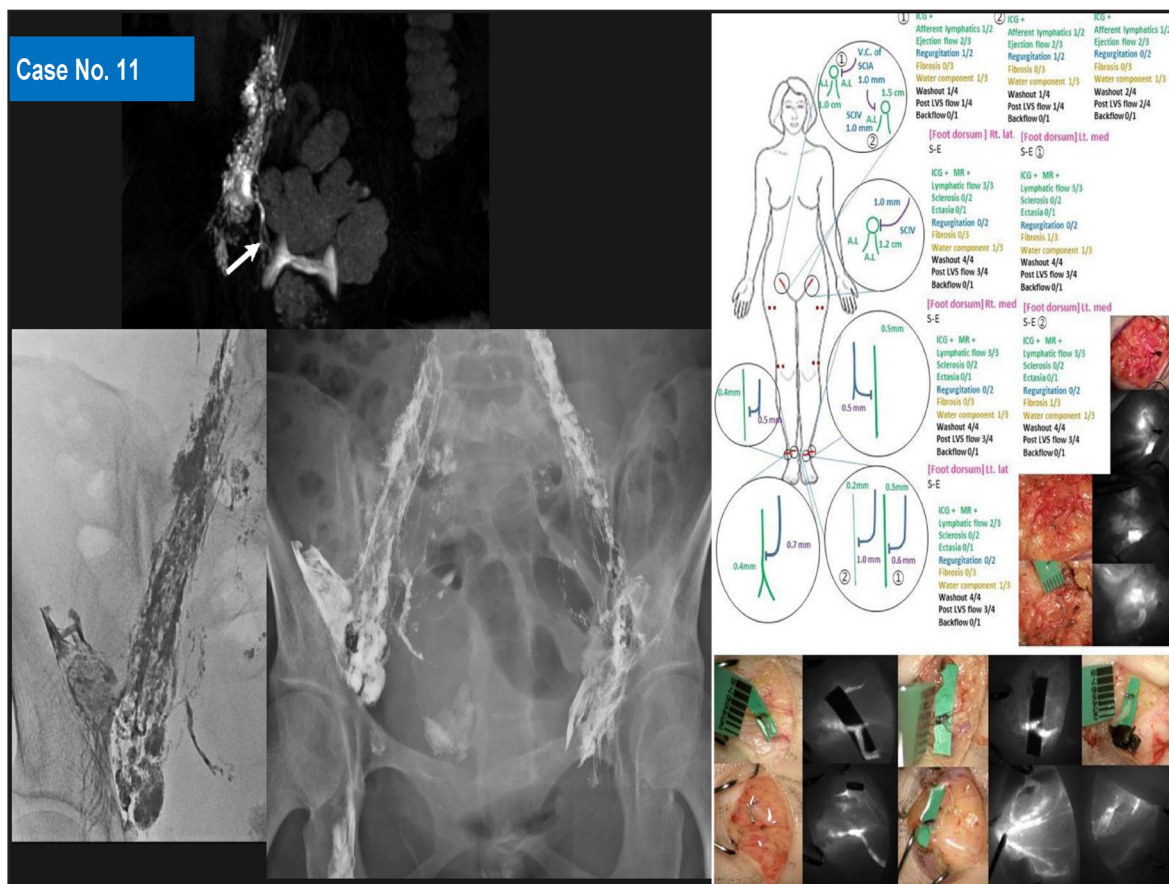
* 50cc milk with melted butter ingestion 3hrs before operation
peritoneal mass just below midline incision -> Frozen Bx: fat necrosis, no tumor
ascites (+): chyle, 800cc
adhesion (+): liver, colon, A-loop, stomach, retroperitoneum
-> visible chyle leakage: stomach lesser curvature 뒤로 Lt. liver 아래에 retroperitoneum으로 판단되는 조직에서 chyle이 새어나옴. -> severe adhesion으로 leakage가 있는 lymphatic vessel을 박리하기 어려워 blind로 수회에 걸쳐 prolene suture ligation을 시행함.
-> 해당부위에서 chyle leak 없고 기타 복강내 다른 곳에서도 추가적인 chyle leak 없는 것 확인함.

Chylous ascites after gynecological surgery

Case No. 11

30/F S/P Uterine myectomy (underlying LAM)

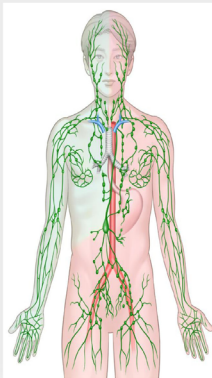




Summary

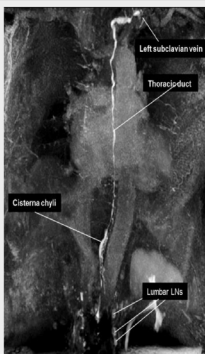
Anatomy and Function of Lymphatics

- Right lymphatic duct + Thoracic duct system
- Fluid transport
- Fat and protein transport
- Immune cell transport
- (Cancer spread route)



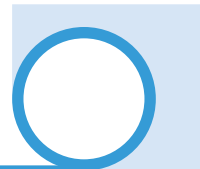
Dynamic MR Lymphangiography

- Sedation (pediatrics)
- Local anesthesia
- Groin intranodal selection
- T2 WI
- Dynamic enhancement
- Cover thorax and abdomen



Risk Factors of Chylous Ascites after Abdominal Surgery

- Higher age
- Female
- Preoperative ascites
- Low preoperative albumin
- Chronic pancreatitis
- Preoperative chemotherapy
- Retroperitoneal tumor invasion
- Tumors fed by the SMA
- Number of lymph nodes removed
- Manipulation of the paraaortic area
- Concomitant vascular resection
- Increased intraoperative blood loss
- Right-sided hemicolectomy
- Early enteral feeding



홍사랑

서울아산병원 간담도췌외과



학 력 사 항

2009.03.~2013.02. 전북대학교 의학전문대학원



경 력 사 항

2013.03.~2014.02. 가톨릭중앙의료원 인턴
2014.03.~2018.02. 서울아산병원 외과 전공의
2018.03.~2021.02. 서울아산병원 간담도췌외과 임상강사
2021.03.~ 서울아산병원 간담도췌외과 촉탁임상전임강사



Scientific Session 2

Chylous ascites; What is it and how do we manage?

Surgical treatment for chylous ascites with case

홍사랑 (울산의대)

제69차 한국췌장외과학회 학술대회



Case Presentation



이현국(이화의대), 박준성(연세의대), 이재훈(울산의대)

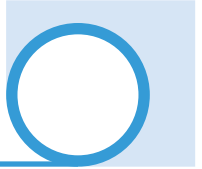


한국췌장외과학회
Korean Pancreas Surgery Club



If the common hepatic artery has to be resected during pancreaticoduodenectomy, what will happen next?

이재훈 (울산의대)



Successful endoscopic management of gastrojejunostomy (GJ) perforation after hepatopancreatoduodenectomy (HPD)

정혜정 (성균관대의대)



Lap. Choledochal cyst excision

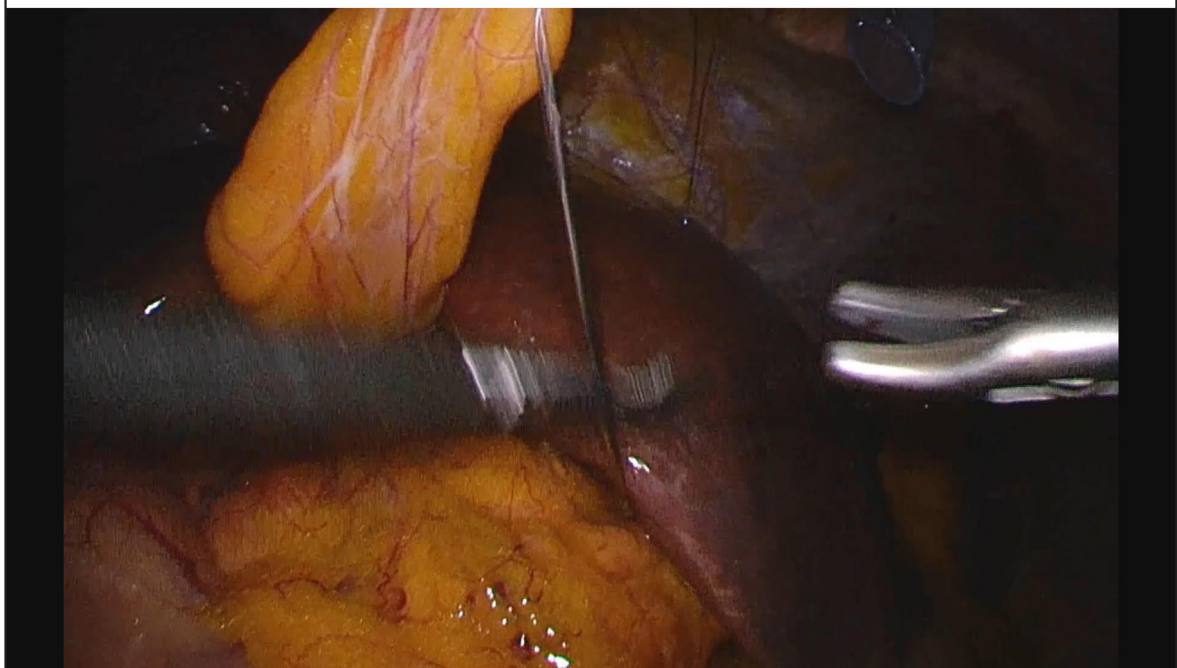
유동도 (가톨릭의대)

Case 1

- **Name:** OI Kim
- **Age/Sex:** 65/F
- **C/C:** abd. discomfort
- **Lab findings**
 - WBC/Hb: 6,500/14.8
 - Pro/Alb: 5.6/3.2 AST/ALT : 22/14
 - TB/DB 0.4/0.1 ALP 66 GGT 16
 - PT/aPTT: 98%(1.06 INR)/35.9
 - CA19-9 8.1 U/mL CEA 6.61



동영상





Rare malignant neoplasm of pancreas: carcinosarcoma

이미랑 (서울의대)

Case presentation

Female, 65 years old

- **Chief complaints**

- Abdominal pain, Weight loss

- **Present Illness**

- 수개월 전부터 시작된 복통, 체중감소로 타원에서 시행한 CT상 pancreas mass 발견되어 further evaluation을 위하여 내원함.

- **Past medical history**

- Leiomyomas
s/p TAH c BS '04.12.07
- GB polyp
s/p LC '17.08.30

- **Social history**

- Alcohol/ Smoking (-/-)

- **Review of system**

- General weakness/weight loss (-/-)
- Abdominal pain (-)

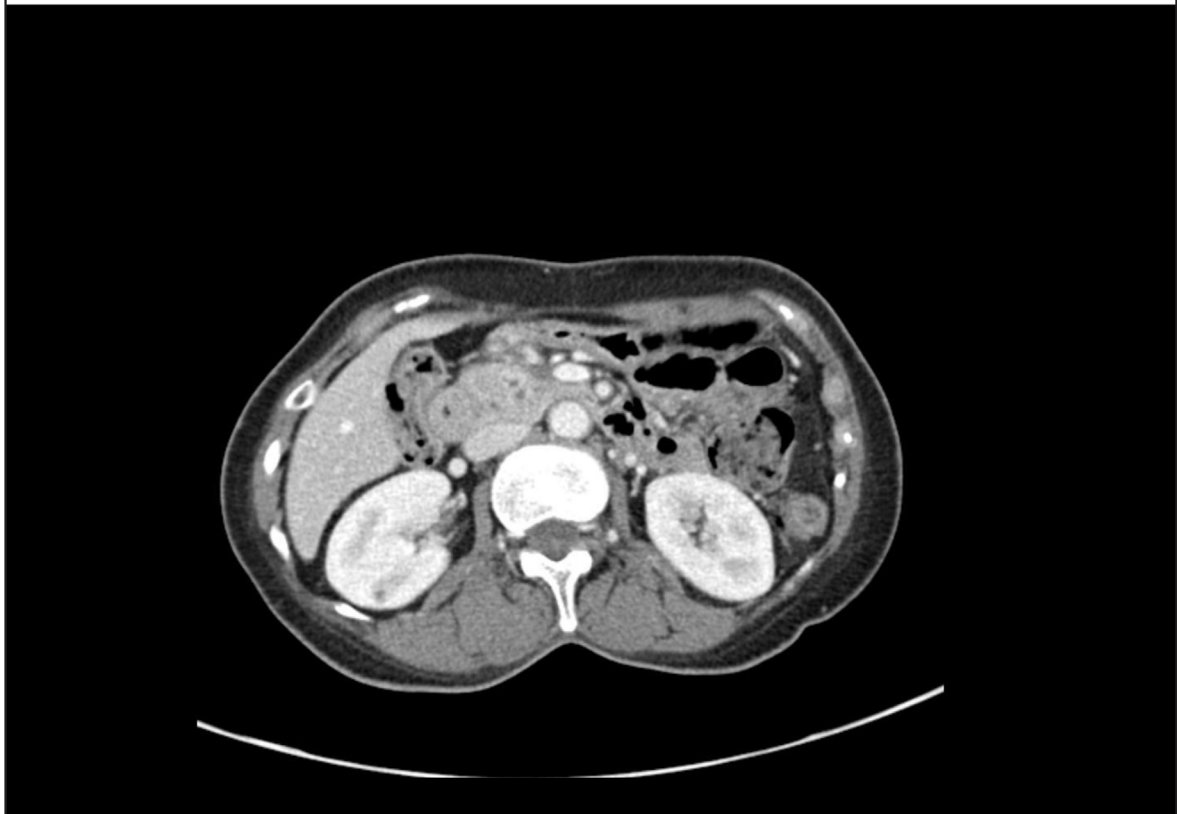
- **Physical examination**

- Abdomen soft, flat
tenderness (-)

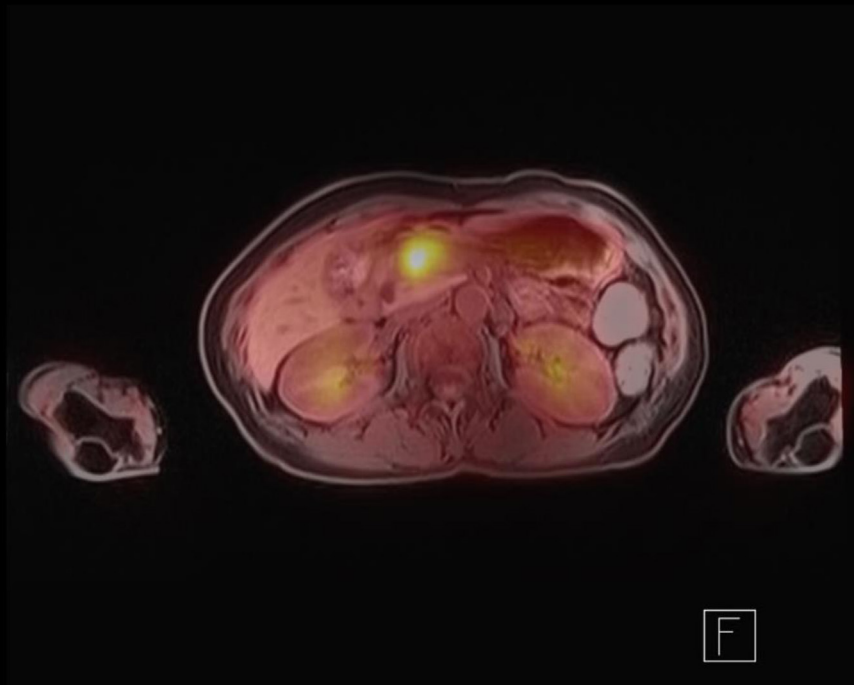
- **Lab findings**

- **LFT** : unremarkable
- **Tumor markers**
 - CEA: 75.7 ng/mL
 - CA 19-9 : 238 ng/mL

2021.03.22 CT

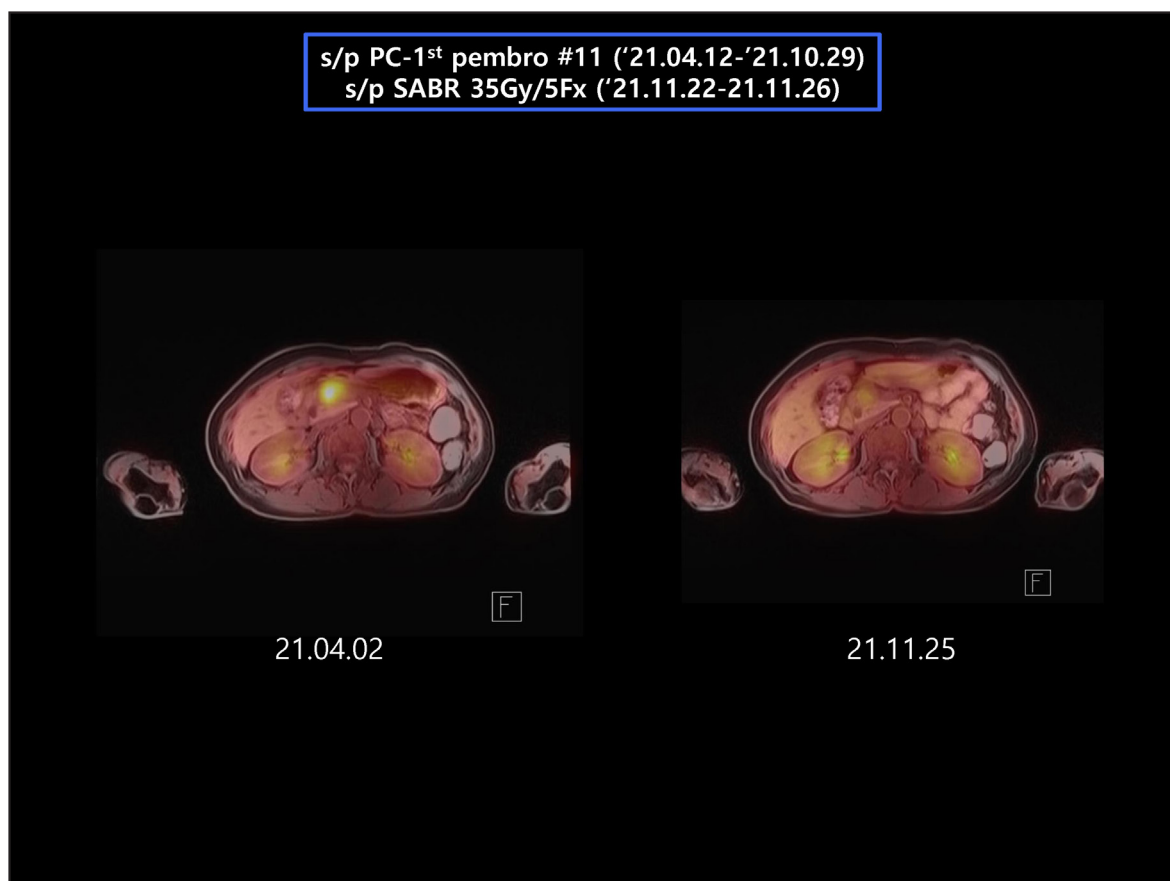
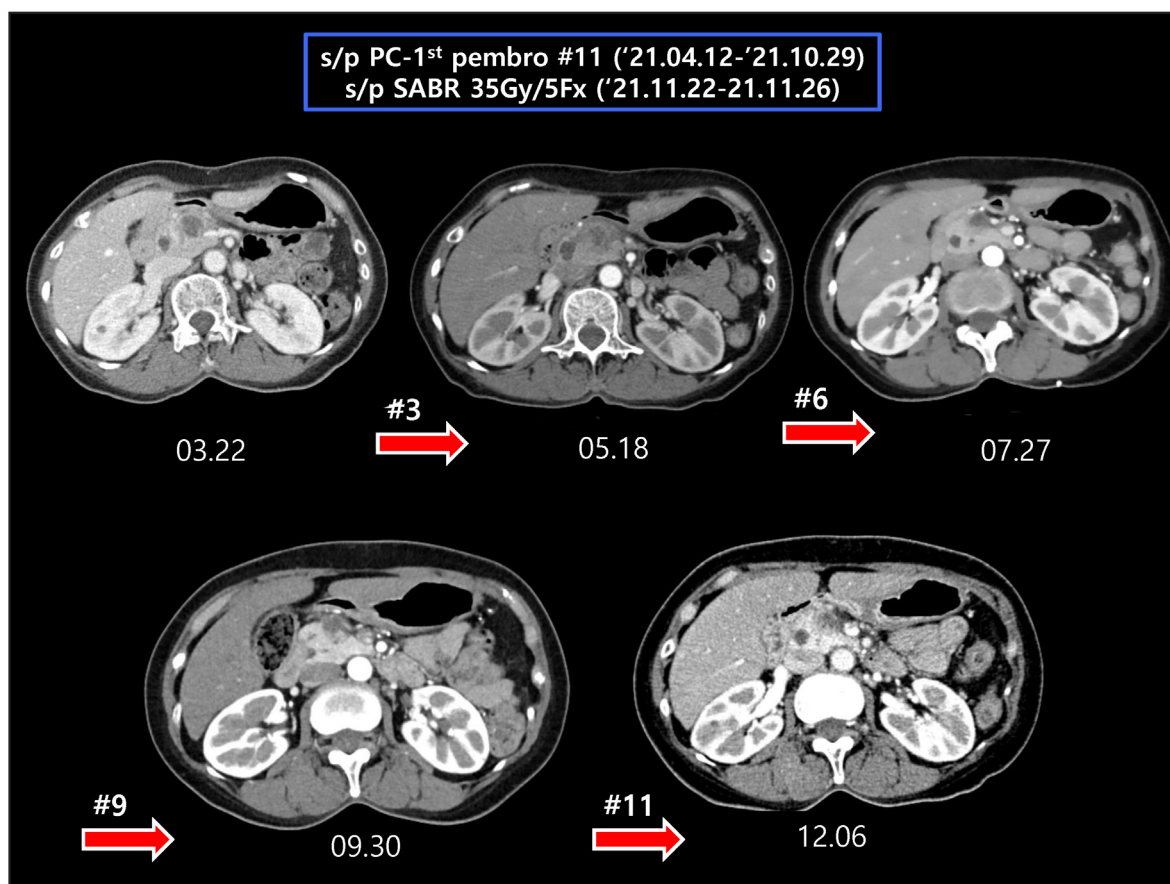


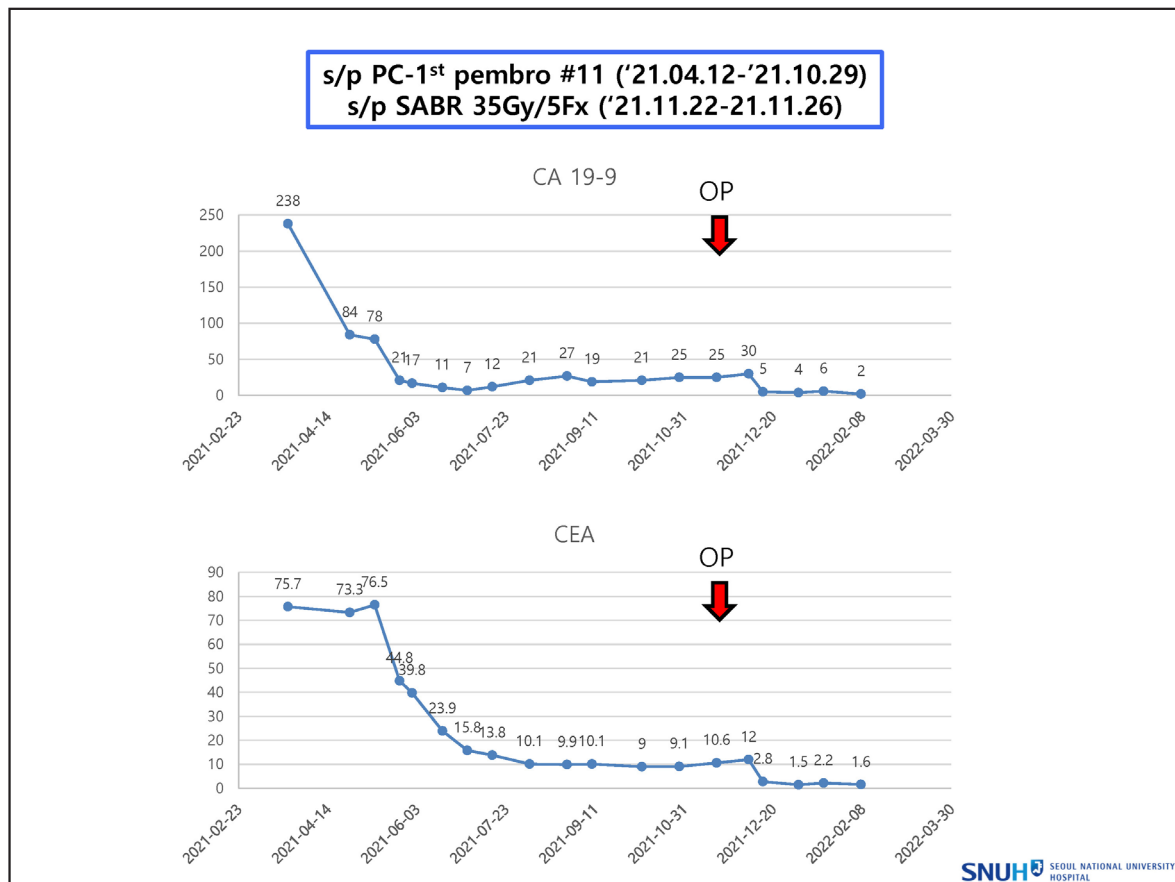
2021.04.02 FDG PET



2021.04.07 EUS biopsy



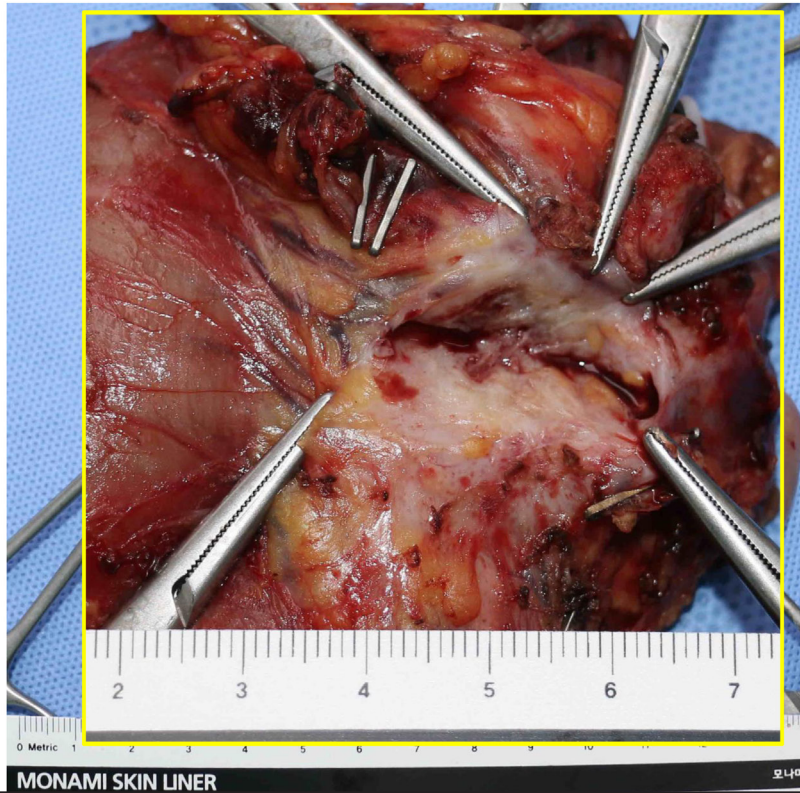




Operation (2021-12-07)

- **Robotic pylorus resecting pancreaticoduodenectomy**
- **Op findings**
 - Adhesion around umbilicus d/t previous op
 - SMV와 abutment되어있었으나 박리됨
 - Other organ invasion은 관찰되지 않음.
- **Total OP time : 255 min**
- **EBL : 250 cc**

Operation (2021-12-07)



Pathologic report

- DIAGNOSIS:
 - ✓ **CARCINOSARCOMA**
 - ✓ Tumor regression grade: CAP grade 3, poor or no response
 - ✓ Gross type: infiltrative
 - ✓ Size of tumor: 1.7x1.5x0.9 cm
 - ✓ Depth of invasion: limited to pancreas
 - ✓ Pathologic staging of primary tumor (AJCC 8th ed.): **ypT1cN0** (0/18)
 - ✓ Surgical margin: free from tumor
 - ✓ Lymphatic invasion(-) Venous invasion(-) Perineural invasion(+)
 - ✓ Associated findings : ductal adenocarcinoma, moderately differentiated with focal squamous differentiation (80%) and spindle cell sarcoma (20%)
 - ✓ Cytokeratin (Pan CK) : Positive in carcinomatous component; negative in sarcomatous component
 - ✓ P63 : Focal positive in carcinomatous component

Postop Course

- **POD #4)** Abdomen CT
 - ✓ No postop. unusual findings.
 - Drain removal
- **POD #7)** Discharge
- Adjuvant FOLFIRINOX+Pembro since '22.01.19

SNUH  SEOUL NATIONAL UNIVERSITY HOSPITAL

- Review -

Pancreatic carcinosarcoma



SNUH  서울대학교병원
SEOUL NATIONAL UNIVERSITY HOSPITAL

Overview

- WHO classification

Malignant epithelial tumors		ICD-O codes
Ductal adenocarcinoma		8500/3
	Colloid carcinoma	8480/3
	Poorly cohesive carcinoma	8490/3
	Signet ring cell carcinoma	8490/3
	Medullary carcinoma	8510/3
	Adenosquamous carcinoma	8560/3
	Epidermoid carcinoma	8576/3
	Large cell carcinoma with rhabdoid phenotype	8014/3
	Carcinoma, undifferentiated, NOS	8020/3
	Undifferentiated carcinoma with osteoclast-like giant cells	8035/3
Acinar cell carcinoma		8550/3
Pancreatoblastoma		8971/3
Solid pseudopapillary neoplasm of the pancreas		8452/3

Carcinosarcoma

- Rare malignancy with poor prognosis
- 1st described in 1951
- Under 40 patients worldwide
- Epithelial + mesenchymal morphology
 - Epithelial component : adenocarcinoma, squamous cell carcinoma, basal cell carcinoma
 - Mesenchymal component : spindle cell sarcoma, rhabdosarcoma, osteosarcoma, chondrosarcoma, undifferentiated sarcoma

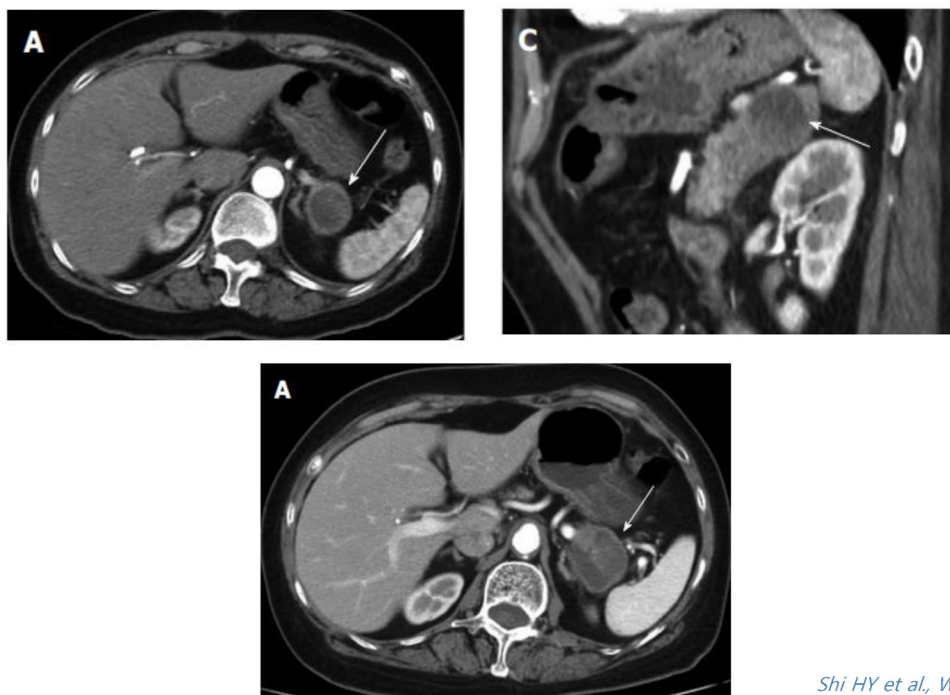
Lalonde et al., Chin Clin Onol 2022

Carcinosarcoma

- Collision theory
- Combination theory
- Transformation theory

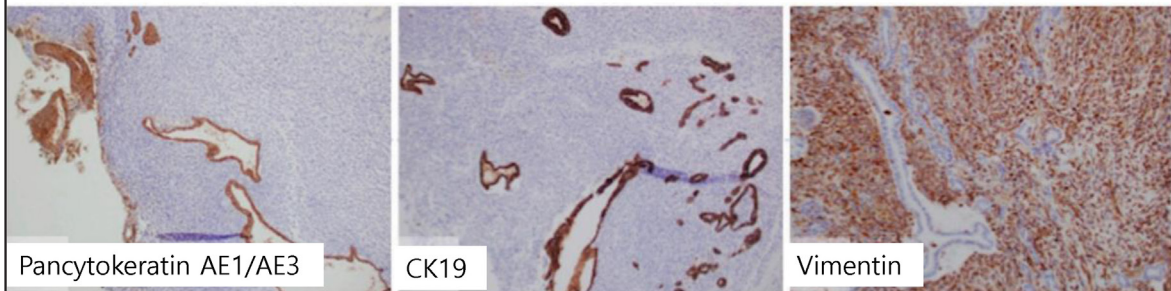
Lalonde et al., Chin Clin Onol 2022

Diagnosis



Shi HY et al, WJG 2015

Diagnosis



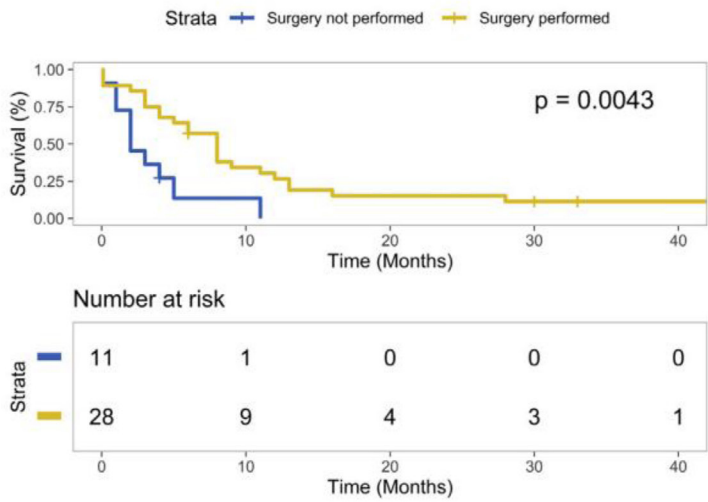
Khan et al., Curr Oncol, 2021

Prognosis

- Surveillance, Epidemiology, and End Results (SEER) database
- From 1973 to 2016
- 39 cases
- Median overall survival : 6 months

Alhatem et al., JSR, 2021

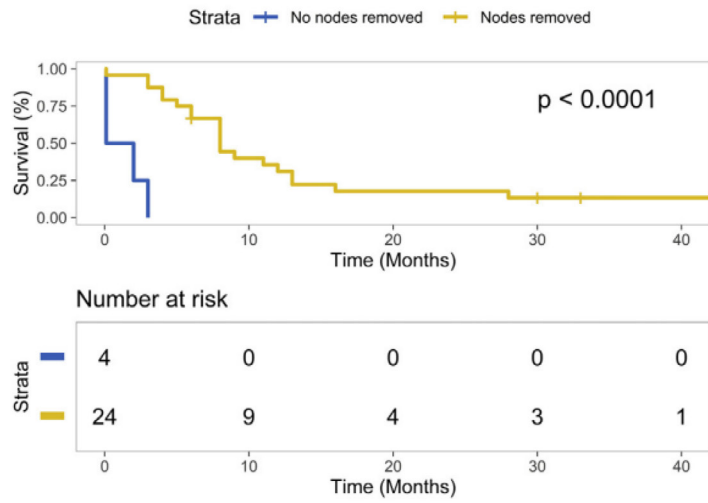
Surgery



	Median
Surgery	8m
No surgery	2m

Alhatem et al., JSR, 2021

Surgery



Lymphadenectomy	Median
Yes	8m
No	1.1m

Alhatem et al., JSR, 2021

Neoadjuvant chemotherapy

Author	Year		neoadjuvant Tx	adjuvant Tx	response	Stage	Survival
Still	2018	LAPC	mFOLFIRINOX	GemAbx#1	PR	ypT3N1(2/28)	10m
Lalonde	2021	BRPC	FOLFIRINOX		PR	ypT2N0 (0/25)	>15m

* Survival after diagnosis

Lalonde et al, Chin Clin Onol 2022
Still et al., Bayl Univ Med Cent, 2018

Neoadjuvant chemotherapy

Author	Year		neoadjuvant Tx	adjuvant Tx	response	Stage	Survival
Still	2018	LAPC	mFOLFIRINOX	GemAbx#1	PR	ypT3N1(2/28)	13m
Lalonde	2021	BRPC	FOLFIRINOX		PR	ypT2N0 (0/25)	>15m
Present	2021	LAPC	FOLFIRINOX +Pembro	FOLFIRINOX +Pembro	PR	ypT1cN0 (0/18)	>12m

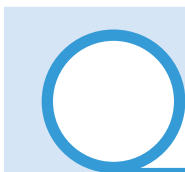
* Survival after diagnosis

Lalonde et al, Chin Clin Onol 2022
Still et al., Bayl Univ Med Cent, 2018

Summary

- Treatment strategy is not established
 - Surgery
 - Lymphadenectomy
 - Neoadjuvant chemotherapy
- Survival outcome ↑
- ➔ Modern treatment approaches for PDAC could be applied





제69차 한국체장외과학회 학술대회

발행일 • 2022년 3월 12일

발행인 • 이현국, 황대욱

발행처 • 한국체장외과학회
(06135) 서울시 강서구 공항대로 260
이대서울병원 A관 8층
Homepage : <http://www.kpsc2004.or.kr/>
E-mail : kpsc2004@gmail.com



체장외분비기능장애 치료에는 크레온 캡슐 Minimicrosphere™

- ✓ 위산에 대한 저항성¹
- ✓ 소장에서 빠른 효소 방출 기대¹
- ✓ 넓은 표면적¹
- ✓ 지름 1.25 mm 미만인 입자의 비율 >90%^{a,2}
- ✓ 음식물과의 적절한 혼합^{3,4}

0R2216026-2

HARMONIC[®] HD 1000i Behind the “WOW”



Unmatched precision

with a unique jaw shape that reduces the need to use a separate dedicated dissecting instrument

Unparalleled strength

with a blade design that delivers more secure seals, even in the most challenging conditions

Optimal efficiency

from increased sealing speed, multi-functionality, and simplified steps for use

*Design Validation Study with surgeons (n=33) operating in simulated procedures in an animate porcine laboratory model. #051950-160425

†In a design validation study with surgeons (n=33) operating in simulated procedures in an animate porcine laboratory model (26/33) #053344-160516

†In a pre-clinical study, for both iliac dissection and lymph node dissection, the HD 1000i was significantly superior to the predicate devices in dissecting capability (p<0.001 in all cases). #051950-160425

*In a pre-clinical study, 100% (56/56) of porcine blood vessels remained hemostatic over a 30-day survival period. #049339-160315

†In a benchtop study with 5-7 mm porcine carotid arteries that compared median burst pressure, HARMONIC[®] HD 1000i (1878 mmHg) vs. competitor product A (1224 mmHg) (p<0.0001). #049305-160315

†In a benchtop study with 5-7 mm porcine carotid arteries that compared median burst pressure, HARMONIC[®] HD 1000i (1878 mmHg) vs. competitor product B (1171 mmHg) (p<0.0001). #049315-160315

*In a porcine study comparing sealing times of HARMONIC ACE[®]*7 and HARMONIC[®] HD 1000i, HARMONIC[®] HD 1000i Shears transected vessels faster than HARMONIC ACE[®]*7 (mean vessel transection time of 9.186 vs 15.291). #051753-160420

†In a design validation study with surgeons (n=33) operating in simulated procedures in an animate porcine laboratory model (26/33) #053344-160515

†Design Validation Study with surgeons (n=33) operating in simulated procedures in an animate porcine laboratory model (33/33) #053346-160515

§Seal reliability at 240 mmHg of 98.2% vs. 98.4% for HARMONIC ACE[®]*7 MIN button. Speed based on average time to transect 150 mm of porcine jejunum (p=0.0000). #050508-160401

||Device measurements based on a metrology study (median cut length of 18.87 mm vs. 14.56 mm). #050283-160329

#Based on average device tip grasping force (distal 5 mm of the jaw). #050295-160329

COPY-18008-EN