HBP 1 **Session for the operators to start laparoscopic HBP surgery (about initial settings and case selection tip)**

Feb 17 (Fri), 09:00-10:30

How to start laparoscopic major liver surgery

Albert Chan, *The University of Hong Kong, Hong Kong*

Laparoscopic liver resection is becoming more frequently performed for primary or secondary liver tumors owing to the advancement of laparoscopy, instrumentations and maturation of laparoscopic surgical skills. As such, it is increasingly widely accepted by most centers as the standard approach for minor resections. The next phase of development in laparoscopic liver surgery is the generalization of technique to major liver resection. Knowledge on port positions and placements, haemostasis and parenchymal transection techniques are core elements for undertaking of a successful laparoscopic major liver resection.

To become fully trained for laparoscopic major liver resections, one should have sufficient prior experience in performing open major hepatectomy in order to gain adequate anatomical knowledge on the caudal-cranial relationship between the liver and the inferior vena cava. Moreover, a visual understanding on the course of middle hepatic vein and its main V5 and V8 branches (as in the case of laparoscopic right hepatectomy) based on preoperative scans would help to reduce the chance of their inadvertent injury during parenchymal transection. The skills for laparoscopic major liver resection is more likely to become widely disseminated if the surgical steps in open hepatectomy could be readily reproduced in the laparoscopic settings. Hilar dissection for clear exposure and isolation of the ipsilateral hepatic artery and portal vein is therefore the preferred approach for control of inflow vessels. A reverse lithotomy position, pneumoperitoneum pressure kept at 14mmHg and fluid restriction all contribute to maintain a low venous pressure that would in turn facilitate parenchymal transection. Laparoscopic Cavitron ultrasonic surgical aspirator is the recommended choice of device for transection as it allows fine tissue transection with clear exposure, and then division of intraparenchymal branches of hepatic veins and bile ducts. Intraparenchymal encirclement and division of the ipsilateral bile duct would certainly help to widen the space between the two transection surfaces, and therefore facilitate further parenchymal transection. Finally, full isolation and encirclement of the ipsilateral major hepatic vein is mandatory for secure purchasing by vascular stapler before its division. As depth perception is of vital importance for a safe liver parenchymal transection, the use of 3-dimensional laparoscopy may enhance the surgeons' performance as well as the dissemination of laparoscopic skills for major liver resection.

Feb 17 (Fri), 09:00-10:30

Safe and reliable approach and appropriate operative indication during the initial attempts for laparoscopic pancreaticoduodenectomy

Yuichi Nagakawa, *Tokyo Medical University, Japan*

Although laparoscopic pancreaticoduodenectomy (LPD) has been expected as minimally invasive surgery, security of the safety is required especially during the initial attempts. Based on our surgical results, we describe an appropriate indication for LPD during the initial attempts, and show our surgical approach and effective retraction methods allowing safe resection in LPD.

Indication during the learning curve: We reviewed surgical results in during the initial attempts. Operating time of patients with anatomical variant of the hepatic artery and/or cholangitis was significantly longer than that without them. In addition, blood loss of patients with BMI of higher than 22 was significantly higher than that with less than 22.

Surgical approach and effective retraction method: Organ retractor was used to secure a wide operative field. Standing position of operator was changed each surgical site to achieve an effective three-way retraction. To prevent hemorrhage from the first jejunal vein (J1V) or IPDV during dissecting at the left side of the SMA, we previously divide IPDVs from the J1V at the right side of the SMA, termed the "initial IPDV dissection". We also applied a novel laparoscopic approach, termed the "uncinate process first" approach, in which the branches of the inferior pancreaticoduodenal artery are dissected first, at points where they enter the uncinate process, which allows safe dissection around the SMA. After introducing this approach, the intraoperative blood loss was significantly decreased compared to the conventional approach. Conclusion: LPD should be performed in selected patients with less BMI and without anatomical variant of the hepatic artery and cholangitis during the initial attempts. Our laparoscopic procedure allows us safety and precise LPD under optimal operative field.

HBP 1 **Session for the operators to start laparoscopic HBP surgery (about initial settings and case selection tip)**

Feb 17 (Fri), 09:00-10:30

Laparoscopic HBP Surgery Through Single Incision

Young Kyoung You, *The Catholic University of Korea, Korea, Republic of*

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Feb 17 (Fri), 09:00-10:30

How to start robotic liver resection?

Yao-Ming Wu, *National Taiwan University Hospital, Taiwan*

Surgery performed by minimal invasive approach had been shown with the benefits of shorter hospital stay, better postoperative recovery and cosmesis of wound. The percentage of major liver resection via minimal invasive approach increased in the past five years contributed by both accumulated surgical experience and availability of instruments. Robotic surgical system has the advantages of 3D surgical vision and flexibility which have the potential to overcome these existed laparoscopic limitations , especially for challenging liver resection.
We had set up the laparoscopic liver surgery program in NTUH since 2007, and performed 69 cases till the end of 2011, including 48 patients (63%) with liver malignancy and 28 patients with non-malignant liver diseases (37%). We initiated the program of robotic liver resection since the beginning of 2012, and finished 250 robotic liver resection in the past 4 years, including 17 living donor of liver harvested by robotic approach.
We got increased percentage of major liver resection from 15% to 33% with the assistance of robotic system. We successfully performed 17 living donor harvest procedures by robotic minimal invasive approach, including 15 right lobes and 2 left lobe.
The previous experience of laparoscopic liver resection helps us to get used and handle this high technique robotic system quickly. The consistency, flexibility and three-dimentional vision of this robotic system are the potential benefits for minimal invasive liver resection in our preliminary experience. The organization of well- trained team and selection of simple cases in the beginning are the key points to initiate the program of robotic liver resection.

HBP 1 **Session for the operators to start laparoscopic HBP surgery (about initial settings and case selection tip)**

Feb 17 (Fri), 09:00-10:30

Laparoscopic Surgery Development in Mongolia

Chinburen Jigjidsuren, *Mongolian Hepato Pancreato Biliary Society, Mongolia*

It has been a 23 years since Laparoscopic cholecystectomy is firstly operated in Mongolia. But due to technical, financial problems, medical professionals training and patients fear (new technology) took decades to really start.

Since Yonsei private hospital of Ulaanbaatar city started laparoscopic cholecystectomy since 1997 many Mongolian surgeons started learning endoscopic surgery by foreign association and training programs in South Korea, USA, some European countries and now the result is Laparoscopic cholecystectomy has revolutionized the care of gallbladder disease in Mongolia. The faster recovery, shorter hospitalizations, decreased wound infections, and decreased use of narcotic medications takes important mind change in both countryside and urban patients.

Now laparoscopic cholecystectomy has now become the gold standard in the treatment of gallstones not only in Ulaanbaatar also in provinces.
In Mongolia, 49% of the 2.7 million people reside in rural areas and live a nomadic lifestyle.2 Mongolia covers a large geographic area equal to the combined areas of Great Britain, France, Germany, and Italy; it is the most sparsely populated country in the world. The dry deserts and wet mountains coupled with the extremes of weather are significant obstacles to adequate road building and impede transportation for patients in need. The vast rural areas of Mongolia are isolated and present a serious challenge to providing access to adequate medical and surgical care.

The epidemiology of diseases in Mongolia has dramatically changed over the last 3 decades. Where echinococcal disease was one of the leading surgical diagnoses in the early 1960s, it is now uncommon. Today, the second most common cause of hospital morbidity in Mongolia is gastrointestinal diseases, with liver diseases, appendicitis, and gallbladder disease representing the majority of these illnesses.

After laparoscopic cholecystectomy surgery was successfully established, Mongolian surgeons society and NGO started to develop hernia surgeries and liver, gastric and colon surgeries in Ulaanbaatar, the capital city. Whenever to advancing the laparoscopic surgery needs multiple disposable instruments such as mesh, staplers, special hand devices, and vessel sealing. Then cost of advanced surgery was beyond the health and welfare insurance. In this period the patients buying directly from the companies whatever needed to accomplish the laparoscopic surgery. It was also stressful and may cause complain between patients and doctors.

When the time passes, everything is changing, the national health insurance program is updated since 2016 for "High Cost Surgical Equipment's", now 70%-80% of high cost instruments such as surgical staplers, vessel sealing devices, implants are covered by Government and the rest for the patients.

This changed the game and the government paid 6,26 million US dollar (15,5 trillion MNT) for only high cost surgical instruments.
So furthermore, we need to train surgical team and inform hospital administration and the patients to develop more adequately and safe surgery.

CRS 1 **Practical application of enhanced recovery after surgery (ERAS) program**

Feb 17 (Fri), 09:00-10:30

Effects of Informative Video using Social Media on Preoperative Anxiety in Patients with Colorectal Cancer

Heung-Kwon Oh, *Seoul National University Bundang Hospital, Korea, Republic of*

Surgery is the majority of curative treatment in colorectal cancer; however it is a still fearful procedure that can give stress and pain for the patients. Many of the patients have difficulty to understand for their surgical procedure information, because of the scarce information source. Therefore, patients usually underwent significant anxiety during the preoperative period, which has been associated to more harmful outcome after surgery. This study aimed to evaluate the effect of video information using social media (YouTube) on preoperative anxiety level in patients with colorectal cancer. We designed prospective, single-arm, observational study. We made 5 minute video clip (https://youtu.be/VzhtOMPUe4Q) that include pathway of the operation day, circumstance of operation theater, kind messages from anesthesiologist and attending surgeons. Patients who have schedule of elective colorectal cancer surgery without previous surgery and major cognitive impairment were included. Primary outcome measure is the difference of Amsterdam Preoperative Anxiety and Information Scale (APAIS) between before watching and after watching video clip during preoperative period. Secondary outcome measures are the difference of Hospital Anxiety and Depression Scale (HADS), length of postoperative hospital day, and postoperative morbidity. This study was registered with the Clinical Trials Registry on 9 August 2016 (ClinicalTrials.org Identifier: NCT02873455). Informative video is an effective tool for reduce preoperative anxiety. We expect this video could give high level of confidence and realistic experience, and may reduce preoperative anxiety to the patients.

Feb 17 (Fri), 09:00-10:30

Prevention and management of postoperative ileus (POI) in laparoscopic surgery

Yong Geul Joh, *Hansol Hospital, Korea, Republic of*

The most important barrier of early bowel recovery after colorectal surgery is postoperative ileus. Surgeons have a tendency to overlook primary POI compare to secondary POI. The terms of primary postoperative ileus, secondary postoperative ileus, early postoperative small bowel obstruction and mechanical obstruction should be used exactly and separately to identify the processing mechanism of these disease entities. Early postoperative small bowel obstruction is defined if within the first 30 days, they developed signs, symptoms and radiographic evidence of small bowel obstruction after return of bowel function, or mechanical intestinal obstruction was definitively confirmed by laparotomy or contrast study. There is a large variation in the reported incidence of prolonged POI according to the definition.

A complex interplay between neurogenic, inflammatory, humoural, fluid and electrolyte, and pharmacologic components play a role in the development of POI. Risk factors of POI are increasing age, male gender, low preoperative albumin, acute and chronic opioid use, previous abdominal surgery, long duration of surgery, emergency surgery, blood loss and need for transfusion and procedures requiring stomas.

The data related to bowel recovery (2-3 days) of laparoscopic colectomy are faster than reported results (3-4 days) after open surgery. Primary postoperative ileus is more frequent after right hemicolectomy or ileostomy formation in laparosopic colectomy. To know the risk factors of POI after laparoscopic colorectal cancer resection will help in the decision of the specific multimodal treatment for reducing POI such as pharmacological treatment. Postoperative ileus may be associated with the extent of small bowel handling that occurs in laparoscopic right hemicolectomies and ileostomy formation. The conclusion of LAFA (LAparoscopy or FAst track multimodal management versus standard care) study was that the optimal intervention of segmental colectomy for cancer was a combination of laparoscopy and a fast track protocol. Laparoscopic surgery can make reduced hospital stay but is not sure to reduce incidence of POI (mechanical ileus requiring reoperation and prolonged postoperative ileus) comparing with enhanced recovery program in this study.

Strategies to prevent postoperative ileus are as follows

1) Enhanced recovery program after surgery(early enteral nutrition, slat fluid restriction, mid-thoracic epidural anaesthesia, alvimopan, Opioid sparing)
2) Laparoscpic surgery
3) Intravenous lidocaine, coffee , chewing gum, nicotine, magnesium sulphate

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Feb 17 (Fri), 09:00-10:30

Immediate Postoperative Pain can be Controlled by Surgeons

Soo Yeun Park, *Kyungpook National University Hospital, Korea, Republic of*

Postoperative analgesia is important part of enhanced recovery after abdominal surgery. Poorly controlled pain delays the return to normal bowel movement, reduces daily activity, and decreases ambulation. Currently, opioid-based IV-PCA is widely used for postoperative pain control due to its short action duration and strong analgesic effect. This type of pain control is usually managed by an anesthesiologist.

The IV-PCA is associated with several adverse effects, such as postoperative nausea and vomiting (PONV), dizziness, decreased blood pressure, and urinary retention. In extreme cases, opioid-based IV-PCA is discontinued earlier due to these effects. Intractable opioid-induced adverse effects can be considered to indicate failure of IV-PCA as an analgesic technique. When we compared the clinical outcomes between patients who received IV-PCA and those who did not, there was no significant difference in the VAS between the two groups during 5 days after operation. However, patients in the non-PCA group requested more rescue analgesia (intravenous tramadol) during the first 24 hours. After then, there were no significant differences between the two groups in the required dose of the rescue drug until fifth day after surgery. The incidence of PONV was significantly higher in the non-PCA group than in the PCA group.

Wound infiltration using local anesthetics is another minimally invasive and low-cost treatment modality with few adverse effects. Although Local infiltration is effective after minor surgical procedures, the effectiveness of this method in extensive surgeries has been inconsistent. Tansversus abdominis plane (TAP) blocks was first described by Rafi in 2001. It is currently used in multimodal postoperative pain treatment. TAP block is performed by injecting a local anesthetic solution between the internal oblique and transversus abdominis muscles to block the sensory nerves (the anterior branch of thoracolumbar nerves that innervate the anterior abdominal wall) arising from the lower six thoracic and first lumbar nerve roots and produce a regional abdominal wall nerve block. Unlike the epidural block, the TAP block does not produce an unwanted motor block, hypotension, and urinary retention. TAP block can be performed by both a surgeon and an anesthesiologist.

TAP block has been usually performed under ultrasound guidance. However, it requires an ultrasound device and a trained physician to reduce the risk of visceral injury. Although the ultrasound-guided TAP block is considered simple and effective, there are a growing number of reports of serious morbidity by injury to the hollow viscus. The intraabdominal approach by surgeons for the TAP block has been described by several studies for both open and laparoscopic surgery. When the accurate anatomical location of a regional nerve is perceived, the injection of the drug can be performed quickly and easily under the direct vision. By employing an intraabdominal approach, visible and tactile confirmation of the correct placement may be achieved without damage to the intraabdominal organ. We modified the previous intraabdominal techniques and developed laparoscope-assisted TAP block for laparoscopic surgery. We confirmed the effectiveness by using a randomized controlled trial comparing the laparoscopic TAP block with the ultrasound-guided TAP block.

There are many factors having effect on postoperative pain, such as age, type of surgery, location or length of incision, physiologic distress during perioperative period, and so on. Therefore, more comprehensive management of postoperative pain would be provided by a surgeon who takes care of patients before and after the surgical treatment.

Feb 17 (Fri), 09:00-10:30

How to Facilitate ERAS Program in Elderly Patient with Colorectal Cancer

Tony Mak, *The Chinese University of Hong Kong, Hong Kong*

The elderly population is growing globally, with 13% of the Hong Kong population aged 65 and over in 2011. The Hong Kong Cancer Registry showed the biggest climb in colorectal cancer in the groups aged 60 and over with colorectal cancer rate of 400 per 100,000 men and 280 per 100,000 women beyond age 70. It is therefore anticipated that there will be a significant number of elderly patients requiring major colorectal cancer surgery in the future.

In the past, major surgery was rarely performed on patients over the age of 80. However, with advances in surgical techniques, anaesthesia, pain management and post-operative care with rising life expectancy, increasing number of elderly patients are undergoing colorectal surgery. There is some evidence in the literature to suggest that elderly patients (>70years old) undergoing colorectal surgery experienced higher rates of complications, mortality, re-admission and longer length of stay. In one study 20% of patients over the age of 80 had one or more complications with mortality rate of 26% in these patients in comparison to 4% mortality rate in patients without complications. In addition, emergency rather than elective surgery, higher ASA, co-morbidities and geriatric syndromes (such as cognitive impairment, postoperative delirium and frailty) are associated with postoperative morbidity and mortality in elderly patients. Therefore, it is of paramount importance that elderly patients are selected and assessed carefully preoperatively for colorectal surgery and managed promptly and appropriately post-operatively to ensure good outcome.

Enhanced recovery after surgery (ERAS) has been recognised to decrease complications and reduces hospital stay. Randomised controlled trials have demonstrated that ERAS when applied to elderly patient can also have fewer complications and can reduce hospital stay. However, disparities have been found between elderly and younger patients on the level of protocol adherence (i.e. food tolerance after surgery, level of mobility and problems with confusion leading to non-cooperation). This may lead to speculations that elderly patients may not benefit from ERAS as much as younger patients. Hence an adjunct programme may be required to further improve recovery for elderly patients undergoing colorectal surgery.

The Comprehensive Geriatric Assessment (CGA) is an established assessment tool, which has been shown to improve clinical management of elderly patients. Its use in elderly patients with osteoporotic hip fractures has proved successful in reducing in-hospital complications, length of stay, readmission rate, disability and mortality. The first combined orthopaedics geriatrics rehabilitation ward was established in the 50's. Since then, several models of orthogeriatric care /rehabilitation have been documented internationally. In a review article, more medical conditions were recognised with geriatrician input with modest effect on functional recovery, length of stay, complications and mortality. There is very little evidence in the literature about the use of the CGA and its benefit in the general surgical setting or a combined geriatric and general surgical team management.

Therefore there is a pressing need for a well-designed randomised controlled trial to assess the effectiveness of 1) CGA in the assessment of elderly patients undergoing colorectal surgery and 2) the management of elderly patient post colorectal surgery with the combined geriatric and general colorectal surgical care.

Laparoscopic central pancreatectomy: How I do it

Ki Byung Song,
Asan Medical Center, University of Ulsan College of Medicine, Korea, Republic of

The patient was placed in the supine position, or a reverse Trendelenberg (10–30°) position if necessary. A nasogastric tube and bladder catheter were inserted. All patients wore antithrombotic stockings during surgery and received prophylactic low-molecular weight heparin until they could walk freely. The operator and the second assistant who held the laparoscope stood to the right of the patient, and the first assistant and scrub nurse were positioned to the left. An open technique was used in all patients to establish the pneumoperitoneum under direct vision through a periumbilical 12-mm trocar. Abdominal pressure was maintained at 12 mmHg by insufflation of carbon dioxide. During most operations, four trocars were placed under direct scope vision. Two 5-mm trocars (one on the epigastrium for the left hand of the operator and one at the left flank for assistance)) and two 12-mm trocars (one on the umbilicus for the laparoscope and one on the midclavicular line parallel to the laparoscope port for the right hand of the operator) were used. After establishing abdominal access, a 30 degree telescope was inserted and the entire peritoneal cavity was examined for abnormalities. The gastrocolic omentum was divided for entrance to the lesser sac, avoiding injury to the colon by the monopolar electrocautery device or ultrasonic coagulating shears. The posterior gastric wall was lifted and retracted cranially using a vicryl 2-0 traction suture, exposing the tumor within the neck or proximal body of the pancreas. If the pancreatic lesion could not be identified easily or further localization was necessary, a laparoscopic intraoperative ultrasound probe was inserted into the 12-mm trocar, and intraoperative ultrasonography was performed, providing excellent results in identifying the location of the lesion. The superior mesenteric vein (SMV) and retropancreatic portal vein were identified at the inferior border of the pancreatic neck and dissected over the retropancreatic portal vein. A tunnel was created in front of the SMV under the pancreatic neck. On completion of the tunnel, a tape was passed through to provide traction on the pancreas. By pulling the tape upwards, the pancreatic neck was dissected proximally and distally for approximately 2 cm, easing insertion of an endostapler to perform the proximal pancreatic transection.

For transaction of the proximal pancreas with a safe resection margin, roticular endoscopic linear staplers of various sizes were used (staple height 3.5–4.2 mm), depending on the thickness or hardness of the pancreas.After completing the proximal pancreatic resection, seven or eight small titaniumclips were applied along the stapling line of the proximal pancreatic stump to prevent pancreatic fistula and bleeding from the resected proximal stump of the pancreas. In most cases, fibrin glue also was applied to the pancreatic stump or a small bleeding site using the specific delivery device.

Distal pancreatic transection was then performed with a harmonic scalpel. The pancreatic duct was isolated and transected. Once the duct was identified, a 2-mm silastic stent was inserted. The duct and stent were sutured together using PDS 5-0 (Ethicon Inc., Somerville, NJ, USA). To release the distal stump of the pancreas from the splenic artery and vein, small connecting vessels were sectioned between clips. This dissection extended up to 2 cm away from the distal section line. In order to provide a relatively tension free anastomosis, sufficient dissection of the pancreatic distal stump from the splenic vessels must be achieved. After completing the resection, the specimen was placed in an entrapment bag and removed through the 12-mm umbilical port with minimal extension. Negative resection margins of proximal and distal portions of the tumors and tumor itself were confirmed by frozen sectional biopsy. Intracorporeal PJ reconstruction was then performed using a 50-cm retrocolic Roux-en-Y jejunal loop. The most common anastomosis is end-to-side invaginated dunking PJ with a double-layer suture. A 2-layer end-to-side PJ with prolene 5-0 interrupted suture was used for the external seromuscular layer of the jejunum, and a prolene 4-0 continuous suture was used for the full layer jejunal anastomosis with the pancreas. Fibrin glue was placed around the PJ to protect the anastomosis. Finally, side-to-side JJ was performed by extracorporeal methods through extended umbilical wound using prolene 5-0 and monosyn 4-0. Routine Jackson-Pratt (JP) drainage was inserted at the proximal stump of the pancreas and distal PJ site in all cases.

Feb 17 (Fri), 11:00-12:30

Laparoscopic distal pancreatectomy: Technical aspects for safe procedure

Ippei Matsumoto, *Kindai University Faculty of Medicine, Japan*

Aim

Laparoscopic distal pancreatectomy (LDP) is a good surgical procedure for benign or borderline malignant tumor of the pancreas because of less invasiveness and cosmetics compared to open distal pancreatectomy. However, it is most important to secure tumor curability and surgical safety. Intraoperative bleeding and postoperative pancreatic fistula (POPF) are major factors for performing safe LDP. We describe technical issue and short-term results of LDP.

Surgical procedure

During spleen preserving (SP) LDP, it should be considered to covert to Warshaw operation or splenectomy when encountering the difficulty of control bleeding or dissection due to adhesion or pancreatitis. For the pancreatic transection, a reinforced triple-row stapler with a bioabsorbable material (Endo GIA™ Reinforced Reload with Tri-Staple™ Technology, Covidien, Tokyo, Japan) is used.

Patients and methods

Between June 2014 and November 2016, 28 patients underwent LDP. Data were analyzed retrospectively from a prospectively collected database. Seven male and 21 female patients with a median age of 64 were enrolled in this study. Pathology were IPMN in 6 patients, PNET in 7, MCN in 3, SPN in 2, and others in 8. LDP with splenectomy were performed in 17 patients and SPLDP in 11 (included Warshaw operation in 2).

Results

Median operation time and blood loss were 326min and 93ml. One patient (4%) developed clinically relevant POPF grade B defined by ISGPF. One patients required readmission due to a pseudocyst of the pancreatic stump 6 months after LDP. The patient required endoscopic trans-gastric drainage. Overall morbidity (Clavien classification III or more) was 7%.

Conclusion

Intraoperative decision for conversion and the use of reinforced triple-row stapler facilitate to control intraoperative bleeding and POPF. Short-term results of LDP were favorable in our series.

HBP 2 **Video session: How I do it (Pancreatobiliary surgery)**

Feb 17 (Fri), 11:00-12:30

Total laparoscopic pancreatico-duodenectomy

Yuma Ebihara, *Hokkaido University, Japan*

Total laparoscopic pancreatico-duodenectomy (TLPD) remains one of the most advanced laparoscopic procedures. But a standardized approach is still lacking. We discuss a video based case presentation to highlight our surgical technique and tips. We also present our experience with the TLPD and our clinical outcomes. To perform the case, we place the trocars in a co-axial orientation. Four 12-mm trocars are placed in paraumbilical, bilateral abdominal and epigastric regions. One 5-mm trocar is placed on patient's left side. The co-axial setting and French position forms the basis of our technique for the TLPD. These main points outline our surgical technique for TLPD. The first step is transection of the stomach using a linear stapler. This maneuver allows us to better expose the upper edge of pancreas, rendered accessible by division of the stomach. This also helps complete the creation of a tunnel posterior to the neck of the pancreas. The second step is "the SMA approach". Through the ligament of Treitz, the retroperitoneum is longitudinally opened and the origin of SMA is visualized just superior to the left renal vein. The periarterial connective tissue and nerve plexuses surrounding the SMA are dissected longitudinally to identify the IPDA. The IPDA is encircled with a vessel tape. After dividing the proximal jejunum, the proximal portion is then pulled to the patient's right. This maneuver makes the SMA rotate in a clockwise direction in order to dissect the lymph nodes surrounding the SMA with an excellent magnified view. Finally the IPDA is ligated. We usually chose the R-Y reconstruction after TLPD. A gastrojejunostomy is performed with a functional end-to-end anastomosis. And side-to-side jejunojejunostomy is performed. All sutures are placed intra-corporeally. For the pancreaticojejunostomy, we use a 3-0 VICRYL for suturing the anterior and posterior wall of pancreas. A duct-to-mucosa anastomosis is performed with 4-0 or 5-0 interrrupted PDS suture. A 5 or 6Fr stent is used as an indwelling pancreatic stent. I usually use the 3mm diameter needle holder for suturing the pancreas duct. Choledochojejunostomy is performed with running a 4-0 VICRYL suture. A 6Fr stent is used as an indwelling biliary stent. We have performed 22 cases of LPD. There were 8 cases of Total Laparoscopic PD and 14 cases of laparoscopic assisted PD. Initially, we performed the LAPD and then we started to perform total laparoscopic PD. Patients with TLPD had significantly longer operative and reconstruction time. But the blood loss was significantly less in TLPD. No transfusion was required in both groups. With regards to post-operative outcomes, no patients had bile leaks. Grade B or C pancreatic fistula was seen in 2 cases in each group. There was no postoperative mortality. TLPD is feasible and safe, however, it is still early to draw definitive conclusions concerning the value of TLPD. Prospective randomized studies with a greater number of cases are needed to confirm its role.

Feb 17 (Fri), 11:00-12:30

Robotic pancreatobiliary surgery

Shin-E Wang, *Taipei Veterans General Hospital, Taiwan*

Pancreatic surgeries are one of the most challenging surgeries that required meticulous surgical skills. Robotic surgery is the latest development in minimally invasive techniques for pancreatic surgery which improves surgical dexterity, especially when fine dissection and multiple sutures are required. Robotic assistance, thus could be rewarding in pancreatic surgeries, especially in the setting of robotic pancreaticoduodenectomy (RPD).

We began to perform robotic pancreatic surgeries starting with robotic distal pancreatectomy (RDP) since September of 2011 as a training step for robotic pancreatic surgeries. RPD at our institute was started since July 15 of 2014. Currently, 78 RDP and 80 RPD have been performed at our institute. Experience of our pancreatic surgeries using da Vinci Robotic system will be shared in this presentation. Surgical technique and result of RPD will be discussed. Conversion to open surgery was required in 9 patients. The median console time for RPD is 6.5 hours. Median blood loss is 100 c.c. Median harvested lymph node number is 16. Delayed gastric emptying (ISPGS B/C) is 3.9%. Pancreatic fistula (ISGPF B/C) is 11.8%.

In conclusion, RPD could be recommended as safely feasible surgery in selected patients. Implementation of RPD requires experience with open pancreaticoduodenectomy and specific training with robotic platform.

HBP 2 **Video session: How I do it (Pancreatobiliary surgery)**

Feb 17 (Fri), 11:00-12:30

Laparoscopic and Robotic Management for Choledochal Cyst in Pediatric Patients

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Choledochal cyst (CC) is a congenital cystic dilatation of the biliary tree, originally described by Vater and Ezler in 1723. A female to male ratio of CC is approximately 3.5:1 with a higher incidence in Asian populations. The current standard treatment of choledochal cyst is complete excision of choledochal cyst and hepaticoenterostomy. With the advance in the technology surgery and device, the application of minimally invasive surgery in children has ever been increasing in the past two decades. Since Farello et al first described laparoscopic resection and Roux-en-Y hepaticojejunostomy in a 6-year-old child with a CC, the laparoscopic surgery is almost accepted as the gold standard in the management of CC recently.
There are some differences in clinical presentation between adults and children.
The classical presentation of a choledochal cyst is that of pain, jaundice and mass in various combinations with secondary hepatobiliary pathology being more common in the older patients because of the long-standing nature of the disease, whereas the infantile choledochal cysts present with obstructive jaundice, pale stool, and hepatomegaly. These symptoms suggest that the obstruction at the distal end of the common bile duct is nearly complete. Infantile choledochal cyst, unlike its adult form, tends to present with a near complete bile duct obstruction. Early surgical intervention minimizes or eliminates these complications. Moreover, sudden severe narrowing of distal choledochus is more commonly found in pediatric patients than in adult patients. Second, stone formation more frequently occurred in adult patients. Stone formation is related to the duration and severity of biliary stasis.
A number of authors have reported the finding of APBDU in their series with frequency ranging from 29% to 96%, which is compatible with the result of Asan Medical center. Because the successful surgical outcome of CC is related to the complications of APBDU, we have been trying to diagnose the type of APBDU in pediatric patients. But ERCP or MRCP are sometimes unavailable to pediatric patients under infants. This preoperatively undiagnosed status may induce open conversion and severe complications.

More than 350 pediatric patients were surgically treated in Asan Medical center until 2016. We started the laparoscopic CC excision at 2008 and the robotic CC excision at 2011. Since then, we performed 63 cases of laparoscopic surgery and 24 cases of robotic surgery for pediatric CC. We plan the robotic CC excision for patients over 12 kg, because we use 3 mm laparoscopic devices for patients under 12 kg. The size of robotic ports has no cosmetic advantage to these children. Nowadays almost CC cases is planned to perform minimal invasive surgery.

Our protocol of minimal invasive surgery for CC has exactly same to open surgery for CC. We dissected hilar structures from anterior to posterior area and from lateral to medial area. Bile duct exploration is performed with silastic irrigation tube toward distal and proximal bile duct for stone removal with saline irrigation. The pathologic bile duct is excised with possibly minimal damage to surrounding tissues. Bleeding is controlled by monopolar or bipolar electrocautery. Distal pathologic CBD is double ligated with laparoscopic tie or clip, and poxymal CBD is excised at the level of hepatic duct with enough dissection on posterior wall of hepatic duct.

Roux-en-Y jejunostomy is performed before hepaticojejeunostomy. Below 20 Kg in body weight, creation of a Roux-en-Y jejunal limb is facilitated by exteriorizing of small bowel via the umbilical trocar site and conducting the jejunojejunostomy extracorporally, as in the conventional open procedure. This approach was fast and safe. This is benefited the neonatal patients. Roux-en-Y limb is placed for the anastomosis with retrocolic maneuver and hepaticojejunostomy is performed by interrupt suture technique with 6-0, 5-0, or 4-0 sutures. We use three stay sutures for hepatic duct extracting, which are at 3, 9 and 12 o'clock. No intrahepatic stent is used. Bile leakage is developed in 7 patients of laparoscopic group and 3 patients of robotic group, repectively. 8 patients were overcomed with no surgical intervention and 2 patients needed to revision of hepaticojejunostomy. All cases of bile leakage was placed at each starting periods of laparoscopic and robotic surgery. A loop syndrome was developed in 3 patients, which induced sugical corrections.

Laparoscopic approach is a safe and feasible option for CC in children. Further randomized studies will be required in the future to establish whether Robotic CC excision could also become the standard treatment option for CC in children.The development of devices is necessary for the expasion of robotic surgery for CC in children.

HBP 2 **Video session: How I do it (Pancreatobiliary surgery)**

Feb 17 (Fri), 11:00-12:30

Single Port Laparoscopic Distal Pancreatectomy

Hyung Joon Han, *Korea University Ansan Hospital, Korea, Republic of*

Introduction

Minimally invasive surgery has become standard in hepatobiliopancreas surgical field, and new technical advances have changed surgical methods by reducing the number and size of ports or wounds. Although single port technique has shown great interest in recent years, it has not yet seen a great advantage over the conventional laparoscopic surgery. Simple laparoscopic surgery in hepatobiliopancreas surgical field, including cholecystectomy, adrenalectomy, and splenectomy, have easily moved from conventional laparoscopic surgery to single port laparoscopic surgery without great concern and surgical risk. However, advanced laparoscopic surgery, including hepatectomy and pancreatectomy, has rarely been performed by single port technique, compared to other surgical field, including gastrectomy and colectomy. Surgical technique for single port laparoscopic distal pancreatectomy is not different from laparoscopic distal pancreatectomy. Some technical tips and laparoscopic instruments made you to overcome the vague negative suspicion, inexpressible avoidance and ergonomic disadvantages of single port laparoscopic distal pancreatectomy. We present our experiences with single port laparoscopic distal pancreatectomy through a single small transumbilical incision.

How I do it

The patient was prepared in supine position. During operation, reverse trandelenberg position was done with left-sided up. Vertical transumbilical incision was made over the umbilicus, which was 2.5 cm. Glove port (Nelis, Korea) was used. Ten-millimeter flexible telescope was used. At first, we divided the gastrocolic ligament and the lower part of the gastrosplenic ligament. After division of ligament, we exposed the body and tail of the pancreas and confirm the location using ultrasonography. The left-sided transverse colon was detached from the spleen and peritoneum entirely. We hung the stomach using gauze, from the greater to the lesser curvature along the posterior aspect, or displaced the stomach using gauze and an articulating instrument. A laparoscopic sealing instrument must be used for ligation of peripancreatic vessels and dissection of the inferior border of the pancreas. If possible, the splenic artery was isolated with a dissector and right-angle laparoscopic instruments and was dual-ligated by laparoscopic clipping instruments. The inferior border

of the pancreas was dissected and elevated for pancreas parenchymal division. Nylon tape was used for elevation of the pancreas and as a guide for stapling of pancreas parenchyma. Laparoscopic stapler was used for pancreas parenchymal transection. Before stapling, clamping was performed with the stapler for 1 minute to assess the potential efficacy of stapling for transection of the pancreas parenchyma.

After transection of the pancreas, the proximal pancreas parenchyma was meticulously examined for bleeding. Additionally, we applied surgical clips along the stapling line for additional reinforcement to prevent bleeding or on the pancreatic duct to prevent pancreatic fistulas. The distal transected pancreas was encircled and ligated with a laparoscopic ligation device for retraction. The dissection and detachment of the distal pancreas were performed with a laparoscopic sealing instrument.

In the case of concomitant splenectomy, the superior parts of the gastrosplenic ligament and the splenophrenic ligament were also dissected, and the short gastric arteries were ligated and divided with laparoscopic sealing and clipping instruments. The resected specimen was enveloped with an endo-bag and retrieved from the abdominal cavity via the umbilical incision. After the glove port was reinstalled, warm saline irrigation and careful hemostasis were performed. A closed suction drain was placed in the left upper quadrant close to the pancreatic stump and brought out through the umbilical port. The single port was removed, and the umbilical incision was closed in layers.

CRS 2 **Myth breaking in colorectal surgery; Myth vs. Reality**

Feb 17 (Fri), 11:00-12:30

Does anastomotic leakage lead to pooron cologic outcome?

Jong Seob Park, *CHA Gangnam Medical Center, CHA University, Korea, Republic of*

Anastomotic leakage (AL) is one of the most frequent postoperative complications following colorectal surgery. Most AL is considered a major postoperative complication, and its severity is greater than any other complication. The rates of AL in colorectal surgery vary widely depending on several factors, particularly whether the anastomosis is intra- or extraabdominal (2.7–8.7% and 3.6–13.3%, respectively). Furthermore, the AL would be related with long-term survival. There is conflicting evidence regarding the impact of anastomotic leak following colorectal cancer surgery on long-term overall and cancer-specific survival as well as rates of local recurrence. Several prior studies demonstrated that there were no differences between local or distant recurrence in colonic and rectal surgeries.[1-4] In contrast, 1 meta-analysis found an association between AL and local recurrence in rectal surgery.[5] This association might be related to the release of a variety of acute-phase reactants and pro-inflammatory mediators.[5] However, the mechanism by which AL might affect tumor recurrence remains uncertain. Another study found that AL was significantly associated with an increased rate of distant recurrence, which could have been due to canceled or delayed administration of adjuvant chemotherapy.[6]

There were more studies to report that AL in rectum would be related with poor long-term survival,[4-9] rather than the studies reported with no difference in survival.[10, 11] AL was significantly associated with increased all-cause mortality in the multivariable analysis[6] Others postulate that cancer-specific outcomes worsen after infectious complications because the inflammatory response somehow interferes with immune surveillance.[12] Additionally, the pelvis after rectal dissection may be a more hospitable environment for implantation than the peritoneal cavity.[7] Whereas, following resection for rectal cancer, the severity of postoperative complications according to a standardized classification system does not demonstrate a statistically significant effect on either overall or disease-free survival.[11]

Many studies included in recent 2 meta-analyzed studies reported that the AL was associated with long-term survival.[4-6] However, most studies reported decreased long-term survival with AL, have combined colon and rectal cancers together. In the studies analyzed patients in colon cancer and rectal cancer individually, AL in patients who underwent resection for colon cancer would be not associated with worse long-term survival.[4, 7]. In contrast to patients with colon cancer, patients with rectal cancer who had a leak or abscess after resection did have higher rates of overall and cancer-specific mortality and of overall and local recurrence compared with matched controls.[7]

In conclusion, the association between AL in the colorectum and recurrence or long-term survival would be still debatable. Further well-designed study is needed to address this issue.

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CRS 2 **Myth breaking in colorectal surgery; Myth vs. Reality**

Feb 17 (Fri), 11:00-12:30

Lateral to medial approach violate 'No-touch' isolation technique?

Sun Jin Park, *Kyung Hee University Medical Center, Korea, Republic of*

The principle of early lymphovascular ligation before manipulation of the tumor during the surgical resection has been termed the 'no-touch isolation' technique.

In 1952, Barnes popularized the "physiologic" resection of the right colon, emphasizing early division of the mesentery and bowel and late handling of the tumor.[1] Subsequently, Turnbull et al.[2] developed the so-called no touch technique, which he suggested the possibly detrimental role played by the surgeon's hands in cancer dissemination. He advocated that the tumor-bearing area should not be manipulated until the lymphovascular pedicles are ligated and the colon is divided.

Currently, the no-touch technique is controversial. Turnbull et al. reported improved survival for colon cancer patients operated on with his no-touch technique compared with conventional surgery,[2] but his data was entirely retrospective and has been questioned over the years. A randomized trial comparing no touch resection with conventional surgery (lateral to medial) during open resection has failed to show a similar advantage although there was a trend toward shorter time to recurrence and an increase in the number of distant metastases in the conventional surgery group.[3]

In respect of molecular biology, it is possible that handling the tumor during surgery may cause a release of circulating tumor cells, hence contributing to future disease recurrence. Some studies suggest that there is a trend towards reduced tumor cell dissemination with the no touch technique compared with the conventional method.[4] However the benefit in terms of improved patient survival remains unproven.

We usually agree with the concept that the medial-to-lateral technique should be the preferred approach for laparoscopic colon dissection.[5] Currently, however, the no touch isolation or medial-to-lateral technique is not universally regarded as a standard technique. There is a lack of solid evidences yet. We need to wait for the result of Japanese on-going clinical trial (JCOG1006).[6] Whether there are any true oncologic advantages to the medial-to-lateral approach in laparoscopic operations for colon cancer still remains to be determined.

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CRS 2 **Myth breaking in colorectal surgery; Myth vs. Reality**

Feb 17 (Fri), 11:00-12:30

Is Mechanical Bowel Preparation Useless?: The Gaps between Theory and Practice

Se-Jin Baek, *Korea University College of Medicine, Korea, Republic of*

Before the 1970s, the administration of oral antibiotics (OA) combined with mechanical bowel preparation (MBP) prior to colorectal surgery was considered as a standard procedure, and this was widely adopted in order to reduce infectious complications. However, well-designed clinical trials regarding MBP began its publication from the year 1972, and subsequent evidence suggested that MBP was unnecessary, and may even be harmful in terms of anastomotic leakage. In particular, the omission of MBP has been emphasized, along with a wide application of an enhanced recovery after surgery (ERAS) program for the purpose of minimizing the perioperative physiologic change. The Cochrane database synthesized the evidence on MBP use for elective colorectal surgery through the four reports from 2003.(1)
Regardless of the scientific evidence from the studies, the surgeons' emotional barrier regarding MBP was higher than expected and the behavior patterns did not change easily. In a 2003 survey with 550 colorectal surgeons in the US,(2) 99% of the responders prescribed some type of MBP, and 75% of the responders used OA prophylaxis as part of their standard preoperative protocol for elective colorectal surgery. Similarly, the surgeons' emotional resistance for the omission of MBP is great until now in Korea.(3) Most respondents (97.3%) were in favor of a preoperative MBP procedure, and 52.1% of them agreed to the use of OA from a Korea national survey that was conducted in 2013.
This tendency is similar in European countries where many studies for the omission of MBP have been performed. According to the results of the surveys from Switzerland, Denmark, UK, and the Netherlands in 2011,(4-8) MBPs were performed in approximately 63%~83% of rectal surgery, 40.2%~90.6% of left colonic surgery, and 9.5%~43% of right colonic surgery, respectively. Accordingly, there was a tendency to perform MBP more frequently in the case of a left colonic surgery including rectal surgery and laparoscopic surgery. In addition, younger surgeons and surgeons with a higher case load in colorectal surgery used MBP significantly.(4) The most common reasons for using MBP were the construction of a protective ileostomy (22%) and the improvement of surgical field exposure (16%).(8) As to the question of what stages of the operation are influenced by MBP, 29% answered "small bowel swelling", followed by "exposure to surgical field" with 29%, and "no concern" with

52%. In a study from Australia in 2014,(9) 31.7% were performing MBP as a routine, while 57.3% were selectively administered. The main reasons for MBP were to improve bowel handling (54.9%), followed by concerns if resections required a covering ileostomy (40.8%), and a personal preference (33.8%).

There is a great discrepancy between the scientific basis for the MBP and the actual practice, particularly in the case of a left colonic surgery, including rectal surgery. Even the Cochrane review concluded that the evidence for the MBP in rectal surgery is still lacking and further studies are deemed necessary.(1) Several recent studies reported that full preparation improves the surgical outcome after colectomy, and the results are suggested as basis for the groups who are concern about the omission of MBP and asserted its constant use.(10-14) In a study conducted on 8,442 patients in the US in 2015,(13) MBP with OA was independently associated with reduced anastomotic leak, surgical site infection, and postoperative ileus, as compared to without MBP and MBP alone. These studies have stressed the importance of preoperative intestinal bacterial decontamination with OA. In the same vein, a subgroup analysis, which was published in the Cochrane review in 2011, clearly showed that the most favorable option for reducing surgical site infection was OA alone. However, studies on whether OA alone can improve the postoperative outcome are still insufficient, as compared to MBP with OA. It may be considered to regularly use MBP with OA until further studies are obtained.

There are several practical issues concerning the MBP procedure. First, MBP procedures vary among the clinicians. Second, there is a lack of comparative studies on novel bowel preparation agents in recent years. Third, the studies for MBP in laparoscopic surgery and rectal surgery are lacking. Additional studies on these are expected to provide a scientific evidence for the necessity of using or omitting MBP.

CRS 2 **Myth breaking in colorectal surgery; Myth vs. Reality**

Feb 17 (Fri), 11:00-12:30

When can the Protective Ileostomy be Protective?

Jeonghyun Kang, *Yonsei University College of Medicine, Korea, Republic of*

Anastomotic leakage (AL) is a major cause of postoperative mortality and morbidity after rectal cancer surgery, and the incidence of AL ranged from 2.5% to 20%. After the introduction of total mesorectal excision (TME) and spread of this technique to a standard procedure for the management of rectal cancer, it is debatable whether TME in itself results in higher rates of AL. With an increasing proportion of sphincter preserving procedures, more patients are exposed to the risk of this serious complication.

It is well known that risk factors of AL are male gender, malnutrition status, recent weight loss, cardiovascular disease, steroids use, alcohol abuse, advanced age, obese, prior radiation history, blood transfusion, and low rectal tumor height. In the era of preoperative chemoradiotherapy (pCRT) for rectal cancer treatment, there is debate on the impact of pCRT on the increasing rate of AL.

The impact of AL on long term oncologic outcomes for patients with rectal cancer is contradictory. In a large scale population-based cohort study, AL did not result in an increased local recurrence rate. In a single center based study, clinical leakage was not associated with time to local recurrence, disease-free survival, or overall survival. In contrast, many investigators reported an increased local recurrence rate or reduced overall survival rate after AL. One of the possible explanations for this discrepant oncologic effect of AL after rectal cancer surgery might be the fact that the definition of AL has not been standardized. Although the International Study Group of Rectal Cancer suggested the three grading system of AL in 2010, most previous studies used their own definition of AL.

Protective diverting ileostomy was known as a practical way to prevent AL after rectal cancer surgery. Nevertheless, there was no definite guideline when to make a protective ileostomy. In daily practice, most surgeons make protective diverting ileostomy according to their own experience or literature based evidence. It is not fully investigated that protective ileostomy could really prevent anastomotic leakage. Most of previous retrospective studies showed that protective ileostomy could prevent anastomotic leakage. However, these retrospective study have inherent selective bias that most “high-risk” patients were included in the diversion group. Several randomized trails demonstrated that diversion could reduce AL. In contrast, some randomized trials did not show any difference of AL rate according to

the formation of ileostomy. Altogether, it is generally agreed that diverting stoma did not have a significant relationship with symptomatic anastomotic leakage. However, diverting stoma does seem to mitigate the consequences of leakage, reducing the need for urgent abdominal reoperation.

Another important issue is that ileostomy have potential several risk factors of complications. The risk factors for stomal complications can be divided into patient-centered, procedure-centered, and disease-centered factors. Patient factors include age, gender, BMI, nutritional status, american society of anesthesiologists (ASA) physical status classification system, and steroid use. Although Ileostomy repair after rectal cancer surgery is a relatively simple technique in daily practice, a recent systematic review reported morbidity rates of 17.3~33.0% following ileostomy repair.

The Korean Laparoscopic Colorectal Surgery Study Group reported that a low tumor height, male sex, advanced stage, multiple linear stapler firings, preoperative chemoradiotherapy, and perioperative bleeding were independently associated with AL after laparoscopic sphincter-saving TME for rectal cancer. Thus, these factors, simply or in combinations, should be regarded as possible indicator of making a protective diverting ileostomy. Nevertheless, it is not sure that we must make the ileostomy for all such cases. Still there is no definite answer that making protective ileostomy could really prevent anastomotic leakage for those potential high risk groups.

Well-designed randomized controlled trial is warranted to answer that question. However, the study design should consider patient safety issue the most important goal.

LS 1 **Luncheon Symposium 1**

Feb 17 (Fri), 12:30-13:30

The application of combined laparoscopy-endoscopy for digestive diseases

Zhining Fan, *The First Affiliated Hospital with Nanjing Medical University, China*

Digestive benign diseases included benign tumors or choledocholithiasis are currently treated by endoscopy or laparoscopy alone. This way may not be benefit for all patients. Gastrointestinal subepithelial tumors are traditionally managed by laparoscopic resection. However, precise delineation of the location and margins of subepithelial tumors can be challenging, thus potentially resulting in removal of additional surrounding healthy tissue to ensure a negative-margin (R0) curative resection. For endoscopic approaches, endoscopic submucosal tunnel resection and endoscopic full-thickness resection was investigated for subepithelial tumors. The endoluminal size limit its application for large tumors. Now there has been an increasing interest regarding laparoscopic and endoscopic cooperative surgery. It is a hybrid approach which could integrated superiorities of both laparoscopy and endoscopy. Besides gastrointestinal tumor, combined LC-ERCP could cure patients with choledocholithiasis and cholelithiasis. This one-stage approach was microinvasive, efficient and precise, which could benefit for rapid recovery and be done even without X-ray. Based on multidisciplinary cooperation, this novel combined strategy would innovate the new field for treating digestive diseases.

Feb 17 (Fri), 13:30-15:00

Experience of AITS: IRCAD / Taiwan

Hurng-Sheng Wu, *Asia Institute Tele-Surgery, Taiwan*

Abstract

AITS/IRCAD is established in May, 26, 2008, located near the town of Chunghua, in the middle west of Taiwan island. The modern building of institute using its European counterpart as a structural blueprint and international next work in Asia. Which architecture remains some points IRCAD's school in Strasbourg, is composed of an auditorium, able to welcome 125 participants, the morning programs, given in the auditorium, are dedicated to theoretical lecture, which explanation of the technical principles of the different surgeries, and often through high speed optic cable allowing the broadcast of live surgery in relation to the program of the theoretical session; on the third floor, there is a big experimental lab. Including 20 operative tables, each table depends on the program is allowing two attending surgeons to perform real surgeries on the quarantine porcine or cadaver.

Since 2008 till today, this school has welcomed more than 5000 surgeons from 60 countries who can benefit from Intensive or Advanced Courses (more specialized on a specific technique), which program includes a theoretical session (update concepts, explanation of surgical techniques, pre-recorded videos, live surgeries broadcast---) and animal or cadaver session.

AITS had the same faculties wise bank and programs as EITS/IRCAD, this school through the infrastructure can offer the participants the guarantee to get a first-class level of theoretical and hands-on teaching.

Stomach 1 **Training for MIS: focusing on gastric procedure**

Feb 17 (Fri), 13:30-15:00

Experience of Chinese University of Hong Kong

Enders KW Ng,
Prince of Wales Hospital, The Chinese University of Hong Kong, Hong Kong

Hong Kong is a relatively low gastric cancer incidence area with only 10 new cases per 100,000 per year. The majority of patients are being managed in public hospitals. On the other hand, we are having an increasing trend of morbid obesity and poorly controlled obese type II diabetes mellitus. Thus, training of younger surgeons for MIS gastric procedures is a challenging task.

The Hong Kong College of Surgeons has initiated governance of subspecialty training programs since 2013. The upper gastrointestinal curriculum is a two-year program in which each trainee is required to perform as chief surgeon in 50% in the first year and 75% in the second year of training. The minimum number of gastrectomy and bariatric procedures each trainee needs to be involved per year is only 20 and 12 respectively, which are deemed inadequate. Therefore, other measures are requried to overcome such a training hurdle.

Sending selected trainees to high volume centres overseas for either observation or even hands-on training is the most common practice. Our fellows often undertake their overseas training in Japan or Korea. Those who are interested in functional UGI operation or baratric surgery would go to Europe of the US instead. This allows them to directly observe experts in performing various surgery, and acquire the essential and up-to-date knowledge in the perioperative care of the patients concerned.

Our other approach is to have hands-on workshops in skill laboratories. By using animal or cadaveric models, our young surgeons can be trained for more advanced skills, such as minimally invasive radical gastrectomy and lymphadenectomy for malignancy, sleeve gastrectomy, roux en Y gastric bypass, etc.

In day-to-day practice, our trainers would divide the entire gastric operation into multiple small steps and allow individual trainees to carry out some of the procedures according to their level of experience. Sometimes a single operation may be operated by two or even more trainees under supervision.

Feb 17 (Fri), 13:30-15:00

Experience of Yonsei University

Hyoung-Il Kim, *Yonsei University College of Medicine, Korea, Republic of*

Recent decades witnessed radical changes of patient's characteristics, surgical procedures, postoperative cares and follow-up program in care for gastric cancer patients. The education of new generations should be adopted appropriately to changing environment. Regarding the patient's characteristics, more patients have comorbidities which should be considered for perioperative care requiring high index of suspicion. The cutting-edge technologies penetrated into the operating theater that many aspects of surgical procedures have changed. Compared to twenty years ago, now we have various types of energy devices and imaging systems such as 3D video, 4K image, and fluorescence imaging systems. Reconstruction maneuver also extensively changed following introduction of laparoscopy and staplers. Intra-corporeal anastomosis following resection is one of the most extensively studies area among gastric surgeons. It is worth of note that global trends of changes in anastomosis. Circular stapler is now gradually replaced by linear stapler. In our institution, anastomosis following laparoscopic gastrectomy is exclusively performed using linear stapler regardless of subtotal gastrectomy or total gastrectomy. Postoperative patients' status is reviewed at weekly meeting to assess and manage appropriately. It could be helpful to take advices from colleagues because young surgeons have limited experience in postoperative care. Follow-up of the patients in outpatient clinic also has changed. Because more number of long-term survivor is expected, nutrition and quality of life is more important than ever. Our institution is changing details of patient care according to changing environment and the education to young generation is also changing appropriately.

CRS 3 **Evolution of Minimal Invasive Surgery in Colorectal Disease**

Feb 17 (Fri), 13:30-15:00

Application of Minimal Invasive Surgery to Maximal Invasive Surgery

Jintung Liang, *National Taiwan University, Taiwan*

The possibilities for using minimal invasive technologies to improve the outcome of patients undergoing colon and rectal surgery will be enormous in the next decade. In our view, the colon and rectal specialist may possess unique skills that put her in an enviable position for a futuristic approach to the minimal invasive procedure. We expect that, to facilitate the efficiency of the laparoscopic colorectal surgery and to accelerate and enhance the educational process, the equipments such as high-definition laparoscopic video cameras, better energy devices, and increasingly smaller devices incorporating sophisticated technology (single-port device, Da Vinci system), and even the operating theater itself will be subjected to profound changes in the near future.

Feb 17 (Fri), 13:30-15:00

Current Status and Future Perspective of Single Port Colorectal Surgery

Byung Soh Min, *Yonsei University College of Medicine, Korea, Republic of*

Robotic Single /Reduced Port Colectomy
Byung Soh Min, M.D., Ph.D.
Yonsei University Health System
Seoul, Korea
Why robotic system for single port surgery?
Robotic vs. Lap.

Conversion-to-open rate: 6.8%
The most common reasons: visualization, adhesion & equipment malfunction
Patient selection on the basis of radiologic findings of inflammation, previous abdominal surgery, aberrant anatomy

Personal experience in robotic single port colectomy using glove port

LAP vs. ROB
Postoperative pain score (VAS)
LAP vs. ROB

Home-made Glove port
Vs. for Colectomy
Da Vinci Single-Site
Single-Site +1 Technique
Single-Site +1 LAR
in animal model
Porcine model

+1 robotic arm for static retraction from RLQ
+1 port later used for lap stapler insertion
Lessons from animal lab
+1 robotic arm for retraction is NOT a good idea

retracting power of single site arm was not so bad
need to fully utilize the features of +1 robotic arm
Single-Site +1 Complete Mesocolic Excision
for Right Colon Cancer
Single-Site +1 Complete Mesocolic Excision
for Right Colon Cancer
Single-Site +1 Complete Mesocolic Excision
for Right Colon Cancer
Single-Site +1 Complete Mesocolic Excision
for Right Colon Cancer

Hot issue in colorectal surgery
Optimal area for applying single port / NOTES concepts / technique
Several pioneers using laparoscopic approach, but only few using robotic approach

Transanal TME
using Home-made Glove Port
in Cadaver
Transanal TME
using Home-made Glove Port
in Cadaver
How to make it worth with single port surgery?
Strict selection of the patients
Admit the limitations
Keep struggling
Believe in Future
Future Perspectives
: The Impact of Technological Advance

Feb 17 (Fri), 13:30-15:00

Image guided laparoscopic surgery

Seong-Ho KONG, *Seoul National University Hospital, Korea, Republic of*

Laparoscopic surgery and endoscopic treatment via the so-called "4th space" (submucosal layer of the intestine) such as endoscopic submucosal dissection and POEM are examples of notable disruptive innovations of the gastrointestinal surgery in past 20 years. They drove surgeons to have an interest not only to the radicality but also to the quality of life of the patients. One of the directions of next innovation in surgery may be "Precision surgery" or "Personalized surgery", in which the surgery is individually tailored to the location of the pathologic lesion or the safety of the surgery is enhanced by ancillary tools to help surgeons avoiding injuries to normal tissues.

Different approaches are under investigation to provide visual information of the lesion and normal tissues to surgeons. One of approaches of the "image-guided surgery" is to make a digital clone of the patient from DICOM images of the preoperative images (CT/MRI) and applied in the operative view as augmented reality. There are some problems to solve for this strategy, for example, how to register the preoperative virtual image and intraoperative images, which changes by respiration, pneumoperitoneum, camera movement, and the surgical procedure, and many researches are undergoing. "Near-infrared fluorescent imaging" is a relatively economic and robust strategy to visualize normal structures and malignant lesion structures, possible lymphatic metastasis pathway of the cancer, and vascular perfusion of the organ. Cancer specific probes under development are expected to provide patient-tailored function-preserving resection. A hybrid technique combining rigid endoscopy (laparoscopy), flexible G-I endoscopy, and intravascular intervention techniques may maximize the potential of "image-guided surgery" and tailored resection.

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Feb 17 (Fri), 13:30-15:00

New Generation Robotics

Ki Beom Bae, *Inje University Busan Paik Hospital, Korea, Republic of*

Minimally invasive surgery has been remarkably developed with robotics on laparoendoscopic surgery. Robotic 3D full-HD vision system enabled surgeon to see the more magnified view of organ and tissue than the laparoscopic 2D vision. And the more precise surgery could be done with 7-degree movements of robotic instruments. Da Vinci system made these possible and has been currently applied to various kinds of surgical procedures. However, bulky robotic arms and difficulties of docking platform to patient have been the disadvantages of da Vinci surgical system. The pressing goal is to develop a platform that is less bulky, more ergonomic, and capable of providing force feedback to the surgeon. Recently developed new generation of da Vinci Xi system much improved those problems. The new da Vinci Xi robotic platform is more user-friendly, has easier installation, and is more intuitive for surgeons than previous version1. It provided a broader field of vision with excellent robotic arms movement, minimizing collisions and allowing an easier and comfortable surgical assist. Da Vinci Xi makes surgery easier in patients with shorter console times2,3. In rectal cancer surgery, overall operative times and mean hospital stays were shorter in the Xi-Robotic TME group, and fully robotic surgeries with a complete take-down of the splenic flexure with Xi-system were all done in the recent comparative study4. The new da Vinci Xi could offer some advantages with respect to the da Vinci Si in rectal resection for cancer. The synchronous movement with robotic arms and patient's bed is now possible without redocking of robotic arms, which could enhance the fully robotic surgery and shorten the operation time. The development of imaging system may also enable a wide range of sophisticated surgeries to be much easier. Single site surgery has been also developed with da Vinci single site platform such as Si-and Xi-single port platform. But, it has limitation of motion and collisions between robotic arms in multiport of small single site. Recently a true single port robotic platform(Da Vinci SP) has been developed to overcome these limitations. And it is now under clinical tests for its feasibility and safety.

Therefore, the next generation of robotics will be the true single port platform with full range of motion and with high tech imaging system discriminating nerve, lymphatics, and vessels. Moreover, one of the important requirements of next generation of robotics is also the development of surgical robots to bring a reduction in costs.

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Feb 17 (Fri), 15:30-17:00

Minimally invasive esophago-gastrectomy

Simon Law, *The University of Hong Kong, Hong Kong*

Minimally invasive esophagectomy (MIE) has gained impetus in recent years, and in many centers around the world it has become the mainstay resection procedure for esophageal cancer. The European TIME randomized trial showed an impressive 4-fold reduction in pulmonary complications compared to the open procedure. National data however have also demonstrated increased morbidities in some countries, possibly related to contamination of results from less experienced centers exploring the new technique. Uncertainties still exist regarding its widespread adoption. Technically it is also controversial whether the procedure is best carried out in the semi / prone position or left lateral position, and in this era of multimodality treatments, whether MIE is safe after such strategies, especially chemoradiotherapy (CRT).

At the author's center, 80% of esophagectomies are performed using the MIE approach in the left lateral position, the typical method for intrathoracic squamous cell cancers would be video-assisted thoracoscopic (VATS) mobilization of the esophagus with total mediastinal lymphadenectomy, and laparoscopic gastric mobilization and cervical esophago-gastrostomy. In selected patients and in patients with type I or II adenocarcinoma of the gastro-esophageal junction, an intrathoracic anastomosis is selected. Over 60% of our patients who undergo MIE would have had neoadjuvant chemoradiotherapy. Adjunctive measures are used to enhance the safety of surgery, such as use of continuous vagal nerve monitoring during recurrent laryngeal nerve nodal dissection, and indocyanine green fluorescence angiography to assess the gastric conduit perfusion used for esophageal reconstruction.

Our results indicated that in patients who had VATS or total MIE, blood loss and wound infection rates were lower than open surgery. Anastomotic leak rates were below 5%. Pulmonary infection rates were 12.5% in the total MIE group vs. 13.1% in the open surgery group. Hospital mortality rate was 4.8% in the MIE group and 1.6% in the open group (p=NS). Recurrent laryngeal nerve palsy rate was however higher in the MIE group (19% vs. 11%), related to more aggressive nodal dissection.

When neoadjuvant CRT was given prior to VATS esophagectomy, CRT + VATS had longer VATS time (180 vs. 156 mins). CRT did not result in higher pneumonia or other surgical complications. Hospital mortality rate was both at 6%. CRT + VATS group sampled more lymph nodes (median 33.8 (range 1-78) vs. 26 (range 2-72)). CRT resulted in a 32.4% pCR rate, with consequent lower stage distribution compared to VATS group. On multivariate analysis, for all patients, gender, pT stage, number of lymph nodes sampled, number of involved nodes, and R-category were independent prognostic factors.

VATS can achieve results at least comparable to that of open surgery, and is safe after CRT. Prognostic factors included gender, pT stage, number of nodes sampled, number of involved nodes and R-category.

Compression-less pancreas traction: a novel approach for supra-pancreatic lymph node dissection of laparoscopic gastrectomy

Naoki Hiki, *Cancer Institute Hospital, Japan*

Background: In radical operation for gastric cancer, it is important to maintain a balance between a quality of lymph node dissection and a safety of surgery, that is to say, less postoperative complications. During supra-pancreatic lymphadenectomy in laparoscopic gastrectomy (LG), the good operative field should be provided in a safe and effective way to reduce pancreas related complications. Here we present a novel approach without direct compression of the pancreas in LG, and consequent surgical outcomes of this method.

Methods: We previously compressed the pancreas itself during in supra-pancreatic lymph node dissection of LG to obtain an adequate operative field, and have gradually modified the operative procedures. In our new method started in January 2016, the operative field is provided pulling and controlling i) the connective tissues along the inferior border of the pancreas and ii) nerves along the common hepatic and splenic arteries, instead of direct compression of the pancreas itself. The comparison between 43 patients in the compression-plus group (CP group) in 2015 and other 43 patients in the compression-less group (CL group) in 2016 were evaluated in terms of surgical outcomes including amylase concentration of drain fluid (D-AMY).

Results: The D-AMY levels were significantly lower in the CL group postoperative day both 1 and 3 ($p = 0.001$ and 0.001, respectively) compared with the CP group. The rates of pancreatic fistula and intra-abdominal complication decreased from 7.0% to 4.7% and from 16.3% and 7.0%, respectively.
Conclusions: Our approach for supra-pancreatic lymphadenectomy "compression-less pancreas traction" can be considered as a safe and useful method in LG.

Stomach 2 **Surgery Up-to-date**

Feb 17 (Fri), 15:30-17:00

Sentinel Node Navigation Surgery for Gastric Cancer: Current Status

Keun Won Ryu, *National Cancer Center, Korea, Republic of*

FEASIBILITY STUDIES AND META ANALSYS OF SENTINEL NODE BIOPSY IN PATIENTS WITH GASTRIC CANCER

Many SNB gastric cancer feasibility studies have been published in the last decade mainly from Korea and Japan. However, most were performed by a single institution with small numbers of patients. The SNB indication and techniques, such as biopsy method, tracers, injection site, and pathological evaluations, were not standardized so procedural details differ. Several review articles and meta-analyses have been reported about this topic in gastric cancer. The pooled detection rate estimate was > 90% but sensitivity was 80%, with heterogeneity between studies. Several points have been suggested to improve SNB results, such as harvesting five or more SNs, preference for EGC rather than advanced gastric cancer, double tracers rather than a single tracer, submucosal rather than subserosal injection, and more precise pathological evaluations. The conclusion from all of these meta-analyses is that SNB is unsatisfactory for clinical application and should be used cautiously. Additional methods have been investigating recently to improve SNB results in patients with gastric cancer, particularly in terms of sensitivity.

PUBLISHED SENTINEL NODE BIOPSY CLINCAL TRIALS IN PATIENTS WITH GASTRIC CANCER

Two large-scale multicenter SNB feasibility studies in patients with gastric cancer have been performed in Japan. The first is the Japan Clinical Oncology Group trial (JCOG0302) and the other is the Japanese Society for Sentinel Node Navigation Surgery (SNNS) trial. Several of the protocols differed between the studies and the final published results were totally different. Miyashiro et al. reported that the JCOG0302 study was stopped before all patients were recruited due to the high false-negative rate. The cause of the high false-negative rate was the simple pathological evaluation and insufficient experience of the participating institutions. Kitagawa et al. reported promising results for clinical applicability from the SNNS trial. They reported 97.5% detection rate with a mean of 5.6 SNs and 93% sensitivity. Among the four false-negative cases, two were T2 lesions, and the location of missed met

astatic nodes was at the same sentinel basin in three cases. These results suggested that the optimal indication is T1 lesions, and that sentinel basin dissection rather than a pick-up biopsy is an adequate biopsy method.

A small phase II trial was reported from a single institution of Japan. Ichikura et al. reported that limited gastrectomy with SNB was satisfactory for short-term outcomes and recurrence during the observation period. Another single-center phase II trial from Korea is closing patient recruitment and the final results were reported. Primary end point of this study was 3y relapse free survival rate and 100 among 113 patients were analysed. Detection rate was 99% with 6.1 SN and 4.6 non-SN. SN of 11 patients were positive and standard surgery was performed and FNR was 2.24%. There are 7 morbidity and no mortality. During the 47.5 moth follow up period, 4 patients died and 4 cancer recurrence (one cancer death) were reported. Finally the 3y FRS was 94.9% and 3y OS was 98.0% and the conclusion of this study was that this procedure is feasible and safe.

ONGOING PHASE III TRIAL OF LAPAROSCOPIC SENTINEL NODE BIOPSY IN PATIENTS WITH GASTRIC CANCER

The controversial issue of SNB in gastric cancer has been investigated by many academic societies and institutional researchers. Several points were suggested to improve the SNB results. Moreover, most patients with EGC who will be long-term survivors want to save their stomach for improved QOL, and clinicians have the responsibility to solve this problem. A study group called SENORITA (SEntinel Node ORIented Tailored Approach) was launched by a Korean academic society that includes surgeons, gastroenterologists, pathologists, and nuclear medicine specialists to solve this problem in a phase III trial. The protocol for the SENORITA multicenter phase III trial has been developed and patient recruitment is finished last December. Briefly, the study is a non-inferior design of laparoscopic SNB with stomach preserving surgery compared to conventional standard laparoscopic gastrectomy. The primary endpoint is 3-year disease free survival and the secondary endpoints are postoperative complications, QOL, 5-year disease free survival, and overall survival. The calculated sample size was 290 patients for each arm and the indication was cT1N0 < 3 cm, regardless of the histological result. Laparoscopic SNB will be done using basin dissection, and all harvested sentinel basin nodes will be examined by intraoperative frozen section with 2 mm slices. Primary tumor resection was proposed based on our previous publication but will be modified based on intraoperative findings.

The most essential point for a SNB phase III surgical trial is to standardize and overcome the learning curve. The preceding quality control study of the participating institutions prior to the phase III trial is finished. This study was based on completing a checklist consisting

of seven essential SNB steps associated with the endoscopic, surgical, and pathological procedures. If SNB was performed perfectly in 10 patients by completing these seven steps, that institution can participate in the phase III trial. The results showed 92.6% detection rate and 100% sensitivity.

CONCLUSION

Laparoscopic SNB with gastric organ and function-preserving surgery in patients with EGC may be a good surgical option to improve short- and long-term QOL without impairing the surgical or oncologic outcomes in selected patients with EGC after validation by the SENORITA phase III trial

Feb 17 (Fri), 15:30-17:00

Knack & Pitfalls of Ventral rectopexy

Doo-Seok Lee, *Daehang hospital,Seoul., Korea, Republic of*

Laparoscopic ventral rectopexy (LVR) is a surgical procedure to correct the posterior compartment prolapse such as a rectal prolapse (EP) and a high-grade internal rectal intussuception (IP) accompanying a rectocele. Since D'Hoore et al first introduced LVR in 2004, LVR has recently gained in popularity especially in Europe. The operation includes ventral rectal mobilization without posterior mobilization and the fixation of a synthetic or biological mesh among the anterior rectal wall, the vaginal vault and the sacral promontory. This technique carries several advantages for pelvic floor reinforcement, such as the provision of support to the rectovaginal septum and the simultaneous correction of associated genital prolapse, rectocele and enterocele. Another advantage is less development of postoperative constipation caused by posterior rectal mobilization related to the rectosigmoid inertia. LVR is so-called nerve sparing surgery. So LVR is considered to be a functional surgery for obstructed defecation syndrome or fecal incontinence

LVR is a technical demanding procedure requiring precise dissection of rectovaginal septum and suturing technique in confined narrow pelvis. Fixating the mesh to the rectum is time consuming procedure using 6-7 stitches in rectovaginal septum, another two stitch to the mesocolon. There are several cases that ventral rectopexy can not be performed for patients with severe adhesion, endometriosis and previous pelvic radiation. It would be technically challenging to do LVR for male patient who has big prostate.

The main concern in performing LVR is mesh related complication; erosion, infection and chronic pain. The rates of mesh related complications were reported around 2-3 %. Another debate is whether LVR is effective for treatment of symptomatic IP as there is lack of high level evidence and standardized tool of the assessment for functional outcomes.

Multicenter randomized controlled trials for LVR are in process in Europe. The use of biologic mesh could be good alternatives to reduce mesh related complication according to the early results of studies. It is expected that LVR will be widely adopted as a functional surgery to improve the quality of life.

CRS 4 **MIS for benign Colorectal Disease**

Feb 17 (Fri), 15:30-17:00

Current status of management of diverticulitis

Min Ro Lee, *Chonbuk National University Medical School, Korea, Republic of*

In Asian countries, diverticulitis occurs primarily in the right colon, whereas in Western countries, diverticulitis involves mainly the sigmoid colon. Although the incidence of right colonic diverticulitis has been increasing in Asian countries, no definitive treatment strategy has been formulated. Treatment options for sigmoid diverticulitis are well established. Conservative management has been shown to be effective in patients with uncomplicated sigmoid diverticulitis, whereas, in patients with complicated sigmoid diverticulitis, elective sigmoid colectomy should be considered after the patient recovers from that episode.5–8 Emergency sigmoid colectomy is required for patients with diffuse peritonitis and in those who fail conservative management.

Recently, conservative management has been reported to be effective in patients with right colonic diverticulitis, and surgical resection for patients with this disease is debatable.

The present lecture is going to include the efficacy of conservative management for right colonic diverticulitis, and evaluated risk factors for recurrence following successful conservative treatment of the first attack of right colonic diverticulitis.

The Role of Laparoscopic Surgery in the Management of Inflammatory Bowel Disease

Yong Sik Yoon,
Asan Medical Center, University of Ulsan College of Medicine, Korea, Republic of

Patients with inflammatory bowel disease (IBD) comprise a population of patients that have a high likelihood of both surgical treatment at a young age and repetitive operative interventions. Therefore surgical procedures need to aim at minimizing operative trauma with best postoperative recovery.

Minimally invasive techniques have been one of the major advancements in surgery in the last decades and are nowadays almost routinely performed in colorectal resections irrespective of underlying disease. However due to special disease related characteristics such as bowel stenosis, interenteric fistula, abscesses, malnutrition, repetitive surgeries, or immunosuppressive medications, patients with IBD represent a special cohort with specific needs for surgery.

There is lack of randomized trials comparing minimally invasive surgery (MIS) with open surgery for the management of IBD. Majority of the published studies are either case control or cohort studies, which have shown reduced hospital stay, comparable or fewer complications but with an increased operating time associated with MIS. Emergency MIS can be safely undertaken providing there is appropriate patient selection, the surgeon is adequately experienced and there are sufficient resources to allow for potentially more complex operations.

This lecture summarizes current evidence of MIS for patients with Crohn's disease or ulcerative colitis and gives an outlook on the future perspective of technical advances in this highly moving field with its latest developments in single port surgery, robotics and transanal techniques.

HBP 3 **Current status and future perspective of laparoscopic HBP surgery**

Feb 18 (Sat), 09:00-10:30

Current Status of Laparoscopic Hepatectomy

KuoHsin Chen, *Far-Eastern Memorial Hospital, Taiwan*

Despite all the advances in minimally invasive surgery (MIS), laparoscopic liver resection (LLR) remains one of the most challenging procedures. Regular indications include tumors less than 5 cm in diameter, located in anteriolateral segments. Even in the countries with many active surgeons doing LLR, the penetration rate has remained low until recently. Difficulties in surgical exposure, lack of effective bleeding control tools and procedure complexity are all obstacles to wide spread of this approach, although more and more series published have demonstrated better perioperative outcomes and compatible oncological results compared to open hepatectomy. Furthermore, steep learning curve is also one of the major concerns.

During the 2nd international consensus meeting on laparoscopic liver resection held in Morioka Japan in 2014, several clinical questions had been raised and addressed. Many conceptual changes regarding LLR have been suggested although the evidence level was generally low at that time. The role of inflow control, parenchymal transection, bleeding control maneuvers, caudal to cranial approach and CO2 insufflation pressure had been discussed. With these, laparoscopic hepatectomy can be a more reproducible procedure even for major hepatectomy. Nowadays, Anatomical resection of HCC whenever possible and parenchymal sparing resection of colorectal liver metastasis (CRLM) have been recommended. Every year, more and more surgeons have engaged in this field and several surgical innovations have been obtained.

Laparoscopic major hepatectomy become a more standardized procedure including donor hepatectomy in living donor liver transplantation. Until recently, some experts centers from different countries advocated either pure laparoscopic or robotic approach in donor hepatectomy for adult to adult living donor liver transplant. However, this procedure is highly sophisticated and should be very cautiously performed for the sake of donor safety.

With the introductions of new image modalities for preoperative evaluation, surgical planning and even navigation, new endoscopic image system with various new functions including flexible endoscope, 3-D image, ICG fluorescence image and augmented reality etc, laparoscopic major liver resection become more and more reproducible.

In this talk, the major conceptual changes in LLR will be addressed. Current status of LLR will be summarized.

Feb 18 (Sat), 09:00-10:30

Current Status of Laparoscopic Pancreatobiliary Surgery

Song Cheol Kim,
University of Ulsan College of Medicine and Asan Medical Center, Korea, Republic of

Minimally invasive surgeries (e.g., laparoscopic or robotic surgeries) have been accepted and standardized as safe procedures, with comparable or better results compared to conventional open surgeries for managing various diseases of the intraabdominal organs. Likewise, the laparoscopic approach for the pancreas and biliary disease is performed more frequently. Laparoscopic distal pancreatectomy(LDP) is now accepted as the preferred procedure for managing benign and malignant lesions in the body or tail of the pancreas by many pancreatic surgeons. LDP provides the advantages in terms of reduced blood loss and enhanced postoperative recovery resulting in shorter hospital stay and similar rate of POPF and other complication compared to open distal pancreatectomy (ODP). LDP is also associated with the significantly better quality of life (QoL) compared to ODP.

Nevertheless, pure totally laparoscopic pancreaticoduodenectomy (LPD) is still not performed worldwide because of the complexity of the procedure. Most of the meta analyses found that LPD or Robotic assisted LPD (RAPD) were feasible and oncologically safe procedures. Although the operative time was longer in LPD and RAPD, most perioperative and oncologic outcomes were comparable and LOS was shorter. Moreover, laparoscopic or robotic procedures performed by experienced providers were more favorable regarding intraoperative and postoperative outcomes. But randomized controlled trials and prospective studies that provide unbiased data are necessary, as well as data accumulated by providers' training for TLPD should also be analyzed.

Minimally invasive biliary surgery also well accepted in laparoscopic or Robotic cholecystectomy, and choledochal cyst. Robotic single port laparoscopic is the emerging new surgical technique in minimal invasive biliary surgery. Minimal invasive surgery for distal bile duct cancer is developing as a part of LPD. Minimal invasive surgery for hilar bile duct cancer is still remaining as an experimental procedure.

HBP 3 **Current status and future perspective of laparoscopic HBP surgery**

Feb 18 (Sat), 09:00-10:30

Tips and tricks for maximum utilization of CUSA during laparoscopic hepatectomy

Goro Honda,
Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital, Japan

The functions of devices used for dissecting liver parenchyma can be categorized as follows: 1. excavation: crushing the liver parenchyma and exposing the vessels; 2. suction: removing the fluid including blood from the dissected portion; 3. stanching: coagulating or sealing the vessels at bleeding points; 4. transection: cutting the vessels and membranes; 5. spreading field: providing good operative field by pulling or compressing. A cavitron ultrasonic surgical aspirator (CUSA) can facilitate functions 1 to 3 in a single device by mounting the function of low voltage electric cautery (VIO) at the tip. Additionally, transection can be partially done for thinner vessels, using the tip of CUSA like a knife, after sealing them. Because changing devices in laparoscopic surgery leads to loss of time and stress to the surgeon, CUSA, which has multiple functions, is very useful. However, there are several tips and tricks to utilize these functions maximally. Herein, we present our approach on using CUSA as a standardized technique.

Feb 18 (Sat), 09:00-10:30

Advanced laparoscopic pancreato-biliary surgery: How to create a reliable operation?

Yoshiharu Nakamura, *Nippon Medical School, Japan*

Laparoscopy affords 10 to 15 times magnification on intra-abdominal tissues, organs, and vessels compared with an open approach. And laparoscopic surgery can improve the visualization of intra-abdominal organs for all surgeons involved in the operation through the monitor, especially of the retroperitoneal organs. In this respect, laparoscopic pancreato-biliary surgery is obviously superior to an open approach. Additionally, senior surgeon can give timely advices to the operator's techniques through the monitor that can provide the same visual field to all surgeons involved in the operation. In this regard, laparoscopic surgery could be an adequate tool for surgical education. The disadvantages of laparoscopic surgery compared with an open approach include the limited range of motion and the limited sense of touch, because laparoscopy is performed using a number of forceps inserted through trocars. Moreover, laparoscopic surgery is sometimes more difficult compared with open surgery, in part because surgeons must operate in a three-dimensional space through a two-dimensional (2D) vision, which results in loss of depth perception. It is important to create the good operative field in laparoscopic surgery even in hepato-biliary pancreatic area. Consequently, surgeons must determine the appropriate operative procedure for every single patient, whether laparoscopic pancreato-biliary resection is suitable or not, by accessing a full understanding of the both advantages and disadvantages on laparoscopic procedures. In our opinion, execution of the above-mentioned strategy must be done before and during the operation, and which can be the most feasible strategy against the difficulties of advanced laparoscopic pancreato-biliary operations.

To date, we have performed laparoscopic pancreato-biliary surgery in more than 250 patients and brought up many next generations to be good laparoscopic surgeons. The objective of this presentation is to provide everyone with a better understanding of how to create a reliable operation and how to make a good team through overcoming the several difficulties of advanced laparoscopic pancreato-biliary resections based on our experience and a review of the literature.

HBP 3 **Current status and future perspective of laparoscopic HBP surgery**

Feb 18 (Sat), 09:00-10:30

The Current Status of Laparoscopic Hepatectomy in China

Xiao-Ping Chen, *Tongji Medical College, China*

China laparoscopic hepatectomy originated in the last century at the beginning of 90s. After 20 years of development, now laparoscopic liver resection in China widely popularization. In addition to Shanghai, Beijing, Wuhan, Guangzhou and other places of large hospitals, many county hospitals have carried out laparoscopic liver resection. As of the end of 2016, according to incomplete statistics, the total number of cases Chinese laparoscopic liver resection has more than 20 thousand cases. The development process of China laparoscopic liver resection will be introduced.

Feb 18 (Sat), 09:00-10:30

Current status and future perspective of Robotic HPB Surgery

Chung Ngai Tang, *Pamela Youde Nethersole Eastern Hospital, Hong Kong*

The development of laparoscopic HPB surgery is relatively slow in comparing to other abdominal operations and it has not yet become mainstream treatment due to the high technical requirement, the difficulties in mobilizing the liver & pancreas, safety in performing demanding anastomosis, concerns about hemostasis and the fear of gas embolism and more importantly the skepticism in applying this approach for malignancy. Most of the studies have focused on feasibility and safety, and some also addressing the long-term oncological results, all of which seem to be similar to the open approach. Generally, laparoscopic HPB surgery is considered to be a safe, feasible and oncologically comparable to open counterparts in selected patients under expert hands.

The recent introduction of robotic surgical system has revolutionized the field of minimal access surgery. Robotic technology allows surgeon to perform challenging tasks and procedures that are technically demanding and difficult in laparoscopic surgery. The robotic surgical system overcomes many obstacles of conventional laparoscopic surgery. It improves dexterity, eliminates fulcrum effect and physiologic tremors and its three-dimensional imaging allows precise tissue manipulation and suturing. With the surgeon sitting at a remote and ergonomically designed workstation, current system also eliminates the need to twist and turn in awkward positions to move the instruments and visualize the monitor. Most importantly, faster acquisition of surgical skills and shortening of learning curve can be enhanced which are crucial for popularization of a surgical approach.

During the 4-year period from May 2009 to January 2017, we have performed 1586 robotic operations in Pamela Youde Nethersole Eastern Hospital (PYNEH) with only 1.26% open conversion and 0.25% operative mortality rates respectively. In contrary to the western world, majority of our cases are general surgery (n=974) in which 485 cases (30.5%) are robotic HPB surgery. The remarkable success of robotic HPB surgery (n=485) has in fact drawn significant attention from the rest of the world and therefore we have been frequently invited to share our experience in local and international conferences.

Apart from feasibility and safety, more studies with long-term follow-up are needed to evaluate its optimal role. There is no doubt that this technology will continue to contribute to the future development of HPB surgery.

Stomach 3 **Laparoscpic total gastrectomy I**

Feb 18 (Sat), 09:00-10:30

Laparoscopic modified esophagojejunostomy

Sang-Uk Han, *Ajou University School of Medicine, Korea, Republic of*

The recent nationwide survey on gastric cancer has been published. In 2014, more than 50% of all gastric cancer surgeries were performed by minimally invasive surgery. Of them, totally laparoscopic surgery was performed in 4,388 patients (28.1% of all gastric cancer surgery), however the proportion of totally laparoscopic total gastrectomy was only 3.4%.

Intracorporeal esophagojejunostomy remains the most critical and technically challenging step in laparoscopic total gastrectomy. Various methods for laparoscopic total gastrectomy have been introduced, but no standard protocol has been established. Intracorporeal reconstruction methods for Roux-en-Y esophagojejunostomy are categorized into the linear stapler and circular stapler methods, according to the type of stapler used for the esophagojejunostomy. Definitive evidence on the superiority of either method is still lacking. A recent review suggested that the circular stapler method is associated with a significantly higher risk of leakage and stenosis of the esophagojejunostomy: the rates of leakage for the circular and linear stapler methods were 4.7% and 1.1%, respectively ($p < 0.001$), while the rates of stenosis were 8.3% and 1.8%, respectively ($p < 0.001$). However, this study was not a systematic review, but included 23 retrospective and two prospective studies.

The overlap method is one of the most favored linear stapler methods. It was first introduced by Inaba et al. in 2010, and has several advantages over conventional end-to-side anastomosis using a circular stapler. Stapler handling is easier, even in a narrow space, and stapling can be performed regardless of the diameter of the esophagus. However, the overlap method that is currently being used has several technical shortcomings, namely, difficulties obtaining traction on the esophageal stump that necessitates the use of an additional stay suture, the risk of unintended stapling of the left crus, and the need for an additional stay suture when closing the common entry hole. To overcome these shortcomings, we modified the conventional overlap method using two barbed knotless sutures. We have termed this method 'MOBS' and performed it since March 2015. We here introduce our technique with its safety and feasibility for not only laparoscopic surgery but robotic surgery, based on our experience.

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Stomach 3 **Laparoscpic total gastrectomy I**

Feb 18 (Sat), 09:00-10:30

Laparoscopic total gastrectomy for esophago-gastric junctional adenocarcinoma

Eishi Nagai, *Graduate School of Medical Sciences, Kyushu University, Japan*

The incidence of esophago-gastric junctional (EGJ) adenocarcinoma has been increased in not only western countries but also eastern countries. EGJ carcinoma is defined as carcinoma with its center located within 5cn of the esophago-gastric junction, which is further classified into three groups depending on its epicenter. The prognosis of the EGJ adenocarcinoma remains still poor. Surgery is the most effective treatment to cure the EGJ carcinoma. However, the optimal surgical procedure for EGJ adenocarcinoma has yet to be established, because the pattern of nodal involvement is unclear. Moreover, the tumor location near the esophageal hiatus makes it difficult to achieve R0 resection, which is the most important factor for cure. Recently, Japanese gastric cancer association has demonstrate the tentative standard in the extent of lymphadenectomy for junctional cancer based on tumor location, histology and T-categories which may support appropriate surgical management of EGJ carcinoma. Laparoscopic gastrectomy has been gaining acceptance as a surgical option for advanced gastric cancer. Recently, laparoscopic procedure has been adopted for the treatment of EGJ carcinoma, because laparoscopic surgery can provide us excellent operative view even near the esophageal hiatus.

Our surgical procedure is as follows; We performed 3D computed tomography preoperatively to confirm the vessel anatomy around the stomach and the pancreas. Under general anesthesia, the patient was placed in the supine position with legs slightly apart. The operator and first assistant stood on the patient's right and left sides, respectively, and the laparoscope operator stood between the legs of the patient. First, a trocar 12 mm in diameter was inserted near the umbilicus by the open laparoscopy method. Under pneumoperitoneum of 12 mmHg, 12 mm trocars were inserted into the bilateral abdomen and 5 mm trocars were placed into the bilateral upper abdomen. Liver retractor was inserted in the epigastrium. After dissecting the regional lymph nodes around the stomach, lymphadenectomy of No. 19 (infradiaphragmatic LN), No. 20 (LN in the esophageal hiatus of the diaphragm) and No. 110 (paraesophageal LN in the lower thorax) was performed. During this procedure, thoracic cavity was sometimes opened. After checking the oral side of the tumor by intraoperative EGD scopy, we divided the esophagus using linear stapler. Before reconstruction, the whole

stomach with regional lymph nodes was taken out through a minimally enlarged umbilical incision to check the lesion. The esophageal stump was checked by frozen section. Roux-en-Y reconstruction was performed by transhiatal approach. The Roux limb was ascended through the retrocolic route. Esophago-jejunal anastomosis was performed using linear stapler. After the linear stapler was fired, the common entry incision was closed by hand sewing to avoid possible stenosis of the anastomotic site. When an esophago-jejunal anastomotic site was very high in the mediastinum, transthoracic approach was attempted for esophago-jejunostomy under prone position.

We will show our surgical strategy and the detailed surgical procedure for EGJ carcinoma using video clips.

Stomach 3 **Laparoscpic total gastrectomy I**

Feb 18 (Sat), 09:00-10:30

Laparoscopic total gastrectomy with D2 lymphadenectomy

Chang-ming Huang, *Fujian Medical University Union Hospital, China*

The incidence of No. 10 lymph node metastasis is reported to be 9.2%-20.0% in advanced proximal and middle gastric cancer. Thus, according to the Japanese treatment guidelines for gastric cancer, D2 lymphadenectomy, including No. 10 lymph node dissection, should be adopted for total gastrectomy in advanced gastric cancer. However, due to the complexity of the splenic hilar vessels, often adhering to the omentum or peritoneum, and the narrow and deep space at the splenic hilum, spleen-preserving splenic hilar lymphadenectomy is difficult. And it has become one of the most difficult operations during the surgical treatment of gastric cancer. In the early years, splenectomy was performed to achieve radical lymphadenectomy in many centers. However, this operation brought more surgical trauma and higher morbidity and mortality rates. While in recent years, with the further study of the surgery of the spleen, the important immunologic function of spleen has been recognized by people. And increasing improvement of the surgical techniques also makes the spleen-preserving splenic hilar lymphadenectomy to be accepted by more and more surgeons. Based on our experiences with laparoscopic gastrectomy for gastric cancer, we gradually explored a set of procedural operation steps called "Huang's three-step maneuver". We not only provide the concrete operation steps for the surgeon, but we also provide our recommended technique of pulling and exposure for assistants. This new maneuver simplifies the complicated procedure and improves the efficiency of laparoscopic spleen-preserving splenic hilar lymphadenectomy, making it easier to master and allowing for its widespread adoption. Moreover, in our study, the operative complication rate did not increase during laparoscopic spleen-preserving splenic hilar lymphadenectomy. It has been confirmed that laparoscopic spleen-preserving splenic hilar lymphadenectomy is safe and feasible.

Bariatric 1 **Bariatric & Metabolic Surgery Session**

Feb 18 (Sat), 09:00-10:30

Mini Gastric Bypass: Current Status

Ahmad Assalia, *Rambam Health Care Campus, Israel*

Until recently, Mini-Gastric Bypass (MGB) was considered a controversial procedure due to the lack of long term results, the issue of nutritional deficiencies and the issue of biliary reflux with its long-term potential consequences. Even though, in the recent years, it is gaining increasing popularity as more experience and long-term results are accumulating. As thousands of procedures were performed around the globe, it appears that MGB is a safe and effective bariatric procedure. It's associated with less technical complexity, has shorter learning curve, revisable and reversible, with even better results than sleeve gastrectomy and Roux en-y gastric bypass. The incidence of symptomatic bile reflux is very low with unclear consequences for the long-term and nutritional deficiencies are manageable in the vast majority of patients.

Bariatric 1 **Bariatric & Metabolic Surgery Session**

Feb 18 (Sat), 09:00-10:30

Surgical Tip of Bariatric Surgery for Super-obesity Patients

Tae Kyung Ha, *Hanyang University College of Medicine, Korea, Republic of*

Currently, bariatric surgery has been widely performed to treat patients suffering from morbid obesity. Obesity is recognized as a disease, thus can be graded by severity. Body mass index (BMI) is most useful and simple diagnostic method to classify the extremity of obesity. Morbid obesity is considered if the BMI of a patient is more than 40 kg/m2. Patients with more than 50 kg/m2 of BMI are classified into superobesity. This extreme disease is challenging for bariatric surgeons because the risk for morbidity and mortality is higher than morbid obesity. Therefore, all of the members involved in the management of obesity should practice complete and thorough preoperative evaluation, which could reduce the risk and enhance surgical outcome.
Preoperative assessment of a bariatric surgical patient includes cardiovascular system, respiratory system, endocrine disease, psychological problem, and musculoskeletal disease. Among them, deep vein thrombosis which is the second most common cause of death for bariatric surgery should be evaluated and prevented preoperatively. Respiratory system also should be assessed prior to surgery because patients undergoing bariatric surgery have pulmonary disease undiagnosed such as obstructive sleep apnea which eventually causes severe morbidity and mortality after the surgery. If the patient is found to have the condition, preoperative use and adaptation of continuous or bilevel positive airway pressure apparatus while sleeping can reduce the hypoxic and hypercarbic respiratory arrests.

Operative equipment

The operating room needs to contain an operating table that can accommodate up to 300 kg. Side attachments and foot board provides safe patient positioning and preventive measures of pressure ulcers during operation should be considered. Gel or foam soft pad can support and prevent this problem.
To acquire ergonomic operating environment, you have to stand up on operating stepboard which enable you perform in a convenient posture because abdomen of patients with superobesity are highly distended under pneumoperitoneum.
The complete dissection around angle of His created between the cardia at the entrance

of the stomach and the esophagus allow you to carry out safe transection of upper body of stomach not injury to the esophagus. It is important to note that inadvertent injury to upper pole of spleen also can occur before doing staple firing.

We would like to summarize below,
Bariatric surgeons who have patients with superobesity undergoing surgery should assess preoperative undiagnosed problems which cause serious complications after surgery and treat them with members of bariatric team before planned operation. Operative steps for superobesity patients should proceed with extreme caution and close monitoring for unrecognized respiratory depression should be essential.

Bariatric 1 **Bariatric & Metabolic Surgery Session**

Feb 18 (Sat), 09:00-10:30

Oncometabolic Surgery for Type II DM Gastric Cancer

Jong-Han Kim, *Korea University Ansan Hospital, Korea, Republic of*

Backgrounds

When we look at the prevalence of adult obesity, the proportion of overweight people in Asia is quite similar to United States, but as BMI goes up through 30, there is big difference in obesity prevalence between United State and Asian countries. However, our country have type II diabetes as many as United States with very low incidence of morbid obesity. We think right now Asians have 10% disease prevalence of type II diabetes. It means there are a lot of non-morbidly obese metabolic diseases and pure metabolic surgery would be essentially needed for those patients. Also, our country have increasing trend of type II diabetes and there are around 5 million people potentially diabetic in this small country.

The incidence of early gastric cancer is increasing due to increased supply of endoscopy and screening program around the country and almost 70~80% of gastric cancer cases are diagnosed in early stage. For the treatment of early gastric cancer, the proportion of endoscopic submucosal dissection is abruptly increasing recently and the long-term outcomes reported are not inferior compared with laparoscopic gastrectomy. So, which therapeutic option between endoscopic resection and surgery is the best choice for early gastric cancer? If type II diabetes gastric cancer patients who are expected long-term survival when they were curatively resected can resolve their metabolic problem, surgery can be more attractive option compared with endoscopic resection.

What is oncometabolic surgery?

The concept of oncometabolic surgery is based on the theory of metabolic and gastric cancer surgery for the non-morbidly obese patients with metabolic diseases who have gastric cancer but expected long-term survival when curatively resected.

The origin of effectiveness for metabolic surgery are weight loss, bypass and altered gastrointestinal hormonal secretion from resection of gastric fundus. In high BMI patients over 35, the weight loss is a more powerful factor for metabolic effect. In otherwise, fundus removal and bypass can be a more profound comparing weight loss.

In 2013, Dr. Park in Korea University reported the foregut theory is the possible mechanism of action for the remission of type II diabetes in low body mass index patients undergoing subtotal gastrectomy for gastric cancer. In his report, factors for diabetes remission were

HbA1c, BMI change and Billroth II reconstruction and remission rate and reduction rate in HbA1C were higher in cases of Billroth II than Billroth I reconstruction. So, the effect of reconstruction after gastrectomy on type II diabetes was influenced by the presence of bypass. Then, how we predict remission of type II diabetes after metabolic surgery? At the results of recent several reports, good responders were proved to be the patients who have short duration of diabetes, especially less than 5 years, whose blood sugar level were controlled not by insulin but medication, young aged and evidence of adequate beta cell mass in pancreas (C-peptide > 3 ng/ml). So there is ABCD scoring system for evaluation of prediction of diabetes remission including Age, BMI, C-peptide and Duration of diabetes.

Ongoing study for Onco-metabolic surgery

Now, we have ongoing project of prospective pilot study namely, "The Effect of long-limb bypass reconstruction after gastrectomy in gastric cancer patients with type II diabetes" in our center from 2014. In long-limb bypass reconstruction, the length of biliopancreatic limb is over 50 cm and the length of Roux limb is over 100 cm, so the total bypass length is over 1.5 m. In this year spring, we reported interim outcomes for our project : "Comparison of the therapeutic effect for type II diabetes between long-limb & conventional bypass reconstruction after Subtotal Gastrectomy in patients with gastric cancer" In this study, we performed long-limb reconstruction after gastrectomy in type II diabetes gastric cancer patients for simultaneous control of gastric cancer & type II diabetes. In backgrounds, westernization of dietary life in Korea resulted in high incidence of type II diabetes with gastric cancer recently. .The aim of this study was to investigate association between diabetes control and length of bypass limb due to national reimbursement for surgical treatment of gastric cancer. In results, the reduced value of BMI and improvement of diabetes control that is to dose reduction or termination of diabetes medication and insulin therapy were statistically different between long-limb bypass and conventional bypass reconstruction group. In multivariate analysis, long-limb bypass reconstruction method was proved to be significant factor for diabetes control improvement. Future perspectives for this prospective study are long-term outcome, large scale and establishment for the "Length" of bypassed proximal intestine and standard of oncometabolic surgery for gastric cancer.

Summary

Oncometabolic surgical concept needs to be considered for gastric cancer with favorable prognosis.

Mechanism studies of pure metabolic effect for non-morbidly obese subject are needed.

More index other than BMI to evaluate metabolic status should be developed for the non-morbidly obese population with type II diabetes undergoing gastrectomy for gastric cancer.

Bariatric 1 **Bariatric & Metabolic Surgery Session**

Feb 18 (Sat), 09:00-10:30

New Method of Adjustable Gastric Band: S-loop

Yun Chan Park, *Seoul Slim Surgery, Korea, Republic of*

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Feb 18 (Sat), 09:00-10:30

Endoscopic and Robotic Transaxillary Thyroidectomy; Positioning and Instrumentation

Jong Ju Jeong, *Severance Hospital, Korea, Republic of*

The operative set up is consist of 3-stage; patient position, developing working space, docking and instrumentation. The soft pillow is inserted under the patient's shoulders for the slight extension of the patient's neck. The lesion side arm is raised and fixed to expose the axillary area and to shorten the distance between the lesion-side arm pits to anterior neck area. After patient positioning, the surgeon should develop the working space.5 to 6cm skin incision is made along with the lateral border of pectoralis major muscle. next step is subcutaneous chest skin flap. subcutaneous chest skin flap is made along with the anterior border of pectoralis major muscle. After indentifying the lesion-side clavicle, the procedure goes to the subplatysmal lateral neck skin flap until 2 branches of SCM muscles are exposed. After exposing the 2 branches of the SCM muscle, the dissection is approached through the avascular space between the 2 heads of the SCM muscle. After identifying omohyoid muscle, not cutting the omhyoid muscle and only freeing the muscle from the strap muscle is enough for the adequate exposure of thyroid gland. After drawing the omohyoid muscle superiorly, the carotid sheath is separated down from the strap muscle. The common carotid artery, the internal jugular vein and strap muscles are exposed. After lifting up the strap muscle and drop down the jugular vein, the lateral border of thyroid gland is exposed. The exposure of thyroid gland is made until one-third portion of contralateral thyroid lobe is exposed. After inserting external retractor, the retractor is connected with the suspension devices and table mount for the elevation of skin flap, sterna head of SCM muscle, and strap muscles.
The operation table is adjusted for the matching of the retractor blade with the axis of robotic column at the same alignments. For the right-side approach, 30-degree dual-channel endoscope are located in the center of the axillary incision. The camera is inserted in an upward direction. An 8-mm trocar for the ProGrasp forceps is then positioned at the right of camera, parallel with the suction tube of the retractor blade. The 5-mm trocar of a Maryland dissector is then positioned on the left of the camera and the 5-mm trocar for the Harmonic curved shears at the right side of the camera. Instruments should be as far apart as possible.

THY 1 **Basic skills of Endoscopic and Robotic Thyroid Surgery: Postioning and Instrumentation**

Feb 18 (Sat), 09:00-10:30

Basic skills of endoscopic and robotic thyroid surgery positioning and instrumentation: Bilateral Axillo-Breast Approach (BABA)

Su-jin Kim, *Seoul National University Hospital, Korea, Republic of*

Although open thyroidectomy (OT) is the treatment of choice of thyroid surgery, oncoplastic thyroid surgery using bilateral axillo-breast approach (BABA) can provide cosmetic effects and surgical safety and oncologic completeness to patients who do not want scar on the neck. After application of da Vinci robotic system, BABA robotic thyroidectomy overcomes the disadvantages of endoscopic surgery such as 2-dimensional view or the camera and inflexible instruments. BABA robotic thyroidectomy has shown a successful surgical outcome, but most of the surgeries are performed in South Korea, and there are controversies about oncological safety in differentiated thyroid cancer (DTC). To date, no randomized controlled trial is available in comparing RT to OT. All published studies are nonrandomized or retrospective comparisons. RT compares less favorably than OT for longer operative time, higher cost, and required higher technical skill, and advanced training. However, in terms of surgical safety and oncological completeness, BABA robotic thyroidectomy (RoT) is comparable with OT. In addition, in selected patients, BABA RoT is feasible to treat Grave's disease, thyroglossal duct cyst, and lateral cervical lymphadenopathy. Oncoplastic thyroid surgery using robotic or endoscopic BABA approach offers better cosmetic satisfaction to patients than OT and also showed similar surgical and oncologic completeness as OT.

Feb 18 (Sat), 09:00-10:30

Positioning and Instrumentations in Transoral Endoscopic / Robotic Thyroidectomy Using Vestibular Approach

Hoon Yub Kim, *Korea University Anam Hospital, Korea, Republic of*

Introduction

The existing endoscopic or robotic methods for thyroidectomy have been criticized for not being truly minimally invasive, since they require extensive dissection of the chest and neck region and a long operative time. Many surgeons believe these procedures are more invasive than conventional open thyroid surgery, and thus research has continued on less invasive methods. Transoral thyroid surgery was developed to fill this need for a truly minimally invasive approach.

Historically, Wilhelm et al. [1] reported the first human series of transoral thyroidectomy in eight patients. Nakajo et al.[2] reported the results of clinical trials as well. They performed transoral endoscopic thyroidectomy named as TOVANS without gas insufflation. These studies inspired us to develop our new mandibular periosteal approach for thyroid surgery, which we named as the transoral periosteal thyroidectomy (TOPOT). Through experimentation with cadavers, we defined anatomical spaces and developed a mandibular periosteal approach that does not limit the movement of endoscopic instruments and reduces the risk of injury to the upper teeth, nose and mental nerves.[3]

To develop the feasible and ideal anatomical approach, and then to evaluate the clinical safety before the application of the method to real human beings, TOPOTs were performed in seven fresh human cadavers and ten live pigs. Total thyroidectomies were successfully performed in all these cadavers and the pigs. The recurrent laryngeal nerves could be identified and preserved in all cadavers using TOPOT. Median operative time was 89.8(55-132) minutes. In the swine experiments, we could find no serious intra/postoperative complication, just except the postoperative fluid collection in the operative space when the drain was not placed in it.[4]

On the basis of the successful cadaver and animal trials, and then after the approval of the IRB, we started the robotic transoral thyroidectomy procedures using our periosteal approach in the patients, which, we believe, would be the first series of robotic transoral thyroidectomy in live human beings.[5]

Positioning, Instrumentations and Procedures of Transoral Robotic Thyroidectomy (TORT)

I. Working space formation

Once the patient is placed under general anesthesia, the neck is placed in slight extension. Three incisions are made in the gingival-buccal sulcus: one in the midline, approximately 2 cm above the frenulum labii inferioris, and two laterally near the angle of mouth. The central incision is addressed first. A submental subplatysmal pocket is formed to create a tunnel towards the edge of the mandible. Blunt dissection is performed to elevate the platysma off the strap muscles all the way down towards the suprasternal notch. This blunt dissection is facilitated via injections of saline mixed with epinephrine into the subplatysmal layer. Once an adequate flap is created, the endoscope (30 degrees, down facing) cannula is inserted. CO2 insufflation (8-10 L/min) is introduced and maintained via the central port. A similar blunt dissection is also performed from the two lateral incision sites allowing insertion of the instrument cannulae into the subplatysmal working space. A few vicryl stitches can be used to help retract the subplatysmal flap superiorly in order to create a larger working space.

II. Docking stage

Once the working space formation is complete, the robotic system is deployed. The cannulae are inserted into the robotic arms, starting with the central cannula to secure the position of the endoscope. A Maryland dissector and the Harmonic scalpel are inserted into the left and right ports respectively.

III. Console stage

Dissection in the midline raphe is performed to separate the strap muscles. The strap muscles are dissected off the thyroid gland, exposing the lobe(s) of interest. The pyramidal lobe is dissected off the thyroid cartilage and isthmusectomy is performed. Once the thyroid lobe is freed off the trachea medially, the superior pole is addressed. Careful dissection of the superior lobe is performed ligating one vessel at a time. The superior parathyroid gland is identified and preserved. The thyroid lobe is retracted inferiorly to facilitate the identification of the recurrent laryngeal nerve (RLN) at its entry point into the larynx. Once the RLN is identified and carefully preserved, the Berry's ligament is addressed. The dissection is then carried out inferiorly preserving the inferior parathyroid gland. Once the inferior lobe is free off of its surrounding soft tissue, hemithyroidectomy is complete.

Ipsilateral central compartment dissection with tracing the RLN into the thoracic inlet may be followed if it is needed, and the lympho-adipose tissue in the central compartment can be retrieved en-bloc with the resected thyroid lobe. The specimen can be removed through the midline oral incision or through the additional axillar incision, which later can be occupied by the closed suction drain, in the plastic bag.

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HBP 4 **Video session: How I do it (Liver surgery)**

Feb 18 (Sat), 11:00-12:30

Left lateral sectionectomy

Ji Hoon Kim, *Eulji University School of Medicine, Korea, Republic of*

Laparoscopic left lateral sectionectomy (Video session: How I do it)

With the accumulation of experience in the field of laparoscopic surgery and further development of laparoscopic instruments, laparoscopic liver resection has rapidly evolved and become a viable alternative to open liver resection. Indication and application of laparoscopic liver resections have significantly extended, and the limitations have gradually diminished[1]. The laparoscopic approach to left lateral sectionectomy should be considered the standard of care. laparoscopic left lateral sectionectomy is increasingly becoming the accepted approach for resection of tumors in hepatic segments II and III, the variations in surgical technique exist[2,3]. We herein describe surgical procedures of pure laparoscopic left lateral sectionectomy.

Surgical procedure

Four trocars were placed in the upper abdomen. Intra-abdominal pressure was maintained at 10-12 mm Hg. After cholecystectomy, an umbilical tape was inserted to encircle the hepatoduodenal ligament for the Pringle maneuver. The superficial hepatic parenchyma was transected using energy devices, and the deeper portion of the parenchyma was dissected using a laparoscopic Cavitron Ultrasonic Surgical Aspirator (CUSA). In our center, a modified liver hanging maneuver was applied, as previously described[4,5].

The upper end of the hanging tape was placed on the lateral side of the left hepatic vein, and the pathway of the tape was positioned along the ligamentum venosum.

Parenchymal transection is carried out until portal pedicles of segments II and III are exposed.

portal pedicles of segments II and III were divided using vascular stapler. The left hepatic vein is encircled by the hanging tape at the end of parenchymal transection. The left hepatic vein divided using vascular stapler.

After careful hemostasis, a fibrin glue sealant was applied to the liver raw surface. Following irrigation of the surgical field, a silastic drain was inserted, and the wound was closed in layers. The resected specimen was placed in a plastic vinyl bag and withdrawn through trocar site extension or previous incision.

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HBP 4 **Video session: How I do it (Liver surgery)**

Feb 18 (Sat), 11:00-12:30

Laparoscopic Left Hepatectomy adopting Extrafascial Glisson Approach

Yang-seok Koh, *Chonnam National University Hwasun Hospital, Korea, Republic of*

INTRODUCTION

Laparoscopic left lateral sectionectomy is now accepted as a standard surgical method for the lesion in the left lateral section. However, laparoscopic left hepatectomy is yet to gain credit for left lobe lesions as a standard option. The author would like to introduce a simple method of inflow control for laparoscopic left hepatectomy.

METHODS AND PROCEDURES

55 year-old female with two hepatic metastases on S4a and S3. She was underwent retroperitoneal mass excision for leiomyosarcoma two years ago. Laparoscopic left hepatectomy was planned and performed. Intraabdominal adhesion was cleared and GB was dissected out. Inflow control was glissonian approach. For this, arantius duct was divided and its caudal end was retracted until left portal pedicle was exposed. Anteriorly, uplifting round ligament and lowering hilar plate could help creating front gate for the Goldfinger to isolate the left pedicle. Left pedicle was stapled and transected. Parenchymal dissection was carried out along the demarcation line exposing MHV fully. Transected left liver was wrapped in a plastic bag and taken out through previous incision.

RESULTS

Patient was discharged uneventfully at postoperative 9 day. She received chemotherapy thereafter.

CONCLUSION

Extrafascial Glisson approach is very safe and easy way for inflow control. During laparoscopic left hepatectomy, it can reduce operation time and safely be carried out.

Feb 18 (Sat), 11:00-12:30

Pure Laparoscopic Right Hepatectomy for Hepatocellular Carcinoma in Patients With Cirrhosis

Youngin Yoon, *Korea University College of Medicine, Korea, Republic of*

LRH Definitions and Technique

LRH was performed using a pure laparoscopic technique, in which the entire liver resection procedure was completed using a laparoscopic port; hand assisted devices or working incisions were not used. During the pure LRH, the patient was positioned in the supine French position with the surgeon standing between the patient's legs. A CO2 pneumoperitoneum was established, with intra-abdominal pressure controlled less than 12mmHg. Five ports were usually used. The laparoscope was inserted through the umbilical trocar site first to evaluate the resectability of the HCC. Four other trocar are inserted. In most cases the anterior approach technique was performed, before mobilization of right side of liver, we controlled inflow of the liver using the Glissonean approach. The right portal pedicle was isolated and encircled with a nylon tape and clamped using a bulldog clamp. Hepatic resection line was delineated by clamping of right Glissonean pedicle. Intraoperative ultrasonography was routinely used to guide the resection planes and ensure tumor-free margins. To facilitate the confirmation of the location of HCC and the estimation of the required extent of hepatic mobilization, 0.3 mg/kg body weight of indocyanine green (ICG) was administered intravenously 36 hours prior to surgery to some of the patients undergoing LRH. The transection was performed from the anterior surface of the liver to the right liver hilum along the middle hepatic vein (MHV), and down to the anterior surface of the IVC. During transection of the liver, a Pringle maneuver was used in some cases for intervals of 15 min with a resting period of 5 min between intervals. Central venous pressure was kept below 5cmH2O. Parenchymal separation was done using a combination of cavitron ultrasound surgical aspirator (CUSA EXcelTM) and an energy device (Harmonic ScalpelTM, Ethicon Endosurgery, Cincinnati, Ohio, USA or THUNDERBEAT, Olympus Medical Systems Corp., Tokyo, Japan). Small branches of the Glisson pedicles were clipped using a Hem-o-lok clip (Weck Closure System, Research Triangle Park, North Carolina, USA). On the other hand, right anterior and posterior Glisson pedicles were ligated individually using an endoscopic linear stapler (Covidien, Minneapolis, MN, USA), with a 45 mm gold cartridge. After completing parenchymal transection up along the inferior vena cava (IVC) with entire exposure MHV, the right hepatic vein was reached, dissected free, and divided by vascular staplers (Covidien, Minneapolis, MN, USA) with a 45 mm gold cartridge. The specimen was wrapped in an endo-bag and extracted through a Pfannenstiel incision. Fibrin glue was applied to the cut surface, and an abdominal drainage was routinely placed during the operation.

Ref.) Pure Laparoscopic Versus Open Right Hepatectomy for Hepatocellular Carcinoma in Patients With Cirrhosis: A Propensity Score Matched Analysis.
Ann Surg. 2016 Nov 15. [Epub ahead of print]

HBP 4 **Video session: How I do it (Liver surgery)**

Feb 18 (Sat), 11:00-12:30

How I do it: Laparoscopic Right posterior sectionectomy

Kai Chi Cheng, *Kwong Wah Hospital, Hong Kong*

Due to the difficulty in bleeding control and visualization of the surgical field, lesions in the posterosuperior liver segments are generally considered not suitable for laparoscopic resection. With gaining experience and improvement in technology, the safety and feasibility of laparoscopic major resection, including those in the posterosuperior segments, have been published in recent years. Nonetheless, it is still considered in its experimental phase with incompletely defined risks in the Second Consensus Meeting held in Morioka.

In this video presentation, we would like to share our technique and experience in laparoscopic right posterior sectionectomy. To perform successful laparoscopic right posterior sectionectomy, proper pre-operative case selection, optimal operative theatre setup and correct identification of anatomical landmarks during the operation are essential.

Feb 18 (Sat), 11:00-12:30

Laparoscopic Central Hepatectomy

Long Tran Cong Duy,
University Medical Center at Ho Chi Minh city Vietnam, Vietnam

Laparoscopic liver resection is further and further developing and popularizing.
It is necessary to develop and standardize the optimal (simple, effective, safe) approach in order to narrow the gap between open and laparoscopic surgery.
Similar to open surgery, there are some principles that we must respect in laparoscopic surgery in treatment for HCC

- Effective inflow control during liver parenchymal transection.

The more selective control, the better liver function reserved.

- Anatomical transection plane helps to minimize blood loss and shorten operative time

Anatomical resection results in better oncologic outcome
Extra Glissonean approach is very useful and facilitates the obedience of these principles.
Recently, we have developed and improved the totally laparoscopic Glissonean approach which means we dissect seperately the Glissonean pedicles in most of anatomical liver resection for HCC treatment.
We would like to present our experiences in applying this technique in performing Laparoscopic Anatomical Central Hepatectomy for HCC

HBP 4 **Video session: How I do it (Liver surgery)**

Feb 18 (Sat), 11:00-12:30

Robotic liver resection

Gi Hong Choi, *Severance Hospital, Korea, Republic of*

In 2002, we published the techniques and perioperative outcomes of 30 patients. Among 30 patients, 20 patients received major hemi-hepatecotmy, including 6 right hepatectomies and 14 left hepatectomies, Two patients (6.7%) were converted to open surgery. Overall complication rate was 43.3%, however, Grade III complications was 20%. Our initial experiences demonstrated that robotic hemi-hepatectomy as well as minor liver resection is a feasible and safe procedure. Through this experience, we have established unique techniques for parenchymal transection, named rubber band traction method. During parenchymal transection, Harmonic scalpel is mounted on the left hand and Maryland forceps on the right hand. As our experience with open anatomic liver resection using extrahepatic glissonean pedicle approach has increased, the indication of robotic liver resection has been expanded into anatomic liver resection in the right liver. In 2016, we reported our initial experience on right side anatomic liver resection in 10 consecutive procedures, including central bisectionectomy (n=1), extended right hepatectomy (n=1), extended right posterior sectionectomy (n=2), right posterior sectionectomy (n=3), segmentectomy 6 (n=1) and segmentectomy (S4b and ventral segment of S5) (n=2). There was one open conversion and overall complication rate was 70%, but most complications were grade I. One patient experienced a biliary stricture after extended right hepatectomy and received endoscopic intervention.
Recently, robotic liver resection has been expanded into more complex as ALPPS procedure and living donor right hepatectomy. New Xi system is allowed for simultaneous colon and liver resection. Fluorescence image can improve the identification of biliary structure, detection of occult lesions and liver segmental boundary, especially during parenchymal transection.

Feb 18 (Sat), 11:00-12:30

Laparoscopic total gastrectomy with D2 lymphadenectomy

Young-Kyu Park, *Chonnam National University Hwasun Hospital, Korea, Republic of*

Laparoscopic total gastrectomy for advanced gastric cancer is still a challenging procedure because of distal pancreatic and splenic hilar node dissection and mediastinal dissection, especially in gastroesophageal junctional cancer. Even though the recent report from Japanese trial, many surgeons believe that D2 lymphadenectomy should include splenic hilar node dissection during total gastrectomy. Spleen-preserving or splenectomy is important to complete removal of number 10 lymph node station especially in the upper one-third gastric cancer involving greater curvature.

The reasons why hilar node dissection is a complicated procedure are an anatomical variation of splenic hilar vessels, accessibility, and a few experiences. And that process also could induce the higher postoperative complication such as pancreatic fistula, bleeding, abscess, and intraoperative injury of a splenic vessel or splenic parenchyma. To keep in mind of preservation of distal pancreatic blood supply, avoidance of evitable pancreatic and splenic injury, and not to leave of any sized lymph node is critical.

This lecture focus on further lymph node dissection during total gastrectomy, compared to distal gastrectomy. I will show the technical tips with a representative video clip and surgical outcomes after laparoscopic total gastrectomy in advanced gastric cancer.

Stomach 4 **Laparoscpic total gastrectomy II**

Feb 18 (Sat), 11:00-12:30

LND including splenectomy using 3D flexible scope

Sun-Hwi Hwang, *Pusan National University Yangsan Hospital, Korea, Republic of*

1. Japanese gastric cancer treatment guidelines 2014 (ver. 4)
2. laparoscopic spleen-preserving splenic hilar lymph node dissection
3. 3DCT, 3D Laparoscopy

Extent of lymph node dissection

- D1 lymphadenectomy
- T1a tumors that do not meet the criteria for EMR/ESD
- cT1bN0 tumors that are histologically of differentiated type and 1.5 cm or smaller in diameter.
- D1+ lymphadenectomy

cT1N0 tumors other than the above.

- D2 lymphadenectomy
- Potentially curable T2-T4 tumors as well as Ct1n+ tumors.
- The role of splenectomy for complete resection of Nos. 10 and 11 nodes had long been an issue of controversy.
- The randomized trial (JCOG 0110) was concluded and revealed non-inferiority of spleen preservation in terms of overall survival.
- Splenectomy should not be performed unless the primary T2-T4 tumor either directly invades the spleen or is located in the greater curvature of the upper stomach.

JCOG0110

Eligibility Criteria

- T2-T4 proximal gastric cancer
- Absence of tumor invasion of the greater curvature
- Not of linitis plastica type (Borrmann type 4)
- No gross lymph node metastasis along the splenic artery or splenic hilum

Splenectomy should not be performed unless the primary T2-T4 tumor either directly invades the spleen or is located in the greater curvature of the upper stomach.

Value of spleen-preserving No. 10 LN dissection for advanced proximal GC

- No. 10 LN dissection is an important but difficult part of a D2 radical resection for advanced proximal GC.
- The rate of No. 10 LN metastasis has been reported to be 9.8%-27.9%.
- Spleen preservation in a radical operation enables immunotherapy for patients with advanced GC.
- Laparoscopic spleen-preserving No. 10 LN dissection operation tends to reduce surgical trauma, increase safety, and protect organ function

STRATEGIES OF LAPAROSCOPIC SPLEEN-PRESERVING NO. 10 LN DISSECTION

- medial approach
- Dissection of the No. 11p, 11d, and 10 LNs
- root of the splenic artery toward its distal end.
- severing of the short gastric vessels (SGVs) prior to LN dissection
- Surgeon stands on the patient's right side.
- retropancreatic approach
- division of the gastrosplenic ligament and severing of the left gastroepiploic and short gastric vessels
- left-sided approach in which the LNs are excised from the SLA toward the root of the SpA, and the SGVs are severed at their roots
- Importance of teamwork
- Step over the learning curve
- Be familiar with the complex anatomy in this region
- deep location of the splenic hilar,
- the narrow operative space,
- the fragile texture of the spleen,
- the tortuosity of splenic vessels and
- The complicated branching of the splenic hilum

3DCT reconstruction and 3D flexible scope maybe helpful

Stomach 4 **Laparoscpic total gastrectomy II**

Feb 18 (Sat), 11:00-12:30

Robotic total gastrectomy with D2 lymphadenectomy

Hiroshi Okabe, *Otsu City Hospital, Japan*

Backgrounds: In Japan, standard surgery for upper gastric cancer (GC) has been D2 total gastrectomy (TG) with splenectomy aiming for complete removal of #10 lymph nodes. However, the recent randomized controlled trial demonstrated the noninferiority of spleen preservation when the tumor does not invade the greater curvature. Because splenic hilar dissection was optional in this trial, spleen preserving TG without #10 dissection should be the new standard for such cases. For GC invading greater curvature, spleen preserving TG with splenic hilar dissection would be accepted as an optional treatment, although splenectomy remains standard. Number of laparoscopic TG for advanced GC is limited in Japan, because of less evidence and technical difficulty. To overcome technical difficulty, we introduced robotic TG for advanced GC. In this lecture, our techniques and concept of robotic splenic hilar dissection, and clinical outcome of our initial experience will be presented.

Methods: Between 2012 and 2016, a total of 18 laparoscopic (group L) and 14 robotic (group R) TG with splenic hilar dissection was performed. Lymph node dissection was done by ultrasonic device in laparoscopic surgery, while monopolar device was mainly used in robotic surgery. In both procedures, splenic hilar dissection was done in the first part of the surgery. Clinical and surgical outcome of these 32 patients were retrospectively evaluated.

Results: Patient backgrounds such as age, sex, and clinical stage were similar between two groups. All operations were successfully done without conversion. Median operation time was 407 vs 479 min, blood loss was 114 vs 70 mL, postoperative stay was 15 and 12 days, complications of Clavien-Dindo grade II occurred in 5 (28%) and 1 (7%) in the L and R groups. There was no complications with grade III or higher. There was no mortality.
Discussion: By using articulating function of the robotic monopolar device, robotic splenic hilar dissection was easier compared to the laparoscopic procedure, especially when the vessels run tortuously. Monopolar dissection around pancreas would reduce heat injury caused by ultrasonic device during laparoscopic surgery. However, dissection using only monopolar is difficult in obese patients, because the exposure of the splenic hilum tends to be limited.

Conclusions: Robotic TG with D2 lymphadenectomy is feasible. Further technical refinement and larger clinical experience would be necessary for wider acceptance.

Feb 18 (Sat), 11:00-12:30

Comparison of Antireflux Surgery and Stretta Procedure for Gastroesophageal Reflux Disease

Zhi-tong Li, *First Affiliated Hospital of Zhengzhou University, China*

Bariatric 2 **Anti-reflux Surgery for GERD Session**

Feb 18 (Sat), 11:00-12:30

Anti-reflux surgery after endoscopic anti-reflux procedure

Jin-Jo Kim,
The Catholic University of Korea, Incheon St. Mary's Hospital, Korea, Republic of

Gastroesophageal reflux disease (GERD) is a common condition requiring considerable medical resources. Medical treatment with proton pump inhibitor (PPI) is the primary therapy for GERD, and this approach is very effective; however, there are several reasons that patients with GERD would like to avoid chronic PPI use. This includes intolerance to the medication, inability to comply with daily medication, and concern about potential long-term adverse effects. In addition to side effects and tolerance issues, chronic PPI use carries a substantial cost for the patient.

The main alternative to medical therapy is surgery, with laparoscopic anti-reflux surgery (LARS) being the standard of care. Despite the efficacy of surgery, LARS is invasive and carries procedure morbidity such as dysphagia, gas bloat, and difficulty in belching. Given these issues, there has been a great deal of interest in developing and intermediate option as an alternative to chronic PPI use. During the past 10 years, a multitude of endoscopic therapies have emerged to try to fill this particular need. These therapies can be categorized mechanistically into 4 groups: (1) radiofrequency energy delivery to the gastroesophageal junction (GEJ) (Stretta), (2) endoluminal suturing of the proximal stomach and/or distal esophagus, (3) injection of nonabsorbable inert material into the luminal wall in the region of GEJ, and (4) plication techniques attempting to stimulate fundoplication (Transoral Incisionless Fundoplication, TIF; EsophyX). Despite promising early studies, many of the therapies fall short in high-quality in randomized controlled trials. Furthermore, the physiologic aberration resulting in GERD is frequently addressed inadequately. Currently, only 2 kinds of therapies, Stretta and EsophyX, are under FDA approval. According to SAGES recommendations to Stretta and EsophyX, Stretta is considered appropriate therapy for patients being treated for GERD who are 18 years of age or older, who have had symptoms of heartburn, regurgitation, or both for 6 months or more, who have been partially or completely responsive to PPI, and who have declined laparoscopic fundoplication. Long-term data is not yet available for EsophyX. In short-term follow-up, from 6 months to 2 years, EsophyX may be effective in patients with a hiatal hernia <2 cm with typical and atypical GERD. Further studies are required to define optimal techniques and most appropriate patient selection criteria, and to

further evaluate device and technique safety. In 2014, there was a report about endoscopic anti-reflux procedure using endoscopic submucosal dissection (ESD) techinique on GEJ, so called ESD for GERD (ESD-G) from Japan.

Recently, Korean gastroenterologists started to get interested in endoscopic therapy for GERD and the number of cases is increasing without available official report. I have experienced 3 cases of patients after Stretta and 1 case of patient after ESD-G. My experience of these patients is mentioned here.

Bariatric 2 **Anti-reflux Surgery for GERD Session**

Feb 18 (Sat), 11:00-12:30

Clinical Outcomes of Laparoscopic Nissen Fundoplication for Gastroesophageal Reflux Disease

Joong-Min Park, *Chung-Ang University Hospital, Korea, Republic of*

INTRODUCTION

Laparoscopic fundoplication is advocated for the treatment of GERD and is regarded as an alternative treatment option in Western countries. Several randomized studies have documented a better or similar effect with laparoscopic fundoplication compared with long-term treatment using a proton pump inhibitor (PPI), with curative or significant improvement in symptoms reported in 85 to 90% of patients [1-5].

However, while most patients have excellent outcomes with anti-reflux surgery, the outcomes of this procedure in some patients are unsatisfactory. The aim of the present study was to evaluate surgical outcomes of laparoscopic Nissen fundoplication in proven cases of GERD at a single institution in Korea and to identify predictive factors of the outcomes of anti-reflux surgery that could facilitate appropriate patient selection for the surgical treatment of GERD.

METHODS

We identified 61 consecutive patients who underwent primary laparoscopic Nissen fundoplication for the treatment of GERD from November 2012 to February 2015 at Chung-Ang University Hospital, Korea. The medical records of the study patients were reviewed retrospectively. Patient information including demographic data, preoperative presentation of symptoms, preoperative evaluation, surgical procedure, surgery outcome, complications, and postoperative symptoms was recorded. Indications for surgery included proven GERD with failed medical treatment, complications of GERD (esophageal stricture, esophageal ulcer, and/or Barrett's esophagus), extra-esophageal symptoms (laryngopharyngeal and/or respiratory symptoms), and a preference for surgical treatment in order to avoid the need for lifelong medical treatment. For symptomatic evaluation, patients were asked to report any GERD symptoms they had experienced, including frequency and severity of symptoms. Typical (heartburn and regurgitation) and atypical symptoms were reported separately. Information on duration of GERD symptoms and use of PPI therapy was also collected.

RESULTS

Patient and procedure characteristics

A total of 61 patients underwent primary laparoscopic fundoplication for the treatment of GERD. The mean patient age was 46.7 (range, 19-83) years. Preoperatively, all patients described symptoms of GERD. Typical symptoms (heartburn, regurgitation) were present in 60 patients (98.4%), while atypical symptoms were present in 40 patients (65.6%). Thirty-nine patients (63.9%) had both typical and atypical symptoms. The mean duration of GERD symptoms was 78.8 (range, 6-480) months. Thirty-seven patients (60.7%) reported a history of poor response to acid-suppression treatment with PPIs. The mean duration of PPI medication was 22.0 (range, 0-120) months.

Postoperative symptom control and side effects

Among the 60 patients who had typical GERD symptoms, typical GERD symptoms were completely controlled in 47 patients (78.3%) and partially improved in 4 patients (6.7%). Typical GERD symptoms were not controlled in 9 patients (15.0%) after surgery. For the 40 patients who had atypical GERD symptoms, atypical symptoms were completely controlled in 25 patients (62.5%) and partially controlled in 8 patients (20.0%). Seven patients (17.5%) with atypical symptoms did not improve after fundoplication. A total of 48 patients (78.7%) were completely cured and symptom-free including typical and atypical symptoms, and 54 patients (88.5%) experienced complete or partial resolution of GERD symptoms.

The side effects of surgery were evaluated on the day of discharge and six months after surgery. Twenty-one patients (34.5%) developed postoperative dysphagia of mild or moderate grade. The rate of occurrence of this side effect significantly reduced with time, being present in only 6 patients (9.8%) at six months after surgery (p=0.001). Most cases of dysphagia were mild grade (5 patients), although one patient had moderate grade dysphagia due to the intrathoracic migration of the wrap. Surgical or interventional treatments were not necessary for these patients.

Clinical and surgical factors influencing the control of GERD symptoms after surgery

Complete GERD symptom control rates were compared according to age, sex, BMI, presence of atypical symptoms, hiatal hernia status, esophagitis on endoscopy, results of pH monitoring and upper gastrointestinal barium studies, duration of symptoms, response to PPI therapy, and surgeon experience.

On univariate analysis, symptom control rates for patients who reported a good response to PPI therapy were significantly higher compared to patients who did not respond to PPI (p=0.008). In addition, the rate of symptom control for patients with a hiatal hernia on preoperative endoscopy was better than that of patients without a hiatal hernia (p=0.030). Age, sex, BMI, atypical symptoms, abnormal pH monitoring score, radiologic reflux on barium esophagography, esophagitis on endoscopy, long duration of symptoms, and surgeon ex

perience did not significantly influence the surgical outcomes of GERD symptom control. Multivariate logistic regression analysis showed that preoperative PPI response was an independently significant predictor of outcome (p=0.035).

CONCLUSION

Although laparoscopic Nissen fundoplication is not commonly performed in Korea, it is an efficacious method for controlling the symptoms of GERD based on our early experiences, which represent the most comprehensive report of laparoscopic anti-reflux surgery in Korea to date. Careful preoperative patient selection can identify patients at a high risk of surgical failure. PPI non-responders have an increased risk of poor surgical outcome; thus, caution should be exercised in evaluation and treatment of such patients.

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Feb 18 (Sat), 11:00-12:30

Surgery to treat Giant Paraesophageal hernia

Han Hong Lee,
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Paraesophageal hernia is a kind of hiatal hernia and type II, III and IV hiatal hernia belong to the paraesophageal hernia. Paraesophageal hernia develops in old age and is usually asymptomatic. However, in symptomatic cases, patients complain heartburn, regurgitation, postprandial fullness, chest pain and dysphagia.

Barium swallowing is considered the most useful diagnostic modality which gives various informations about paraesophageal hernia. However, recently, computed tomography (CT) is most frequently conducted because CT is possible to be examined in emergent situation. Above this, esophagogastricduodenoscopy, esophageal manometry, 24 hrs pH testing are used for diagnosis of paraesophageal hernia.

There are many debates in the methodology for operative technique, as follows: (1) operative approaching method: transthoracic or transabdominal (laparoscopic), (2) Resolution of short esophagu, (3) Mesh application, (4) Gastropexy, (5) Fundoplication, and (6) Relaxing incision. In the present topics, the surgical guidelines for such debating points in paraesophageal hernia will be suggested through previous references and studies.

THY 2 **Surgical tips of Robotic Thyroid Surgery**

Feb 18 (Sat), 11:00-12:30

Preservation of parathyroid glands and RLN

Yumi Lee, *University of Ulsan College of Medicine, Korea, Republic of*

Recurrent Laryngeal Nerve and Parathyroid Gland Preservation in robotic thyroid surgery

Recently, robot thyroid surgery is performed worldwide in thyroid tumors. And reducing the surgical complications, such as injury of recurrent laryngeal nerve and parathyroid glands, is also an important factor in robot surgery besides thyroidectomy.

Robot thyroid surgery has a problem of not knowing how strong the surgeon is holding and retracting the tissues or feel the thermal change when energy device is activated. Dissection or manipulation should be performed by layers and structures. The surgeon should not advance to the next procedure immediately after activating the coagulating energy device when related to tissues for preservation since there could be a thermal injury. After the activation, pause or make contact to a gauze placed in the operative field to check the spread of remaining heat. The shielded side of the device should be placed to the remnant structure side. By doing so, the thermal spread could be minimized. When coagulating vessels, surgeon should not impatiently manipulate the grasped tissues since it could tear before fully coagulated and encounter bleeding. When preserving the recurrent laryngeal nerve and parathyroid gland, these surgical tips are very important to minimize the injury.

Endocrine surgeons are to perform functionally safe thyroidectomy and reduce the surgical complications in any types of thyroid surgery. Above-mentioned techniques will help preserve the recurrent laryngeal nerve and parathyroid gland in robot thyroid surgery.

Feb 18 (Sat), 11:00-12:30

Intraoperative Neuro-monitoring: Pros and Cons

Jihyoung Cho, *Keimyung University School of Medicine, Korea, Republic of*

The management of the recurrent laryngeal nerve (RLN) in thyroid and parathyroid surgery has undergone to revision and modifications. The procedures to reduce the rate of RLN palsy (RLNP) have been the subject of investigation. Before the intraoperative neuromonitoring (IONM) era, routine meticulous anatomic localization and exposal of RLN have been recommended as the standard of care. In the late 1990s, IONM has been proposed as an adjunct to the prime visual identification of RLN. IONM has been applied for the early functional confirmation of the RLN, assists dissection in the case of intertwining between the branches of the inferior thyroid artery or distorted RLN, nerve branching detection, and non-RLN assessment, assists in the completeness of total thyroidectomy, and detects and elucidates the mechanism of RLN injury.

At 2010, a technique of standardized intraoperative neuromonitoring (S-IONM) was introduced by International Neural Monitoring Study Group (INMSG). Currently, the technology allows the permanent monitoring of the RLN by the continuous vagus nerve stimulation.

Robotic surgery in thyroid disease is a well-known procedure today, since the start of active development from 2007. This innovative surgery has spread worldwide in a short period and advanced especially, in Korea, concerning the increase of thyroid disease. The striking increase of robotic thyroidectomy was detected from 2009 and made a plateau since than in Korea. Nowadays, the robotic thyroidectomy can be performed safely, including visual identification of RLN, by experienced surgeons.

Similar to open conventional thyroidectomy, IONM can be applied to robotic thyroidectomy. In terms of IONM, the advantages and disadvantages of IONM in the robotic thyroidectomy is still important issue.

However, until now, there are just little studies and reports about IONM during robotic thyroidectomy. So, the clinical evidence such as the safety and feasibility should be evaluated in correlation with standardization of IONM technique and increased experience in robotic thyroidectomy.

THY 2 **Surgical tips of Robotic Thyroid Surgery**

Feb 18 (Sat), 11:00-12:30

Cervical lymph node dissection: Central and Lateral

Kee-Hyun Nam, *Severance Hospital, Korea, Republic of*

We have described our initial experience with robot-assisted modified radical neck dissection (MRND) in thyroid cancer using the da Vinci S system.

Inclusion criteria

(1) well-differentiated thyroid carcinoma with clinical central and lateral lymph node (LN) metastasis (cases with less than 5 metastatic LNs on the lateral neck), (2) tumor ≤4 cm, and (3) minimal invasion to the anterior thyroid capsule and strap muscle.

Exclusion criteria

(1) definite tumor invasion to an adjacent organ (recurrent laryngeal nerve [RLN], esophagus, or trachea) and (2) perinodal infiltration at a metastatic lateral LN.

Operative methods

Total thyroidectomy with central compartment neck dissection (CCND)

Under endoscopic guidance, the upper pole of the thyroid is drawn downward and medially using a ProGrasp forceps, and the superior thyroid vessels are then identified and individually ligated close to the thyroid gland using Harmonic curved shears to avoid injuring the external branch of the superior laryngeal nerve. The upper pole of the thyroid is then detached from the cricopharyngeal and cricothyroid muscles until the superior parathyroid gland is exposed. The thyroid gland is then pulled superiorly and medially using the ProGrasp forceps to expose the lateroinferior portion of the thyroid. The lateral side of the central compartment LN dissection is started from the common carotid artery and continued to the inferior thyroid artery superiorly and the substernal notch inferiorly. After exposing the common carotid and inferior thyroidal arteries, soft tissues and LNs in the pretracheal area are detached from cervical thymic tissues and dissected to the substernal notch until the anterior surface of the trachea is exposed. The inferior thyroid artery is then divided close to the thyroid gland using the Harmonic curved shears, and the whole cervical course of the RLN is traced. In the Berry ligament area, the thyroid gland is detached meticulously from the trachea to avoid direct or indirect thermal injury of the RLN. Contralateral thyroidectomy is performed in the same order as described for the opposite site with medial traction of the thyroid. Contralat

tracheoesophageal groove. The resected specimen is then extracted through an axillary skin incision.

MRND

After thyroidectomy, lateral neck dissection is started from the level III/IV area. The IJV is hauled medially using the ProGrasp forceps, and soft tissues and LNs are pulled laterally using a Maryland dissector and detached from the anterior surface of the IJV to the posterior aspect of IJV until the common carotid artery and vagus nerve are identified. Smooth, sweeping, lateral movements of a Harmonic curved shears can establish a proper plane and allow vascular structures to be differentiated from specimen tissues. The dissection of the IJV is progressed upward from level IV to the upper level III area. During this procedure, the superior belly of the omohyoid muscle is cut at the thyroid cartilage level. Packets of LNs are then drawn superiorly using the ProGrasp forceps, and the LNs are meticulously detached from the junction of the IJV and subclavian vein. Difficulty may be experienced reaching this point with a nonarticulated Harmonic curved shears owing to obstruction by the clavicle. In such cases, increasing the height of the external 3rd joint of the robotic arm equipped with the Harmonic curved shears and increasing its introduction angle is likely to resolve these problems and allow the target point to be reached. In general, the transverse cervical artery (a branch of the thyrocervical trunk) courses laterally across the anterior scalene muscle, anterior to the phrenic nerve. Using this anatomic landmark, the phrenic nerve and transverse cervical artery can be preserved without injury or ligation. Further dissection is followed along the subclavian vein laterally. The inferior belly of omohyoid muscle is cut where it meets the trapezius muscle. The distal external jugular vein (which can join the IJV or the subclavian vein) is then clipped and divided at its connection with the subclavian vein. Level VB dissection in the posterior neck area proceeds along the spinal accessory nerve in the superomedial direction, and is followed by level IV dissection, while preserving the brachial nerve plexus, the phrenic nerve, and the thoracic duct. The dissection proceeds by making turns at levels VB, IV, and III, and then by proceeding upward to the level IIA area. The individual nerves of the cervical plexus are sensory nerves, and when encountered during dissection they are sacrificed to ensure complete node dissection, while preserving the phrenic nerve and ansa cervicalis.

After dissection of the level III area, the external retractor and robotic axis are repositioned to allow better exposure of the level II area. The external retractor is then reinserted through the axillary incision and directed toward the submandibular gland. The operating table should also be repositioned more obliquely with respect to the direction of the robotic column to allow the same alignment between the axis of the robotic camera arm and the direction of retractor blade insertion. Drawing the specimen tissue inferolaterally, soft tissues and LNs

are detached from the lateral border of the sternohyoid muscle, the submandibular gland, and the anterior surfaces of the carotid artery and the IJV. Level IIA dissection is advanced until the posterior belly of the digastric muscle is exposed superiorly. After removing the specimen, fibrin glue is sprayed around the area of the thoracic duct and minor lymphatics, and a 3-mm closed suction drain is inserted just under the axillary skin incision. Wounds are closed cosmetically. The incision scar in the axilla is completely covered when the arm is in its neutral position.

Conclusion

Robot-assisted CCND and MRND are technically feasible, safe, and produces excellent cosmetic results. Based on our initial experience, robot-assisted MRND should be viewed as an acceptable alternative method in patients with low-risk, well-differentiated thyroid cancer with lateral neck node metastasis.

LS 2 **Luncheon Symposium 2**

Feb 18 (Sat), 12:30-13:30

What we have learned fro Big Data databases in Minimally invasive surgery?

Eduardo M Targarona, *Hospital of Santpau, Spain*

Evidence Based Medicine is the most powerful tool to asses knowledge in clinical practice, and EBM permits to obtain the highest quality information. However, surgical randomized trials are difficult to perform, time consuming and sometimes impossible to recruit enough amount of cases in a limited period of time.

During last years, advances in informatics has permitted to create large databases including thousands of patients. The large databases, that include relevant clinical data, has been devised to monitor clinical outcome, evaluate and compare the quality of surgical care and benchmark results between hospitals. But by other hand, those 'Big data' banks permit to know real outcome for a disease or a surgical procedure, related to a number of clinical variables, with a invaluable potential for clinical research. However, this data banks also pose a number of potential shortcoming, and its value in terms of EBM in comparison to standard EBM tools is controversial.

In this presentation I will review the current concept of Big data, potential advantages and disadvantages, as well to summarize the added information when we search the papers published in relation to Minimally Invasive Surgery.

HBP 5 **Keynote Lecture**

Feb 18 (Sat), 13:30-15:00

Laparoscopic liver resection: an ongoing revolution

DANIEL CHERQUI, *Paul Brousse Hospital, Villejuif France, France*

The adoption of laparoscopic liver resection (LLR) has been slower than for other laparoscopic procedures. This reflects perceived risks of uncontrollable bleeding, oncological inadequacy and a degree of skepticism regarding a major change in practice for unproven benefit. LLRs require expertise in liver surgery and advanced laparoscopy. They demand the acquisition of new skills for the established liver surgeon including complex dissection and suturing techniques and mastery of various novel technologies. Increasing numbers of hepatobiliary surgeons have explored the possibilities of LLR, resulting in two international consensus meetings and publications involving more than 9,000 patients.

There are no published randomized controlled trials comparing open surgery with LLR. The variety of conditions where liver resection can be used (benign disease, primary and secondary liver cancers, normal or diseased underlying liver), the variety of procedures (extent of resection, anatomical or non-anatomical, tumor location) limit the accrual of large numbers of comparable patients in a reasonable length of time. Despite these difficulties, two RCTs are currently underway comparing open vs laparoscopic resection, one for colorectal liver metastases (CRLM) and the other for major hepatectomy. The results of these two studies are expected soon.

Current views therefore rely on cohort and case-matched series, propensity score matched series and meta-analyses. Most early reports involved minor resections in favorable locations, with the gradual introduction of major and/or more complex resections including anatomic parenchymal sparing resections and removal of tumors from difficult locations. A recent comprehensive review reported over 9,000 operations along with a rise in the proportion of major or complex resections from 30%. Meta-analyses suggest several short term advantages for laparoscopic surgery including decreased pain, less bleeding, lower morbidity and shortened hospital stay. Comparative oncologic outcomes including resection margin status and overall and disease specific survival all seem similar to open surgery.

Of the two major consensus meetings, the first established the feasibility and safety of LLR in selected patients and made recommendations about indications. The second was a rigorous conference with an independent jury of "open" liver surgeons. The jury recommendations, although emphasizing the limited level of available evidence, validated minor resections as standard practice while major resections and/or complex anatomical resections were still considered to be at an exploration stage.

LLRs seem applicable in 20-50% of liver resections depending on the referral base and local expertise. Indications for LLR should not be different from those for open resection. There are, however, specific issues that require attention.

The current classification of liver resections is based on the amount of parenchyma resected, defining major hepatectomy as 3 or more segments and minor hepatectomy as less than 3 segments. This overlooks the complexity of resection that varies according to the segmental location and the sites of tumours within those segments. A difficulty score for LLR proposed at the second consensus conference suggested that "easy" procedures involve solitary lesions 3-5 cm or less located in peripheral segments (segments 2-6). These require minor resections, including left lateral sectionectomy. "Complex" operations include not only major resections (right and left hepatectomies) but also anatomical parenchymal sparing segmentectomies and sectionectomies in the difficult postero-superior segments 7/8. Parenchymal sparing resections are considered the standard of care and unnecessary laparoscopic right hepatectomies to overcome difficult locations should be avoided.

Tumour size and number are also critical. Although, anecdotal cases of LLR for huge tumours, multiple bilobar metastases or lesions requiring biliary and/or vascular reconstruction have all been reported, these types of lesions are still considered contraindications to LLR at most centres.

Benign liver disease still represents about 35% of reported LLRs. It is paramount that the availability of the laparoscopic approach does not encourage unnecessary resection of harmless benign lesions such as asymptomatic focal nodular hyperplasia or liver hemangioma.

Hepatocellular carcinoma (HCC), occurring mainly in patients with cirrhosis, is the most common single indication for LLR reported world-wide with >50% of reported LLRs. While peripheral partial resections were initially common, more demanding anatomical resections are now increasingly performed. Dominance of HCC is the result of growing numbers of Asian series but also reflects the fact that HCC appears more amenable to a laparoscopic approach, due to screening programs for early HCCs and the recognition of improved tolerance of cirrhotic patients to laparoscopy with less postoperative decompensation and ascites.

In contrast, CRLM account for about 25% of the operations undertaken for malignancy. This reflects the clinical features of CRLM making them less amenable to a laparoscopic approach than HCC. This includes management of the primary and frequent bilobar disease requiring complex and/or staged resections. Despite improvements in preoperative imaging and laparoscopic ultrasound, there is a perceived risk of insufficient exploration especially after neoadjuvant chemotherapy. and more patients are now being considered for LLR. Difficulties can be turned to advantages such as combined laparoscopic liver and colon resection or laparoscopy in staged or repeat resections. Earlier recovery after LLR may also be associated with earlier access to adjuvant chemotherapy, similar to laparoscopic pancreatic resection.

Laparoscopic living donor hepatectomy remains controversial. Avoiding long incisions clearly improves donor quality of life, but concerns about donor safety, has limited its diffusion. Laparoscopic left lateral donor hepatectomy for adult to child transplantation is gaining wider acceptance, but full-right or left laparoscopic donor hepatectomy has been reported by only a handful of teams and should still be considered to be in a development phase.

LLR has gained a significant and irreversible place in hepatic surgery due to recognized short and long term advantages. Minor resections in peripheral segments are performed laparoscopically by a majority of HPB teams and the diffusion of major and/or complex resections is increasing annually. Because LLR requires specific training and attention, there is a need for organization. This should focus on regular dedicated updates on developing advances in techniques, clarifying indications, evolving guidelines and creating international registries, along with specific training and credentialing. All need development, so that meaningful improvements in patient care and outcomes will follow.

HBP 5 **Keynote Lecture**

Feb 18 (Sat), 13:30-15:00

Current status and future aspects of Laparoscopic pancreatic resection

Palanivelu Chinnusamy, *GEM Hosptial and research centre, India*

Laparoscopic surgery reduces surgical morbidity in various operations, however laparoscopic pancreaticoduodenectomy (LPD) is a relatively complex operation with few centres around the world performing large case volumes on a regular basis. Although the first published case was described in 1994, it has been slow to gain popularity . This is likely in part due to the challenging technical aspect of the procedure including the retroperitoneal location of the pancreas, close vicinity to the superior mesenteric artery and vein, portal vein and hepatic arteries and the technical difficulty of three anastamosis. In recent years, however, we have seen an increasing number of studies examining LPD. Initial research evaluated feasibility and outcomes, assessing whether LPD could be done with adequate safety . The question then moved from is LPD safe to how does it compare to the open approach? Will it appreciate the same benefits of other laparoscopic surgeries? Partially enabled by higher volumes at specialized centers, studies began comparing LPD with open pancreaticoduodenectomy and results now suggest acceptable perioperative and long term outcomes with lap PD. Additional advantages of laparoscopic PD include higher magnification, lesser blood loss, improved lymph node yield, shorter hospital stay and earlier initiation of adjuvant chemotherapy.

Though robotic surgery offers advantages like 3-D optics, enhanced suturing ability, and more degrees of freedom of movement by means of fully-wristed instruments, data on cost analysis are lacking and further studies are needed to evaluate also the cost-effectiveness of the robotic approach for PD in comparison to open or laparoscopic techniques.

HBP 5 **Keynote Lecture**

Feb 18 (Sat), 13:30-15:00

Summary of the First State of the Art Lecture on Pancreatic Resection

David Kooby, *Emory University School of Medicine, United States*

Comprehensive content from each element of the meeting follows in separate manuscripts in this collection. The major points of emphasis are summarized here:

1. MIPR is a growing aspect of pancreatic surgery and has entered phase 2a of the IDEAL framework for incorporating surgical innovation into practice.
Current terminology used to describe MIPR methods lacks precision, making it difficult to compare existing research reports systematically. Using the Delphi method, the steering committee proposed simple system for standardizing MIPR terminology.
Based on the results of the first international survey on MIPR, MIDP is considered an appropriate alternative to ODP for surgical pathology of the left pancreas; MIPD is still in the investigational phase; and nearly all survey participants would welcome systematic training in MIPR and would support an international effort to collect data on this topic.
A growing body of data for MIDP show that perioperative outcomes, such as intraoperative blood loss and hospital stay are both improved as compared with ODP. Cancer outcomes between MIDP and ODP appear similar as well, but data are limited on this topic.
Data regarding perioperative and cancer outcomes for MIPD is less mature than for MIDP, although emerging data suggest safe and similar outcomes to OPD can be achieved in organized, high-volume centers.
Early cost comparisons of MIPR and OPR suggest cost efficiency of MIDP as compare with ODP, while more data are required to comment on cost efficiency of MIPD and robotic surgery. Existing cost comparisons of MIPR and OPR are limited by single-center bias, and value assessments are necessary. Properly designed Quality-of-Life investigations are needed as well.
Current training of MIPR is inconsistent and inadequate. Examples of successful teaching programs exist and should be disseminated to the general pancreatic surgery community.
Research to attain best-level evidence in MIPR is challenging. The feasibility of developing effective RCTs is dubious, but registry development has the potential to add value to the field.

Feb 18 (Sat), 13:30-15:00

Single-port gastrectomy

Chang Min Lee, *Korea University College of Medicine, Korea, Republic of*

A Few surgeons have adopted single port laparoscopic surgery for gastric cancer, as some technical complexity is embedded in gastric cancer surgery. It is technically demanding to perform a sufficient LND with straight instruments inserted through only one trocar, because the stomach is supplied and drained by several vessels that run in diverse directions. Such a limited condition also lies in the process of reconstruction. Moreover, many surgeons are also concerned about the level of difficulty involved with correcting unexpected accidents during a single-port laparoscopic surgery.

Despite the limitations, several surgeons have reported the clinical outcomes of single port laparoscopic distal gastrectomy (SPDG) for EGC.1-4 Although the long-term oncologic outcomes have not been investigated, a favorable prognosis is expected from several reports showing the number of harvested LNs after SPDG for EGC.1,3,5 In addition, according to a recent comparative study, the short-term clinical outcomes of SPDG were not inferior to those of multi-port laparoscopic distal gastrectomy for EGC.1 Moreover, Ahn et al. reported the technical feasibility of performing EJ during single-port laparoscopic total gastrectomy (SPTG) for proximal EGC.6,7 Since EJ has been regarded as a challenging procedure even in conventional laparoscopic surgery, SPTG is a noteworthy achievement in the era of minimally invasive surgery.

Moreover, since we had also experience with SPDG for EGC, single-port laparoscopic proximal gastrectomy with double tract reconstruction (SPPG with DTR) could be designed based on our accumulated expertise.8 Although this expertise includes many aspects regarding reduced port laparoscopic surgery, one of the most important issue was how to overcome the collision of instruments through the limited number of port. With regard to this issue, we have applied the diverse instruments in single-port laparoscopic gastrectomy for gastric cancer. In addition, we have also developed the new designed instrument.

With our expertise of single-port laparoscopic surgery for gastric cancer, we performed a pilot study to evaluate the clinical effectiveness of a newly developed bipolar vessel seaing device durging reduced port laparoscopic distal gastrectomy (RPLG) for gastric cancer. Through this trial, we contemplated some knowhows to shorten the learning curve of single-port laparoscopic surgery.

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Feb 18 (Sat), 13:30-15:00

Intracorporeal anastomosis

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Laparoscopy-assisted gastrectomy (LAG) for gastric cancer was first reported in 1994, and has undergone rapid development and gained popularity in the past few decades. Korean Laparoscopic Gastrointestinal Surgery Group (KLASS) proved that laparoscopic gastrectomy has multiple benefits compared with open gastrectomy (OG) such as minimal invasiveness, earlier patient recovery after surgery and better postoperative quality of life. Kanaya S firstly intruded the intracorporeal B-I (delta shaped) anastomosis in 2002. Totally laparoscopic gastrectomy (TLG) has been rapidly adopted and techniques of TLG have been rapidly improved. Totally laparoscopic total gastrectomy (TLTG) with D2 lymph node dissection is largely performed for gastric cancer patients in these days. Many RCT or observation studies are performing to prove TLG is safe, feasible and oncologic outcome of TLG is not inferior to that of OG. I would like to introduce various intracorporeal anastomosis after TLG (including TLDG, TLTG or TLPG) based on my personal experiences.

Stomach 5 **Reduced port Gastrectomy**

Feb 18 (Sat), 13:30-15:00

Reduced Port Gastrectomy

Jun Ho Lee, *Samsung Medical Center, Korea, Republic of*

Advancement of Single-port and Reduced-port Laparoscopic Gastrectomy for Gastric Cancer; A Systemic Review

Laparoscopic gastrectomy has been established as one of the surgical option for early gastric cancer. Accumulation of laparoscopic experiences enables surgeons to do less invasive surgery including reduced port laparoscopic gastrectomy (RPLG) or single port laparoscopic gastrectomy (SPLG) to improve quality of life in patients with gastric cancer.
Laparoscopic gastrectomy is a complicated technique compared to open gastrectomy, so as that is associated with a surgical learning curve for complete performance. Kunisaki et al. found that experience of 20 cases of LADG was sufficient to achieve stable surgical outcomes including operation time and reduced blood loss. SPLG which is more technically demanding due to the ergonomics of the crossing instruments, may require a longer learning period compared to RPLG.
Standardizing techniques and shortening the learning curve would be important issues to be addressed in the future. And higher costs of new techniques can be considered to adopt into existing healthcare systems. None of the trials performed an economic analysis to determine the financial aspect of RPLG and SPLG. The use of special ports in SPLG will need to be evaluated against the cosmetic and quality of life to determine if SPLG is a more cost-effective procedure than CLG. More objective parameter for postoperative pain and cosmesis were needed to clarify benefit of RPLG and SPLG. Finally, Incidence of umbilical port hernia in the larger incision SPLG should be checked with long-term follow up.
RPLG and SPLG have noteworthy as less minimally invasive approach with acceptable postoperative outcomes compared to CLG. However, these approaches were just extension of CLG which can be performed by same instruments and not the final endpoint of gastrectomy for gastric cancer. RPLG and SPLG should be considered as a bridge technique from CLG to robotic single port surgery or Natural Orifice Transluminal Endoscopic Surgery (NOTES).

Feb 18 (Sat), 13:30-15:00

Surgical and Oncological Safety of TAA

Jandee Lee, *Severance Hospital, Korea, Republic of*

Robotic surgery is an innovation in thyroid surgery that may compensate for the drawbacks of conventional endoscopic surgery. The advantages of robotic thyroid surgery over conventional surgery suggest that robotic thyroidectomy with or without neck dissection may become the preferred surgical option for thyroid diseases. Robotic thyroid surgery will likely continue to develop as more endocrine and head and neck surgeons are trained and more patients seek this newly developed surgical option.
Oncologic outcomes of cancer-related surgery are important for patient prognosis. The short-term oncologic effectiveness of thyroid cancer surgery can be assessed by measuring serum thyroglobulin (Tg) concentration via iodine-131 (131RI) scanning, whereas the long-term effectiveness can be evaluated by lack of tumor recurrence. The number of retrieved neck LNs is also significant in determining surgical radicality. The number of LNs retrieved during robotic thyroidectomy was higher than or similar to the number retrieved during endoscopic or conventional open surgery. Indeed, large case series and comparative analyses have shown similar surgical completeness and radicality using robotic as using conventional open method. Our recent report also showed that the 5-year surgical complications rates and oncologic quality were similar between robotic total thyroidectomy and open total thyroidectomy.

Although robotic thyroidectomy with modified radical neck dissection (MRND) is a feasible procedure with reasonable surgical completeness and radicality rates as well as low morbidity rates, to date no randomized trials have assessed robotic surgery for thyroid diseases, likely due to differences in surgical costs. Moreover, the follow-up period of these studies was not sufficient to determine the long-term effects of robotic surgery on oncologic outcomes. Recently, we reported 5-years surgical outcomes after robotic MRND by a pioneer surgeon. In this study, the perioperative and 5-year oncologic outcomes were similar after robotic and conventional open MRND. However, further prospective randomized clinical trials with long-term follow-up are necessary to compare the surgical outcomes of robotic with open surgical methods.

THY 3 **Is Robotic Thyroid Surgery worthwhile?**

Feb 18 (Sat), 13:30-15:00

Surgical and Oncological Safety of BABA

Won Seo Park, *Kyung Hee University School of Medicine, Korea, Republic of*

Surgical and Oncologic Safety of Robotic BABA Thyroidectomy

Won Seo Park (Kyung Hee University, Korea)

The incidence of thyroid is increasing rapidly especially in young female patients and the prognosis of differentiated thyroid cancer is excellent. For these reasons, cosmetic results of thyroid surgery are important. There were many efforts to minimize or hide the scars on the neck using endoscopic surgical technique via various methods such as cervical approach, anterior chest approach, breast approach, gasless axillary approach, axillo bilateral breast approach and bilateral axillo-breast approach (BABA). The BABA is ideal approach because of its excellent cosmetic results, optimal view for both lobes of thyroid and distant port location avoiding interference of instruments. Most of all, the BABA is suitable for total thyroidectomy. But the endoscopic thyroidectomy via BABA has some limitations such as long learning curve and difficulty in dissecting central and lateral lymph nodes due to rigidity of instruments. Robotic surgical system provides surgeons three dimensional image with 15 times magnification, articulated instruments increasing degree of freedom and ergonomically comfortable position. Grafting robotics on the endoscopic technique can overcome limitations of endoscopic thyroidectomy via BABA without losing the advantage of that.

Recent studies suggest that outcomes of robotic BABA thyroidectomy regarding to complication rate and surgical completeness are comparable with that of conventional open thyroidectomy. Surgical completeness may be represented by postoperative thyroglobulin level, result of radioactive iodine scan and number of extracted lymph node.

I will introduce robotic BABA thyroidectomy and then talk about surgical and oncologic safety of that in this lecture.

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THY 3 **Is Robotic Thyroid Surgery worthwhile?**

Feb 18 (Sat), 13:30-15:00

Functional Benefits: Something more than Cosmesis

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Over the past decade, the application of surgical robotics has brought about dramatic changes in various surgical fields. Robot-assisted transaxillary thyroidectomy has achieved safe and meticulous management of thyroid disease with remarkable cosmetic excellence. Furthermore, robotic thyroidectomy can offer many functional benefits including reducing postoperative pain, sensory changes, and early recovery of voice and swallowing functions, and better patient's body image and these can improve the patient's quality of life. Robotic thyroidectomy is a promising alternative of conventional open thyroidectomy and shifts the paradigm of thyroid surgery with great benefits.

Feb 18 (Sat), 13:30-15:00

Single port Herniorrhaphy: benifits and limitations

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In the field of hernia surgery, there is still a controversy about which surgical procedure is best.

(1) Conventional hernia repair vs. laparoscopic hernia repair
According to recent studies, there was no difference in recurrence rates between the two procedures, and laparoscopic hernia repair showed less pain, rapid recovery, and better cosmetic results. For these reasons, laparoscopic hernia repair is increasingly being performed.

(2) TAPP: single incision (SIL-TAPP) vs. conventional (CL-TAPP)
SIL-TAPP can be more cosmetically superior than CL-TAPP. However, we usually use a nearly scar-free trans-umbilical incision in both procedures. In CL-TAPP, two additional 5mm incisions do not make a big cosmetic difference. And, In CL-TAPP, we can close the peritoneum with suture material. But in SIL-TAPP, we must use tacks to close the peritoneum. Therefore, I think that SIL-TAPP is more invasive than CL-TAPP.

(3) Laparoscopic hernioplasty: TEP vs. TAPP
There are many articles comparing TEP and TAPP, with contradictory results. However, TAPP is more likely to cause bowel injury or bowel adhesion than TEP. Therefore TEP is the currently preferred technique

(4) TEP: single incision (SIL-TEP) vs. conventional (CL-TEP)
There are a few comparative studies about SIL-TEP and CL-TEP. Most studies reported that SIL-TEP has a longer operative time than CL-TEP. However, all of the studies showed the safety of SIL-TEP. And some of the studies reported there was less pain and a better cosmetic outcome in SIL-TEP.
In terms of space making, SIL-TEP has an advantage over CL-TEP. SIL-TEP enables a more meticulous preperitoneal dissection. And mesh interposition in SIL-TEP is more comfortable than CL-TEP.
The limitation of SIL-TEP is the steep learning curve. However, if you overcome the learning curve, SIL-TEP is an operation that is more advantageous than any other type of hernia surgery.

Hernia 1 **Current Management of Hernias**

Feb 18 (Sat), 13:30-15:00

Laparoscopic ventral herniorrhaphy; When & How?

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The incidence for incisional hernia is 10-20 %, making it one of the most common surgical complication after laparotomy[1]. Since popular techniques for open ventral hernia repairs were described[2,3], the vast majority of surgeons worldwide continue to repair the small hernia by suture despite the clear message of Burger et al.[4] in 2004 that "suture repair should be abandoned." The invention of prosthetics has revolutionized ventral hernia repair, leading to a significant reduction in the recurrence rates, ranging as low as 1% to 14% in some studies. However, the need for an extensive dissection, which was associated with postoperative wound related complications, has driven surgeons to search for new techniques. Karl Leblanc's initial description of the laparoscopic ventral hernia repair with mesh, this minimally invasive technique gained popularity and was adopted by surgeons over the ensuing years[5]. Proponents of laparoscopic repair reported decreased hospital stay, decreased pain, decreased wound infection rates, and earlier return to work among the advantages for this approach. Meta-analyses of prospective randomized studies comparing laparoscopic repair of incisional and ventral hernias with open repair have shown a significantly lower rate of wound infections, with no removal of the mesh, for the laparoscopic intraperitoneal onlay mesh repair technique and a trend toward lower infection rates with mesh removal using the laparoscopic technique[6]. However, only 22%–27.4% of incisional hernia repairs were performed by a laparoscopic approach, and its use among surgeons lagged compared to other complex laparoscopic procedures. Findings and operation procedures can be extremely complex, for example, with respect to the size of the defect or hernia sac, the extent of intraabdominal adhesions, the required operative competence, the length of the operation, and the costs for the materials. A surgeon who has not been trained in this specific area finds it increasingly difficult to determine the best treatment option. Experts in the field realized that laparoscopy should not be applied to all patients and preoperative selection was important to determine the best patients for this approach. Furthermore, there are surgeon specific variations in mesh fixation techniques, and differences in the type and size of mesh used. Controversies persist, and evaluation of published reports has yet to definitively answer questions regarding the best indications and techniques for laparoscopic repair.

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Hernia 1 **Current Management of Hernias**

Feb 18 (Sat), 13:30-15:00

Diagnosis and Treatment: Lipomas of Spermatic Cord and Round Ligament

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Abstract

Background: Inguinal herniorrhaphy is one of the most common surgical procedures. For patients with inguinal pain, hernia is diagnosed most of the time. Lipomas that have clinically similar symptoms with inguinal hernia are often overlooked even though it is relatively common. To provide an appropriate treatment, lipoma should be considered in patients with groin pain without a hernia.

Methods: 1086 adult patients with inguinal hernia symptoms visited our hospital from September 1st, 2012 to December 31st, 2016. Of 926 male patients, 134 cord lipomas were observed, and of 160 female patients, 38 round ligament lipomas were observed.

Results: In male adult patients, there were 58 cord lipomas with hernia and 76 cord lipomas without hernia. In female adult patients, there were 10 round ligament lipomas with hernia and 28 round ligament lipomas without hernia.

Conclusion: When dealing with patients with groin mass in the absence of hernia, lipoma should be suspected to treat accordingly. While preoperative imaging studies can be helpful, accurate diagnosis of lipoma can be made intraoperatively. Since it shares a lot of clinical similarities with inguinal, it can also be diagnosed via thorough examination using laparoscopy and external manipulation of the inguinal canal, and treated with TAPP and intracorporeal excision method.

Keyword: inguinal hernia, lipoma

Feb 18 (Sat), 15:30-17:00

Single incision Laparoscopic Surgery for Biliary Tract Disease

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Single port laparoscopic surgery is a new advanced technique in laparoscopic field. Although there are some difficulties in SPLC, but it has a lot of benefits according to previous many reports.
Until now, in HBP field, though some reports about CBD operation with single port technique, most of single port surgery in HBP field is cholecystectomy.

Laparoscopic cholecystectomy (LC) is largely accepted as the standard procedure for treating benign gallbladder disease[1]. Single-incision laparoscopic cholecystectomy (SILC) was first described in 1995[2], but it has not enjoyed widespread use to date. This approach emerged as a form of natural orifice surgery, but criticisms have been raised[3] and some surgeons are still reluctant to utilize this type of approach if its safety has not been established[4].
Although the introduction of SILC into the surgical community dates back to the mid-1990s, the evidence supporting this minimally invasive technique is still based largely on the results of small observational studies[5-7].
Current UK National Institute for Health and Clinical Excellence guidelines, published in May 2010, affirmed: 'Current evidence on the safety and efficacy of singleincision laparoscopic cholecystectomy (SILC) is limited to small numbers of patients. Since the main potential advantage to patients of this procedure is cosmetic, there is a particular need for good safety data. Therefore this procedure should only be used with special arrangements for clinical governance, consent and audit or research'.
Two well conducted meta-analyses have already compared SILC with conventional LC[4,8]. Thefirst, by Markar and colleagues[8], which analysed seven studies (375 operations), six randomized and one quasi-randomized, suggested that SILC is a safe technique. Clearly, as suggested by the same authors, the data were not mature or numerous enough to make firm conclusions. There was no meta-analysis of cosmetic results or quality of life (QoL) and postoperative pain was evaluated only on the day of surgery. A more recent meta-analysis

by Garg and coworkers[4] including nine randomized clinical trials (RCTs) (659 procedures) concluded that SILC does not confer any benefits in terms of postoperative pain and hospital stay. According to these authors, SILC has postoperative complications similar to those of LC, but better cosmetic results.

In view of the shortcomings of previous analyses due to the lack of the published RCTs on this topic and for the availability of data from a further RCTs[9-10], it was considered necessary to perform a thorough meta-analysis to compare all available data.

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Feb 18 (Sat), 15:30-17:00

Tailor-made laparoscopic surgery for suspected gallbladder carcinoma

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Introduction: Gallbladder carcinoma is one of the last malignancies to be tackled using minimally invasive techniques; to date. This study was to evaluate our tailor-made laparoscopic surgery for suspected gallbladder carcinoma using preoperative EUS and intraoperative pathological examination (IPE).

Methods AND ProCEDURES: In our institution, the cases of the possibly GBC suspected by US, CT, and MRI was additionally examined by EUS, and T1 case undergo laparoscopic whole layer cholecystectomy, T2 case underwent laparoscopic gallbladder bed resection±Lymph node dissection and ≧T3 case undergo open radical surgery. For T2 case, staging laparoscopy was done first to further exclude inoperative factors. A surgical margin of the cystic duct was examined by IPE. Laparoscopic gallbladder bed resection was performed. IPE was performed again to confirm the presence of carcinoma and the depth of invasion. Surgery was completed when the diagnosis was benign disease. Lymph node dissection was performed according to the depth of invasion.

Results: Appropriate estimation by EUS was made in 91% of 126 possibly suspected GBC patients. However, over surgery was performed in 9.1% and under surgery was performed in 1.1% before tailor-made laparoscopic surgery started. Among 25 suspected T2 cases who underwent tailor-made laparoscopic surgery, surgery finished after gallbladder bed resection for 7 patients with benign lesion. Additional regional lymph node dissection was performed laparoscopically in 16 patients (LS group). Compared to open surgery group, the mean operative time and the mean number of dissected lymph nodes was not significantly different. The intraoperative blood loss was significantly smaller (104 vs. 584ml, p=0.002) and postoperative hospital stay was significantly shorter (9.1 vs. 21.6 days, p=0.002). All patients survived without recurrence so far.

Conclusion: Our strategy for suspected gallbladder carcinoma is safe and useful for applying the appropriate-sized wound which is suitable for the performed treatment.

HBP 6 **Session for the Recent Issue & Controversy of laparoscopic HBP surgery**

Feb 18 (Sat), 15:30-17:00

Role of laparoscopy in pancreatic cancer

Masafumi Nakamura, *Kyushu University, Japan*

Laparoscopic pancreatectomy, first described in the mid-1990s, has gradually evolved during the following decades and is currently utilized for treatment of benign and low-grade malignancies of the pancreas. As for laparoscopic distal pancreatectomy (LDP), we performed multicenter comparative study of LDP and open distal pancreatectomy (ODP) using propensity score-matching of more than 2,000 patients in Japan and reported LDP was associated with more favorable perioperative outcomes than ODP, such as lower rates of intraoperative transfusion, clinical grade of pancreatic fistula and morbidity and shorter hospital stay, but a longer operative time. These data showed that LDP is low risk and high return method at least for benign pancreatic tumors.

Oncological advantages of LDP for invasive cancers have not been proved by RCT. However, several papers retrospectively revealed that LDP for cancer was technically feasible and oncological outcome was not inferior to that of open method in terms of the rate of R0 resection and the number of dissected lymph nodes. Meanwhile, there are some limitation of LDP for cancer, i.e., positive resection margin after LDP for cancer was more often in low-volume hospitals compared with in high-volume hospitals, open approach was favored for large tumors invading adjacent organs.

Laparoscopic pancreaticoduodenectomy (Lap-PD) has reported to be associated with shorter hospital stay and less blood loss compared with open-PD and there was no difference in mortality between two methods in high-volume center. In addition, patients who underwent lap-PD received adjuvant chemotherapy sooner after surgery than patients who underwent open-PD. However, these results were limited to high-volume centers in previous reports. The nation-wide risk of mortality rate for patients who underwent lap-PD was twice as high as that for patients who underwent open-PD. Therefore, lap-PD is best performed at institutions with surgeons who have extensive experience in pancreatic resection and in advanced laparoscopic procedures.

A smaller incision and earlier postoperative recovery appear to be potential advantages of laparoscopic pancreatectomy for patients with cancer. However, the safety of this procedure should be ensured before the method can be widely recommended.

Feb 18 (Sat), 15:30-17:00

Laparoscopic living donor hepatectomy

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Over last two decades, laparoscopic surgery has been adopted in various surgical fields. Its advantages of reduced blood loss, reduced postoperative morbidity, shorter hospital stay, and excellent cosmetic outcome compared with conventional open surgery is well validated. In comparison with other abdominal organs, laparoscopic hepatectomy has developed relatively slowly due to the potential for massive bleeding, technical difficulties and a protracted learning curve. Furthermore, applications to liver graft procurement in live donor liver transplantation (LDLT) have been delayed significantly due to concerns about donor safety, graft outcome and the need for expertise in both laparoscopic liver surgery and LDLT. Now, laparoscopic left lateral sectionectomy in adult-to-pediatric LDLT is considered the standard for care in some experienced centers. Currently, the shift in application has been towards left lobe and right lobe graft procurement in LDLT. However, the number of cases is too small to validate the safety and reproducibility. The most important concern in LDLT is donor safety. Even though a few studies reported the technical feasibility and comparable outcomes to conventional open surgery, careful validating through larger sample sized studies is needed to achieve standardization and wide application.

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Safe technique and indication of Major laparoscopic resection for liver disease

Yuichiro Otsuka, *Toho University Faculty of Medicine, Japan*

Liver resection has been demonstrated as an ideal treatment of choice for patients with surgically resectable liver disease. We have suggested that the laparoscopic liver resection (LLR) can provide favorable outcome with early postoperative recovery in selected patients. Due to the technical reason, the surgical indication was limited in Minor LLRs, such as left lateral sectionectomy or partial hepatectomy on the surface of infero-lateral region of the liver in 1990's.

Development of instruments and technical refinement with effective usage of maginified caudal endoscopic view, have contributed to overcome the limitation of LLR. With accumulation of experience, advanced LLRs, such as hepatectomy for tumor located postero-superior region of the liver or anatomy oriented resections including Major hepatectomy for liver disease, have been utilized by totally laparoscopic approach.

Our indications for LLRs are for the patients who have sufficient postoperative hepatic functional reserve which is predicted by ICGR15 and volumetric CT, same as open hepatectomy. In disease factor, locally resectable tumors which have no signs of tumor involvement to the hepatic hilum, the inferior vena cava, confluences of major hepatic veins or adjacent organs. Although, there is no definite limitation in tumor diameter, tumor smaller then 5cm would be favorable for non-anatomical partial LLR. In Major LLR, tumor larger than 10cm would not be suitable in achieving sufficient working space under the pneumoperitoneum. Preopearative simulation using imaging modalities of US and 3D-CT can contribute to assess operability, difficulty and plan of LLR.

The technical tip, in order not to fall into pits, is to standardize the fundamental technique, such as patient's position, trocar placement, maintenance of operative field, choice and appropriate use of instruments, isolation and division of vessels, and control hemostasis. All these technique can be learned in the Minor LLRs.

Hilar dissection of hepatic inflow vessels is performed in anatomical liver resection. In our concept, individual isolation approach is used for hemi-hepatectomy, and Glissonean pedicle approach is used for anatomical hepatectomy smaller than hemi-hepatectomy. Recent developed ICG Fluorescence imaging system can help to perform anatomy oriented hepatic parenchymal transection.

We believe that benefits of LLR are not only minimally invasiveness, but also precise performance of hepatectomy. The accumulation of contrivance in each Minor fundaments lead to Major progress to safe expansion of the indication of LLR.

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Feb 18 (Sat), 15:30-17:00

Oncological Outcome of Laparoscopic Hepatectomy

Tan To Cheung, *The University of Hong Kong, Hong Kong*

Laparoscopic liver resection has been gaining popularity but it has not been widely accepted in many major centers because previous published data involves small case numbers. The worries of bleeding and survival outcome had hindered the development of this method particularly in patients with cirrhosis.

Many studies had shown that laparoscopic hepatectomy can achieve very good short term outcome. Evidence of long-term outcome started to emerge and a lot of retrospective studies had shown non-inferior oncological outcome when compared to open hepatectomy.

In Queen Mary Hospital, the University of Hong Kong we compared out result of laparoscopic hepatectomy vs open hepatectomy.

110 patients had pure laparoscopic liver resection. 330 patients were matched in the open liver resection group. Pure laparoscopic group has less median blood loss (150ml vs 400ml, $P<0.01$), shorter operation time (285minutes vs 255minutes, $P<0.001$) and shorter hospital stay (4days vs 7 days, $p<0.001$).

In pure laparoscopic group the 1 year, 3 year and 5 year overall survival vs open group was 98.9%, 89.8%, 83.7% vs 94%, 79.3% and 67.4% respectively $P=0.033$. The disease free survival was 87.7%, 65.8%, 52.5% vs 75.2% 56.3% and 47.9% respectively.

Laparoscopic liver resection can be carried out safely with favorable short terms and long terms outcome even in patients with hepatectomy and cirrhosis in high volume center for liver cancer treatment.

THY 4 **Evolution of Robotic Thyroid Surgery**

Feb 18 (Sat), 15:30-17:00

Current Status of Robotic Thyroid Surgery in Hong Kong

Brian Lang, *University of Hong Kong, Hong Kong*

Robotic thyroid surgery has been proven to be very popular in many Asian countries. It was initially developed to overcome the limitations of traditional endoscopic (extra-cervical) thyroidectomy (ET). Its technical advantages over ET include giving the surgeon finer control of instruments, magnified three-dimensional stable endoscopic view, reduction in unintentional hand tremors, and improvement in freedom of motion of instruments. Numerous studies have found that robotic thyroid surgery is safe and technically feasible in patients with benign and well-differentiated, low-risk thyroid cancers and may be a good surgical alternative option for patients with more advanced well-differentiated thyroid cancers. In the literature, various robotic approaches have been described in the literature and they all appear to have similar excellent surgical outcomes as an open conventional procedure. However, despite these excellent results from overseas experienced centers, the adoption of robotic thyroid surgery in Hong Kong has been relatively slow and it appears that most of the procedures are being done for patients with benign thyroid diseases such as nodular goiter and Grave's disease. Nevertheless, there is some evidence that robotic thyroid surgery is gaining wider acceptance by the surgical community over time with more centers equipped with the robotic device.

THY 4 **Evolution of Robotic Thyroid Surgery**

Feb 18 (Sat), 15:30-17:00

Current Status of Robotic Thyroid Surgery in Korea

Tae-Yon Sung
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Robotic surgery in thyroid disease is a well-known procedure today, since the start of active development from 2007. This innovative surgery has spread worldwide in a short period and advanced especially, in Korea, concerning the increase of thyroid disease.
Recently, over 3,745 Robot systems have been installed worldwide, among them 462 in Asia. In Korea, about 60 Robot systems are installed in 46 hospitals. The start of Robotic thyroid surgery was actively initiated from Yonsei University and became an accepted procedure at the year 2009. The striking increase of robotic thyroid surgery was detected from 2009 and made a plateau since than in Korea. Until now, about 148 English written SCI/SCIE published papers can be searched in PubMed, which 47 papers are written by Korean physicians based on the Korean population medical data.
Most of the papers presented a promising future of the Robotic thyroid surgery. Even though several disadvantages are still seen, such as longer operation time than open thyroidectomy, equivocal or increased surgical complications and much expensive cost in certain countries like Korea, the operation time period and surgical complications gradually decreased as cases increased in most of the published papers. Fortunately, most of the papers presented no specific differences in disease-free survival or recurrence.
Current status of Robotic thyroid surgery in Korea for the management of thyroid disease is stable, safe and promising. However, it is not to say that it is better than other thyroid surgical approaches but equally safe as any procedure. The golden standard for selecting the appropriate surgical procedure should be focused on the individualized patient's thyroid disease status.

Feb 18 (Sat), 15:30-17:00

Future of Robotic Thyroid Surgery: Instrumental development & Surgeon's perspective

Woong Youn Chung, *Severance Hospital, Korea, Republic of*

Robotic surgery has been introduced from the year 2000 and has marked increase in its use since then. The use of robot favors a less invasive operation; with a much better view of the organs being operated; with great approximation of the structures; with the surgeon's vision in three dimensions; procedure even less invasive with less tissue trauma. So, the robot makes the trained surgeon perform more safe and accurate operations. The surgeon do not use any force to control the robotic arms, doing movements with the extremities of the fingers; thus, there is much less fatigue in prolonged procedures. Another relevant feature of the robot, of great importance is the possibility of extensive training in simulators. There is an outfit named MIMIC with programs that simulate situations of object manipulation, movement, energy use, sutures, etc. The surgeon can thus become familiar with the equipment and thorough training, perform initial procedures with more skill and accuracy, reducing the learning curve. and possibly reducing the risk of occurrence of accidents and complications.

The most important point of this new technology is the introduction of a new paradigm in surgery: the existence of a robot system that allows the use of computer programs for performing tasks. No other surgical platform, at present, has this feature. Laparoscopic forceps are directly controlled by the surgeon's hands and, with the exception of the power instruments, little change occurred over the past 20 years. On the other hand, are well known the incredible advances in diagnostic medicine since the introduction of computer programs in imaging and interventional equipment; innovations in these areas occur almost daily. This same feature is now available to the surgeon. Computer programs can, for instance, be inserted to allow different examinations during operation; identification of lymph nodes compromised by tumor; differentiation over vessels, nerves and other tissues.

From this premise, the possibilities are almost endless bring new technologies in the future. The robotic platform is evolving exponentially. The robots are here to stay. The possibilities of computer programs interact are almost endless. So, the future has arrived!