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LECS (Laparoscopic endoscopic cooperative surgery) was performed as part of minimal-invasive surgery due to the development of gastroscopy techniques such as EMR and ESD and the development of laparoscopic techniques. The concept of LECS was further activated by Dr. Hiki from Japan. In this lecture, we will talk about the recent trends in LECS procedures that can be usefully used in benign diseases. In addition, we will look at recent trends in NEWS, Clean-NET, etc., which are being applied to malignant diseases.
Experiences of EFTR; Advantages and Limitations

Bangwool Eom

Center for Gastric Cancer, National Cancer Center, Korea

We developed non-exposure simple suturing endoscopic full-thickness resection (NESS-EFTR) to overcome the limitations of laparoscopic and endoscopic cooperative surgery (LECS). LECS enables to determine an appropriate surgical margin, however, an artificial perforation occurs, which can produce transmural communication and expose the tumor to the peritoneum. NESS-EFTR technique includes laparoscopic seromuscular suturing which results in inversion of the stomach wall, EFTR of the inverted stomach wall, and endoscopic mucosal suturing using endoloops and clips.

Initially, we examined the NESS-EFTR in porcine models. Eight pigs were assigned to NESS-EFTR group and the other eight pigs to laparoscopic wedge resection in the randomized trial. The complete resection rates in the NESS-EFTR were 100% and all wounds were successfully closed in both groups.

Then the NESS-EFTR was prospectively performed in 11 patients with gastric subepithelial tumor from August 2015 to June 2017. The rate of complete resection and successful closure was 100% and there was no postoperative complication except one case of transient fever.

In the next step, the NESS-EFTR was applied to patients with gastric cancers. From July 2017 to January 2018, twenty patients with early gastric cancer less than 3 cm in size without absolute indication for endoscopic submucosal dissection were enrolled. Sentinel basin was detected using Tc99m-phytate and indocyanine green, and the NESS-EFTR procedure was performed when all sentinel basin nodes were tumor-free by frozen pathologic examination. All procedures of NESS-EFTR were performed in 17 of the 18 remaining patients (94.4%) without conversion, and the complete resection rate was 83.3% (15/18). The rate of intraoperative perforation was 27.8% (5/18), and endoscopic clipping or laparoscopic suturing or stapling was performed at the perforation site. Based on this pilot study, currently, a phase 2 clinical trial of NESS-EFTR is under way.

Endoscopic full thickness resection, gastric cancer
Lessons from EFTR Trials with Sentinel Node Evaluation for EGC

Sun Gyo Lim1, Hoon Hur2, Gil Ho Lee1, Choong-Kyun Noh1, Kee Myung Lee1, Jin Hong Kim1, Chul Kyu Roh2, Sang-Yong Son2, Sang-Uk Han2

1Department of Gastroenterology, and 2Department of Surgery, Ajou University School of Medicine, Suwon, Korea

The minimal invasive resection with sentinel node evaluation has been recently developed in the treatment of early gastric cancer (EGC), because an excessive gastric resection in patients with EGC could induce a lowered quality of life without gaining additional oncologic improvement. In the process of this development, endoscopic full-thickness resection (EFTR) of the stomach was considered as better choice than other resection modalities due to its adequacy of resection range and simultaneous advantages in oncologic safety. Sentinel node navigation surgery (SNNS) has been combined with EFTR in recent studies and showed its efficacy and feasibility in the treatment of EGC. In the initial phase of EFTR, exposure type methods have been used in clinical trial. However, they were replaced by non-exposure type EFTR methods, because there was a concern about spillages of cancer cells and gastric juice which could undesirable clinical outcome. Although endoscopic full-thickness resection is a promising and reasonable method for the treatment of early gastric cancer, which could secure adequate oncologic safety and improved quality of life, further large-scale prospective and comparative studies between EFTR and conventional surgical treatment with a long-term follow-up should be performed in a multi-center trial setting.
The 2020 Eaes Guidelines on Bariatric Surgery

Nicola Di Lorenzo¹ and Nicola Di Lorenzo¹

¹Surgical Sciences, Universita Roma Tor Vergata, Italy

Background

Surgery for obesity and metabolic diseases has been evolved in the light of new scientific evidence, long-term outcomes and accumulated experience. EAES has sponsored an update of previous guidelines on bariatric surgery.

Methods

A multidisciplinary group of bariatric surgeons, obesity physicians, nutritional experts, psychologists, anesthetists and a patient representative comprised the guideline development panel. Development and reporting conformed to GRADE guidelines and AGREE II standards.

Results

Systematic review of databases, record selection, data extraction and synthesis, evidence appraisal and evidence-to-decision frameworks were developed for 42 key questions in the domains Indication; Preoperative work-up; Perioperative management; Non-bypass, bypass and one-anastomosis procedures; Revisional surgery; Postoperative care; and Investigational procedures. A total of 36 recommendations and position statements were formed through a modified Delphi procedure.

Conclusions

This document summarizes the latest evidence on bariatric surgery through state-of-the-art guideline development, aiming to facilitate evidence-based clinical decisions.

Keywords Bariatric surgery · Obesity · Guidelines · EAES · GRADE · AGREE II
Lessons Learned from Animal Experiment for Metabolic and Bariatric Surgery

Tae Kyung Ha

General Surgery, Hanyang University College of Medicine, Korea

To identify the mechanism of bariatric/metabolic surgery, researches using animal model have been essential and crucial. Most of these studies have been performed in rats and mice. However, setting up animal models of bariatric/metabolic surgery, especially Roux-en-Y gastric bypass (RYGB) is very challenging. Verifying the benefits and pitfalls of each surgical model in rodents will advance our understanding of their translational potential. Two rodent models of bariatric surgery, vertical sleeve gastrectomy (VSG) and RYGB recapitulate the human forms of surgery. However, the result from studies using rodent model should be always critically evaluated for their applicability to the human. It is important to summarize both advantage and limitations of data from animal experiments designed to investigate and identify the physiological mechanisms of bariatric/metabolic surgery.

Bariatric Surgery, Animal Model, Roux-en-Y Gastric Bypass, Vertical Sleeve Gastrectomy
Intraoperative neuromonitoring (IONM) has been applied as an adjunct to standard visual identification of the recurrent laryngeal nerve (RLN) to help prevent nerve paralysis. Nowadays, it is widely accepted that the IONM affects the quality of thyroid procedures as an adjunct to the gold standard of visual nerve identification, adding a new functional dynamic during thyroid surgery. The main aims of IONM are as follows:
- Early definitive localization of the nerve, thus avoiding excessive manipulation and damage to RLN and possible extralaryngeal branch(es) or anatomic variants (i.e. the nonrecurrent laryngeal nerve);
- Confirmation of RLN visual identification (preventing visual RLN misidentification);
- Evaluation of the laryngeal nerve function before, during and after dissection, with objective confirmation of the neurophysiological integrity on the first side before approaching the contralateral side.
IONM improves professional standards of RLN management considering the frequency of postoperative vocal fold (VF) dysfunction, which is more common than expected (monitoring surgical performance. Neural monitoring could be performed routinely given that difficult cases cannot always be predicted preoperatively. Even if nerve monitoring yields the greatest advantage in difficult thyroid operations, routine application has shown to steepen learning curves through greater experience in interpretation of the signal and troubleshooting system malfunction. The high quality IONM is fundamental to optimizing surgical strategy that will yield the best patient outcomes as it relates to laryngeal function after thyroid surgery.
There is no difference in purpose, principles and staged procedures of IONM in between open conventional thyroidectomy and endoscopic/robotic thyroidectomy. However, modified procedures and technical tips in application of this novel technology especially specified for transoral robotic thyroidectomy(TORT), the lastly developed robotic thyroidectomy approach which gains a lot of attention nowadays, would be presented with video clips to deepen the understandings of IONM for thyroid surgeons.
Image Guided Thyroid Surgery

Wan Wook Kim ¹ and Jaepyong Cha²

¹Surgery, Kyungpook National University, Korea
²Sheikh Zayed Institute for Pediatric Surgical Innovation, Children’s National Hospital, USA

PURPOSE

In thyroid surgeries, it is often difficult to visually distinguish parathyroid glands (PTGs) from their surrounding anatomical structures. To preserve the PTG well, the surgeon must be able to identify the PTG well, and preserve the vasculature to the PTG. Although PTGs are well-identified through histopathology or recent fluorescence technologies, it is crucial to determine tissue viability for intraoperative decision making—to preserve PTGs or perform autotransplantation—based on their perfusion levels. In this study, we evaluated the feasibility of our non-invasive, portable digital angiography device to visualize feeding vessels in real-time and assess viability of PTGs intraoperatively without any exogenous dye injection.

PATIENTS AND METHODS

A total of 10 patients who underwent open thyroidectomies were included in this pilot study. Our portable, hand-held imager is designed to enable digital angiography that non-invasively acquires image from dual camera sensors, rapidly computes blood flow, and visualizes tissue perfusion levels in different colormap onto the screen in real-time. Digital angiography permits a continuous vasculature perfusion imaging and PTG tissue viability assessment in contrast to indocyanine green (ICG)-angiography that requires an exogenous dye injection and is temporally limited in multiple applications.

RESULTS

We intraoperatively identified PTGs using near-infrared autofluorescence (NIRAF) that were indistinguishable with standard color vision assessment. Furthermore, PTG tissue viability was intraoperatively assessed by visualizing vasculature perfusion in different colors. The blood flow through artery branches near the thyroid was observed in real-time and PTG perfusion was clearly differentiated between well- and poorly-perfused PTGs.

CONCLUSIONS

This pilot study demonstrated the feasibility of the digital angiography device for application in human clinical trials. In the future, this technology could be a robust tool for intraoperative PTG identification and viability assessment in head and neck surgery.

Parathyroid gland, Tissue viability, Portable digital angiography, Perfusion assessment
Appropriate Energy Device Selection and Usage

Han Deok Kwak

Colorectal surgery, Chonnam National University Hospital, Korea

Energy device is a generic term for surgical instruments that emit high frequencies, ultrasonic waves and/or microwaves. The energy interacts with living tissue and turns into heat, which seal vessels by denaturing proteins in tissues at high temperatures, causing vascular walls to stick together, then can be transected. Therefore, the energy devices can both cut tissue and seal blood vessels. There are two types of energy devices commonly used; bipolar devices that utilize high-frequency electric current and ultrasonic devices that utilize ultrasonic vibrations. Each energy device offers different benefits and is selected based on the situation and the type of procedure. Bipolar device has its benefit for sealing blood vessels working by using the tip of the device to grasp the tissue to be cut and then a high frequency electrical current is run through the tissue. Heat is generated through the electrical resistance of the tissue, thus increasing the temperature of the tissue. As a result, the proteins in the tissue denature and the blood vessels are sealed. However the maximum temperature is only around 100°C, which is not enough to cut tissue. Therefore, an independent blade can be used to cut the tissue once vessels have been sealed. Meanwhile, ultrasonic device can seal and cut in one step. The maximum temperature reaches around 200°C with strong ultrasonic vibration, it generate frictional heat and the tissue is broken apart or transected. However, the device lack the same level of sealing ability as that of bipolar devices. Recently, it was introduced that both bipolar and ultrasonically generated frictional heat energy in one instrument. However, recently released high-performance devices have a price burden.

From the viewpoint of a laparoscopic surgeon, a comprehensive knowledge of different energy sources is mandatory to decide the appropriateness of an instrument for a procedure.
Duodenal Stump Reinforcement Might Reduce Both Incidence and Severity of Duodenal Stump Leakage after Laparoscopic Gastrectomy with Roux-en-Y Reconstruction for Gastric Cancer

Naoki Hiki

Upper gastrointestinal surgery, Kitasato University, Japan

BACKGROUND

Although duodenal stump leakage (DSL) is a relatively rare complication after gastrectomy with Roux-en-Y (R-Y) reconstruction, it is difficult to treat and can be fatal. We investigated the impact of duodenal stump reinforcement on DSL after laparoscopic gastrectomy with R-Y reconstruction for gastric cancer.

METHODS

This retrospective study of 965 patients with gastric cancer who underwent laparoscopic distal or total gastrectomy (LDG or LTG) with R-Y reconstruction compared surgical outcomes between two groups, the duodenal stump reinforcement group (reinforcement group) (n = 895) and that without duodenal stump reinforcement (non-reinforcement group) (n = 70).

RESULTS

Mean operative duration was significantly longer in the reinforcement than in the non-reinforcement group (LDG; 291 min versus 258 min, p < 0.001, LTG; 325 min versus 285 min, p < 0.001). DSL occurred less frequently in the reinforcement than in the non-reinforcement group (0.67% vs. 5.71%, p < 0.001). Furthermore, non-reinforcement was an independent risk factor for DSL in multiple logistic regression analysis with adjustment for potential confounding factors. Patients with DSL in the non-reinforcement group all required re-operation, while all but one patient with DSL in the reinforcement group recovered with conservative management.

CONCLUSIONS

Duodenal stump reinforcement in laparoscopic gastrectomy with R-Y reconstruction may reduce the risk of DSL development and minimize its severity.
Laparoscopic Distal Gastrectomy Using 4K Vision

Hyung-Ho Kim

Seoul National University Bundang Hospital

With the advancement of minimally invasive surgery, laparoscopic gastrectomy has now become one of the standard treatments for gastric cancer. Good resolution and stable field of view are necessary in performing laparoscopic surgery. Recently, 4K resolution cameras have been released. The 4K camera has four times amount of pixels compared to a high-definition camera. Higher resolution allows a clearer image of the field and better perception of depth. In this case, a 58 year-old female diagnosed with early gastric cancer in the low body, anterior wall of the stomach underwent laparoscopic distal gastrectomy with Roux-en Y gastrojejunostomy and D1+ lymph node dissection. A 4K camera was used, giving a clearer view of the lymphatic structures, and better depth.
Paraesophageal Hernia Repair

Joong-Min Park

Department of Surgery, Chung-Ang University College of Medicine, Korea

This video demonstrates laparoscopic hiatal hernia repair using UHD 4K video system (Arthrex Inc, FL, USA). UHD 4K shows 4 times higher image definition than Full HD, and provides greater detail, greater depth perception and enhanced depth of field especially for laparoscopic surgery.

The patient was an 80-year-old woman with a known large hiatal hernia. She came with symptoms of dysphagia, dyspnea, and acid regurgitation for 10 years. Endoscopic and radiologic evaluation confirmed type 3 hiatal hernia (mixed paraesophageal hernia) because gastroesophageal junction was displaced upward 6cm from normal position and upper body and fundus of stomach was in the chest.

The surgical procedures are as follows. (1) Reduction of herniated stomach; (2) Hernia sac dissection and excision; (3) Circumferential esophageal mobilization; (4) Short gastric vessels division for mobilization of fundus; (4) Crural repair with reinforcement; (5) 360-degree Nissen fundoplication.

Detailed surgical images can be found in the video presented.

paraesophageal hernia, hiatal hernia, fundoplication
Laparoscopic Hepatectomy Using 4k Imaging System: Comparing With 3d Flexible System

Kyung-Suk Suh

Department of Surgery, Seoul National University College of Medicine, Seoul, Korea

Background

The usefulness of laparoscopic systems in abdominal surgery is already known, and laparoscopic liver resection is also widely used in hepatectomy operation using a 3D flexible videoscope. This 3D imaging system provides some advantages such as in the better in-depth perception and spatial orientation. In recent decades, the rapid development of video technology has led to the development of 4K camera laparoscopic devices.

Purpose

Nowadays there have been not many studies comparing 4K and 3D flexible scope. This video presentation compares to 4K and 3D flexible laparoscopic surgical views in the same operation of liver resection in patients with hepatocellular carcinoma.

Methods

A 71 years old male had hepatitis B treated with Tenofovir. On laboratory findings, there are no abnormality of LFT, platelet count, and PT INR. The tumor markers such as AFP, PIVKA were not much elevated. He had about 2cm hepatocellular carcinoma, located between segments 5 and 8 on the CT scan. He underwent laparoscopic S5/8 tumorectomy using with 4K and 3D flexible laparoscope.

Result

The 4K imaging system provides a higher quality image with less eye strain. However, it has limitations that this does not provide a bird eye view, so this system led to a lack of depth perception and spatial orientation. We hope that 3D 4K ‘flexible’ scope or 8K imaging system will be developed in the future.

4K Imaging system, 3D flexible system, Laparoscopic hepatectomy
Single Port Appendectomy – Technical Considerations

Chang Woo Kim

Surgery, Kyung Hee University Hospital at Gangdong,

Single-incision laparoscopic surgery (SILS), which is characterized by only one surgical incision, is a novel technique in the era of the minimally invasive surgery. SILS have been introduced with its safety and feasibility for various diseases including appendectomy, cholecystectomy, herniorrhaphy. However, SILS is not an alternative for conventional laparoscopic surgery (CLS), but an option for selective patients by interested surgeons, whereas CLS completely occupied the standard methods for some diseases over open surgery. It is mainly due to the discomfort of SILS, such as collision of the laparoscopic instruments and unclear learning curve. SILS for appendicitis also has difficulties for experts as well as novices. Herein, the presenter shows a list of considerations for safe appendectomy: an access device, camera, instruments, and technical tips.

appendectomy, single-incision laparoscopic surgery, single port surgery
Immediate Versus Delayed Appendectomy - Evidence Based Decision Making, Management Protocol

Ma Chung Hyeun

Department of Surgery, University of Ulsan College of Medicine, Gangneung Asan Hospital, Korea

This aim of this lecture is to inform residents of the timing of appendectomy and to educate the decision making process. Appendicitis is the most common diagnosis of acute abdominal pain that may require surgical treatment. There is a lifetime risk of onset in 8.6% of men and 6.9% of women. The standard treatment for acute appendicitis during the past one century has been emergency appendectomy. However, with the introduction of laparoscopic surgery, laparoscopic appendectomy is mostly performed as the primary treatment. Many studies support the success of non-surgical treatment in patients with non-perforated appendicitis. However, the most important thing would be to clarify the patient selection criteria. However, such work requires early understanding of patients, and it will be very difficult to proceed without adequate compensation for the period of monitoring patients without surgery under the national health insurance system called DRG. Many other studies have cited the reduction of medical costs for patients receiving non-surgical treatment. This is a natural result. In the case of perforation or accompanying abscesses, treatment strategies have gradually diversified, such as surgery at intervals after initial antibiotic treatment, and percutaneous drainage. Recently, in some Europe, clinical trials with non-surgical treatment for simple appendicitis without complications have been conducted, and studies related to such non-surgical treatment are increasing in both adults and children. In this lecture, non-surgical treatment for appendicitis was introduced, and the treatment timing and the latest findings according to appendicitis classification were summarized.

appendectomy, timing of surgery, antibiotics
Laparoscopic Procedure: IA Ds

Ju Yeon Lee

Pediatric surgery, Chonnam National University Children’s Hospital, Korea

Anorectal malformation is a well-documented spectrum of disorders that has been reported in 1 in 5000 live births. The exact etiology is not well understood, and it has been linked to some genetic and familial dissociations. This wide spectrum of congenital disorders ranges from imperforate anus with or without fistulas to the urethra, bladder, or perineum to complex anogenital malformations involving the entire ano-genito-urinary tract. The surgical approach to repairing these defects changed dramatically in 1980 with the introduction of the posterior sagittal approach, which allowed surgeons to view the anatomy of these defects clearly, to repair them under direct vision, and to learn about the complex anatomic arrangement of the junction of rectum and genitourinary tract. The open posterior sagittal anorectoplasty (PSARP) is the current standard for surgical management of anorectal malformations.

Introduction of laparoscopy allowed better visualization of the depth of the infant’s pelvis and safe dissection of high types of anorectal malformations and led to the development of a minimally invasive laparoscopic approach for high imperforate anus, introduced in 2000 by Georgeson et al.

Laparoscopic assisted anorectal pull-through (LAARP) positions the neorectum accurately inside the sphincter complex without dividing any of these muscles. Some physiologic measurements after LAARP indicate that outcomes are at least equivalent to PSARP.

IA, PSARP, LAARP
Hirschsprung disease (HD) is a congenital anomaly characterized by the absence of ganglion cells in the myenteric and submucosal plexuses. HD occurs in approximately 1 : 5,000 live births. Approximately 80% of children have a “transition zone” in the rectum or rectosigmoid colon. Another 10% have more proximal colonic involvement, and about 5–10% have total colonic aganglionosis with variable involvement of the distal small intestine. The surgical goal in HD is to remove the aganglionic bowel and pull the normally innervated bowel through the anus to allow normal bowel movements. The following are the representative surgical methods of Hirschsprung’s disease. In 1948, Swenson proposed a full-thickness dissection of the rectum and end-to-end anastomosis, while Duhamel suggested a retrorectal pull-through. Few years later, Soave first described an extramucosal dissection of the rectum, aimed to preserve the pelvic innervation at best. Progression occurred from a two- or three-stage procedure to a primary operation in the early 1980s. The laparoscopic-assisted primary pull-through was first described by Georgeson et al in 1995. And, the entirely transanal endorectal pull-through emerged in 1998. Recently, single incision surgery or robot assisted surgery have also reported good results.

We will look at laparoscopy assisted surgery performed in Hirschsprung's disease, and advantages of laparoscopy assisted surgery.
Robotic-assisted Pediatric Surgery for Anorectal Malformations and Hirschsprung’s Disease

Kyong Ihn

Department of Pediatric Surgery, Severance Children’s Hospital, Yonsei University College of Medicine, Korea

Background
Since the use of robotic surgery increased during the last decade, a variety of pediatric surgical procedures have been reported to be feasible with a robotic approach. Particularly, dissection and reconstruction of the lower gastrointestinal tracts by laparoscopic techniques performed in narrow fields, such as the pelvis of infants, are challenging issues. The recently introduced robotic system provides distinct advantages in these procedures, providing a highly magnified three-dimensional (3D) visual field, wristed instruments with seven degrees of freedom, a stable camera platform, and tremor filtration.

Procedures
In using the robot, recently published researches followed the Georgeson technique for laparoscopic-assisted anorectoplasty. After the liberation of the front and lateral sides of the rectum was done, recto-urethral or recto-bladder neck fistula was ligated, taking great care to avoid injuring adjacent urogenital structures. The anorectal pull-through with minimal perineal dissection was completed.

In Hirschsprung’s disease, totally robotic Soave pull-through has been applied recently. The brief steps of the procedure are shown: (1) Seromuscular biopsies; (2) Mesocolic division; (3) Robotic endorectal dissection; (4) Transanal dissection; (5) Pull-through; (6) Colo-anal anastomosis.

Conclusion
The robotic system offers potential solutions through more sophisticated features. It provides articulating instruments and a magnified, 3D view, as well as motion scaling and tremor filtering, particularly in a narrow operative space like the pelvis of a small infant. Although early results of robotically assisted repair of ARMs and HSCR are encouraging, larger numbers and long-term outcomes are needed to be alternative surgical options.

Anorectal malformation, Hirschsprung’s disease
[SY09] UGI 2: Minimally Invasive Gastrectomy for Advanced Gastric Cancer (AGC)

SY09-1

Application of indocyanine green fluorescence imaging system' during laparoscopic surgery for AGC

Chang-Ming Huang
Fujian Medical University Union Hospital

With the rapid development and popularization of laparoscopic and robotic radical gastrectomy, gastric cancer (GC) surgery has gradually entered a new era of precise minimally invasive surgery. The era of precision medicine has put forth new requirements for minimally invasive surgical treatment of patients with GC at different disease stages. In patients with advanced GC, systematic LN dissection can be achieved without increasing surgical complications. With the successful application of indocyanine green (ICG) fluorescence imaging technology in minimally invasive surgical instrumentation in recent years, researchers have found that ICG fluorescence imaging yields good tissue penetration and can identify LNs in fat tissue better than other dyes. Therefore, whether ICG fluorescence imaging technology can guide surgeons in performing safe and effective LN dissection has attracted much attention.

ICG fluorescence imaging is an emerging new method in the era of precision treatment in minimally invasive surgery, and provides a more stable signal, more obvious background contrast, and deeper penetration depth than other contrast agents. This technology is recommended as an effective method for sentinel LN mapping and LN dissection navigation in minimally invasive surgery for GC. The application of ICG tracer-guided LN dissection is helpful in completing D2 LN dissection in laparoscopic and robotic radical gastrectomy, and to perform more precise LN dissection in function-preserving surgery. Novices of minimally invasive radical gastrectomy and experienced surgeons can benefit from ICG fluorescence imaging.
SY10-1

**Current Status of Robotic Surgery for Rectal Cancer in Japan and Its Future Prospects**

Ichiro Takemasa

Surgery, Surgical Oncology and Science, Sapporo Medical University, Japan

Various international randomized controlled trials (RCTs) have demonstrated that laparoscopic colectomy has superior short-term outcomes and equivalent long-term survival to open resection, while there has been controversy regarding oncological safety of laparoscopic surgery for LARC. The results of several RCTs are inconsistent. Laparoscopic rectal cancer surgery with in-line rigid instruments is technically demanding and still highly challenging due to the limited operative field of the narrow pelvis. Several options have been introduced to overcome the technical limitations of laparoscopic surgery. Transanal TME (TaTME) providing better operative view and less obstructive procedures near the lower rectum is revolutionary. Robotic assisted laparoscopic surgery (RALS) providing a stable 3D operating field and intuitive procedures with multiple-joints forceps is also extremely innovative. Better ergonomics for the surgeon that make it possible to perform complex procedures precisely is expected to improve the quality of TME and reduce autonomic nerve damage. Meta-analysis showed its feasibility despite lack of tactile sensation and higher costs. However, there is still limited evidence on oncological benefits and safety. The ROLARR trial conducted mainly in the UK failed to reveal the superiority in open conversion, positive CRM, and TME completion rates of RALS, while there is a rapid learning curve and good indications for difficult cases. In Japan, RALS has been covered by insurance for about 2 years which has led it to spread rapidly. Convincing evidence on its safety and oncological benefits of RALS is essential.
Laparoscopic Surgery for Colorectal Cancer in Korea: Nationwide Data from 2013 to 2018

Sun Jin Park

Surgery, Kyung Hee University College of Medicine, Korea

We previously reported the first nationwide data from 2008 to 2013 on laparoscopic surgery for CRC in Korea, and the laparoscopic resection rate increased from 42.6% in 2008 to 64.7% in 2013 [1]. This study was the second report on nationwide data including a total of 117,320 patients underwent surgical resection for CRC from 2013 to 2018 [2]. Nationwide data were obtained from the Health Insurance Review & Assessment Service database. Data and trends of laparoscopy use for colorectal resection over six years were examined. In Korea, a total of 117,320 patients underwent surgical resection for CRC from 2013 to 2018. The proportion of laparoscopic resection increased from 64.9% in 2013 to 78.5% in 2018. The rate of laparoscopic resection for colon cancer increased from 64.7% in 2013 to 77.4% in 2018. For rectal cancer, the rate of laparoscopic resection increased from 65.4% to 81.6%. Males accounted for 59.8% of all patients, but females surpassed males at over 80 years of age. The age of peak incidence was in the 60’s for males and in the 70’s for females. A steady increase in the number of patients undergoing surgery for CRC was observed over 80 years of age. The laparoscopic surgery rate of 42.6% in 2008 steadily increased by more than 35% over 10 years and reached 78.5% in 2018. In particular, the rate of laparoscopic surgery for rectal cancer was 81.6%, whereas the rates were 75.7% for right colon and 79.3% for left colon cancer in 2018.

References


Colorectal neoplasm, Colorectal surgery, Laparoscopy, Database, Korea
Benefits and Disadvantages in Robot Assisted Liver Surgery

Sung Hoon Choi

Surgery, CHA Bundang Medical Center, CHA University, Korea

Over the past two decades, laparoscopic liver surgery has evolved drastically due to both instrument development and accumulated experience in techniques. However, laparoscopic surgery has intrinsic drawbacks such as non-ergonomic posture and long learning curve, among other factors. But, the expansion of robotic liver surgery has been very slow.

Compared to laparoscopic surgery, the freely articulating ‘endo-wrist’ function of robotic surgery is one of the greatest advantages of this approach. This increased dexterity of robotic instruments improves accessibility to areas where access is difficult by a laparoscopic approach and is suited for delicate tasks involving complex anatomical structures. Such difficult procedures and accessibility by laparoscopic hepatectomy include following:
1) posterolateral segment lesion, 2) management of hilar vascular structures, 3) associated radical lymph node dissection, and 4) accompanied bilioenteric anastomosis.

Despite of several advantages of robotic surgery, however, the feasibility of liver parenchymal transection using a robotic approach is the greatest obstacle to overcome. In contrast to that there are various effective devices for parenchymal resection in laparoscopic hepatectomy, there are only limited instruments for robotic liver resection. In robotic surgery, in case of accidental hemorrhage, instrument conversion for hemostasis is sluggish, and it is difficult to proceed with the operation due to contamination of the operative field. Therefore, it is important to prevent bleeding for a smooth operation with several tips, keeping the central venous pressure below 4 cmH2O and applying the Pringle maneuver and proper traction technique.

The robotic surgical platform requires a different environment than laparoscopic surgery. Therefore, in order to successfully implement the robotic liver surgery, regular education and continuous exposure to robotic surgery are important. And, it is essential to prepare and train the surgical team to handle the robotic system, as well as the preoperative conception and protocol.

Hepatectomy, Laparoscopic, Robotic, Minimally invasive
The postoperative complication is an important surrogate marker for estimating the feasibility or quality of surgery of each surgeon in gastric cancer and the Upper gastrointestinal field. Among all complications, post-operative bleeding, anastomotic leakage, intestinal obstruction, and intra-abdominal abscess are major complications that often need radiologic or endoscopic or surgical intervention.

When intra-abdominal bleeding is observed, computed tomography is usually performed and estimates whether bleeding can be managed with angiographic intervention or surgical exploration. In the case of surgical exploration, the laparoscopic approach helps delicate exploration and preventing additional tissue injury. Anastomosis leakage is one of the most drastic complications following upper gastrointestinal surgery. Frequent leakage site is different from the anastomosis method. One of the most frequent and critical anastomosis is an esophagojejunostomy and duodenal stump. Mostly, anastomosis leakages are managed with intervention or endoscopic treatment. When anastomosis leakage is developed, proper drainage for the septic foci should have proceeded. After that, the control of the leakage site is followed. Endoscopic or interventional stent insertion or sponge suction procedures are frequently used.

In the case of intestinal obstructions, there are two types of intestinal obstruction. One is adhesion, the other is anastomosis kinking type. Both situations are managed with a laparoscopic and open approach. The laparoscopic approach can safely be performed in case of intestinal obstruction. Adhesiolyis and bypass bowel anastomosis are successfully performed. Moreover, laparoscopic management has advantages of lessening additional adhesion due to complication managements.

Various complication case videos will be presented, displayed and discussed.
Laparoscopic Complex Hepatic Resections Based On Caudal View and Major Vascular Exposure

Fernando Rotellar

HPB and Liver Transplant Unit, Clinica Universidad de Navarra, Pamplona, Spain, Spain

Background: Although most types of liver procedures can be performed laparoscopically, there are complex situations in which major veins represent the limits or the anatomical landmarks for a safe resection. There are three main elements that allow us to perform these complex resections that require major vascular exposure: a) completion of the learning curve, b) better understanding of the balance CVP/pneumoperitoneum and a fine anesthetic management, and finally c) taking advantage of the caudal approach, that represents the main conceptual change in laparoscopic liver surgery.

Purpose: Didactic demonstration that thanks to the caudal view and major vascular exposure, several approaches to the major veins can be performed in order to perform safe vein-guided resections in complex situations.

Methods: Several specific approaches to the major veins are described and shown in detail: dorsal approach to the middle hepatic vein, inferior approach to the middle hepatic vein, dorsal approach to the right hepatic vein, etc.. These approaches are applied in particular cases: complex left and right hepatectomies, anatomical resections in difficult segments (i.e. segment VII), difficult lesions in the paracaval portion of the caudate lobe.

Results: After adequate completion of the learning curve and a better refinement of the anesthetic management a vein-guided concept of liver surgery is possible under laparoscopic approach, and particularly useful in complex cases. This concept is based on the combination of the caudal approach and major vascular exposure.

Liver, Caudal approach, Vein-guided, Major vessels, Complex hepatectomy, Laparoscopy
Laparoscopic Liver Resection for the Tumors Located in the Posterior Section with Caudal Approach and Postural Changes

Zenichi Morise

Surgery, Fujita Health University School of Medicine, Okazaki Medical Center, Japan

In laparoscopic liver resection (LLR), there is no ventral space for lifting the liver up. Also, surgeons should handle the tumor bearing area in the bottom of the small subphrenic space, “Rib Cage”, with the overhanging large and heavy right liver. On the other hand, LLR facilitates to acquire a good view from caudal and dorsal direction, and to use postural change for dissection and handling organs and tumors. We apply the caudal approach of LLR with postural changes for the tumors in the posterior section.

1. For the posterior sectionectomy, we apply the caudal approach of LLR with prior transection to mobilization in the left lateral position. In this procedure, dissected IVC and RHV on the transection surface are the guide to the transection direction. The transection plane is well-opened between the resected liver fixed to the retroperitonium and the remnant liver sinking down with the gravity.

2. For the partial resection for large tumors in Segment (S) 7, we apply the caudal approach of LLR with prior transection to mobilization in the semi-prone position. In semi-prone position, the S6 is cleared downward of the operative field and the good access to S7 is obtained. Without the dissection of the retroperitoneum, the transection plane was opened between the resected liver and the remnant liver.

3. For the partial resection of deep small tumors in S6/7 and the segmentectomy of S7 and, we apply the caudal approach of LLR with prior mobilization in the semi-prone position. A good surgical space was obtained in the dorsal, but above the liver, in this position for manipulations of instruments.

Caudal approach with postural changes is feasible and one of the good choice for LLR for the tumors located in the posterior section.

Laparoscopic liver resection, posterosuperior tumors, caudal approach, postural change
Technical Tips and Pitfall of Various Parenchymal Transection Methods

Jong Man Kim

Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine

Introduction
Laparoscopic liver surgery has gained wide acceptance resulting in a paradigm shift of liver surgery. Technical innovations and accumulation of surgeon’s experience have allowed laparoscopic liver resection (LLR) to become an effective procedure with favorable peri- and post-operative outcomes.

The goal of liver parenchyma transection is to minimize blood loss while obtaining adequate surgical margin clearance for malignancies. Multiple preoperative imaging modalities along with intraoperative ultrasonography findings may contribute to best determining the appropriate cutting line during LLR; however, technical expertise required to obtain adequate exposure along with minimizing and controlling bleeding during liver parenchymal transection remains a challenge for safe LLR, and therefore represents a major concern for hepatobiliary surgeons.

Techniques for laparoscopic liver parenchymal transection

Most surgical teams use a 10–14mmHg pneumoperitoneum, which allows a good control of bleeding. Parenchymal transection starts with the opening of both capsule and superficial layer of the liver (up to 2 cm deep), in which no major vessels or bile duct are generally present. This step can be safely performed using ultrasonic shears only (i.e., Harmonic®, Ethicon EndoSurgery, Inc., Cincinnati, OH or Thunderbeat®, Olympus Co., Tokyo, Japan) without pre-coagulation. Doing this, triggering ultrasonic shears before completely closing the device allows limiting bleeding. In selected cases of superficial small tumors requiring wedge resection, we can use ultrasonic shears only without CUSA.

Transection of deeper parenchyma should be performed with caution and requires meticulous exposure of intra-parenchymal structures (i.e., vessels and bile ducts). To achieve this, both CUSA (CUSA EXcel®: IntegraTM Life Sciences Corporation. NJ, USA) and laparoscopic bipolar cautery for hemostasis are used concomitantly.

To minimize bleeding from transection plane, intermittent pedicular clamping is used without restriction. The use of an intermittent Pringle maneuver has been reported to have no detrimental effects on postoperative liver function. In cases of important bleeding, decrease of airway pressure by brief pause of artificial ventilation have been reported with good outcomes.

Conclusions
Liver parenchymal transection continues to be the technical challenge of the pure laparoscopic approach. Optimal determination of the transection line, appropriate use of devices, and better understanding the basic rules of bleeding control allow to perform a cautious transection; which further contributes to safer as well as standardization of LLR.

References
Robotic Ventral Rectopexy

Andrew Stevenson

Colorectal Surgery, Royal Brisbane Hospital and University of Queensland, Australia

In many parts of the world, Ventral Rectopexy has become the operation of choice for the surgical treatment of full thickness rectal prolapse. The term “ventral rectopexy” was first used in a paper by the German surgeon F. Deuscher in 1960.(1) A number of centres in Europe and the United Kingdom started performing the modern interpretation of the ventral rectopexy using minimally invasive approaches.(2) The principle advantage of the ventral approach is the avoidance of the posterior mobilisation and preservation of rectal function with reduced risk of postoperative constipation compared with the posterior approach.

The VR operation also has the ability to address co-existent middle compartment prolapse in a minimally invasive fashion. More recently, enhanced knowledge of the role of internal rectal prolapse (usually combined with rectocele) and understanding of the pathophysiology of obstructed defaecation syndrome, has also made VR the procedure of choice for this condition.

A variety of techniques have been described for ventral rectopexy including the types of prostheses (synthetic v. biologic) and sutures (permanent v. absorbable), as well as the operating platform (open, laparoscopic or robotic). Recommendations to reduce potential morbidity of the procedure, such as prosthesis-related complications, include careful choice of prosthesis with avoidance of permanent sutures and polyester mesh.(5,6) It is also recommended that VR should be performed by adequately trained surgeons who work within a multidisciplinary team framework.(7)

Considering the ergonomic advantages to be gained from the robotic technology, VR is perhaps the most suited of all the range of colorectal operations. This presentation will describe the evolution and intricacies of achieving an ergonomic approach to robotic ventral rectopexy using a biologic graft, drawing on the author’s personal 450 VR case experience over 12 years.(8)

rectal prolapse, ventral rectopexy, robotic surgery, incontinence, constipation
Recurrent Rectal Prolapse

Seung Hyun Lee

Colorectal Division, Department of Surgery, Kosin University College of Medicine, Korea

Rectal prolapse is protrusion of the rectum through the anal canal. Surgical treatment of rectal prolapse is subdivided into two main categories: abdominal and perineal. Abdominal surgery may be open or minimally invasive and generally aims to fixate the rectum to the sacrum (rectopexy). Rectopexy may be undertaken with or without a coexisting resection. Perineal surgery resects redundant rectal mucosa (Delorme’s procedure) or full-thickness rectal resection (Altemeier’s procedure, Rectosigmoidectomy) and can be performed with or without levatorplasty. While the perineal procedures may be associated with low complication rates, the recurrence rate after these procedures is usually higher than the abdominal procedures.

The recurrence rate of rectal prolapse after primary surgery has been reported variably, estimated that 20–30% of patients, about one-third recurrence within 6–7 months, the overwhelming majority of whom are female. The pathophysiology of the recurrence is far from understood. The high recurrence rates are likely to be due to technical failure secondary to the presence of a redundant colon or inadequate fixation. Patient factors inadequately treated such as chronic straining may also contribute to recurrence.

The most of studies for recurrent rectal prolapse were not randomized controlled with heterogeneous, small numbers of patients. With the review of that studies, a treatment algorithm is not able to developed. However, outcome of surgery for recurrent rectal prolapse is similar to that of primary surgery, with little higher tendency of recurrence rate. Keys in decision-making process for recurrent rectal prolapse are surgeon preference, patient’s health status, previous (primary) procedure. Also, it is necessary to consider maintaining adequate vascular supply to the intervening bowel segment between the two anastomotic sites.

rectal prolapse
Sleeve Gastrectomy, Why Is It So Popular?

Kyung Won Seo

Surgery, Kosin University Gospel Hospital, Korea

A number of surgical options are available for the treatment of obesity. The most common bariatric surgery procedures are laparoscopic Roux-en-Y gastric bypass (LRYGB), sleeve gastrectomy, and adjustable gastric band. Over time the laparoscopic sleeve gastrectomy (LSG) has become the most popular bariatric operation worldwide. This is thought to be due to its effectiveness, safety and its numerous advantages. LSG surpasses the LRYGB, which was previously the most common procedure. Roux-en-Y gastric bypass appears to remain the most popular operation among patients with obesity and type 2 diabetes.

LSG is one of the newest types of weight loss surgery to treat morbid obesity. Historically, it was used as the first step in a two staged bariatric surgery. It was found that some patients lost enough weight with a sleeve gastrectomy alone and that the second stage of the operation was not required.

LSG offers numerous advantages as below. It induces rapid and significant weight loss that comparative studies find similar to that of the Roux-en-Y gastric bypass including large-scale randomized controlled trial. It’s typical maintenance of greater than 50 percent excess weight loss. Digestion isn’t re-routed and intestines are left in place, so digestion occurs normally and post-operative nutritional deficiencies would be minimal. Dumping syndrome isn’t likely to occur unlike with LRYGB. It is highly effective in improving obesity related diseases such as type 2 diabetes, sleep apnea, dyslipidemia and hypertension. It may be converted to gastric bypass or duodenal switch if it has necessary for additional weight loss. It has less chance of developing ulcers than with gastric bypass surgery.

Bariatric surgery, sleeve gastrectomy, popularity
Ruox-en Y gastric bypass: Is it still standard?

Sang Hyun Kim

Soonchunhyang University School of Medicine

Roux-en-Y gastric bypass (RYGB) has been widely considered as the gold standard procedure in bariatric surgery past 20 years. The surgery has well-sustained results of weight loss, diabetes control, and other comorbidity resolutions with acceptable complication rates. However, sleeve gastrectomy (SG) has recently become the most popular bariatric procedure as a stand-alone procedure. Since then, the popularity of sleeve gastrectomy has grown over time, the gap between number of SG and RYGB continues to widen. This trend is likely due to perception that SG is a less technically demanding procedure with lower complication rate and fewer nutritional problems compared with gastrointestinal bypass surgeries. Moreover, well-designed randomized controlled trials and meta-analyses have reported that SG generally has a comparable effect with the RYGB in terms of weight loss and resolution of diabetics. Besides, sleeve plus procedure such as duodenojejunal bypass with sleeve (DJB-SG) or single anastomosis duodenoileal bypass with sleeve (SADI-S), modified form of BPD/DS, was introduced over 10 years ago. These procedures began to attract bariatric surgeon’s attention showing good results in short- and midterm period. We compare RYGB with other surgical procedures in terms of effectiveness, durability, safety, and popularity and suggest the direction in which RYGB should go in the future.
Gastric Band: Should We Abandon Gastric Band? An Observation Study of 10 Years of Experience at a Tertiary Center

Seong Min Kim

Department of Surgery, Gil Medical Center, Gachon University College of Medicine, Incheon, Republic of Korea, Korea

Background/Purpose

Although laparoscopic adjustable gastric bands are considered a standard treatment for severe obesity, their use remains controversial. We evaluated rates of band explantation and the incidences of complications leading to and following band explantation.

Materials and methods

This retrospective review was performed on patients that underwent adjustable gastric band explantation. For each of the three groups of patients that underwent explantation, we compared demographic and anthropometric data, band duration in situ, operative approach, and morbidities.

Results

Between January 2009 and October 2018, a total of 267 patients underwent primary laparoscopic adjustable gastric band surgery. Of these 267 patients, 99 (37.1%) underwent band explantation. Numbers (%) of patients in the slippage (SL), band erosion (BE), and intolerance (IT) groups were 13 (13.1%), 39 (39.4%), and 47 (47.5%), respectively. Mean %EBMIL values at explantation in these groups were 74.6±45.5, 79.7±40.3, and 36.1±46.0, respectively (p<0.001), and mean times for maintaining bands in situ were 45.1±28.0, 39.4±24.3, and 51.2±22.7 months, respectively. Isolated band removal was performed for slippage (SLi, n=12), band erosion (BEi, n=39), and intolerance (ITi, n=31). The numbers (%) of patients in the SLi, BEi, and ITi groups that experienced a surgical complication (Clavien-Dindo class ≥1) were 0 (0.0%), 24 (61.5%), and 3 (9.7%), respectively (p<0.001). In the BEi group, four patients (4/39, 10.3%) underwent reoperation after AGB removal.

Conclusion

During our 10 years of experience, 37.1% of adjustable gastric band had to be removed. Intra-abdominal abscess and intragastric bleeding were rare but serious complications after explantation. Potential candidates for adjustable gastric band should be informed of the high long-term risk of band explantation and its associated morbidities.

Laparoscopic adjustable gastric band; erosion; intolerance; slippage
Bariatric surgery has become extremely popular, because of its proven success with weight loss and co-morbidity resolution. Despite this, there are patients who have complications or inadequate weight loss that desire additional revisional surgery. Decision making for revisional bariatric surgery is complex. The surgeon must take into account the reasons for the additional procedure, usually either complications or the desire for additional weight loss or comorbidity treatment. This talk will briefly cover some of the common conversion procedures for complications, but will focus primarily on surgery for weight loss recidivism. In determining the appropriate conversion operation, it is important to assess the patient’s compliance with lifestyle modification as well as assess for any anatomic problems with their original procedure. If the patient struggles with compliance with supplementation, additional malabsorption is less desirable. If the patient is fully compliant with the behavioral programs, they are excellent candidates for revision. If an anatomic problem is identified, the most straightforward revision will entail addressing that problem. If not, a simple algorithmic approach with ideal risk/benefit analysis should be within the surgeon’s wheelhouse. Decision making for band, sleeve and bypass revision will be discussed in detail.

Bariatric, revision, gastric bypass, sleeve
Minimally invasive surgery has rooted in China in 1991. At first, laparoscopic surgery was not highly valued and it was even difficult to promote. Chinese Society of Laparoscopic and Endoscopic Surgery (CSLES) was founded in 1995, role as a key to promote the minimally invasive surgery in Chinese general surgery. In the past 30 years, the scope of minimally invasive surgery has expanded from the initial cholecystectomy to the fields of gastrointestinal, hepatobiliary and pancreatic, metabolic, and hernia surgery. After development for more than 20 years, Chinese laparoscopic surgery joined the international scene and now competitive on the world stage. From the perspective of evolution, minimally invasive surgery will furtherly developed with the advances in the treatment of the disease. The future development direction of minimally invasive surgery in China remains to be further explored.
Early detection and treatment is one of the most effective strategies to improve prognosis upper GI cancer patients and endoscopy plays an important role in this aspect. Accurate diagnosis of intramucosal cancers, that can be treated by endoscopy, is often difficult by conventional white light endoscopy because these lesions have subtle change in color and morphology. Recently, advanced endoscopic image systems that uses optical and electrical technology to enhance lesion characteristics are developed. Narrow band imaging (NBI) illuminates blue and green narrow banded shortwave length lights and contrast surface structure and color of the mucosa are well contrasted. Moreover, with using magnifying endoscopy, the microvasculature of the superficial mucosa can be evaluated in detail. A multicenter randomized controlled trial proved that the magnifying NBI significantly improve diagnostic accuracy for small depressed type early gastric cancers compared to white light image (90% vs. 65%, p<0.001). Flexible spectral imaging color enhancement (FICE) uses electrical image processing to achieve contrasted spectral images that is similar to the NBI. However, image resolution of electrical image enhancement is not as good as optical image enhancement because electrical image processing always creates noise in images. Accordingly, the same manufacturer produced optical image enhancement system: blue LASER imaging (BLI). Moreover, the system equips Linked color imaging (LCI) mode that uses similar light to the BLI and combines color enhancement to improve detection of the upper GI lesions. I-Scan is another technology of color enhancement. It modifies color tone of white light images by electrical image processing. Recently, the manufacturer equipped optical system using band limited filter (I-Scan OE) to achieve similar image enhancement effect to the NBI. In summary, nowadays, every endoscope manufacturers have products of advanced endoscopic image systems that uses optical and electrical enhancement, and they are ready to use. The systems enhance color, surface structure or vasculature and improve endoscopic diagnosis. Proper understanding of indication and usage maximize the benefit of advanced endoscopic image in clinical practice.
Future High Technologies for Gastrointestinal Endoscopy: Frontiers of Robotic Endoscopy

Seong Ji Choi¹ and Hyuk Soon Choi²

¹Department of Internal Medicine, Hanyang University College of Medicine, Korea
²Department of Internal Medicine, Korea University College of Medicine, Korea

Gastrointestinal endoscopes were used only for the diagnosis purposes at first, but their roles had been dramatically widened especially in the part of therapeutics. Many patients who had to undergo open surgery for internal bleeding can now be treated with endoscopy. In addition, patients with early gastric cancer had to undergo resection of a large part of the stomach, but in recent years, endoscopic resections have been performed, which could preserve the stomach anatomy and do not cause major complications. However, as technologies have advanced, doctors need more sophisticated and high-precision endoscopic instruments and thus have become more interested in robots. The development of medical robots began a long time ago and has recently shown remarkable progress. The number of robotic surgeries has increased exponentially over a short period of time. Rigid endoscopes, such as the da Vinci surgical system, have been developed and altered the paradigm of clinical operations. Flexible endoscopic robots have technical limitations rather than rigidity, but there is an increasing number of clinical trials of various devices that can be applied to the hospital. Due to the rapid development of artificial intelligence in recent years, many subsystems have been invented to assist in diagnostics, which rely on professionals. Various AI systems are on the verge of endoscopic clinical application. In the endoscopic field, the role and area of robotics, which are the core component of the 4th industrial revolution, are expanding. Robots, which have replaced the roles that human resources cannot perform in the industrial field, are now being used as medical tools, leading to the medical era of information technology. In the future, robots in the field of gastrointestinal endoscopy are expected to elicit a major changes and impacts on health care systems.

Robotic endoscopy, Gastrointestinal endoscopy
Preoperative Considerations in Laparoscopic Cholecystectomy - Indications of Cholecystectomy

Jun Suh Lee

Surgery, Seoul National University Bundang Hospital, Korea

Laparoscopic cholecystectomy is one of the most commonly performed procedures in the field of general surgery. This operation is performed for many disease entities, including gallstones and polypoid disease. But many clinicians in different fields participate in the diagnosis and decision making of patients, such as primary physicians, emergency medicine physicians and gastroenterologists. Due to the lack of a universal indication for surgery, there is often confusion in the decision making process.

In this lecture, various indications for surgery are reviewed, and an evidence based operation indication is summarized.

Cholecystectomy
Robotic Cholecystectomy

Jae Do Yang

Surgery, Jeonbuk National University Hospital, Korea

Cholecystectomy is one of the most commonly performed abdominal procedures. Laparoscopic cholecystectomy (LC), first introduced in the 1980s, offered faster recovery time and a more cosmetic result making it the more favorable approach. In developed countries, up to 90% of cholecystectomies are done via laparoscopy. Now emerging robotic technology is making its way into the minimally invasive arena. Robotic cholecystectomy (RC) is often disparaged as a costly technology that can lead to increased operative times with outcomes that are quite similar to LC. However, this perspective is skewed as many existing studies were performed in the early phase of learning for this procedure. RC can be performed in a cost-effective manner as the volume of robotic procedures increases. It has become increasingly popular and has been established as a safe approach. In addition, improved visualization and capability to perform fluorescence cholangiography can improve the safety profile of cholecystectomy to a level that has not yet been achieved with conventional laparoscopy. Advanced simulation technology for robotic surgery, and newer single site robotic platforms have the potential to further revolutionize this technology and lead to improved patient satisfaction.

In this review, we will present to address the history of robotic-assisted cholecystectomy, the technical aspects of single-port approaches, use of cholangiography, demonstration of safety and use in both community and academic settings.

cholecystectomy, robotic cholecystectomy
Proper Management of Surgical Complications after Laparoscopic Gastric Surgery

Sungil Choi

Surgery, Kyung Hee University Hospital at Gangdong, Korea

Introduction
Because of the high incidence of gastric cancer in Korea, total gastric resection or partial resection is frequently performed. In addition, when laparoscopic surgery has been widely performed in gastrectomy, complications of that procedure may be different from open surgery.

Leakage — Postoperative leak can arise from any of the suture or staple lines. An anastomotic leak most commonly occurs within the first 2 to 7 days after surgery. The causes of anastomotic leaks can be categorized into systemic and local factors. Important local factors include insufficient suture technique, poor blood flow, tension and bowel edema.

Duodenal stump leakage — This complication is a breakdown of the duodenal stump closure, or duodenal stump leak, following a Billroth II or Roux-en-Y type of procedure. The most important goal of treatment of duodenal stump leak is control of sepsis and drainage of the abscess pockets.

Stricture or Obstruction — Stricture and obstruction of anastomosis site characterized by chronic or intermittent nausea, nonbilious vomiting, and bloating. Benign strictures can be treated by repeated dilation or endoscopic stent.

Bleeding
The bleeding that occurs immediately after surgery is mainly caused by poor hemostasis or incomplete clipping of the vessels at the surgical site. Hemorrhages occurring 1-2 weeks after surgery are caused by erosion of the vascular wall due to intraperitoneal abscesses, or caused by pseudo aneurysm by vessel injury during using energy devices. Intraluminal bleeding occurs mainly in the cut or anastomosis sites of the stomach. Clinically, persistent or intermittent fresh bleeding through the nasogastric tube is observed, and rarely seen through the intra-abdominal drainage tube. Most patients can be treated with conservative treatment or endoscopic hemostasis, but reoperations should be performed if severe bleeding is present.

laparoscopic Gastric surgery, Surgical complications, Leakage, Bleeding
Proper Management of Complication after Laparoscopic Biliary Surgery

Jong Hoon Park
Department of surgery, Daegu Fatima Hospital, Korea

Laparoscopic cholecystectomy (LC) represents one of the most common procedures performed in Korea, accounting for 78,489 patients treated in 2018. Unfortunately, recent studies reported that rates of BDI during LC had plateaued (0.30%–0.60%). Reports from large-volume hepatobiliary surgery centers have focused mainly regarding the optimal timing of repair after LC-BDI to prevent postoperative complication. Missed injuries that result in sepsis or bile leak as well as high injuries that require hepaticojejunostomy will result in a higher stricture rate after repair. According to severity of disease, sepsis control is first priority of all.

Timing of reconstructive surgery is one of the most important factors that can affect outcome of treatment. There are a number of classifications for BDI including Bismuth classification. The description and classification of iatrogenic bile duct injuries after cholecystectomy should always include all clinically relevant data on each injury pattern, which will have an impact on surgical treatment and outcome.

The success of biliary reconstruction after complicated laparoscopic cholecystectomy can be achieved by experienced biliary surgeons with a team approach in a community hospital setting.

Except bile duct injury, vascular injury happen to be combined and other bowel injury is also happened during the trocarization.

Most results indicate that minor bile duct injuries can be successfully treated endoscopically if a proper abdominal drainage is maintained. Roux-en-Y hepaticojejunostomy is feasible and safe with contained morbidity and durable results even when previous surgery has failed. Postoperative biliary leak is a significant independent predictor factor for the occurrence of late anastomotic stricture.

Laparoscopic end-to-end anastomosis could be performed when it was possible to approximate both the proximal and distal ends of bile duct without tension, and when the diameters of both ends were comparable. Most BDI can be recognized intraoperatively or within a few days after LC, with a favorable prognosis following proper management.

Bile duct injury, Laparoscopic cholecystectomy
Proper Management of Surgical Complication after Laparoscopic Hernia Surgery

Hyun Beak Shin

Surgery, Jeonbuk National University Hospital, Korea

International guidelines for groin hernia managements published in 2018 explains the prevention and treatment of complications after both open and laparoscopic surgery. Specifically, it describes urinary retention, groin pain, ischemic orchitis, hematoma, seroma, subcutaneous emphysema, intestinal obstruction, mesh complications, and mortality. The learning curve for laparoscopic hernia surgery suggested that the incidence of complications was significantly different between before and after the first 100 cases performed by the surgeon. Based on these contents, I would like to talk about the treatment of various complications after laparoscopic hernia surgery, adding my own experiences at the time of just over 100 cases.

Laparoscopy, Hernia, Complication
Current Trend And Future Direction Of Minimally Invasive Pd In Korean Surgical Society

Chang Moo Kang

Division of HBP Surgery, Department of Surgery, Yonsei University College of Medicine, Korea

With the accumulating experiences of laparoscopic and robotic surgery, laparoscopic and robotic pancreaticoduodenectomy is increasing in Korea. In addition, developing new robotic surgical system is expected to foster the current trend of minimally invasive pancreaticoduodenectomy (MI-PD). However, it is true that MI-PD is one of the challenging procedures. For safe and effective clinical practice of MI-PD, systemic surgical education system and quality control are necessary for the novice surgeons and our patients. In this presentation, the current practice and future direction of MI-PD in Korea will be discussed.

minimally invasive, laparoscopic, robotic, pancreaticoduodenectomy
We take it grant that the type 2 diabetes is progressive disease with chronically leading to death by inevitable complications. However, a change has been initiated since some time. The discovery of incretins in the mid-1900s resulted in a paradigm shift that led to hope for improvement in diabetes exacerbation and finally to a revolutionary revelation in 2000, that surgery could cure diabetes. With the announcement of the foregut hypothesis in 2005, diabetes was expected to be exterminated within couple of years. However, it has stagnated for nearly 20 years since then. To date, the principle of diabetes treatment is that care is the paradigm rather than cure. If the principle were to shift to cure, it would be a huge transformation in the paradigm. This paradigm shift seemed attainable with the discovery of surgical treatment. Nevertheless, the likelihood of this paradigm changing is still ongoing, in spite of incessant researches and clinical trials.

Surgery to treat diabetes needs to meet the following requisites simultaneously: proven safety, effectiveness, and long-lasting antidiabetic effects. The paradigm in diabetes treatment will not change unless these three requisites take place in synchronicity with the single surgery; if not, the surgery itself is considered as one of palliative measurement.

I have been concerned with the mechanism of amelioration of hyperglycemia with surgery since 2009. In 2015, I discovered a new fact and devised a surgery. The principle is duodenum should be excluded totally, while pyloric sphincter needs to be preserved at the same time. In conclusion, the question of whether a paradigm shift is possible in the field of type 2 diabetes is possible to answer. Treatment paradigm of type 2 diabetes is about to shift. But it will take lot of time with demanding work until publicly acknowledged.

metabolic surgery, paradigm shifting
Laparoscopic Lateral Lymph Node Dissection for Advanced Low Rectal Cancer

Takashi Akiyoshi

Cancer Institute Hospital, Japanese Foundation for Cancer Research, Japan

The optimal management of the lateral pelvic lymph nodes (LPLNs) in patients with advanced rectal cancer remains controversial. Recent studies suggest that neoadjuvant chemoradiotherapy (CRT) is not enough for patients with swollen LPLNs. We basically perform laparoscopic LPLN dissection (LPLND) in patients with LPLNs with a long-axis diameter of ≥7 mm on pretreatment imaging, regardless of the lymph node size after preoperative treatment. Among 460 consecutive patients with clinical stage II/III low rectal cancer treated with preoperative CRT between 2004 and 2015 at our institution, the percentage of laparoscopic surgery was 92%, and there was no conversion to open surgery. LPLND was performed in 155 patients (34%). Pathological complete response (pCR) was identified in 80 (17.4%) patients, and LLN metastasis was identified in 44 (9.6%) patients. The operation time was significantly longer, and total blood loss was significantly greater in the LPLND than TME group (450 vs. 298 min and 130 vs. 35 mL, respectively; p < 0.0001). The major complication rate tended to be higher in the LPLND than TME group (11.6 vs. 6.9%, respectively; p = 0.101). For the entire cohort, the 5-year overall survival (OS), disease-free survival (DFS), and cumulative local recurrence rate (LR) was 90.4%, 74.7%, 4.9%, respectively. The 5-year DFS and cumulative local recurrence rate in patients with LPLN metastasis was 62.4 and 2.3%, respectively. In patients with ypN+ (n = 140), 5-year DFS in patients with LPLN metastasis tended to be better than that in patients without LPLN metastasis (62.4 vs 43.5%, p = 0.0675). In conclusion, additional laparoscopic LPLND is feasible in patients with advanced lower rectal cancer and clinically swollen LPLNs treated with preoperative CRT.
Two type of laparoscopic hernia repair: transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approach.

**TAPP repair** – First step is a small incision beneath the umbilicus. A 10mm trocar is inserted through the incision and the abdomen is filled with gas. A camera is inserted through the trocar and. Two 5 mm operating trocars were inserted on the midclavicular line 2 cm below the level of the horizontal line from the umbilicus and the surgical instruments were inserted via two 5 mm trocars. The peritoneum (membrane that lines the abdominal cavity) is cut and the hernia sac is removed carefully. A synthetic mesh is placed over the peritoneal opening and then closed with sutures. The disadvantage of the TAPP procedure is it can cause injury to adjacent abdominal organs. The advantage of the TAPP procedure is that it can be performed on patients who have undergone previous lower midline surgery.

**TEP repair** – First step is a small incision below the umbilicus. A balloon is placed in the preperitoneal space (space between the peritoneum and anterior abdominal wall) and filled with gas to separate the layers. Blunt dissection with finger or scope could be used for making preperitoneal space initially. One 10mm trocar is inserted via umbilicus incision site and two 5 mm trocar are inserted on the vertical line from the umbilicus with about 5 cm distance from each trocar. The camera and the surgical instruments are passed through the trocars. Surgeon exposes the hernial sac, repositions it and seals the hernia with a synthetic mesh. The incisions are then closed with sutures. The mesh slowly gets incorporated with the tissues of the abdominal wall. The advantage of TEP procedure is that it prevents the risk associated with damage to the internal organs as it is performed outside of the peritoneum.

Laparoscopic Inguinal hernia repair, Transabdominal preperitoneal (TAPP) hernia repair, Totally extraperitoneal (TEP) hernia repair
Tailored Laparoscopic Surgery of Gastrointestinal Stromal Tumor

Kodai Takahashi¹ and Eiji Kanehira¹

¹General surgery, Medical Topia Soka, Japan

The surgical principles of gastrointestinal stromal tumors treatment comprise en bloc resection (R0 resection) with avoidance of rupture, which may result in peritoneal seeding. Because lymphadenectomy is not indicated for the treatment of gastrointestinal stromal tumors due to the very low propensity for lymph node metastases, it should be preferable to select such a resection method as can preserve both of the configuration and function of the stomach to maintain the quality of life of patient. Generally, laparoscopic simple wedge resection is the most common surgery for gastrointestinal stromal tumors in the world. However, for gastric submucosal tumors located distant from the esophagogastric junction and the pylorus, it is not necessarily difficult to perform simple wedge resection with preserving the stomach as much as possible. For those located in the esophagogastric junction and the pylorus, total or subtotal gastrectomy is often selected due to its anatomical difficulty. Hence, in order to preserve the entire stomach of the patients with those tumors we have been performing percutaneous endoscopic intragastric surgery (PEIGS) since 1993.

Additionally, to minimize the sacrifice of innocent gastric wall surrounding the gastrointestinal stromal tumors in gastric wedge resection with a stapling device, we have been performing a "combined laparoscopic and endoscopic approach for neoplasia with a nonexposure technique" (CLEAN-NET) since 2015. CLEAN-NET can be a useful option in the laparoscopic surgical treatment of gastrointestinal stromal tumors, when excessive sacrifice of the healthy gastric wall surrounding the endophytic tumor should be avoided. We have been performing tailored laparoscopic surgery of gastrointestinal stromal tumors by these techniques. The details of the techniques are described in this presentation.

GIST,
Laparoscopic Surgery for Ventral Hernia

Byung Eun Yoo

General Surgery, Yang Hospital, Namyangju, Korea

Spigelian hernias are rare abdominal wall defects that occur at the semilunar line lateral to the rectus abdominis muscle. They are located between the muscular layers of the abdominal wall. Generally, they are difficult to diagnose because of their location and vague symptoms. Once the diagnosis is made operative management is indicated due to the risk of incarceration. We report a 79 years old female patient who had a protruding mass on the left lower abdomen after laparoscopic totally extraperitoneal inguinal hernia repair 10 months ago. Spigelian hernia was diagnosed with CT. The patient underwent laparoscopic ventral hernia repair with dual mesh.

Ventral hernia, Laparoscopic surgery
Transoral Endoscopic Thyroidectomy (vestibular Approach)

Seok-Mo Kim

Department of Surgery, Yonsei University College of Medicine, Korea

Introduction

Transoral endoscopic thyroidectomy by a vestibular approach (TOETVA) is a novel technique for thyroid cancer operation. Compared with other endoscopic approaches including transaxillar or bilateral axillobreast approach, it requires substantial dissection to reach the thyroid and provides the shortest access to the target organ.

Material and Methods

The aim of this video is to provide detailed instruction of the TOETVA. A 22-year-old euthyroid female patient presented for routine checkup. Ultrasonography showed a 1.1 cm suspicious nodule on the right thyroid gland. Fine needle aspiration biopsy revealed Category VI papillary thyroid carcinoma. TOETVA was performed. A specially designed endoscopic retractor for transoral thyroidectomy was used.

Results

Right thyroid lobectomy with central compartment neck dissection was performed effectively through this novel endoscopic approach without any intraoperative complications such as recurrent laryngeal nerve injury or blood loss. The specially designed endoscopic retractor that retracts the strap muscles enables two-handed dissection. Final pathologic result showed papillary carcinoma and a microcarcinoma of 1.2 and 0.1 cm, and all of the five retrieved central nodes were free from tumor. The patient had an excellent cosmetic outcome without complications.

Conclusions

TOETVA is safe and feasible and provides an excellent cosmetic outcome.
Single-port Laparoscopic Paraaortic Lymph Node Dissection

Sang Chul Lee

General Surgery, The Catholic University of Korea, Korea

Objective

The aim of this presentation is to demonstrate the technical feasibility of single-port laparoscopic paraaortic lymph node dissection as a part of surgical modalities treating far advanced colorectal cancers especially related with paraaortic lymph node metastasis.

Methods

71-year-old male patient with huge sigmoid colon cancer causing obstruction was performed single-port laparoscopic subtotal colectomy with paraaortic lymph node dissection. Preoperative work-up assumed T4N2M1, regional and paraaortic lymph node metastasis. Subtotal colectomy included the area from mid A-colon to mid rectum. And both hepatic and splenic flexure full mobilizations were performed. Surgical boundaries for paraaortic lymph node dissection are as follow, renal vein is the superior and gonadal vessel and ureters are lateral, pelvic promontory is the inferior boundary, respectively. By lifting of duodenum, upper parts of lymph nodes are easily exposed and could be dissected safely. Energy device, especially vessel sealer was used for safe dissection and secure sealing of raw dissection surfaces to prevent chylous ascites. Dissection was performed without vascular injury. And entire lymph nodes were extracted.

Results

Single-port laparoscopic paraaortic lymph node dissection was performed without serious perioperative complications. The patient was discharged on post-operative day 6. Total number of harvested lymph node was 31, 16 in Rt. side and 15 in Lt. side, respectively. And ironically, all lymph nodes showed negative for metastasis.

Conclusion

Even though the technique of single-port laparoscopic surgery is still assumed as a difficult operation, the quality of single-port laparoscopic paraaortic lymph node dissection is good enough, especially in concern of number of harvested nodes. Even though rare in practice, single-port laparoscopic paraaortic lymph node dissection can be acceptable as an oncologic procedure.
Surgical Outcomes and Education for Young Surgeons in Robotic PD

Chuandong Sun

Department of hepatobiliary and pancreas surgery, The Affiliated Hospital of Qingdao University, China

Introduction

In the era of minimal invasive surgery, it is very important of young surgeon training, both of laparoscopic and Robotic surgery.

Methods

“Step by step method” was used in all the resident and Fellow training, including: 1. Let them doing operation design, patient position, Trocar port, equipment, Robotic arm docking and position; 2. Familiar with 2D laparoscopic simulator; 3. Familiar with simple 2D laparoscopic operation, and try to do simple 2D laparoscopic surgery, such as laparoscopic cholecystectomy, the baseline number of laparoscopic cholecystectomy is 50 cases; 4. Familiar with 3D laparoscopic simulator, and familiar with Robotic simulator; 5. Operation assistor of Robotic surgery about 50 cases; 6. Begin to do robotic surgery, from simple to complex. If them failed in one step, they will back off to the previous step. After two or three years training, the young surgeon could do the Robotic PD.

Conclusion

Step by step method is useful in the young surgeon training, both of training and working, set up the minimal invasive concept.

laparoscopic simulator, robotic simulator, minimal invasive surgery
How do I set up and overcome the Learning Curve of Laparoscopic PD (I)

Ki Byung Song

Department of Hepatobiliary & Pancreatic Surgery, Ulsan University College of Medicine and Asan Medical Center, Korea

During the past 25 years the application of a minimally invasive approach to pancreatic surgery has progressively increased and established as feasible and safe. Although, laparoscopic pancreaticoduodenectomy (LPD) is one of the most technically challenging procedures, it is a safe, feasible, and oncologically acceptable procedure when performed in a high-volume center. Comparative studies have demonstrated the several advantages of laparoscopic approaches over the open approach for pancreatic resection, namely, less blood loss, shorter hospital stay, and early recovery. However, much of this evidence originates from high-volume centers with a high level of expertise. LPD should follow a step-by-step principle because of the long and steep learning curve. Innovative training system and educational programs for next generation surgeon should be considered. After modification and simplification of Lap PD, standardized surgical methods should be used.
Japanese randomized trial (JCOG0212) comparing TME with TME plus lateral lymph node dissection in clinical stage II or III lower rectal cancer was reported. This study is a multicenter, randomized controlled, non-inferiority trial and in total, 701 patients were randomized to the mesorectal excision with lateral lymph node dissection (n=351) and mesorectal excision alone (n=350) groups. The numbers of patients with local recurrence were 26 (7%) and 44 (13%) in the mesorectal excision with lateral lymph node dissection and mesorectal excision alone groups, respectively (p=0.02). Especially, numbers of local recurrence in lateral node area were found in 4 patients in the mesorectal excision with lateral lymph node dissection group and 23 patients in mesorectal excision alone groups. These results would indicate positive lateral lymph nodes should be completely dissected for patients at potential risk for the metastasis.

Lateral lymph node dissection is not technically easy and requires a deep anatomical understanding for the lateral pelvic area. In addition, we left some lymph nodes at the bottom of the lateral space where the positive lymph nodes are possibly observed around the inferior vesicle vessels.

In recent years we have been performing lateral lymph node dissection from below following taTME. The new procedure provides us better anatomical recognition in the bottom of the pelvis than conventional operation which would suggest to have better clearance of the lateral lymph nodes. We could also perform simultaneously lateral lymph node dissection with two-team, leading to shorten the total operative time.
In laparoscopic total gastrectomy, esophagojejunostomy is a technically demanding procedure. Although several techniques have been reported, a reliable technique has not yet been established. Here we introduce current status of reconstruction in TLTG.

There are three categories of reconstruction in totally laparoscopic total gastrectomy. It depends on the divorce used in reconstruction including circular stapler, linear stapler and Hand-sewn anastomosis. Methods of anastomosis with circular stapler include hand-sewn purse-string suture, hemidouble stapling technique and OrVil system using. Methods of anastomosis with linear stapler include functional end to end anastomosis, overlap anastomosis and other anastomosis. We describe the produce, advantages and disadvantages of every method. Which reconstruction method in TLTG is the best one?

We think the best one is the method appropriate for the patients and surgeons best.
Comparison of Laparoscopic Surgeries in Complete Rectal Prolapse

Dongmin Kwak

Colorectal department, General surgery, KOO hospital, Korea

The aims of the surgical treatment for rectal prolapse are to correct the anatomical abnormality and to cure the accompanying symptoms of incontinence, constipation and pain, with the lowest rate of complications as possible and an acceptable rate of recurrence. Several procedures have been described to treat rectal prolapse. Two approaches are possible. The perineal approach is related with high recurrence rate and deterioration of functional outcome. So, the abdominal approach is generally accepted for the procedure of choice.

The abdominal procedures differ mainly in the extent of rectal mobilisation, the method of rectal fixation and the additional sigmoid colon resection. Those contain suture rectopexy (Sudeck), anterior mesh rectopexy (Ripstein), lateral mesh rectopexy (Orr-Loygue), posterior mesh rectopexy (Wells), ventral mesh rectopexy (D’Hoore) and resection rectopexy (Frykman-Goldberg) in rough. All these abdominal procedures can be performed laparoscopically.

In this presentation, we will deal with the advantages and disadvantages of each operation and try to recommend more efficient option among them according the conditions of patient.

laparoscopy, external rectal prolapse, abdominal approach,
IP Chemotherapy for Gastric Cancer with Peritoneal Metastasis

Hironori Ishigami

Department of Chemotherapy, The University of Tokyo, Japan

Background

We have developed a new multidisciplinary treatment with systemic chemotherapy and intraperitoneal (ip) paclitaxel (PTX) or docetaxel (DOC), combined with gastrectomy after response to chemotherapy. Here we report the results of clinical trials of chemotherapy and a retrospective study of surgery after chemotherapy.

Methods

We performed phase I trials of five chemotherapy regimens: S-1/PTX plus ip PTX, S-1/oxaliplatin plus ip PTX, S-1/cisplatin plus ip PTX, capecitabine/cisplatin plus ip DOC, and FOLFOX plus ip PTX. We completed phase II trials of four regimens and a phase III PHOENIX-GC trial comparing S-1/PTX plus ip PTX with S-1/cisplatin. Additionally, we retrospectively evaluated the safety and efficacy of gastrectomy in three multicenter trials.

Results

In phase I trials, the recommended doses of ip PTX and ip DOC were determined to be 20–40 mg/m2 and 10 mg/m2, respectively, with systemic dose-limiting toxicities. In phase II trials, the 1-year overall survival rate of FOLFOX plus ip PTX trial in patients with inadequate oral intake was 56%. Those of the other three trials were 72%–78%, and the negative conversion rates on peritoneal cytology were 68%–86%. PHOENIX-GC trial narrowly failed to show statistical superiority of S-1/PTX plus ip PTX over S-1/cisplatin (p=0.080; hazard ratio [HR] 0.72, 95% confidence interval [CI] 0.49–1.04). However, the exploratory analysis adjusting for the baseline imbalance in the amount of ascites suggested clinical benefits (HR 0.59, 95% CI 0.39–0.87). Out of 222 patients in three multicenter trials, 93 patients underwent gastrectomy after disappearance or marked shrinkage of peritoneal metastasis. The median survival times of patients with and without surgery were 26.3 months (95% CI 21.3–34.2 months) and 12.3 months (95% CI 11.3–13.1 months), respectively.

Conclusions

Multidisciplinary treatment with long-term ip and systemic chemotherapy combined with gastrectomy is safe and effective for gastric cancer with peritoneal metastasis.
Phase 1 Study of Pipac with Oxaliplatin for Gastrointestinal Cancer with Peritoneal Metastasis

Jimmy So

Department of Surgery, National University of Singapore, Singapore

Background: Pressurized Intraperitoneal Aerosol Chemotherapy (PIPAC) is a novel, laparoscopic intraperitoneal chemotherapy delivery technique which aims to improve on drug distribution and tissue penetration to treat peritoneal metastases. Thus far, PIPAC has been conducted with oxaliplatin at an arbitrary dose of 92mg/m2. We conducted a phase 1 study to establish safety and tolerability.

Experimental design: We used a 3+3 dose escalation design of PIPAC oxaliplatin for patients with peritoneal metastases from gastrointestinal tumors, after failure of at least first-line chemotherapy. Dose levels were planned at 45, 60, 90 and 120mg/m2.

Findings: This study included 16 patients with 24 PIPAC procedures (8 gastric, 5 colorectal and 1 gallbladder, pancreas and appendix cancer each). Median age and Peritoneal Cancer Index (PCI) score were 62 years and 17, respectively. Two patients developed pancreatitis (grade 2 and 3) at 45mg/m2, necessitating cohort expansion. Another patient developed grade 2 pancreatitis at 90mg/m2. There were no other dose limiting toxicities and the highest dose cohort (120mg/m2) tolerated PIPAC well. Pharmacokinetic analyses demonstrated good linearity between dose and maximum concentration ($r^2=0.951$) and area under the curve ($r^2=0.995$). Based on response evaluation criteria in solid tumors, 62.5% and 50% of patients had stable disease after one and two PIPAC procedures, respectively. 8 patients underwent 2 PIPAC procedures, with improvement of median PCI and Peritoneal Regression Grade Score from 15 to 12 and 2.5 to 2.0, respectively.

Conclusions: The recommended phase 2 dose of PIPAC oxaliplatin is 120mg/m2. Future studies should build on these results to further delineate the efficacy and role of PIPAC oxaliplatin for peritoneal metastases.
Minimally Invasive Management of Peritoneal Metastasis Laparoscopic CRS and HIPEC for Colorectal Cancer with Peritoneal Metastasis

Soo Yeun Park

Kyungpook National University School of Medicine

Peritoneal carcinomatosis is a common cause of colorectal cancer dissemination and its prognosis is the worst amongst stage IV colorectal cancer. While there is lack of evidence from randomized controlled trials, studies have addressed the efficacy of cytoreductive surgery and intraperitoneal chemotherapy for colorectal peritoneal carcinomatosis on the long-term survival over systemic chemotherapy only.1-4 In 2017 update of the National Comprehensive Cancer Network guidelines, complete cytoreductive surgery and/or intraperitoneal chemotherapy is considered as a treatment option for selected patients with limited peritoneal metastasis for whom R0 resection can be achieved.5 The peritoneal dissemination occurs by implantation of free intraperitoneal cancer cells that are exfoliated from a primary tumor over the whole visceral and parietal peritoneum. For the maximum effect of both cytoreductive surgery and intraperitoneal chemotherapy, complete removal of all visible nodules should be achieved.6 The complete cytoreductive surgery usually demands and various combinations of peritoneectomy and intraabdominal organ resection. For these reasons, a large laparotomy incision is usually suggested for those procedures.7,8

In surgical resection of localized colorectal cancer, laparoscopic surgery reduced abdominal incision, pain, time to recover, wound related complication, and overall morbidity than open surgery. Moreover, postoperative immunologic function was better preserved in laparoscopic surgery than open approach. After the publication of long-term oncological safety from randomized controlled trials, laparoscopic surgery is widely accepted as the standard of care patients with localized colorectal cancer.9,10 Currently, laparoscopic surgery is commonly used to assess the extent of peritoneal dissemination and resectability or to perform palliative intraperitoneal chemotherapy for patients with peritoneal carcinomatosis. Meanwhile, there are concerns regarding the technical difficulty and oncologic safety of laparoscopic radical resection of peritoneal metastasis.

The technical feasibility and oncological safety of laparoscopic cytoreductive surgery has been explored in limited number of patients.11 To date, there are only three retrospective studies showing the results of comparison between laparoscopic and open cytoreductive surgery.12-14 Two of them evaluated limited numbers of patients having heterogenous characteristics and non-colorectal cancer. Although one of three was performed by us, it also included small number of patients and palliative intraperitoneal chemotherapy. We hypothesized that the laparoscopic approach offers a faster postoperative recovery and comparable oncologic outcomes to open surgery in selected patients having limited colorectal peritoneal carcinomatosis.

Summary of our experience of laparoscopic surgery for patients with colorectal peritoneal metastasis is the following. The purpose of this study was to verify the completeness of cytoreduction, postoperative outcomes, and survival outcomes of laparoscopic surgery for patients with limited peritoneal carcinomatosis by comparing open surgery. The limited peritoneal carcinomatosis was defined as 10 or less of peritoneal cancer index (PCI) in this study. Study design: A total of 42 patients who underwent laparoscopic cytoreductive surgery (LCRS) were matched with 21 patients who underwent open cytoreductive surgery (OCRS) for limited peritoneal metastasis (peritoneal cancer index 10 or less) of colorectal cancer from November 2004 and December 2017. The operative outcomes and follow-up oncologic outcomes were compared between LCRS group and OCRS group. The main endpoints were completeness of cytoreductive surgery (CCR), morbidity, cancer-specific survival, progression-free survival, and peritoneal progression-free survival. Clinicopathologic characteristics and operative outcomes were comparable between the groups. Of 42 patients underwent LCRS, 6 patients (14%) required conversion to open surgery. The mean operating time was similar between the two groups, and patient-controlled analgesia and rescue narcotics were used signifi- cantly less frequently in the LCRS than in the OCRS group. The mean postoperative hospital stay was less in the LCRS than the OCRS group (14.3 ±7.3 vs 20.2 ±12.2 days; P = .019). Postoperative 90-day mortality occurred in 1 patient in each group. The 3-year cancer-specific survival rate was 63.5% in the OCRS group, and 61.5% in the LCRS group (p = 0.422). The type of operation (open cytoreductive surgery versus laparoscopic cytoreductive surgery) was not related to survival outcomes (cancer-specific survival, disease-free survival, and peritoneal recurrence-free survival). Our results indicate that With careful selection by experienced laparoscopic surgeons, laparoscopic cytoreductive surgery was technically feasible and safe to treat colorectal cancer patients with limited peritoneal metastases.


Single-incision laparoscopic surgery has gained popularity because it causes less postoperative pain with better patient recovery and superior cosmetic effect for colorectal disease. However, this technique is challenging due to its restriction in the triangulation and retraction. The da Vinci SP surgical system was recently introduced to overcome these limitations. It has two joints called endo-wrist and elbow in robotic instruments and articulating endoscope permitting flexible movement. All robotic instruments are inserted through a cylindrical single port. According to our early experience, this new surgical system can achieve limitless quadrant abdominal surgery, maximize cosmetic effect with comparable surgical and oncological outcomes, which might be a novel surgical platform that can be used as an alternative surgical modality for colorectal surgery. To confirm the validity of this surgical platform, long-term and functional outcomes in a large study population is needed.
The development of laparoscopic equipment helps surgeons to observe surgical anatomical structures more precisely. The surgical images transmitted from laparoscopic surgery to the monitor show 10-15 times larger magnification than traditional open surgery. The 4K and 8K high-definition monitors and 3D camera images show sophisticated anatomical structures. Recently, imaging technology has been rapidly developed to be capable of visualizing physiological functions as well as anatomical structures. Near-infrared (NIR) camera system is one of visualization equipment using indocyanine green (ICG) fluorescence.

At a near-infrared wavelength of 800 nm, the biologic constituents have low activity, while ICG is activated to form fluorescence. ICG binds to intravascular proteins that prevent the extravasation of ICG molecules, intraoperative angiography can be easily performed after intravenous injection of ICG. And since it is absorbed into the liver and excreted to the biliary system, it can image the anatomical structure of the hepatobiliary system. A new fluorescent drug is developed to be excreted through the kidneys instead of the liver and that can visualize the ureter easily.

Fluorescent lymph node mapping is also studied using the injection of ICG around tumors that can facilitate to make a fluorescent image for the lymphatic drainage from the tumor. This technique could be helpful to find sentinel lymph nodes or to determine the dissection range of the cancer-associated lymph nodes.

The various light source can be used to activates fluorescent substances including xenon lamps, LEDs, and lasers. The shorter wavelength could make the high resolution of the fluorescence image. In addition, fluorescent wavelengths using near-infrared rays of 800 nm have low transmittance, and thus, when fat and connective tissue are covered the targeted tissue, fluorescence intensity should be limited. To overcome these shortcomings, the wavelength of 1000-1500nm as a second window could be used for the novel fluorescence imaging device in the future.
Technical Tips in Energy Devices

Seong Kyu Baek

Surgery, Keimyung University Dong San Hospital, Korea

The ongoing desire to improve hemostasis and efficiency during surgery is manifested in the rapid development of electrosurgical technology. These changes have brought about a wide variety of devices available to the practicing surgeon during open, laparoscopic, and robotic surgery. Depending on the instrument chosen, various clinical effects ranging from simple coagulation to the sealing of large vascular bundles are obtained. This technological boom has led to a multitude of energy device platforms, configurations, generators, cost points, and vendors.

As technology evolved, a variety of devices which used energy to heat tissue and control bleeding were created. Every device has potential pitfalls and advantages. This lecture focuses on the Technical Tips in Energy Devices in laparoscopic and Robotic surgery.

The reliance on monopolar electrosurgery persists. There is no clear evidence to support the use of either bipolar or ultrasonic devices.

An understanding of the pros and cons of these technological advancements can improve the operative experience of both surgeon and patient.

Energy Devices, Laparoscopy, Robotic system
Currently in clinical trials, we are interested in minimally invasive surgery, and this is why we are preparing for the presentation, hoping to be of little help to the single port assistant technique skill.

Basically, you need to understand Laparoscopic Sys' and instruments and how to use them in detail. In addition, if you understand the advantages and disadvantages of a single port type, you will be a better assistant.

Triangulation is based on laparoscopic camera moving and angle view control, which helps in smooth operation. Furthermore, it can be operated with minimal manpower, one of the advantages of minimally invasive surgery.

Single Port Assistant Technique Skill
ORAL SESSION 01

OS01-01

02. BP

Perioperative and Oncologic Outcome of Robot-assisted Minimally Invasive (Hybrid Laparoscopic and Robotic) Pancreatoduodenectomy: Based on Pancreatic Fistula Risk Score and Cancer/Staging Matched Comparison with Open Pancreatoduodenectomy

Hyeong Seok Kim1, Hongbeom Kim1, Wooil Kwon1, Youngmin Han1, Yoonhyeong Byun1, Jae Seung Kang1, Yoo Jin Choi1 and Jin-Young Jang1*

1Department of Surgery and Cancer Research Institute, Seoul National University College of Medicine, Korea

Background

Robotic surgery is a novel approach that scores over conventional minimally invasive approaches, even in pancreatic surgery. We investigated clinical outcomes of robot-assisted minimally invasive (hybrid laparoscopic and robotic) pancreatectoduodenectomy (RA-MIPD).

Methods

Total 150 patients who underwent RA-MIPD between 2015 and 2018 were compared with 710 patients who underwent open pancreatectoduodenectomy (PD) during the same period. Demographics and surgical outcomes were analyzed, and propensity score matched (PSM) analysis was performed to evaluate complications including clinically relevant postoperative pancreatic fistula (CR-POPF) and oncologic outcomes in patients with malignancy.

Results

PSM analysis was performed based on the pancreatic fistula risk. Patients undergoing RA-MIPD were younger (RA-MIPD vs open PD: 61.2 vs. 65.5 years, P < 0.001); however, no significant intergroup difference was observed in sex (P = 0.091) and body mass index (P = 0.281). Operation time was longer in the RA-MIPD group (361.2 vs. 305.7 min, P < 0.001); however, estimated blood loss did not significantly differ (515.6 vs. 478.0 mL, P = 0.318). Overall complication (24.7% vs. 30.9%, P = 0.178) and CR-POPF rates (6.7% vs. 6.9%, P > 0.999) were similar. The RA-MIPD group showed lower pain scores and shorter length of postoperative hospitalization (11.5 vs. 17.2 days, P < 0.001). After PSM analysis for cancer and staging among patients with malignancies, no significant intergroup difference was observed in the R0 resection rate (96.7% vs. 93.3%, P = 0.527), tumor size (2.59 vs. 2.60 cm, P = 0.954), total number of retrieved lymph nodes (17.0 vs. 16.6, P = 0.793), and 2-year survival rates (84.4% vs. 77.8%, P = 0.898).

Conclusions

Compared with open PD, RA-MIPD is associated with better or at least similar early perioperative and equivalent mid-term survival outcomes. RA-MIPD is safe and feasible and enables early postoperative recovery. RA-MIPD is expected to play a key role in near future.

Pancreatoduodenectomy, Robot-assisted, Minimally invasive surgery, Survival, Pancreatic fistula, Propensity score matching
Comparisons of Short-Term and Long-Term Outcomes between Open and Laparoscopic Distal Pancreatectomy in Patients with Pancreatic Ductal Adenocarcinoma

Jung Min LEE¹, Jae Seung KANG¹, Hee Ju SOHN¹, Yoonhyeong BYUN¹, Yoo Jin CHOI¹, Youngmin HAN¹, Eun Joo KIM¹, Hongbeom KIM¹, Wooil KWON¹ and Jin-Young JANG*¹

¹Department of Surgery and Cancer Research Institute, Seoul National University College of Medicine, Korea

Backgrounds

Laparoscopic distal pancreatectomy (LDP) has been performed widely in most benign tumors of pancreatic body or tail. However, safety and feasibility of LDP in regards to the pancreatic adenocarcinoma (PDAC) were not well-known.

Purpose

The present study aimed to compare the short-term and long-term outcomes of LDP with those of open distal pancreatectomy (ODP).

Methods

This was a retrospective study with prospectively collected medical data. Between 2009 and 2017, patients who underwent distal pancreatectomy and pathologically confirmed as PDAC were enrolled. Clinical and pathologic variables were investigated. To reduce selection bias, 1:1 propensity score matching (PSM) was performed with T and N stage of 8th American Joint Committee on Cancer staging system. Survival outcomes and cumulative recurrence rates were calculated with Kaplan-Meier method.

Results

Total 210 patients were enrolled. LDPs and ODPs were performed in 35 patients (16.7%) and 175 patients (83.3%), respectively. After 1:1 PSM, age, sex, underlying diseases were comparable between two groups. In terms of short-term outcomes, operation time (128 vs. 164 minute, P=0.001) and postoperative hospital stay (11.1 vs. 16.5 days, P=0.011) were significantly different between two groups. Tumor size (3.2 vs. 3.1 cm, P=0.889), number of harvested lymph nodes (12.6 vs. 14.4, P=0.365), and R0 resection rates (91.4 vs. 80.0%, P=0.172) were comparable. 5-year overall survival rates (26.4 vs. 24.6%, P=0.742) and cumulative recurrence rates (56.3 vs. 61.4%, P=0.582) were comparable between two groups. LDP has similar or better perioperative outcomes (operation time, postoperative hospital stay) and shows similar survival outcomes, and recurrence patterns in PDAC patients, compared with ODP. LDP is a safe and feasible procedure in PDAC patients.

Distal pancreatectomy, Pancreatic ductal adenocarcinoma, Laparoscopy
Objective(s)

A soft pancreas remains a potent risk factor of postoperative pancreatic fistula (POPF) following pancreaticoduodenectomy (PD). Recently, minimally invasive PDs have been gradually expanding its application. This study aims to evaluate the effect of anastomotic technique of laparoscopic versus robotic pancreaticojejunostomy (PJ) on POPF among patients with soft pancreas in multi-institutional database.

Methods

From January 2014 to December 2019, 155 patients with soft pancreas and small pancreatic duct less than 3 mm diameter underwent laparoscopic or hybrid PD (laparoscopic resection and robotic reconstruction) at two institutions. Surgical outcomes of 123 patients who underwent totally laparoscopic PD and 32 patients who underwent hybrid PD were compared.

Results

General demographics were comparable between laparoscopic and hybrid group including age, gender, BMI, ASA, indications, and diameter of pancreatic duct. Proportion of periampullary malignancies were similar in both group (74.8 % vs. 75.0 %, p=0.981). Mean diameter of pancreatic duct was almost identical (1.98±0.69 mm vs. 1.84±0.63 mm, p=0.326) All patients underwent duct-to-mucosa anastomosis for pancreaticojejunostomy. Mean pancreatic duct size was also comparable (1.98±0.69 vs. 2.08±0.96, p=0.475) Mean operative time and estimated blood loss were similar. POPF, delayed gastric emptying, and overall postoperative complication rates were not different in both group. Clinical relevant POPF rates higher than grade B were 8.8% and 9.4% in each group. Length of hospital stay was also comparable (12.0 ± 9.1 vs. 12.0 ± 8.3 days, p=0.985).

Conclusion

Our study showed similar POPF and overall complication rates in both laparoscopic and hybrid PD group. Both laparoscopic and robotic approach could be good alternative way to achieve safe and effective minimally invasive PD.

Pancreaticoduodenectomy
Laparoscopic Cholecystectomy in Patients with Previous Upper Midline Abdominal Surgery: Comparison of Laparoscopic Cholecystectomy after Gastric Surgery versus Non-Gastric Surgery

Oh-Seung Kwon1, Doo-Ho Lee1, Yeon Ho Park1 and Doojin Kim1*

1General Surgery, Gachon University Gil Medical Center, Korea

Background

The purpose of this study was to investigate the effect of previous upper abdominal surgery on the feasibility and safety of laparoscopic cholecystectomy, and investigate the effects of the type of previous upper abdominal surgery on laparoscopic cholecystectomy in terms of complications and conversion to open surgery.

Methods: From March 2008 to November 2019, data from 103 consecutive patients who had previously undergone upper midline abdominal surgery before undergoing laparoscopic cholecystectomy at single tertiary referral center were prospectively collected and analyzed for open conversion rate, operation time, intraoperative and postoperative complications, and length of hospital stay. Patients were categorized into two groups according to previous operation method; gastric group versus non-gastric group.

Results

Of 103 patients, 69 patients (67.0%) were gastric group, and 34 patients (33.0%) were non-gastric group. Mean age was 64.1 years, and there were 81 male (78.6%), and 22 female (21.4%). No significant difference was observed in age, sex, American society of anesthesiologists physical status, and preoperative body mass index between the two groups. A significant difference was observed in operation time (Gastric group; 131.4 ± 65.4 versus Non-gastric group; 103.8 ± 52.2 minutes, p=0.035). Open conversion rate was comparable between the two groups (n=4, 5.8% versus n=2, 5.9%, p=0.986). No significant difference was observed in overall morbidity (n=13, 18.8% versus n=7, 20.6%, p=0.833), morbidities of Clavien-Dindo grade IIIa or worse (n=6, 8.7% versus n=1, 2.9%, p=0.275), length of postoperative hospital stay (6.3 versus 6.6 days, p=0.637), and re-admission within 30 days (n=3, 4.3% versus n=1, 2.9%).

Conclusion

Previous upper midline abdominal operations including gastroduodenal surgery are not a contraindication to safe laparoscopic cholecystectomy. Nonetheless, patients with previous upper midline abdominal incisions who are scheduled to undergo laparoscopic cholecystectomy should be informed preoperatively of the chance of open conversion and morbidities associated with operation.

upper abdominal surgery, laparoscopic cholecystectomy
Comparison of Minimally Invasive Reduced-Port Cholecystectomy and Da Vinci SP Cholecystectomy

Seoung Yoon Rho¹, Dai Hoon Han¹, Ho Kyoung Hwang¹, Gi Hong Choi¹, Woo Jung Lee¹ and Chang Moo Kang¹

¹Surgery, Yonsei University College of Medicine, Korea

Background

Minimally invasive cholecystectomy is now standard treatment, meanwhile there is still debate of which platform is more convenient and practical for patients and surgeon both. The da Vinci system has recently released a true single-port platform, the da Vinci SP system (RSPC), with all the instruments entering into one single port.

Purpose

We compared da Vinci SP cholecystectomy and other minimally invasive reduced-port cholecystectomy platform.

Method and materials

Since our center started RSPC in May 2019, 70 cases of RSPC were underwent. We compared 70 cases of RSPC and 94 cases of da Vinci single-site cholecystectomy (RSSC) and 105 cases of laparoscopic single-fulcrum cholecystectomy (LSFC) each group.

Results

In terms of perioperative outcome, there was significant difference between total operative time (mean±SD) (RSPC 75.0±19.0 vs RSSC 91.1±27.3 vs LSFC 56.7±14.1 min), actual dissection time (RSPC 16.5±8.4 vs RSSC 22.9±17.1 vs LSFC 24.9±11.8 min). Docking time (RSPC 5.1±2.0 vs RSSC 9.8±4.4 min) and console time (RSPC 34.6±13.2 vs RSSC 42.5±21.2 min) showed significant differences. There were no significant difference between two groups regarding conversion rate, hospital stays, bile spillage rate during surgery and postoperative complications.

Conclusion

RSPC can be performed safe and feasible. RSPC showed comparable perioperative outcome (hospital stay, postoperative complication rate, bile spillage during surgery, multiport-conversion rate) and showed shorter docking time and actual dissection time compared with RSSC. This benefit may be helpful in beginner for single-incision cholecystectomy. In future, RSPC can be used in pancreatic mass enucleation, distal pancreatectomy, etc.

Da Vinci SP cholecystectomy, reduced-port cholecystectomy
Optimal Timing of Laparoscopic Cholecystectomy after Ercp Clearance & Stenting in Patients of Cholelithiasis with Choledocholithiasis: A Prospective Randomized Study

Saurabh Galodha1*, Rakshay Kaul2 and Bhavesh Devakaran2

1G I Surgery & Liver Transplantation, AIIMS, New Delhi, India
2General Surgery, IGMC, Shimla, India

Background

The optimal timing of laparoscopic cholecystectomy (LC) in patients of cholelithiasis with choledocholithiasis undergoing endoscopic clearance (ERCP) is not clearly established.

Purpose

In this study we tried to ascertain best time for performing LC in patients undergoing ERCP.

Methods

All patients of cholelithiasis with choledocholithiasis undergoing ERCP prior to LC from 1st July 2017 to 30th June 2018 were enrolled. They were divided into three groups; immediate (<24 h)(A), early (24-72 h)(B) and delayed (6 weeks)(C) according to time interval between LC and ERCP. Randomisation was done in 1:1:1 manner. Demographic and intraoperative parameters, perioperative morbidity and hospital stay were analysed.

Results

Sixty-three patients were included in the study (21 each in three groups). Two patients crossed over from group B to C due to post ERCP pancreatitis. Mean age was 48.43 ± 15.134 years, being similar in all groups. There were more females in group C (57.1% vs. 42.1% vs. 87% respectively) (p= 0.008). Mean operative time was significantly less in group A (37.14 ± 9.84 vs. 44.37 ± 7.61 vs. 49.48 ± 12.60 min respectively) (p=0.001). Similarly, mean blood loss was significantly less (25.48±16.03 vs. 32.89±17.10 vs. 48.70 ±16.73 ml) (p <0.001). Bleeding was commonest intraoperative complication (n=12, 19.0%), seen more in group C. One patient in group A had bowel injury requiring repair. 25(39.6%) patients had postoperative complications (4 vs. 8 vs. 13 patients in A, B & C respectively), commonest being surgical site infection. Bile leak was seen in 1, 2 and 4 patients of groups A, B & C (p=0.410). Median hospital stay was 2 vs. 4 vs. 7 days in the three groups respectively (p=0.006).

Conclusion

Best time to perform LC in patients with cholelithiasis with choledocholithiasis is immediately after ERCP in same sitting. Larger studies may be done to validate this study.

Cholelithiasis, Choledocholithiasis, ERCP, Laparoscopic cholecystectomy, Interval
Background

Despite favorable short-term outcomes of laparoscopic pancreaticoduodenectomy (LPD), long-term outcomes after LPD in comparison with open pancreaticoduodenectomy (OPD) have been rarely reported. We compared the long-term outcomes of pancreatic anastomosis between LPD and OPD by evaluating anastomosis stricture and parenchymal atrophy.

Methods

We retrospectively reviewed 212 patients who received OPD (n=121) and LPD (n=91) from a single surgeon, from December 2014 to October 2018. We analyzed the long-term outcomes of pancreatic anastomosis by reviewing the postoperative 1-year CT for anastomosis stricture and parenchymal atrophy. Anastomosis stricture was defined as a 30% increase or more in the pancreatic duct diameter, and pancreatic atrophy was defined as a 30% decrease or more in the remnant pancreas parenchyma.

Results

The incidence of clinically relevant postoperative pancreatic fistula (CR-POPF) was 19.8% in LPD and 18.2% in OPD, with no significance. The LPD group was associated with smaller pancreatic duct (2.3 vs 3.3 mm, P=0.041) and soft pancreas (78.0 vs 48.8%, P<0.001). In the OPD group, there were more patients with pancreatic cancer (22 vs 59.5 %, P<0.001). There were no differences in anastomosis stricture (16.5 vs 24.0%, P=0.184). There were significantly more patients with pancreas atrophy in the open group (17.6 vs 33.1%, P=0.011). Multivariate analysis of risk factors for anastomosis stricture and pancreas atrophy showed operative method was not a significant factor.

Conclusions

The results of this study revealed that long term outcomes of LPD were not inferior to OPD in terms of patency of the pancreatic duct and pancreatic atrophy.
Comparison of Open and Minimally Invasive Pancreaticoduodenectomy for Treatment of of Pancreatic-Head and Periampullary Tumors

Min-Su Park¹, BumSoo Kim¹ and Sang-Mok Lee¹

¹Surgery, Kyunghee University, Korea

PURPOSE

Many minimally invasive pylorus preserving pancreaticoduodenectomy (mPPPD) techniques such as laparoscopic-assisted (LAPD), totally laparoscopic (TLPD) or totally laparoscopic-robotic assisted (TLPD-RA) have been reported, but their advantages with respect to an open technique (oPPPD) and with respect to each other are unclear. We compared the outcome of mPPPD and oPPPD in this study.

METHODS

Patients operated from 2017 to 2020 by mPPPD were matched 1:1 for age, histopathology, American Society of Anesthesiologists category and body mass index to oPPPD patients operated from 2016 to 2020.

RESULTS

Patients eligible for mPPPD are a risk group due to a high rate of soft pancreata. Complication rate and mortality were comparable to oPPPD. There was a significantly reduced transfusion requirement and less delayed gastric emptying, and reduced hospital stay. The main reason for conversion was portal venous tumor adhesion. Patient selection changed and operation time and hospital stay decreased with the surgeons' experience.

CONCLUSION

In selected patients, the minimally invasive pylorus preserving pancreaticoduodenectomy is feasible with complication rates comparable to the open procedure. There seem to be advantages in terms of transfusion requirement and hospital stay.

Pancreaticoduodenectomy, Minimally Invasive
Robotic Selective Paraortic Lymphadenectomy and Combined Resection for Obstructed Rectosigmoid with Clinically Suspicious Paraortic Lymph Node Metastasis and Direct Invasion to Uterus

Sung Uk Bae
Surgery, Keimyung University Dongsan Hospital, Korea

Objective

Although the role of para-aortic lymph node dissection (PALND) in the management of colorectal cancer has not been established, this extended lymphadenectomy might be beneficial in carefully selected patients. Robotic colorectal surgery offers technical advantages to complex surgeries such as combined resection for direct invasion to adjacent organs. We present a video presentation of robotic surgery for rectosigmoid colon cancer with paraaortic lymph node metastasis and direct invasion to uterus and adnexa.

Method

An 81-year-old man was referred to our hospital for treatment of obstructed rectosigmoid colon cancer. Colonoscopic examination revealed a luminal encircling huge ulcerative mass with complete obstruction and a self-expandable metallic stent was inserted under the fluoroscopic guidance. Abdominal computed tomography and radionuclide positron emission tomography of the torso revealed a rectosigmoid colon cancer with paraaortic lymph node metastasis and direct invasion to the uterine fundus and right ovary. Thirteen days after stent insertion, the patient underwent robotic low anterior resection with paraaortic lymph node dissection and subtotal hysterectomy with bilateral salpingo-oophorectomy.

Results

The total procedure time was 390 min. Histopathological examination of the specimen showed a moderately differentiated T4bN2bM1a adenocarcinoma measuring 9.1 × 6.2 cm in size. The total and positive lymph nodes harvested were 35 and 8, respectively. No positive lymph node was observed in the central area among the 10 paraaortic lymph nodes excised. The right ovary was diagnosed as metastatic carcinoma, primary in large intestine. The patient was discharged on postoperative day 12 with minor wound complication. The patient has received 6 cycles of avastin/FOLFOX chemotherapy and there has been no recurrence during the follow up period of 1 year.

Conclusion

Based on the present case, robotic approach for advanced and metastatic colorectal cancer for can be performed safely and facilitate various kinds of combined resections in selected case.

Robotic Surgical Procedures, Colorectal neoplasm, Lymph Node Excision, Laparoscopy
Laparoscopic Multivisceral Resection with Fluorescence-Guided Para-Aortic Lymph Node Dissection for Advanced T4b Colon Cancer

Jin Ah Choi¹, Gyu-Seog Choi²*, Hye Jin Kim¹, Soo Yeun Park¹ and Jun Seok Park ¹

¹Colorectal Cancer Center, Kyungpook National University Chilgok Hospital, Korea

Purpose

Laparoscopic approach has been adopted for complicated procedure for the treatment of colon cancer. However, the surgical procedure of multivisceral resection for treating T4b colon cancer or paraaortic lymph node dissection has not been established. In addition, fluorescence imaging may provide distinguishable anatomical information about lymph nodes during operation. In this video, we demonstrated the surgical skills with laparoscopic approach and FI technique for the treatment of maximally advanced colon cancer which had adjacent organ invasion with paraaortic lymph node metastasis.

Methods

The patient had colon cancer with direct invasion into left adnexa and simultaneous paraaortic lymph node metastasis. She received neoadjuvant chemotherapy. During laparoscopic exploration, tumor directly invaded into left adnexa. Actual PALND began from the aortic bifurcation. After resection of regional lymph nodes, inferior mesenteric artery was ligated. PALND was proceeded upto the lower border of renal vessels and laterally off the anterior surface of psoas muscle. During lymph node dissection, FI was repeatedly used for identifying lymph node. After complete PALND, FI was performed again for identifying any remained lymph nodes. Specimen with en-bloc resection of the colon, Lt. salpinx and paraaortic lymph node was extracted. And anastomosis was performed.

Results

The operation time was 150 minutes and the estimated blood loss was 30 ml. There were no perioperative complications. The pathologic stage was ypT4bN1a. The number of harvested PALN were 40, but no metastatic lymph nodes in para-aortic area was identified.

Conclusions

In this video, maximally advanced rectosigmoid colon cancer was treated by laparoscopic approach with FI after neoadjuvant chemotherapy. Especially, FI helped to prevent residual lymph nodes around para-aortic area during surgery.

Colorectal cancer, Lymph nodes, Lymph node excision, Laparoscopy, para-aortic lymph node dissection
Indocyanine Green Fluorescence Angiography for the Prevention of Anastomotic Leak in Colorectal Surgery: Results of a Monocentric Retrospective Study

Annalisa lo Conte1*, Francesco Mallozzi S.Maria1, Massimo Pezzatini1, Matteo Gasparini1, Camilla Romano1, Antonio Brescia1 and Marcello Gasparini1

1Week- Day Surgery, Ospedale Sant'Andrea, Rome, Ospedale Sant'Andrea, University "Sapienza", Rome, Italy

Background

Indocyanine green fluorescence (IGF) angiography in colorectal surgery is routinely use worldwide and several studies have showed it’s very useful to prevent anastomotic leak.

Purpose

We present our retrospective study conducted at the Sant’Andrea Hospital, University “Sapienza” of Rome, for prevention of anastomotic leakage with the intraoperative routine use of Indocyanine Green Fluorescence. Our goal was to show whether the use IGF in colorectal surgery was related to the reduction of the rate of post-operative complication, blood loss, fistula rate and reoperation.

Methods

Between October 2014 and 2019 we enrolled 302 patients (pt) who underwent to colorectal surgery; 9 pt were excluded because an anastomoses was not performed (Miles and Hartmann procedure). We divided patients in two groups: no- IGF group (123 pt) and IGF group (170pt). The two groups were homogeneous for demographic characteristics and localization of disease. Cases of benign colorectal disease and advanced malignant disease were more representative in the IGF group.

Results

Most patients were treated laparoscopically and no difference in operative time was detected. Post-operative complication 3-5 grade according to Clavien-Dindo classification, rate of reoperation and perioperative blood loss were statistically inferior in the IGC group (p<0, 1). The rate of anastomotic fistula was 6, 5% in no-IGC group and 1, 76% in the IGC group (only 3 pt).

Conclusion(s)

In colorectal surgery anastomotic leak is determined by multifactorial risks, and the routine use of Indocyanine Green Fluorescence is safe and useful to prevent major post-operative complication, blood loss, reoperation and reduced rate of anastomotic fistula.

Indocyanine green fluorescence angiography, colorectal surgery, anastomotic leak
Robotic Supralevator Posterior Exenteration

Jayesh Gori

Colorectal surgery- Tata memorial hospital, SPSR, India

To present the Video of Robotic Supralevator Posterior Exenteration for mid rectal carcinoma post NACTRT on MRI showing T3N1 lesion abutting the rectovaginal septum in 52 yr old lady.

Supralevator posterior exenteration
Laparoscopic Abdominoperineal Resection with En Bloc Bilateral Seminal Vesicle Excision-extended TME

Avanish Saklani¹, Sanket Subhash Bankar¹, Diwakar Pandey¹, Vivek Sukumar¹, Ankathi Suman¹ and Ashwin deSouza¹

¹Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Introduction

In this video we demonstrate the feasibility of laparoscopic surgery for patients with locally advanced rectal cancer planned for abdominoperineal resections requiring extended total mesorectal excision (TME).

Objectives

To demonstrate systematic approach for performing laparoscopic abdominoperineal resection-extended TME for locally advanced rectal cancer.

Methods

A 34 years old gentleman presented to us with per rectal bleeding and altered bowel habits since 2 months. Per rectal examination revealed growth at 8 cm from anal verge with biopsy suggestive of moderately differentiated adenocarcinoma. Magnetic resonance imaging (MRI) pelvis showed mid rectal lesion abutting right seminal vesicle. Metastatic workup was negative. He received neoadjuvant chemoradiation (NACTRT) followed by 4 more cycles of Capecitabine and oxaliplatin. A reassessment MRI scan was suggestive of residual tumour with involvement of right seminal vesicle. This patient underwent laparoscopic abdominoperineal resection with enbloc bilateral seminal vesicle excision.

Results

The surgery was uneventful with an operative time of 360 minutes. Postoperative course was uneventful and patients were discharged on post-operative day 7.

Conclusions

Laparoscopic abdominoperineal resections can be safely and effectively performed for locally advanced rectal cancers and can be beneficial in doing extended TME surgeries.

Low rectal cancer, Laparoscopy, Extended Total Mesorectal Excision
Laparoscopic Supralevator Posterior Exenteration: A Video Vignette

Jitender Rohilla*, Sanket Bankar¹, Diwakar Pandey¹, Ashwin deSouza¹ and Avanish Saklani¹

1Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Objective

To present a systematic approach to Laparoscopic Supralevator posterior exenteration Method: We present a case of a 51 years old lady, diagnosed as a case of locally advanced carcinoma rectum (cT4N1M0). She received neoadjuvant chemoradiation following which a reassessment MRI scan was done, suggestive of loss of fat planes with uterus. She underwent Laparoscopic supralevator posterior exenteration with 5 ports.

Results

The procedure was performed in 500 minutes with a blood loss of 200 ml and had no intraoperative or postoperative complications. Conclusions: Laparoscopic supralevator posterior exenterations can be safely performed in selected patients at high volume centres.

Locally advanced rectal cancer, Exenterative Surgery, MIS
Recent studies have shown that complete mesocolic excision (CME) in minimally invasive surgery (MIS) is safe and feasible in the hands of experts [1]. However, the crucial pitfall of MIS remains in advanced cancers due to high conversion rates [2]. A number of studies show a much lower conversion rate in robotic colectomies than laparoscopic surgery owing to a great technical advantage of reliable dexterity [3, 4]. Moreover, the recent FOxTROT trial suggests that neoadjuvant chemotherapy (NACT) can be safely carried out in advanced, operable colon cancer patients with pathologic down-staging and a lower rate of incomplete resections, improving surgical outcomes [5]. We present a video of robotic CME after NACT for advanced colon cancer. A 49-year-old female with abdominal pain was referred to our hospital for treatment of ascending colon cancer. Colonoscopic examination revealed a circumferential mass with partial obstruction. The patient’s abdominal CT and positron emission tomography (PET) CT revealed mid-ascending colon cancer with extensive pericolic infiltration and conglomerated ileocolic lymph node (LN) metastasis abutting to the duodenum and superior mesenteric vein (SMV). The patient received 4 cycles of NACT with modified FOLFOX6, and showed partial response to therapy with much smoother margin of LN. We performed robotic right hemicolectomy with CME. Conglomerated LN abutting to the duodenum and SMV was carefully removed with the combination of inferior and medial to lateral dissection technique using the robotic articulated scissor. Histopathologic examination showed a T4aN2aM0 adenocarcinoma with R0 resection. The total and positive lymph nodes were 34 and 4. The patient was discharged without complications. Robotic CME combined with NACT could be a useful treatment option for advanced colon cancer, which may help to enhance curative resection rate and the benefit of MIS.
Advantages of the Da Vinci Robotic System for Rectal Cancer Resection in the Presence Of a Large Abdominal Aortic Aneurysm

Hyunmi Park1, Taehoon Lee1, Guglielmo Niccolo Piozzi1, Hong Bae Choi1, Ji-Seon Kim1, Se-Jin Baek1, Jung-Myun Kwak1, Jin Kim1 and Seon-Hahn Kim1*

1Colorectal Surgery, Korea University College of Medicine, Korea

BACKGROUND

Benefits of the robotic surgery in the treatment of colorectal cancer surgery have been widely shared due to its stable platform, superior 3D view and flexible endowristed instruments.

PURPOSE

This video showcases the benefits of the robotic platform in the central vascular ligation of left sided colorectal cancers in the presence of a large abdominal aortic aneurysm.

METHOD & RESULT

A 69 year old man with a low rectal adenocarcinoma at 3.5cm from the anal verge was found to have a symptomless incidental 5.5cm infrarenal abdominal aortic aneurysm during staging. Treatment for the rectal cancer was decided to take precedence after discussion with the vascular surgeons. Due to the large dome shaped aneurysm, it was not possible to reach the descending colon and sigmoid colon or their mesentery with straight laparoscopic instruments which are inserted from the patient’s right side, and only with the flexible endowrist was such dissection possible.

The video depicts a clear view of the aneurysm in the midline, from which the left colic artery arises from the root of the inferior mesenteric artery.

The endowrist of the monopolar scissors at the surgeon’s dominant hand are used at a 90 degree angle to avoid damaging the aneurysm which was in the path of the instrument.

The patient had a smooth post operative recovery and was discharged home on day 6 and underwent and uneventful EVAR 3 weeks later.

CONCLUSION

The robotic platform is the ideal and oncologically safe minimally invasive surgical modality to achieve central vascular ligation of left sided colorectal cancers in the presence of a large abdominal aortic aneurysm obstructing the path of the instruments, where conventional laparoscopy would have made minimally invasive surgery too challenging.
Safety of Barbed Suture Material for Wound Closure in Single Incisional Cholecystectomy

YE SEUL KIM

General Surgery, Bundang CHA medica center, Korea

Introduction

Single incision cholecystectomy is surgical methods that provide comparable results to conventional laparoscopic cholecystectomy (LC). However, high risk of post-operative incisional hernia is an issue in single incision cholecystectomy. This study evaluated the incidence of incisional hernia after single incision cholecystectomy, and the safety of barbed suture material during wound closure.

Methods

Total number of 984 patients underwent laparoscopic or robotic single incision cholecystectomy between March 2014 and December 2019. During this period, there were 689 patients who underwent wound closure with monofilament suture material (Monosyn®R 2-0) and 295 patients with barbed suture material (StratafixTM 2-0).

Results

Both Patient groups were comparable in age, gender, BMI, ASA score and total operation time. Total incidence of incisional hernia after single incision cholecystectomy was 2 of 984 patients (0.2%). Two patients developed incisional hernia were monofilament suture group and none in the barbed suture group (0.3% vs. 0%, p=0.355). Univariable analysis to identify risk factors for incisional hernia have not shown any significant factor including age, sex, ASA score, BMI higher than 30, acute cholecystitis, and bile spillage during cholecystectomy.

Conclusion

Our study showed very low incidence of incisional hernia. Also, there was no incisional hernia patient in barbed suture group. If technically appropriate, single incision cholecystectomy does not appear to present a high risk of hernia. Barbed suture material can be safely applied in wound closure without risk of incisional hernia.
The Yonsei Experience of Minimally Invasive Pancreaticoduodenectomies: A Propensity Score-Matched Analysis with Open Pancreaticoduodenectomy

Munseok Choi¹ and Chang Moo Kang"¹

¹Department of Surgery, Yonsei University College of Medicine, Korea

Introduction

With continued technical advances in surgical instruments and growing expertise, several surgeons have performed minimal invasive pancreaticoduodenectomy (MIPD) safely with good results, and the approach is being performed more frequently. We performed over 200 cases of MIPD and compared their outcomes to those of open pancreaticoduodenectomy (OPD) using the large sample size. The aim of the present study was to evaluate the safety and feasibility of MIPD compared with OPD.

Methods

From September 2012 to December 2019, pancreaticoduodenectomy was performed for 352 patients at Yonsei University Severance Hospital by a single surgeon. Patients were divided into two groups: those who underwent OPD (n=132) and those who underwent MIPD (n=220). We performed a 1:1 propensity score-matched analysis and retrospectively analyzed the demographic and surgical outcomes.

Results

After Propensity score matching analysis, the mean operation time for the MIPD group was similar and estimated blood loss was lower than the OPD group. The postoperative pancreatic fistula (POPF) grade B and C did not differ significantly between the 2 groups (p=0.204). There was no difference in 30-day mortality rates between the two groups (p=1.000).

Conclusions

MIPD can be a good alternative option for well-selected patients with periampullary lesions requiring pancreaticoduodenectomy.
Outcome of Laparoscopic Cholecystectomy by Exposing the Inner Layer of the Subserosal Layer in Case of Acute Cholecystitis.

Nattawut Keeratibharat

Surgery, Institute of Medicine, Suranaree University of Technology, Thailand

Introduction

Bile duct injury is the serious complication of laparoscopic cholecystectomy (LC). Therefore, the critical view of safety has been accepted as a safe method for gaining a sufficient view of Calot's triangle. However, it is usually difficult to achieve a critical view of safety in presence of severe gallbladder inflammation due to a frozen Calot's triangle. Universal safe procedure of laparoscopic cholecystectomy by exposing the inner layer of the subserosal (SS) layer was introduced by G.Honda et al (2016). This approach was used for many cases with cholecystitis with severe inflamed gallbladders in our institution. The purpose of this study was to evaluate outcomes of LC that performed by exposing the inner layer of the serosal layer.

Methods

Demographic data and peri-operative data were recorded in case of acute cholecystitis. The procedure was done by dissecting the gallbladder along the SS-inner layer to achieve cystic duct. The outcome of procedures were recorded.

Result

Thirty patients who diagnosed acute cholecystitis underwent laparoscopic cholecystectomy in which technique was used. In all cases, the procedure was complete without complications. The mean operating time was 70 minutes (range 35-120 minutes) and the mean of blood loss was 22.6 ml (range 5-100 ml).

Discussion

Applying this standardized procedure, we have safely performed LC in all cases without intraoperative cholangiography. Exposing the SS-inner layer was easier in case of acute cholecystitis compared with elective case due to fibrotic change of gallbladder.

Laparoscopic cholecystectomy, acute cholecystitis
Validation of Original, Alternative and Updated Alternative Fistula Risk Scores after Open and Minimally Invasive Pancreatoduodenectomy in an Asian Patient Cohort

Boram Lee 1, Yoo-Seok Yoon 1*, Ho-Seong Han 1, Ho-Seong Han 1, Jai Young Cho 1, YoungRok Choi 1 and Jun Suh Lee 1

1Department of Surgery, Seoul National University Bundang Hospital, Korea

BACKGROUND

Several fistula risk score (FRS) predicting clinically relevant postoperative pancreatic fistula (CR-POPF) have been developed based on the analysis of western patient population. The purpose of this study was to validate and compare the performance of the original (o-FRS), alternative (a-FRS) and updated alternative FRS (ua-FRS) after open pancreatoduodenectomy (OPD) and minimally invasive pancreatoduodenectomy (MIPD) in an Asian patient cohort.

METHODS

From January 2012 to February 2019, 597 consecutive patients underwent PD (305 OPD, 274 MIPD) in two centers. Model performance was assessed using the are under the receiver operating curve (AUC).

RESULTS

CR-POPF occurred in 17.7% after OPD and 16.4% after MIPD. The a-FRS had better discrimination (AUC 0.71, 95% confidence interval [CI], 0.64-0.78) than o-FRS and ua-FRS in the OPD group, whereas the ua-FRS (0.69, 0.60-0.78) had better discrimination than o-FRS and a-FRS in the MIPD group. Among risk factors suggested in 3 FRS systems, the male (hazard ration (HR), 2.47; 95% CI, 1.21-5.06; P=0.013), pancreas texture (HR 6.179; 95% CI 2.78-13.7, P<0.001) and pancreas duct size (HR 0.82; 95% CI 0.69-0.95, P=0.017) were identified for CR-POPF risk factors in OPD group. In MIPD group, the pancreatic texture (HR, 4.77; 95% CI, 1.65-13.8; P<0.001) and duct size (HR, 0.77; 95% CI, 0.63-0.94; P=0.015) were identified for CR-POPF risk factors.

CONCLUSION

The ua-FRS appears to be an accurate tool for prediction occurrence of CR-POPF after MIPD. However, some risk factors had no statistical significance. Further research is needed to revise the ua-FRS for Korean cohorts.
Fluorescent Cholangiography in Laparoscopic Cholecystectomy: A Single Center Experience

Kee-Hwan Kim¹*, Yong-Seok Kim¹, Soo-Ho Lee¹ and Yongseon Kim¹

¹Surgery, Uijeongbu St. Mary's Hospital, the Catholic University of Korea, Korea

Background

Laparoscopic cholecystectomy (LC) is one of the most common surgery in South Korea with approximately 80,000 cases performed per year. Injury of the biliary tract is the serious complication of cholecystectomy, with an incidence rate of 0.3% to 0.5%. Indocyanine green (ICG) fluorescent cholangiography is a non-invasive technique that helps real-time identification of biliary structures for safe dissection within the Calot’s triangles.

Purpose

The purpose of this study is to summarize our initial experience with ICG to assist in the identification of biliary tract structures and to evaluate the relationship between timing of ICG administration and the degree of bile duct structure identification during surgery.

Method

Retrospective case series from April 2019 to January 2020 for elective LC with ICG administration performed at a single institution. Patient demographics, indications for operation, pre-and post-operative laboratory test, biliary structures visualized, amount of ICG used, operative times, duration between ICG administration to operation and complications were recorded.

Result

One hundred sixteen cases were included. Cystic duct (CD), common hepatic duct (CHD), and common bile duct (CBD) were identified with ICG in 88.8% of cases, 3.4% for CBD only, 0.9% for CD only, 4.3% for CHD only and 2.6% for completely invisible. Critical view of safety (CVS) was full identified in 99.1% and CVS was not identified only in 0.9%.

laparoscopic cholecystectomy, Indocyanine green (ICG) fluorescent cholangiography , Critical view of safety(CVS)
Laparoscopic Excision of Type II Choledochal Cyst Arising from the Intrapancreatic Common Bile Duct in an Adult

Jun Suh Lee, Yoo-Seok Yoon, Ho-Seong Han, Boram Lee, Moonhwan Kim, Jai Young Cho and Hae-Won Lee

1Surgery, Seoul National University Bundang Hospital,

Introduction

The Todani type II choledochal cyst is a rare pathological condition that presents as a diverticulum isolated from the common bile duct (CBD). Although surgical resection is the treatment for type II choledochal cyst, complete resection is technically difficult when the cyst is connected to the intrapancreatic CBD. This video shows laparoscopic excision of a type II choledochal cyst arising from the intrapancreatic CBD.

Methods

A 56-year-old woman presented with an intrapancreatic cyst that had been incidentally detected 4 years earlier and had grown gradually, according to follow-up radiological images. Computed tomography and magnetic resonance cholangiopancreatography revealed a 4.6 cm cyst located mainly within the pancreas and connected to the intrapancreatic CBD. We performed laparoscopic excision of the choledochal cyst.

Results

The patient was placed in a supine position. Three 5 mm and two 12 mm trocars were used. Laparoscopic inspection identified the cyst protruding from the pancreas behind the CBD. After kocherization, the cyst was dissected from the CBD and further dissection continued into the pancreas. As the intrapancreatic portion of the cyst was meticulously dissected from the pancreas, the stalk connecting the CBD was identified. Cyst excision was completed when the stalk was ligated with Hem-o-lok® clips. Laparoscopic cholecystectomy was also performed. The operation took 80 min and the estimated blood loss was 50 mL. The patient was discharged on postoperative day 4 with no postoperative complications.

Conclusion

This video demonstrates that laparoscopic excision of a type II choledochal cyst arising from the intrapancreatic CBD is technically feasible.

Choledochal cyst, Laparoscopy
Surgical Outcomes and Learning Curve Analysis of Robotic Pancreaticoduodenectomy: A Propensity Score-Based Comparison with Open Approach

Hyeyeon Kim¹, Jae Hoon Lee¹*, Yejong Park¹, Jaewoo Kwon¹, Woohyung Lee¹, Ki Byung Song¹, Dae Wook Hwang¹ and Song Cheol Kim¹

¹Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

[Background]
Pancreaticoduodenectomy (PD) is one of the most challenging surgeries. Recently robotic surgeries have become worldwide trend with many benefits. Though there are a few reports about robotic PD (R-PD) until today.

[Purpose]
The purpose of this study is to analyze our first consecutive 70 cases of R-PD and associated surgical outcomes, and to compare the clinical outcomes to open PD (O-PD).

[Methods]
The medical records of 70 patients who underwent R-PD and 269 O-PD patients between 2015 and 2019 were retrospectively analyzed. Cumulative sum (CUSUM) analysis of operative time (ORT) was used to describe learning curve. Surgical and oncologic outcomes of R-PD were analyzed by dividing into early group (1-35) and late group (36-70). Comparison between R-PD and O-PD was carried out using propensity score matching.

[Results]
In 70 R-PD cases, mean age was 56.1±10.1 years, sex ratio was male: female=50%:50%, mean body mass index (BMI) was 23.7±2.8 kg/m². Most common diagnosis was ampulla of Vater cancer (22 cases; 31.4%), followed by intrapapillary mucinous neoplasm (IPMN, 14 cases; 20%) and cholangiocarcinoma (12 cases; 17.1%). ORT, estimated blood loss (EBL), and length of stay (LOS) reduced upon the passage of time. The overall rate of complications showed the tendency to decrease during the experience (54.3% vs. 28.6%; p=0.052). However, the rate of postoperative pancreatic fistula (POPF) did not show a significant reduction (37.1% vs. 20.0%; p=0.186).

Each 55 cases were matched from R-PD and O-PD after propensity score matching. R-PD had longer ORT than O-PD (414.5 min vs. 244.7 min; p<0.001), but there were no differences in EBL, LOS, or readmission. The overall complication rate was higher in R-PD (45.5% vs. 21.8%; p=0.010), but major complication (Clavien-Dindo≥IIIa) rate showed no statistical difference (23.6% vs. 10.9%; p=0.084). The rate of R0 resection was equivalent (94.5% vs. 96.4%; p=0.65), and number of total retrieved nodes were higher in O-PD (14.9 vs. 21.8; p<0.001).

[Conclusion]
The surgical performance in R-PD improved over time. The learning curve completed after 30 R-PD. R-PD seemed feasible in terms of perioperative and oncological outcomes compared to O-PD.

Robotic pancreaticoduodenectomy, cumulative sum learning curve, postoperative pancreatic fistula
Initial Experience of 30 Cases of Robotic Single Site Cholecystectomy Using the Da Vinci Single-Port (Sp) System

Young-dong Yu1*, Hye-Sung Jo1 and Dong-Sik Kim1

1HBP Surgery and Liver Transplantation, Korea University Anam Hospital, Korea

Background/Aims

Single-port robotic surgery is being adopted for various surgical procedures. The da Vinci surgical system released its new pure single-port platform, the da Vinci SP, offering improvements and refinements for established robotic single-site procedures.

Purpose

We aimed to describe our institution's initial experience with robotic single site cholecystectomy utilizing the da Vinci single-port (SP) robotic system.

Methods

A retrospective review of the initial experience of with robotic single site cholecystectomy utilizing the da Vinci single-port (SP) robotic system was carried out. Patient demographics, operative time (docking time + console time), postoperative hospital stay and complications were obtained and analyzed. In addition we compared the perioperative outcomes with patients who underwent robotic single cholecystectomy using the previous Si and Xi models.

Results

Of the 30 patients undergoing robotic single site cholecystectomy utilizing the da Vinci single-port (SP) robotic system, median age was 47 yrs and BMI was 23.71. Of the patients, 21 (70%) were diagnosed with gallbladder stone. Median operative time was 29 min. There was 1 patient with wound seroma (complication rate 0.03%). Median hospital stay was 2 days. The docking time was significantly shorter in the da Vinci SP group (4.16 ± 1.65 min) than the previous da Vinci Si or Xi group (7.03± 3.39 min) (p=0.000). There was no significant difference in console time (p=0.866).

Conclusions

Our experience suggests that robotic single site cholecystectomy using da Vinci SP is safe and feasible requiring less time for preparation than the previous Si or Xi models. The promising features and potential application of da Vinci SP in hepatobiliary and pancreas surgery need further study.

robotic, single site, cholecystectomy, da Vinci single-port (SP) robotic system
Totally Laparoscopic Pancreaticoduodenectomy; Outcomes of 100 Consecutive Experience

Jae Young Jang1, Sung Yub Jeong1 and Sung Hoon Choi1*

1Division of Hepatobiliary and Pancreas, Department of Surgery, CHA Bundang Medical Center, Korea

Background

Laparoscopic pancreaticoduodenectomy (LPD) to resect periampullary lesions is gaining more popularity in many centers worldwide. However, LPD is still not widely available by many surgeons because of concerns on postoperative outcome and technical difficulty. Precise pre-operative plan and proper handling of instruments are mandatory to achieve successful result, especially the target pathology is malignancy. Standardization and optimization of the procedure has been required to overcome such difficulty. We have developed optimal laparoscopic approach suitable to most hepatopancreato-biliary surgeons, based on harmonious arrangement of surgical anatomy and ergonomic instrument setting. Investigation on overall perioperative outcomes of LPD in comparison with open approach followed.

Patients and method

A total of 100 patients underwent pancreaticoduodenectomy (PD) from March 2014 to December 2018 at Bundang CHA medical center, CHA University. 57 patients underwent LPD and 43 underwent open pancreaticoduodenectomy (PD). Prospectively collected clinical data of patients were reviewed retrospectively. We performed comparison of perioperative surgical outcomes between LPD and open PD group.

Results

LPD and open PD group presented comparable demographics. More cholangiocarcinomas (20 vs. 8 cases) and ampulla of Vater cancers (11 vs. 4 cases) were attempted laparoscopically than open surgery, whereas more pancreatic cancers (11 vs. 17 cases) were resected by open PD rather than LPD. The main tumor size was lager in open PD group without statistically significant difference (3.1±2.3 vs. 5.8±17.1cm, p=0.081). LPD group had significantly less estimated blood loss (402±391 vs. 945±402ml, p=0.002), intraoperative transfusion (39±101, 389±822ml, p=<0.0001), postoperative delayed gastric emptying (3 vs. 10 cases, p=0.009) and postoperative hospital stay (13.6±6.7, 23.2±18.1 days, p=0.007).

Conclusion

If well-organized surgical plan is established, LPD can be adopted as feasible and safe procedure to resect periampullary pathologies. And LPD is comparable to open PD when radical surgery for acceptable oncologic outcome is required.

laparoscopic pancreaticoduodenectomy, minimally invasive
Comparison of Robotic Single-Site Cholecystectomy and Single-Incision Laparoscopic Cholecystectomy Using a Propensity Score-Matching

Sung Yub Jeon and Sung Hoon Choi

Devision of Hepatobiliary and Pancreas, Department of surgery, CHA Bundang Medical Center, CHA University, Korea

Introduction

Robotic single-site cholecystectomy (RSCS) has been known to have some advantages such as reducing stress of surgeon compared to single-incision laparoscopic cholecystectomy (SILC). However, there are few studies comparing the perioperative outcomes of two operative methods.

Methods

From March 2014 to February 2020, 242 patients underwent RSSC and 869 patients underwent SILC for benign gallbladder disease in our center. Propensity score matching was performed to control variables including gender, age, body mass index, American society of anesthesiologist score, diagnosis, preoperative symptom, preoperative endoscopic retrograde cholangiopancreatography, and previous operation history. Finally, 484 patients were selected among the SILC group through 1:2 matching.

Results

Patient demographics between the two groups were 1:2 matched. Total operation time was slightly longer in RSSC group (48.3 ± 14.6 min vs. 45.3 ± 15.8 min, p-value=0.012). However, actual working time was shorter in RSSC group (37.4 ± 12.8 min vs. 42.1 ± 14.7 min, p-value=<0.001). Conversion to additional port rate was frequent in SILC group (0% vs. 3.1%, p-value=0.013). Postoperative hospital stays (1.8 ± 0.5 days vs. 1.8 ± 0.7 days, p-value=0.291), intraoperative bile spillage rate (12.0% vs. 16.3%, p-value=0.150), and postoperative complication rate (2.5% vs. 1.2%, p-value=0.354) were comparable in both groups.

Conclusion

Both surgical procedures performed safety. But the RSSC demonstrated the better performance of the operation with shorter working time and the advantage of overcoming unexpected difficulties during the surgery with low conversion rate compared to SILC.

Cholecystectomy, RSSC, SILC, Propensity score-matching
Outcome of Single Port versus Conventional Three Ports Laparoscopic Appendectomy

Sajid Malik

Department of Surgery, Allama Iqbal Medical College / Jinnah Hospital Lahore, Pakistan

Introduction

Minimal invasive surgery (MIS) is a modern and safe improvement in field of laparoscopic surgery. Single incision laparoscopic appendectomy (SILA) is a major breakthrough in MIS and has become standard procedure for acute appendicitis in place of conventional three port laparoscopic appendectomy (CTLA).

Objectives

To see the potential advantages in terms of operative time, duration of hospital stay, post-operative pain and cosmetic results in SILA and CTLA groups.

Materials and Methods

96 patients were divided in two groups; group SILA (cases) and CTLA (control). Each group comprised 48 patients. All cases were performed by consultant who were competent enough and trained in MIS.

Results

We found that there was statistically no difference in operative time (p>0.05) and post-operative pain (p>0.05) of both procedures but statistically significant outcome was observed in duration of hospital stay (p<0.005) and cosmetic result (p< 0.005). Post-operative analgesia usage was same in both groups with similar outcome of control. Surgical wound healed in all patients of both groups without complication but noticeably had shown no scar mark on three months follow up in patients of SILA group. Almost all patients in SILA group were discharged on same day on oral diet.

Conclusion

This study showed that results of SILA are better in terms of cosmoses and less duration of hospital stay in the presence of non-significant operative time of two procedures. Staying with promise of minimizing in MIS to SILA, cosmetic satisfaction and minimal hospital stay are its comprehensible advantages.

Laparoscopy, appendectomy, Invasive
Effectiveness of Caudal Epidural Anaesthesia in Anorectal Surgery

SAJID MALIK

Department of Surgery, Allama Iqbal Medical College / Jinnah Hospital Lahore, Pakistan

To assess the effectiveness of caudal epidural anaesthesia in patients with anorectal surgical condition.

Study Design

Prospective randomized study.

Setting

Department of Surgery, Jinnah Hospital, Lahore. Period: 1st August 2016 to 31st Dec 2018.

Materials and Methods

One hundred and eighty patients with general anorectal surgical conditions were recruited in this study with their consent. Patients were subject to surgery planned beneath caudal block.

Results

One hundred and fifty eight patients (87%) satisfy with the technique of anaesthesia and one hundred sixty six (92.22%) patients demonstrate satisfaction with the postoperative pain control. One hundred and fifty two patients (84.44%) were resisted with pre-operative information and 158 (87%) patients show their consent to select this kind of anaesthesia if needed again. In 20 patients there was block failure caused about 11.11% failure rate.

Conclusion

Satisfactory anaesthesia, minimal requirements, cost effectiveness and high patients acceptability make caudal anaesthesia a suitable choice for trivial and surgery.

Anaesthesia, Anorectal Surgery, Caudal Anaesthesia, High Patients Acceptability, Satisfactory Anaesthesia.
Transanal versus Nontransanal Surgery for the Treatment of Primary Rectal Gastrointestinal Stromal Tumors: A 10-Year Experience in a High-Volume Center

Zifeng Yang

Department of Colorectal Surgery, The Sixth Affiliated Hospital of Sun Yat-sen University, China

Background

Rectal GIST (gastrointestinal stromal tumor, GIST) is a rare digestive disease that has a distinct malignant tendency compared to that of gastric-derived GIST. At present, there is still no standard, and the surgical approach to rectal GIST is controversial.

Methods

The clinicopathological data and prognosis of rectal GIST patients admitted to the Sixth Affiliated Hospital of Sun Yat-sen University from 1998.01.01 to 2018.12.31 were collected retrospectively. All cases were divided into either the transanal (TA) group or the nontransanal (NTA) group.

Results

A total of 537 GIST cases were treated in 10 years, including 82 rectal GIST cases (64 cases underwent surgical resection, including 29 cases in the TA group and 35 cases in the NTA group). Preoperative neoadjuvant therapy (p=0.003), postoperative adjuvant therapy (p=0.017), operative time (p=0.013), blood loss (p=0.038), anus-preserver (p=0.048), 30-day complication rate (p=0.000), time to flatus (p=0.036), hospital stays (p=0.011), distance from the anus (p=0.047), tumor size (p=0.002), mitotic count (p=0.035) and NIH (National Institutes of Health, NIH) criteria (p=0.000) were significantly different between these two groups (all p<0.05). The median follow-up time was 41 months (1-122 months). Twelve patients had recurrence and metastasis, and 4 patients died. The 5-year DFS (disease-free survival, DFS) and OS (overall survival, OS) were 74.4% and 91.2%, respectively, in the whole group. There were no statistically significant differences between the TA group and the NTA group at 5-year DFS (81.3% vs 79.0%, p=0.243) and OS (88.7% vs 93.3%, p=0.308).

Conclusion

In the treatment of rectal GIST, transanal resection has a minimally invasive effect, less postoperative complications, high anal sphincter preservation rate, and R0 resection rate and a better prognosis. How to improve the proportion of neoadjuvant therapy and choose the appropriate cases for transanal surgery is still a challenge.

transanal, nontransanal, rectal GIST
Anorectal Melanomas: Time for Immunotherapy

Ambarish Chatterjee¹, Vikas Ostwal¹, Reena Engineer¹, Sanket Bankar¹, Ashwin Desouza¹ and Avanish Saklani*¹

¹Colorectal Surgery, Tata Memorial Hospital, India

Background

Anorectal melanoma (AM) is a type of mucosal melanoma which is rare and has poor outcomes. Most patients are diagnosed in advanced stage and not treated with curative intent. Surgery is the mainstay in non-metastatic patients and is the only curative treatment option.

Purpose and Methods

We retrospectively studied 154 AM patients treated in a single institution between November 2010 and September 2019. We looked at the presentation, use of PET scan for staging, and outcomes of metastatic and non-metastatic patients. Mean follow-up duration was 30 months.

Results

Out of 154 patients, 110 patients were metastatic and 44 were non-metastatic at presentation. PET scan was done for 39 out of 44 patients, with a sensitivity and accuracy of 78.95% and 74.36% respectively for detecting pN stage. Three patients had positive CRM. The median overall survival (OS) of operated patients was 33 months (3-year OS of 41%). Adjuvant systemic therapy (chemotherapy/immunotherapy) was given to only seven patients after curative resection. Overall recurrence rate was 52.2%. In metastatic patients, median OS was 3 months (1-year OS 15.5%). Patients who received systemic therapy had significant survival benefit than those who did not (median OS for chemotherapy: 8 months vs < 1 month; p = 0.001).

Conclusion

In a disease with poor outcome, even in resectable disease, role of immunotherapy in neoadjuvant, adjuvant and metastatic setting needs to be explored. This study, gives an insight on management of localized and metastatic AM, role of PET scan, systemic therapy, and long-term survival of these patients.

Anorectal melanoma, surgery, chemotherapy, immunotherapy, survival
POLYMER CLIPS VS ENDOLOOP FOR APPENDICULAR STUMP LIGATION DURING LAPAROSCOPIC APPENDECTOMY: A RANDOMIZED CONTROLLED TRIAL

Dr. Samiullah Bhatti1, Dr. Shabbar Hussain Changazi1, Dr. Mahmood Ayyaz1, Dr. Zubair Ahmed1*, Dr. Zulqarnain Hyidar1 and Dr. Saad Tahir1

1Surgery, Services Institute of Medical Sciences/Services Hospital Lahore, Pakistan

Introduction

Laparoscopic Appendectomy is the most common surgical procedure worldwide and an important step is the ligation of stump of appendix. Conventional method to ligate the stump and mesentery is by using a loop of vicryl suture. We decided to investigate the use of polymer clips for stump and mesentery ligation in terms of operative cost, complications and time of surgery during laparoscopic appendectomy.

Methods and Procedures

100 patients were recruited from emergency department and randomized to undergo loop closure and polymer clip closure for appendicular stump during laparoscopic appendectomy. Primary outcome measure was the cost of operation and time of surgical procedure while secondary outcome measure was operative complication of stump leakage, infection and bleeding.

Results

Mean age of patients was 28 years. Out of hundred patients 54% (54) were females and 44% (44) were males. Mean time required for appendicular stump and mesentery ligation with vicryl loop was 15 minutes while mean time for polymer clips was 6.50 minutes (p value< 0.001). Mean cost of operation was 15$ for polymer clips while for vicryl loop was 50$ (p value-<0.001). No difference was found in terms of complications in the two groups. (p= 0.598)

Conclusion

Ligation of appendicular stump and mesentery with Polymer clips for laparoscopic appendectomy is cost effective, safe and feasible alternative to vicryl loops.

Appendix, Polymer clip, Endoloop
Does the Microscopic Examination of Anastamotic Donut after Colorectal Resection for Oncological Purposes Benefit the Outcomes?

Awais Naeem

Surgical Oncology, Shaukat Khanum Memorial Cancer Hospital and Research Center, Pakistan

BACKGROUND

Circular end to end anastomosis (CEEA) stapling gun was first described in 1979 which revolutionized the surgical approach. After anastomosis, two donuts are produced. It is common practice to perform microscopic analyses of the donuts. Recent studies oppose this concept of analyzing the donuts as it increases the financial burden and has no role in the management of disease.

METHODOLOGY

During the period of three years, 220 patients underwent circular stapled anastomosis. It is a retrospective study with convenient sampling. Involvement of donuts, involvement of margins, length of donuts and margins were primarily recorded. Ethical review approval was taken from Institutional Review Board. Hospital electronic system was used to retrieve the data.

RESULTS

220 patients underwent CEEA stapled gun anastomosis. All had adenocarcinoma. Most of the patients had T3 disease n=113. Low anterior resection was the most common procedure followed by anterior resection and sigmoid colectomy respectively. We perform all rectal cancers anastomosis with circular stapling gun. On histological analyses among 220 patients, all the proximal and distal anastomotic donuts after colorectal resections were found to be negative. Mean length of proximal donut was 1.79 +/- 0.45 cm. Mean length of distal donut was 1.68 +/- 0.48 cm. All of the proximal margins were negative for cancer involvement except one patient. Mean length of proximal margin was 8.69 +/- 4.48 cm. One patient had involved distal margins out of 220 patients. Mean length of distal margin was 4.9 +/- 5.98 cm.

CONCLUSION

Routine analyses of the donuts have no impact on the management and outcome of disease. Therefore, the practice should be changed. It will reduce the burden on pathologist workload as well as it will reduce the cost of the procedure.

Donuts, colorectal anastomosis
Laparoscopic Complete Mesocolic Excision for Right-Sided Colon Cancer Using a Combination of Anterior and Retroperitoneal Approach

Satoshi Matsumoto¹, Eriko Shinozuka¹, Kumiko Sekiguchi¹, Akihisa Matsuda², Hideyuki Suzuki¹ and Hiroshi Yoshida²

¹Department of Surgery, Nippon Medical School Chiba Hokusoh Hospital, Japan
²Department of Gastrointestinal and Hepato-Biliary-Pancreatic Surgery, Nippon Medical School, Japan

Background

Although recent studies have showed the oncological effectiveness of complete mesocolic excision (CME) for treatment of right-sided colon cancer, there are some concern about an increase of complication rate compared with conventional colonic resections. A worldwide standardized procedure of right colectomy with CME has not been established. We demonstrate a safe and precise laparoscopic procedure using a combination of anterior and retroperitoneal approach.

Operative Technique

The procedure is started with an anterior approach. Following an opening of the omental brusa, the mesentery of the transverse colon is cut away along the inferior border of the pancreas, and the front of the SMV and the SMA are exposed. Then the cranial margin of the resection is defined. The Henle’s gastro-colic trunk is exposed, and an accessory right colic vein is treated safely. The hepatic colonic flexure is taken down easily from cranial to caudal. A retroperitoneal approach is used in the next step. The ileo-colonic mesentery is divided from the retroperitoneal tissues, and the dissection plane is reached the space made by the anterior approach. Then the SMV and the SMA are exposed according to a medial approach. A delicate and careful dissection can be revealed the roots of the ICA/V and the MCA/V with D3 lymph node dissection. Each of vessels is cut at the root and the MCA is dissected with the right branch.

Results

A total of 58 patients with right-sided colon cancer underwent laparoscopic CME using this approach. All procedures were successful without any serious intra-operative complications or any conversion to open surgery. No grade ≥3 post-operative complications occurred.

Conclusions

The use of a combination of anterior and retroperitoneal approach might be a feasible procedure for laparoscopic right hemicolectomy with CME. We would like to show the precise techniques with video presentation.

complete mesocolic excision (CME), right-sided colon cancer, laparoscopic right hemicolectomy
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07. Liver

Routine Application of Laparoscopic Surgery for Hepatocellular Carcinoma Located In the Anterolateral Segments of the Liver: Outlier Analysis

Hyojin Shin¹, Jai Young Cho¹*, Ho-Seong Yoon¹, Yoo-Seok Yoon¹, YoungRok Choi¹, Jun Suh Lee¹, Boram Lee¹ and Junyub Kim¹

¹Department of Surgery, Seoul National University Bundang Hospital, Korea

Introduction

The aim of this study was (1) to compare the perioperative outcomes of laparoscopic anterolateral liver resection (LALLR), open anterolateral liver resection (OALLR) and open conversion anterolateral liver resection (OCALLR) (2) to analyze the risk factors for open conversion.

Methods

We retrospectively reviewed the data of 374 patients who underwent laparoscopic (N=299) or open (N=62) or open conversion (N=13) liver resection for hepatocellular carcinoma located in anterolateral segments between 2004 and 2018.

Results

Among preoperative factors, tumor size (cm) (4.11 ± 2.01 vs. 4.98 ± 3.49 vs. 2.82 ± 1.52, p = 0.000) and proportion of other organ invasion (23% vs. 15.4% vs. 1.7%, p = 0.001) were significantly higher in OCALLR and OALLR than LALLR group.

In operative outcome analysis, estimated blood loss (ml) (1596.1 ± 1604.8 vs. 812.5 ± 977.6 vs. 411.3 ± 614.3, p = 0.003), postoperative hospital days (10.38 ± 5.69 vs. 11.82 ± 9.31 vs. 6.48 ± 6.71, p = 0.000) and complication (38.5% vs. 29.0% vs. 12.5%, p = 0.001) were significantly higher in OCALLR and OALLR than LALLR group.

Conclusion

Laparoscopic approach showed better operative outcomes than open surgery in anterolateral liver resection in selected patients. Moreover, OCALLR showed even poorer operative outcomes than OALLR and risk factors for open conversion were bigger tumor size and other organ invasion.

HCC, Laparoscopy, Anterolateral
Pure Laparoscopic versus Open Right Hepatectomy in Live Liver Donors: A Propensity Score Matched Analysis

Suk Kyun Hong1, Ming Yuan Tan1, Lapisatepun Worakitti1, Jeong-Moo Lee1, Jae-Hyung Cho1, Nam-Joon Yi1, Kwang-Woong Lee1 and Kyung-Suk Suh1*

1Surgery, Seoul National University College of Medicine, Korea

Background

Although PLDRH is gradually spreading worldwide, their outcomes including long-term outcomes of both donor and recipient have not yet been evaluated in a large comparative study.

Purpose

The aim of this study is to present the safety and feasibility of pure laparoscopic donor right hepatectomy (PLDRH) compared with that of conventional donor right hepatectomy (CDRH).

Methods

We retrospectively reviewed the medical records of 894 donors who underwent LDLT between January 2010 to September 2018 at Seoul National University Hospital were reviewed. We performed 1:1 propensity score matching between the PLDRH and CDRH groups. Subsequently, 198 donor and counter recipients were included in each group.

Results

The total operation time (P< 0.001), time to remove the liver (P< 0.001), and warm ischemic time (P< 0.001) were longer in the PLDRH group. The length of postoperative hospital stay was significantly shorter in the PLDRH group (P< 0.001). Although the rate of complication in donor was similar between the two groups, the rates of early (P=0.019) and late (P< 0.001) biliary complication in recipient were higher in PLDRH group. There was no significant difference in overall survival and graft survival between the two groups. PLDRH is feasible when performed at an experienced LDLT center. Further studies on long-term recipient outcomes including biliary complications are needed to confirm the safety.
Purpose

We aimed to evaluate the feasibility and safety of laparoscopic liver resection compared with those of open liver resection in patients with hepatocellular carcinoma (HCC).

Methods

This study enrolled 168 patients who underwent elective laparoscopic liver resection (LLR, n=58) or open liver resection (OLR, n=110) for HCC in two tertiary medical centers between November 2009 and December 2018. Patients who underwent laparoscopic liver resection were propensity score matched to patients who underwent open liver resection at a 1:1 ratio. Perioperative and postoperative outcomes, 1-, 3-, and 5-year disease-free survival and overall survival were prospectively collected and evaluated.

Results

Of the 116 patients, 58 were included in each of the LLR and OLR groups. 85 segmentectomy or sectionectomy, 19 left lateral sectionectomy, 9 left hemihepatectomy, and 3 right hemihepatectomy were performed. Cause of liver cirrhosis were hepatitis B (n=106, 91.4%), hepatitis C (n=8, 6.9%), and alcoholic hepatitis (n=2, 1.7%). Mean follow-up period was 38.2 months. No significant difference was observed in age, sex, American society of anesthesiologists classification, Child-Pugh class, original liver disease, preoperative alpha-fetoprotein, tumor size, tumor location, overall morbidity, transfusion, and operation time. A significant difference was observed only in length of postoperative hospital stay between the two groups (OLR; 9.1 vs 12.2 days, p=0.003). The 1-, 3-, and 5-year survivals were 96.6, 92.8 and 73.3 % in LLR group, and 93.1, 88.8, and 76.1 % in OLR group (p=0.642). The 1-, 3-, and 5-year disease-free survivals were 84.4, 64.0 and 60.2 % in LLR group, and 93.1, 67.4, and 63.9 % in OLR group (p=0.391).

Conclusion

This retrospective and propensity score-matched study showed that laparoscopic liver resection for HCC can be carried out safely with acceptable short-term and long-term outcomes, compared with open liver resection. 

laparoscopic liver resection, hepatocellular carcinoma
Characteristics of Cholangiocarcinoma in India - Experience From a Tertiary Care Centre

Shraddha Patkar, Krunal Khobragade and Mahesh Goel

1Gastrointestinal and Hepatobiliary Surgical Oncology, Tata Memorial Hospital, India

Background

Cholangiocarcinoma is a rare disease in India with no major studies published till date due to paucity of epidemiological and surgical data. The aim was to evaluate the clinical profile of patients presenting with intrahepatic and peri-hilar cholangiocarcinoma to a tertiary care cancer centre.

Materials and methods

All patients diagnosed with intrahepatic cholangiocarcinoma (IHCC) and perihilar cholangiocarcinoma (PHCC) at Tata Memorial Hospital, Mumbai, between January 2012 to July 2016 were retrospectively analyzed.

Results

A total of 726 patients were evaluated of which 273 patients had IHCC and 358 were diagnosed with PHCC. The median age of presentation for IHCC and PHCC were 57yrs and 56.7yrs. Majority of patients were males – 59% for IHCC and 56.7% for PHCC. Commonest symptoms were pain in abdomen and jaundice with average duration of symptoms being 8 weeks (IHCC) and 9.4 weeks (PHCC) respectively. Most patients with IHCC had metastatic disease (184, 67.9%) on presentation. For patients with PHCC, 50.8% (182) had localized disease, 17% (61) had locally advanced and 24.3% (87) were metastatic. Chemotherapy with palliative intent was offered to 144 patients with IHCC and 60 patients with PHCC. Surgery or chemoradiotherapy could be offered to only 59 patients with IHCC and 128 patients of PHCC. 56 patients with IHCC and 136 of PHCC patients did not take treatment due to socioeconomic reasons.

Conclusions

With less than 15% patients receiving surgery, awareness and early referral with centralization is required to detect disease at a stage where treatment can offer a meaningful survival.

Cholangiocarcinoma, India
Outcomes of Robotic Living Donor Right Hepatectomy from 52 Consecutive Cases: Comparison with Open and Laparoscopy-Assisted Donor Hepatectomy

Seoung Yoon Rho¹, Jae Geun Lee¹, Dong Jin Joo¹, Myung Soo Kim¹, Soon Il Kim¹, Dae Hoon Han¹ and Gi Hong Choi¹

¹Department of Surgery, Yonsei University College of Medicine, Korea

Background

Data for minimally invasive living-donor right hepatectomy, especially robotic living-donor right hepatectomy (RLDRH), in a relatively large donor cohort have not been reported yet.

Purpose: To investigate the feasibility and safety of an alternative robotic living-donor right hepatectomy (RLDRH) technique.

Methods

From March 2016 to March 2019, 52 liver donors underwent RLDRH. The clinical and perioperative outcomes of RLDRH were compared with those of conventional open donor right hepatectomy (CODRH; n=62) and laparoscopy-assisted donor right hepatectomy (LADRH; n=118). Donor satisfaction with cosmetic results was compared between RLDRH and LADRH using a body image questionnaire.

Results

Although RLDRH had a longer operative time (RLDRH, 493.6 min; CODRH, 404.4 min; LADRH, 355.9 min, p<0.001), its mean estimated blood loss was significantly lower (RLDRH, 109.8 mL; CODRH, 287.1 mL; LADRH, 265.5 mL; p<0.001). The postoperative complication rates were similar among the three groups (RLDRH, 23.1%; CODRH, 35.5%; LADRH, 28.0%; p=0.420). Regarding donor satisfaction, the body image and cosmetic appearance scores were significantly higher in RLDRH than in LADRH. There was no significant difference in hospital stay among the three groups (p=0.105). After propensity score matching, RLDRH showed a shorter hospital stay and similar complication rate than CODRH.

Conclusions

RLDRH resulted in a similar postoperative complication rate and shorter length of hospital stay compared with those of CODRH and provided better body image and cosmetic results compared with those of LADRH. RLDRH is feasible and can be safely performed by expert surgeons in both robotic systems and open hepatectomy.

donor hepatectomy, robotic hepatectomy, liver transplantation, living donor hepatectomy, robot-assisted hepatectomy
Improved Outcomes of Major Laparoscopic Liver Resection for Hepatocellular Carcinoma

Hyo Jun Kim1, Jai Young Cho1*, Ho-Seong Han1, Yoo-Seok Yoon1, YoungRok Choi1, Jun Suh Lee1, Boram Lee1 and Junyub Kim1

1Department of Surgery, Seoul National University Bundang Hospital, Korea

Background

Laparoscopic surgery is currently becoming standard treatment option for minor liver resection for Hepatocellular Carcinoma. However, it is still challenging to perform laparoscopic technique for major liver resection. Recent advancement of surgical techniques and accumulation of experiences have enabled surgeons to perform major laparoscopic liver resections, but not many reports are available.

Purpose

To compare the outcomes of major LLR for HCC before and after the adaptation of technological improvements.

Methods

We retrospectively reviewed the medical records of 141 patients who underwent major LLR for HCC from January 2004 to July 2018 in our center. Among them, 28 open conversion cases were excluded for analysis. We divided the patients into two groups according to the date of operation: Group 1 (n=38) and Group 2 (n=75) who underwent major LLR before and after 2012, when advanced techniques including the use of intercostal trocars, Pringle maneuver, and semi-lateral position of patient were introduced. Furthermore, we compared these patients with those who underwent major open liver resection (n=138) during the same period.

Results

Before 2012, 31.4% of the major liver resection was performed laparoscopically. After 2012, LLR increased to 57.7% for major liver resection. Open conversion rate (20.8% vs 19.4%, P=0.835) was not significantly different before and after 2012. Mean operative time (413.0 minutes vs 331.4 minutes; P=0.010), transfusion rate (31.6% vs 13.3%, P=0.021) and hospital stay (9.8 days vs 8.9 days; P=0.002) were significantly less in Group 2. Intraoperative blood loss (1269.7 vs 831.9; P=0.374), postoperative complication (15.8% vs 24.0%; P=0.313), mortality within 3 months (0% vs 1.3%; P=1.000) were not significantly different between the groups. Compared with major OLR group, blood loss (1169.9 vs 979.1, P<0.001), transfusion rate (37.7% vs 19.5%; P=0.002), postoperative complication (41.3% vs 21.2%; P=0.001), and hospital stay (17.0 days vs 9.2 days; P=0.001) were significantly lower in the major LLR group.

hepatectomy, complication, survival
Long-Term Outcomes of Laparoscopic versus Open Liver Resection for Combined Hepatocellular – Cholangiocarcinoma

YOUNGROK CHOI1*, So Hyun Kang2, Boram Lee2, Jai Young Cho2, Ho–Seong Han2, Jun Suh Lee1 and Yoo–Seok Yoon1

1Surgery, Seoul National University College of Medicine, Seoul National University Hospital, Korea
2Surgery, Seoul National University College of Medicine, Seoul National University Bundang Hospital, Korea

Background

Combined hepatocellular – cholangiocarcinoma (cHCC-CCA) is a rare primary hepatic neoplasm. Currently, there are no published studies that analyze the feasibility of laparoscopic liver resection (LLR) in cHCC-CCA alone. This study aims to compare the long-term survival of LLR with open liver resection (OLR) in cHCC-CCA.

Methods

Patients who underwent liver resection for cHCC-CCA from August 2004 to June 2015 were enrolled. Kaplan-Meier survival analysis was performed to analyze the 3-year disease-free survival (DFS) and 3-year overall survival (OS).

Results

A total of 40 patients were enrolled with 23 in the laparoscopic group and 17 in the open group. The 3-year OS was 81.6% in the laparoscopic group and 72.1 % in the open group (p=0.641). The 3-year DFS was 63.3% in the laparoscopic group and 48.2% in the open group (p=0.742). Hospital stay was significantly shorter in the laparoscopic group (7.8±2.7 days) than the open group (16.1±11.7 days, p=0.010). Complication (Clavien-Dindo grade II or more) was also less in the laparoscopic group (2, 8.7%) than the open group (8, 47.1%, p=0.016).

Conclusion

Laparoscopic liver resection for cHCC-CCA is technically feasible and safe, providing short-term benefits without affecting long-term survival.

laparoscopy, liver resection, hepatocellular carcinoma, cholangiocarcinoma, minimally invasive procedure
Difficulty Scoring System of Pure Laparoscopic Donor Right Hemihepatectomy

Jeong-Moo Lee¹, Kwangpyo Hong¹, Eui Soo Han¹, Su young Hong¹, Suk Kyun Hong¹, Nam-Joon Yi¹, Kwang-Woong Lee¹ and Kyung-Suk Suh¹

¹Department of Surgery, Seoul National University Hospital, Korea

Background

The degree of difficulty in laparoscopic liver resection depends on the location of the tumor and the extent of liver resection. However, according to the current difficulty evaluation system, laparoscopic donor hepeatectomy is hard to evaluate the real difficulty level. Because the donor was usually undergone right hemihepatectomy, and there was no underlying liver disease such as cirrhosis. Therefore, a new system is needed to evaluate the difficulty of laparoscopic donor hepeatectomy. In this study, we described the new scoring system and its corresponding factors that determine the difficulty of laparoscopic donor hepeatectomy.

Methods

From January 2019 to December 2019, 93 donors who underwent pure laparoscopic Right hemihepatectomy in Seoul National University Hospital were enrolled. Surgical difficulty score and related factors were evaluated by a surgeon, assistant, scopist, and scrub nurse after surgery immediately. We analyzed which factors are related to surgical difficulty and the relationship between surgical difficulty, surgical outcome, operative time, and complication.

Results

Difficulty scores were divided into 5 points, 1- and 2-point groups were classified into easy case groups, and the 3, 4, and 5-point groups were classified into difficulty groups. Variation of bile ducts or hepatic vein, small abdominal cavity, and huge liver were related to surgical difficulty in multivariate analysis. Absence of main assistant, scrub nurse, and scopist was not related to surgical difficulty independently, but the absence of more than 2 main colleagues was significantly related to surgical difficulty. Operative time and blood loss were correlated positively with our difficulty score system. However, the complication was not related significantly to surgical difficulty.

Conclusions

New surgical difficulty evaluating the system in PLDRH is well correlated with operative time and estimated blood loss. But the surgical difficulty was not related to donor complication.

Difficulty score, Pure laparoscopic donor hepeatectomy,
Objective

There are several techniques for pediatric inguinal hernia (IH) surgery. In this study, we compared three techniques of pediatric inguinal hernia surgery.

Materials and Methods

A retrospective analysis was performed on the hospital charts from July 2002 to October 2019, enrolling pediatric 129 patients with inguinal hernia. LPEC was performed with the percutaneous internal ring suturing technique, and three-port laparoscopic repair (TLR) performed with the internal ring purse string suturing after hernia sac transection. We analyzed the characteristics, operative findings and complications of patients undergoing each operation.

Results

There were 63 patients in open repair (OR), 16 patients in LPEC, and 50 patients in TLR. Age at surgery was the youngest in the LPEC group (29.5 ± 34 months at OR, 14.9 ± 16.6 at LPEC and 43.7 ± 45.3 at TLR, p=0.049). The preoperative laterality of IH was 55 (42.6%) on the right, 62 (48.1%) on the left, and 12 (9.3%) on both sides. However, the postoperatively diagnosed laterality was 37 (28.7%) on the right, 49 (38%) on the left, and 43 (33.3%) on both sides. Bilateral IH repair was performed in 10 (15.9%) with OR, 7 (43.7%) with LPEC, and 26 (52%) with TLR. Operative time was significantly less in TLR group (60.6 ± 27.4 min at OR, 54.4 ± 13 at in LPEC and 36.7 ± 11.5 at TLR, p<0.001), Ipsilateral recurrence was not observed in all groups. One case of contralateral metachronous inguinal hernia developed in patients undergoing unilateral repair with LPEC. The incidence of other complications was not statistically different between the three groups.

Conclusion

Although the operation time was the shortest in the TLR, current data alone do not say which surgical method is best for pediatric inguinal hernia surgery.

Pediatric, Inguinal hernia, Laparoscopic surgery
BACKGROUND
Robotic-assisted hernia repair has recently grown rapidly in the United States and is currently the most common procedure for general surgery. However, there is yet no known published report in Korea.

PURPOSE
We would like to share some of the technical considerations we have gained from our initial surgical experience.

METHODS
All operations were performed using da Vinci Xi system. Three 8mm ports were placed on the right side of the abdomen to accommodate the instruments. The short term surgical outcomes were reviewed retrospectively.

RESULTS
There were three patients who underwent robotic assisted ventral herniorrphagy from July 2019 to January 2020. One patient underwent intraperitoneal onlay mesh (IPOM) and two transabdominal preperitoneal (TAPP) mesh reinforcement. The mean age was 72 years and the mean BMI was 26.6. All hernias were in the midline with an average size of 32.3 cm². The mean operation time was 305 minutes and the average length of hospital stay was 4 days. The patient’s recorded numerical rating scale for pain on day one after operation, was of 3 or less (1-10). There was no recorded complications during the follow-up period. Albeit the small number of cases, robotic ventral herniorrhaphy has shown better cosmetic result and reduction in postoperative pain. Further studies and long term follow up are mandatory, but our initial experience shows a good surgical outcome when such technical tips are applied to a well selected patient population.

Robotic herniorrhaphy
Distal gastrectomy with Billroth I or II reconstruction may cause duodenogastroesophageal reflux (DGER) that result in digestive or respiratory symptoms. The mainstay of the treatment is medical treatment with ursodeoxycholic acid and proton pump inhibitors. However, limited effect of these drugs for DGER is not uncommon. Although the laparoscopic fundoplication has been proved highly effective for gastroesophageal reflux disease (GERD), fundoplication cannot be performed properly on gastrectomized GERD patients. Therefore, we chose Roux-en-Y conversion and hiatal repair as a surgical option. We present a video case of a 72-year-old man with a history of distal gastrectomy and Billroth I anastomosis due to early gastric cancer. GERD due to bile reflux happened after surgery and he was refractory to medical therapy. He received Roux-en-Y conversion from Billroth I gastroduodenostomy and hiatal hernia repair with only cruroplasty. Fundoplication was not performed. He had excellent symptom improvement after surgery. Laparoscopic hiatal hernia repair and Roux-en-Y conversion can be an effective surgical procedure to treat medically refractory DGER after Billroth I gastrectomy.
Clinical Application of Indocyanine green (ICG) Fluorescence Imaging

Boram Lee 1, Jai Young Cho 1*, YoungRok Choi 1, Yoo-Seok Yoon 1 and Ho-Seong Han 1

1Department of Surgery, Seoul National University Bundang Hospital, Korea

Introduction

A recent study reported that resection of extrahepatic metastasis of hepatocellular carcinoma (HCC) in selected patients improving long-term survival [1]. According to the improved preoperative imaging, sub-centimeter sized metastatic nodules are frequently detected [2], however, it is not easy to localize small extrahepatic nodules during surgery. The usefulness of intraoperative indocyanine green (ICG) fluorescence image for the HCC has been reported [3], while the study for detecting extrahepatic metastasis of HCC is rare.

In this report, we describe a case of HCC metastasizing to the peritoneum, which was detected by ICG.

Case

A 50-year-old man was referred to our department for resection for suspected tumor implants from HCC. Three years before admission, he had undergone several times of transarterial embolization and radiofrequency ablation in segment 6, 8 and 2 (Child-Pugh A, Model for end-stage liver disease score, 10) Follow-up computed tomography revealed multiple perihepatic nodules. To confirm the pathology, we decided to proceed the diagnostic laparoscopy. ICG was intravenously injected at a dose of 0.025mg/kg, 1 h preoperatively. When we performed the diagnostic laparoscopy under 3-dimentional scope (ENDOEYE FLEX 3D, OLYMPUS, USA), it was failed to detect perihepatic nodules. Then, we applied ICG fluorescent image system (ITS Model-L, InTheSmart Co. Ltd, Korea) ICG mode revealed the clear demarcation of nodule. The tumor was resected using ultrasonic shears. The tumor was histologically confirmed as a metastatic HCC with focal sacromatoid feature.

Conclusion

ICG image can apply for the detection and efficiently resection of metastatic peritoneal tumors during laparoscopic surgery.

Indocyanine green; Hepatocellular; Neoplasm Metastasis; Laparoscopy,
Early Experience of Robotic Assisted Extended Left Hepatectomy with Caudate Lobectomy, Bile Duct Resection for Perihilar Cholangiocarcinoma

Jaewoo Kwon¹, Yejing Park¹, Woohyung Lee¹, Ki Byung Song¹, Dae Wook Hwang¹, Song Cheol Kim¹ and Jae Hoon Lee¹*

¹Division of Hepato-Biliary and Pancreatic Surgery, Department of Surgery, University of Ulsan college of Medicine and Asan Medical Center, Korea

Background

Combined hepatectomy with caudate lobectomy and bile duct resection is the treatment of choice for patient with perihilar cholangiocarcinoma. This surgical procedure is complex, and incurs a high risk of postoperative morbidity and mortality. However, in recent years, this complicated high-risk operation can be safely performed with robotic instrument in well-selected patients.

Methods

From 2018 to 2019, two patients were treated with robot (Davinci-Xi) assisted left hepatectomy with caudate lobectomy, bile duct resection in Asan medical center. Retrospectively perioperative outcomes and oncologic outcomes were reviewed.

Result

4 trocars were used for camera and robotic arm instruments and 2 trocars were used for assistant. The mean operation time was 748 min, and the estimated blood loss was 150 mL without transfusion. Combined laparoscopic distal gastrectomy was performed to one patient due to concomitant gastric cancer. Most of the procedures were performed using robotic instruments, but laparoscopic afferent limb formation and extracorporeal braun anastomosis was performed. Ductoplasty for hepaticojejunostomy was performed with no difficulty. The biopsy revealed R0 resection. Two patients were discharged 8 and 9 days after surgery without complication.

Conclusions

Robotic assisted extended left hepatectomy with caudate lobectomy, bile duct resection has a long operative time but shows the benefits of fast recovery. This surgery may be considered in highly selective patients.

Robot surgery, Perihilar cholangiocarcinoma
Robotic Transanal and Transabdominal Intersphincteric Resection with Coloanal Anastomosis

Seung Ho Song¹, Hye Jin Kim¹, Jun Seok Park¹, Soo Yeun Park¹ and Gyu-Seog Choi¹*

¹Colorectal Cancer Center, Kyungpook National University Chilgok Hospital, Korea

Background

Optimal treatment of distal rectal cancer can be an intersphincteric resection (ISR) with coloanal anastomosis (CAA) after preoperative chemoradiotherapy (CRT).

Purpose

We aimed to describe the surgical technique of robotic transanal and transabdominal ISR with CAA as a sphincter-preserving method.

Methods

A 24-year-old female was revealed a lower rectal cancer at 3cm from anal verge. Pelvic MRI showed T3N2 with threatened mesorectal fascia. This patient received long-course preoperative CRT. After completing radiation, the status of rectal cancer was improved and MR imaging noticed T2N0 with moderate regression. Robotic ISR with side-to-end CAA was performed at 8 weeks after completing radiation. For transanal dissection, distal rectum was closed at the distal margin for resection to reduce the risk of tumor-cell dissemination. Under direct vision, total intersphincteric dissection was performed following the total mesorectal excision (TME) plane without bleeding. After finishing transanal dissection of the rectum in the anal canal, we moved to the transabdominal phase. After ligation of IMA and full mobilization of the left colon, pelvic dissection was started by using robotic system. The rectum was mobilized using monopolar cautery scissors by dissecting through the avascular plane between the endopelvic fascia to keep the autonomic nerves intact. During continued downward dissection using monopolar scissor, we finally cut the thin membrane to form an opening into the previously dissected extra-abdominal space. All procedure was completed within pelvic cavity. Hypogastric and pelvic nerves are well preserved. The specimen was extracted through the anus and proximal colon was transected. And then side-to-end handsewn anastomosis was created on the perineal side.

Results

The operation time for transanal approach was 21 minutes and operation time only for transabdominal pelvic dissection was 28 minutes. The pathology revealed T2N1 rectal cancer with both negative circumferential and distal resection margins.

Rectal cancer, Robot, Intersphincteric resection, Transanal and transabdominal
Roux-en-Y gastric bypass (RYGB) is the most powerful procedure for resolving obese diabetes control. However, the incidence of revision increases to more than 20% with ≥ 10-year follow-up. For weight regain, the gastric pouch dilatation and widening of gastrojejunostomy is the risk factor. Indeed, long biliopancreatic limb length is effective for diabetes control and weight loss. The elongation of the biliopancreatic limb may lead to greater stimulation of the distal intestine, alterations in bile acid leading to better metabolic outcomes.

A 38-year-old female had undergone standard gastric bypass procedure with severe obesity at another hospital in February 2009. At the time of RYGB, her weight was 135 kg with a body mass index (BMI) of 46.8 kg/m². She had co-morbid conditions of diabetes, hypertension, hyperlipidemia, fatty liver disease, and sleep apnea. In the postoperative period, her lowest recorded weight was 89 kg with a BMI of 30.8 kg/m² at 18 months. However, she had weight regain since 24 months, and her weight increased to 128.2 kg with a BMI of 44.3 kg/m² in January 2020. Therefore, we performed conversion to distal gastric bypass with reshaping of gastric pouch and gastrojejunostomy in February 2020. We present one video case with distal gastric bypass conversion and reshaping of gastric pouch and gastrojejunostomy with failed standard gastric bypass.

standard gastric bypass, failure, distal gastric bypass, conversion,
The First Video of Axillary Lymph Node Dissection Using a Single Port Robotic Surgical System

Jeea Lee¹, Hyung Seok Park¹*, Dong Won Lee², Heamin Lee¹ and Kwanbum Lee¹

¹Surgery, Yonsei University College of Medicine, Korea
²Plastic & Reconstructive Surgery, Yonsei University College of Medicine, Korea

Background

Robotic surgical system with high resolution three dimensional camera and highly flexible robotic arms can enhance surgeon’s performance during various surgeries. Robot-assisted nipple sparing mastectomy (RNSM) through a small axillary incision was introduced and performed by several surgeons. The axillary incision of RNSM is used for sentinel lymph node biopsy and docking with robotic surgical system. When axillary lymph node metastasis is identified in sentinel lymph nodes, conventional axillary lymph node dissection (ALND) can be manually performed through the same incision. However, the axillary incision of RNSM is sometimes inconvenient for conventional ALND because of its location and the small size of incision.

Purpose

Herein, this video presentation will show the first experience of robotic ALND (RALND) through a small axillary incision.

Methods

Before the application of the first RALND to the patient, cadaveric skill lab of RALND was conducted to confirm the availability of RALND. The patient was diagnosed with invasive ductal and lobular carcinoma located in wide area of lower part of the right breast. During the RNSM, the intra-operative frozen section of one sentinel lymph node revealed 2mm-sized metastasis, and RALND was considered.

Result

The axis of the instrument arm was rotated to place parallel to the trunk of the patient. Da Vinci SP® fenestrated bipolar forceps, da Vinci SP® Maryland bipolar forceps, and da Vinci SP® monopolar curved scissors were mounted for sophisticated dissection. A total of 8 lymph nodes including level II were harvested from RALND and thoracodorsal and long thoracic nerves were preserved. The first RALND was successfully performed without any intra-operative event for 61 min.

This is the first video presentation of RALND using the robotic single port surgical system to confirm the feasibility and safety of the new procedure.

Minimal invasive surgery, Axillary lymph node dissection, Robotic lymph node dissection, Single port robotic surgical system
ORAL SESSION 05

ABS-0162

OS05-01

05. Hernia

The Efficacy of Nonfixation and Permanent Tack Fixation in Laparoscopic Totally Extraperitoneal (TEP) Repair of Inguinal Hernia

Min-Su Park* and Sang-Mok Lee

*Surgery, Kyunghee University, Korea

BACKGROUND/OBJECTIVE

Our study aims to compare clinical outcomes of laparoscopic Totally Extra-peritoneal (TEP) repair with mesh fixation in inguinal hernias using nonfixation versus permanent tack fixation.

METHODS

This is a case control study of patients who underwent laparoscopic TEP repair with mesh fixation of inguinal hernias in our institution from 2016 to 2019. In all patients a standard large-pore polypropylene mesh was used and a standardized fixation technique was followed. Patient demographics, presentation, defect size, postoperative complications and recurrence rates were collected and analysed.

RESULTS

50 patients had mesh fixation with titanium tackers (Group TT) were compared with 50 patients who had nonfixation of mesh (Group NT). Mean age was 67.00 (±13.78) in Group TT and 65.00 (±17.15) in Group NT. All patients were males. The median defect size was L3M2 in Group TT and L2M2 in Group NT. All patients were followed up for a mean period of 12 months (range: 1-48 months). There were no recurrences in Group NT, while one Group TT patient developed a medial recurrence.

CONCLUSION

Both nonfixation and permanent tack fixation showed similar post-operative complications and pain scores. As such, they both appear safe and feasible for mesh fixation during laparoscopic repair of inguinal hernias.
What Can I Do to Reduce the Recurrence Rate for Laparoscopic Transabdominal Pre-Peritoneal Inguinal Hernia Repair (TAPP)?

Mathias M. Tomala and Hendrik Schimmelpenning

Background

In the literature have been reported heterogeneous recurrence rates for transabdominal pre-peritoneal plastic (TAPP), ranging 0.5% to 15%. In accordance with the literature, there was a discrepancy between the proportion of operated recurrences and the recurrence rate at follow-up. The aim of the study was to report recurrence rates from 1120 single-center TAPP surgeries performed between 2005 and 2014 and define the quintessences to reduce the recurrence rate.

Methods

A follow-up questionnaire was sent to all operated patients in 2016 and electronic medical files were investigated.

Results

Response rate to the questionnaire was 61.1%, and the refusal rate was 1.2%. Patients reported a recurrence rate of 4.33% (95% confidence interval (CI): 3.04%–6.38%). If patients had at least 5 years of follow-up, the recurrence rate was 5.23% (CI: 3.42%–7.85%), thus approximately 1.91 times higher when compared with patients with a follow-up between one and 5 years (CI for odds ratio: 0.74–5.82). In 9.85% of all surgeries, recurrences were operated (CI: 8.19%–11.79%). If patients had a recurrence at surgery, their odds for another recurrence was 3.35 times increased (CI: 1.16–8.61; p=0.01). Patients with a recurrence had a higher body mass index (median 1.61 kg/m2; Hodges-Lehmann CI: 0.36–2.88). If the localization of the recurrence was medial, the hernia was a recurrence in more than half of the patients (52.8%), while lateral hernias were non-recurrences in almost half of the patients (47.8%). The recurrence risk was 3.96 times higher if there was fluid accumulation (seroma and hematoma) after surgery (CI: 0.93–12.85; Fisher’s exact test p=0.03).

Conclusions

Higher surgical expertise is necessary for the hernia repair with recurrent groin hernia, medial hernia defect and patients with higher BMI. Haematomas and seromas should be avoided also regarding the recurrence.

Inguinal hernia, TAPP, Recurrence
ABS-0325
OS05-03
05. Hernia

Laparoscopic Patent Processus Vaginalis Ligation Using Percutaneous Internal Ring Suturing in Children: Early Experience in Vietnam

Nhat Minh Nguyen¹, Minh Nhat Vo¹, Xuan My Nguyen¹, Khoa Hung Nguyen¹, Dinh Dam Le¹ and Dinh Khanh Le¹

¹Department of Urology, Hue University Hospital, Viet Nam

Background

Surgical laparoscopic interventions in children concerning the inguinal hernia and communicating hydrocele is usually performed through three ports in the abdominal wall with intraperitoneal suturing. Percutaneous internal ring suturing (PIRS) which is a minimally invasive method is also used to repair these disabilities. In this study, we report our early experience with this technique in Vietnam.

Materials and methods

Forty children (ages 9 months – 6 years) with a diagnosis of indirect inguinal hernia or communicating hydrocele was performed percutaneous internal ring suturing between 2019 and 2020. The procedures were performed under general endotracheal anesthesia. A 5mm trocar was inserted in the navel for the camera. The internal ring was sutured under the peritoneum by an 18-gauge injection needle with a nonabsorbable thread inside through the abdominal wall. We tightened the knot from outside and put it in the subcutaneous space. The follow up time is 6 months.

Results

Inguinal hernia or communicating hydrocele was diagnosed on the right side in 23 (57.5%), the left side in 12 (30.0%) and bilaterally in 5 patients (12.5%). The mean operative time was 25 min for unilateral and 34 min for bilateral PIRS. Average follow-up time was 6 months. Recurrence was seen in 1 (2.5%) who was reoperated with traditional laparoscopic for repairing inguinal hernia. There were 2 cases with incidental puncture of the varicose vein that all of them are require no treatment. Postoperative complications were not seen. Most of patients had invisible scars.

Conclusion

The percutaneous internal ring suturing on repairing inguinal hernia and communicating hydrocele is an alternative, effective, minimally invasive method of surgery. The postoperative cosmetic results is excellent. PIRS procedure allows surgeon to observe visualization of the peritoneal cavity and perform other procedures, for example, closing the contralateral inguinal canal.

patent processus vaginalis, percutaneous internal ring suturing, communicating hydrocele, inguinal hernia,
Identifying and preserving the parathyroid gland during thyroidectomy is crucial. The purpose of this study was to develop a real-time parathyroid detection algorithm based on deep learning technology.

Parathyroids were filmed after which intraoperative fine needle aspiration was performed to confirm the parathyroids. Still cut images of confirmed parathyroids were preprocessed for deep learning and region of interest (ROI) was identified by the surgeon as gold standard. Deep learning was performed using Retinanet deep learning model based on ResNet152 backbone. The learning model was based on Deconvolution Network architecture and trained with 6~12 batch sizes and 100 epochs. True object detection condition was defined as intersection over union (area of overlap/area of Union) ≥ 0.2 and probability ≥ 0.5. A 10-fold cross validation was performed for learning. This algorithm produced an automated ROI which then was compared to the surgeons’ ROI to calculate the detection sensitivity by analyzing true positive, false negative and false positive images.

The algorithm was developed based on both endoscopic images and camera + endoscopic images in order to diversify image quality. Both algorithms were tested using endoscopic images. Kernelized Correlation Filters were integrated to the algorithm in order to expedite the detection algorithm process and enhance the sensitivity.

A total of 152 confirmed parathyroid clips were recorded (70 from camera and 82 from endoscope), from which around 70000 still cut images were extracted. The endoscope algorithm produced 34679 true positive, 20029 false negative and 13448 false positive detections which resulted in a sensitivity of 0.63. The camera + endoscope algorithm produced an improved sensitivity of 0.71 with 38877 true positive, 15831 false negative, and 12395 false positive detections. The camera + endoscope algorithm merged with video tracking filter demonstrated sensitivity further enhanced to 0.76 with, 40439 true positive, 14269 false negative and 16531 false positive detections.

deep-learning, parathyroid, artificial intelligence
Background

Conventional Thyroid Lobectomy leaves an unpleasant neck scar. Endoscopic thyroidectomy was first applied by Huschner in 1997. Amongst the best endoscopic techniques is the one we use, referred to as the endoscopic axillary-breast-shoulder approach (ABSA) innovated by Dr. Trans Ngoc Luong.

Objective

To examine the safety, feasibility and cosmetic outcome of endoscopic thyroid lobectomy.

Patients and Methods

We performed endoscopic lobectomy in 20 patients at Lahore General Hospital (LGH) from 9th September 2016 to 31st Dec 2019. We adopted axillary-breast-shoulder approach. Inclusion criteria were age 18-45 years, solitary nodule less than 5 cm and benign FNAC. Exclusion criteria were multiple nodules, solitary nodule more than 5 cm, age more than 45 years, malignant FNAC, recurrent goiter and co-morbid like DM, HTN, IHD, COPD. The parameters studied were the conversion rate, operative time, hospital stay, complications, cosmetic outcome and patient satisfaction. The results were analyzed to draw rational conclusion.

Results

Successful endoscopic lobectomy was performed in almost all cases with conversion to open in two cases. The median operative time was 100 minutes. No peroperative injury was inflicted. One case sustained minor skin burns which healed without any residual scar. One patient developed full thickness skin burn and one patient had seroma. All patients were discharged on first postoperative day. Excellent cosmetic outcome achieved in all patients leading to their optimum satisfaction.

Conclusion

Endoscopic thyroid lobectomy is a safe and feasible procedure with satisfactory cosmetic outcome for benign solitary thyroid nodules in selected patients.
Robot-assisted Nipple-sparing Mastectomy with Immediate Breast Reconstruction: An Initial Experience of the Korea Robot-Endoscopy Minimal Access Breast Surgery Study Group (KOREA-BSG)

Jai Min Ryu¹, Jeeye Kim², Hee Jun Choi³, Beom Seok Ko⁴, Jisun Kim⁴, Jihyoung Cho⁵, Moo Hyun Lee⁶, Jung Eun Choi⁵, Joo Heung Kim⁷, Jeea Lee², Sung Mi Jung¹, Hyuk-Jae Shin⁸, Jee Yeon Lee⁹ and Hyung Seok Park²*

¹Division of Breast Surgery, Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea
²Department of Surgery, Yonsei University College of Medicine, Korea
³Department of Surgery, Samsung Changwon Hospital, Sungkyunkwan University School of Medicine, Korea
⁴Department of Surgery, University of Ulsan College of Medicine, Asan Medical Center, Korea
⁵Division of Breast and Thyroid, Department of Surgery, Keimyung University School of Medicine, Korea
⁶Department of Surgery, Yeungnam University College of Medicine, Korea
⁷Department of Surgery, Yongin Severance Hospital, Yonsei University College of Medicine, Korea
⁸Department of Surgery, Myongji Hospital, Korea
⁹Department of Surgery, Kyungpook National University School of Medicine, Korea

Background
Robot-assisted nipple-sparing mastectomy (RANSM) improves cosmetic outcomes over conventional nipple-sparing mastectomy (CNSM). However, data on the feasibility and safety of the RANSM are limited. Purpose: The aim of this study was to present the results of early experience of RANSM.

Methods
Patients who underwent RANSM with immediate breast reconstruction (IBR) as part of the Korea Robot-Endoscopy & Minimal Access Breast Surgery Study Group (KOREA-BSG) from November 2016 to January 2020 were enrolled. Clinicopathologic characteristics, perioperative complications, and operation time were collected.

Results
Overall, 73 women underwent 82 RANSM procedures conducted by 11 breast surgeons at eight institutions. The median patient age was 45.0 years old (20–66 years). Invasive breast cancer was noted in 55 cases and ductal carcinoma in-situ was recorded in 20 cases. Of those, three patients with BRCA1/2 mutation carriers underwent contralateral risk-reducing RANSM. The incision location was the mid-axillary line and the median incision length was 46.3 mm (30.0-60.0 mm). Median total operation time, total mastectomy time, and reconstruction time was 322.0 minutes (163.0-796.0 minutes), 190.8 minutes (97.5-325.0 minutes), and 133.6 minutes (45.0-689.0 minutes). Only two cases (2.5%) required re-operation. Nipple ischemia was found in nine cases (10.9%) but only one case (1.2%) required nipple excision given that eight cases (9.7%) resolved spontaneously. Skin ischemia was observed in five cases (6.1%) and only two (2.4%) cases needed skin excision whereas three cases (3.6%) resolved spontaneously. There was no conversion to open surgery or cases of mortality. The mean time for mastectomy among surgeons who performed more than 10 cases was 182.3 minutes (± 53.7, minutes) and 195.4 minutes (± 50.4, minutes). This was the first report of RANSM conducted in the KOREA-BSG. RANSM is technically feasible and acceptable with a short learning curve. Further prospective research to evaluate surgical and oncologic outcomes is needed.

Breast neoplasm, Robot-assisted nipple sparing mastectomy, Immediate breast reconstruction
ABS-0321
OS05-07

03. Endocrine (Thyroid, Adrenal gland, Breast)

The Development of Training Program for Robotic Mastectomy Using Cadaver and Porcine Models

Jeea Lee¹, Hyung Seok Park¹†, Jong Han Yu², Jai Min Ryu², Heamin Lee¹, Kwanbum Lee¹, Soong June Bea¹ and Dong Won Lee³

¹Surgery, Yonsei university college of medicine, Korea
²Surgery, Sungkyunkwan University School of Medicine, Korea
³Plastic & Reconstructive Surgery, Yonsei University College of Medicine, Korea

Background

Since robotic assisted-nipple sparing mastectomy (RNSM) was introduced by Toesca in 2015, several pioneers have attempted to spread the new technique for other surgeons who did not have any experience of robotic surgical system. Unfortunately, there is no standardized training systems of RNSM. Therefore, it is essential to develop an effective educational programs of RNSM.

Purpose

The aim of this study is to evaluate the effectiveness of the cadaveric or animal skill labs of RNSM for trainees.

Methods

We performed 18 RNSMs using 8 cadavers and one porcine model between Dec 2013 and Dec 2019. Da Vinci Si for the first four cases and Xi for eight cases were utilized in Severance MIS center, Seoul, Korea since 2013. Skill labs using Da Vinci SP® for six cases were performed in Nov 2019 in Medizin im Grone, Berlin, Germany. All procedures utilized a single incision between anterior and mid-axillary lines.

Results

RNSMs with latissimus dorsi (LD) flaps with implant were performed using Da Vinci Si system for the first four labs. Eight RNSMs in three cadavers and in a porcine using Xi system and six RNSMs in three cadavers using SP system were conducted. Six gasless and 12 gas-inflated RNSMs were simulated. Eight RNSMs were reconstructed with six LD flaps with implants and two direct-to-implants. Robotic axillary lymph node dissection was performed in one cadaver bilaterally. There was one event of injury of the medial part of the pectoralis muscle and costal cartilage in the first skill lab during the operation. After the injury, no intra-operative event or open conversion occurred.

Standardized training protocol of RNSM should be developed for beginners without previous experience of robotic surgical system. Cadaveric or porcine skill labs for RNSM can be one of the essential

Robotic mastectomy, Minimal invasive surgery, Surgical training program, Cadaveric skill lab, Animal skill lab
Minimally Invasive Surgery Training using Traditional Korean Culinary Art

Michael Dennis dela Paz¹ and Chang Moo Kang²

¹Division of Minimally Invasive Surgery, Department of Surgery, Asian Hospital and Medical Center, Philippines
²Division of HBP Surgery, Department of Surgery, Severance Hospital, Pancreatobiliary Cancer Center, Yonsei Cancer Center, Yonsei University College of Medicine, Korea

Surgical skills training from open procedure to laparoscopic procedure up until to robotics procedure comes with certain uniqueness that a surgeon should need to master. In order to shift gear for all the technique to compliments each other, a slight break should be applied and that’s how Korean surgeon enjoyed their training - by having a break of eating out together with the whole training staff composed of both the mentor and the mentee after a tiring day. One of their culinary tradition is grilling samgyeopsal or pork belly strip which is the use of this technique: to apply samgyeosal cooking in laparoscopic box training. It requires modified laparoscopic box or dome trainer applied to a Korean barbeque grill wherein the procedure involves cooking or grilling pork belly strip with the use of laparoscopic instruments such as grasper, dissector and scissors. Same as the standard laparoscopic box exercises, it exercises hand-eye coordination, depth perception, spatial coordination, instrumental tactile feedback, tissue handling skills and non-dominant hand skills of both the surgeon-cook and his or her assistants. The end product of this exercise is a sumptuous delicious Korean barbeque food which could be eaten and enjoyed by the team. Indeed, aparsoscopic samgyeopsal cooking is a feasible alternative minimally invasive surgery skill exercise training that can supplement standard modern virtual simulated laparoscopic training. Future plan is to apply this kind of training exercise in Robotics surgery. By theory, the procedure of samgyeosal cooking can also be applied to robotic surgery training by modifying a robotic arm that can stand to heat. The intuitive and hand-movement –freedom advantage of surgical robotics machine can better completely prepare Korea cuisine such as folding and rolling of the meat with other ingredients into one.

Minimally Invasive Surgery Training, Korean Culinary Art, Laparoscopic Samgyeopsal Cooking
A 44-year old woman was diagnosed with a stomach subepithelial tumor (SET) on a routine screening test. Computed tomography scans revealed a 3.5cm mass on stomach angle, lesser curvature. The patient underwent single port laparoscopic gastric wedge resection through a single transumbilical wound. Operation time was 71min, and estimated blood loss was around 100ml. The patient had sips of water on postoperative day (POD) 1 and had soft blend diet on postoperative day 2. She discharged on POD2.
A 66-year old man suffered from left inguinal bulging. He was diagnosed with left inguinal hernia. The patient underwent multiport laparoscopic totally extraperitoneal hernia repair. Operation time was 88min, and estimated blood loss was less than 10cc. He discharged on the same operation day.
Laparoscopic Cysto-Gastrostomy, 3rd World Country Alternative to Endoscopic Drainage Procedure

Charles Cruz
Surgery, Centro Medico de Santisimo Rosario Hospital, Philippines
Surgery, The Medical City-Clark, Philippines
Surgery, Bataan General Hospital and Medical Center, Philippines

Background

Pancreatic pseudocyst is one of the late complications of chronic pancreatitis. A good number regresses within 6 weeks. However, if it persists beyond 12 weeks and is symptomatic, or if size is more than 5cms even if asymptomatic, drainage is warranted. Drainage options include ERCP with pancreatic sphincterotomy, endoscopic, and laparoscopic/open drainage procedures.

Method

Herein, we present the case of 48 year-old female who underwent open cholecystectomy for chronic calculus cholecystitis, presenting as on and off epigastric and right upper quadrant pain radiating to the back. Two months after the surgery, patient experienced recurrence of abdominal pain of same character, now with associated early satiety. Patient had a palpable bulge at the left upper abdominal quadrant. Abdominal CT-scan revealed an 8.6x8.9x7.4 cm pseudocyst at the pancreatic body. Liver function tests, amylase and lipase were normal. Due to unavailability of endoscopic procedures, patient was scheduled and underwent laparoscopic cysto-gastrostomy. Cysto-gastrostomy was done using interlocking suture. Gastrotomy was closed with continuous running suture.

Result

Cyst measured approximately 10 cms in widest diameter, and was seen bulging at the lesser curvature. A clear fluid with brown and green tinge was drained. There were few necrotic tissues inside the pseudocysts on insertion of the camera. Post-operative course was unremarkable. NGT was clamped on the 2nd hospital day and removed the following day. Diet was started on the 3rd hospital day. Pain was adequately controlled with pain score not exceeding 3/10. Patient was discharged on the 5th hospital day. Conclusion: In 3rd world country government hospitals where endoscopic procedures are not readily available, laparoscopic cysto-gastrostomy is viable option with good post-operative pain control and acceptable length of hospital stay.
Robotic-Assisted Complete Excision of Choledochal Cyst Type I, Hepaticojejunostomy, and Intracorporeal Roux-En-Y Anastomosis

Ji Woong Hwang

Department of Surgery, Hallym University College of Medicine, Korea

Background

For Choledochal cyst type I, complete excision of cyst with Roux-en-Y hepaticojejunostomy anastomosis is the treatment of choice. It has been performed laparoscopically with the advancement of laparoscopic skill. Recently, a robotic surgical system was introduced, providing laparoscopic instruments with wrist-arm technology and 3-dimensional visualization of the operative field.

Purpose

We present a case of robot-assisted total excision of a choledochal cyst type I and biliary reconstruction.

Methods & results

The patient was a 33 years old woman and she had frequent abdominal pain. The choledochal cyst was founded in abdominoperineal CT scan. Total operation time was 272 minutes, including 10 minutes for docking. Estimated blood loss was 30 mL. No intraoperative complications or technical problems were encountered. The patient was discharged at 5 postoperative day without any complication.

Conclusion

Robotic surgery for choledochal cyst type I can be performed feasible and safely, especially to bilio-enteric anastomosis.

dochodal cyst, robot-assisted surgery
Technique of Robotic Repair of Postcholecystectomy Bile Duct Stricture

Kalayarasan Raja
Surgical Gastroenterology, Jipmer, India

Introduction

Despite technical advancements, iatrogenic bile duct injury continues to be a major concern in open and laparoscopic cholecystectomy. Traditionally repair of postcholecystectomy biliary stricture by tension-free Roux-en-Y hepatico-jejunostomy (RYHJ) is done through a large subcostal or midline incision. While laparoscopic RYHJ is feasible, it has many limitations. The use of the robotic platform for postcholecystectomy biliary stricture is scarcely described. The technique of robotic postcholecystectomy biliary stricture repair using DaVinci Xi Robotic Surgical System is described in this video.

Methods

The procedure was performed with the patient in a supine with split leg position. Four 8mm robotic trocars are placed in straight horizontal line at the level of umbilicus with at least 6-8 cm distance between trocars. One 12 mm assistant trocar is placed 4 cm below umbilicus between arm 1 and 2. Before docking intraabdominal adhesiolysis is performed except perihepatic adhesions as it facilitates liver retraction. Key steps are identification of base of segment 4, preservation of left hepatic artery, lowering of the hilar plate, opening of the left hepatic duct, identification of right anterior and posterior sectoral duct, preparation of roux limb and construction of tension free RYHJ.

Conclusion

Robotic postcholecystectomy biliary stricture repair is feasible in expert hands. Long-term outcome needs to be evaluated in a larger series with a longer follow up.
Laparoscopic Cholecystectomy Using Multi-Degree of Freedom Laparoscopic Instruments

Bong Jun Kwak

Department of Surgery, Incheon St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Korea

Background

Most of laparoscopic cholecystectomy has been performed using in-line-instruments without articulation. Recently, the progress of technology allowed to apply multi-degree of freedom laparoscopic instruments to laparoscopic cholecystectomy.

Methods

A 61-year-old man with symptomatic cholelithiasis underwent laparoscopic cholecystectomy. A single 12-mm laparoscope was placed at the umbilicus, followed by two 8-mm trocars through epigastric and right upper quadrant area. Two multi-degree of freedom laparoscopic instruments, monopolar spatula and grasper were used. After dissection by monopolar spatula, cystic duct and artery were clipped using laparoscopic clips. Spatula cautery was used to dissect the gallbladder, which was removed via the umbilicus. The procedure lasted 35 min.

Results

Laparoscopic cholecystectomy using multi-degree of freedom laparoscopic instruments was successfully performed without spillage of bile. The patient was discharged the next day after surgery without complication.

Conclusions

Laparoscopic cholecystectomy using multi-degree of freedom laparoscopic instruments was feasible and safe. The device can help to approach from various angles and to manipulate precisely.

Laparoscopic cholecystectomy, multi-degree of freedom laparoscopic instruments
Laparoscopic Incisional Hernia Repair with Primary Fascial Closure: A Case Presentation

Woon Kyung Jeong1*, Sung Uk Bae1 and Seong Kyu Baek1

1Department of Surgery, Keimyung University Dongsan Medical Center, Korea

Background

Laparoscopic incisional hernia repair with mesh placement is recently used. It can decrease surgical site infections and hospital length of stay compared to open surgery. However, poor function of the abdominal wall and occurrence of seroma are obstacles to its widespread use. Primary fascial closure (PFC) along with laparoscopic surgery could be a solution for the obstacles.

Case

A 70 years old male patient had undertaken emergency open anterior resection for sigmoid colon cancer with colon perforation and received capecitabine chemotherapy. An incisional hernia was diagnosed 8 months after surgery. The fascial defect was about 7 x 5 cm. Laparoscopic incisional hernia repair with PFC was performed. The fascia defect was closed by using a suture passer. After typing the sutures, a sheet of mesh was placed. Operation time was 63 minutes. On postoperative day 4, he was discharged without any complications. A CT scan taken 2 months after surgery showed the closed fascial defect and restored abdominal wall without seroma.

Conclusion

Laparoscopic incisional hernia repair with primary fascial closure can decrease a risk of seroma and restore the abdominal wall better than conventional laparoscopic approach.

incisional hernia, laparoscopy, primary fascial closure
Laparoscopic surgery is considered one of the standard surgical options for colorectal cancer through many evidences. In colon cancer surgery, complete mesocolic excision (CME) with D3 lymph node dissection is also considered as extensive oncological surgery. Many surgeons applied laparoscopic technique for CME with D3 lymph node dissection. But laparoscopic CME with D3 lymph node dissection is still technically challenging especially in making effective traction and counter-traction. At present, surgeons can use only straight-fixed laparoscopic instruments, surgeons with less experiences could have more challenging situations. Although several laparoscopic articulation instruments had been introduced but were not effective and practical. To overcome the limitations, the robotic system is now applied for CME with D3 lymph node dissection, but the robotic system is still expensive and currently available advanced surgical energy device in robot system is not effective and practical. In this video, the author would like to introduce laparoscopic extended right hemicolectomy with D3 lymph node dissection using a new articulation laparoscopic instrument and advanced energy device. After making pneumoperitoneum, retroperitoneal dissection was performed. Then ileocolic vessels and middle colic vessels were identified and ligated at its origin site. During D3 lymph node dissection, traction, and counter-traction could be made effectively by new articulation instruments and dissection around the main vessel could be done safely using advanced energy device. Using new articulation instrument and advanced energy device is not only safe and feasible but less expensive surgical option compared to robotic surgery.

This video shows how to make a good surgical view through effective traction and counter-traction using a new articulation instrument and make a safe dissection around vessels in colon cancer surgery.
Robotic Assisted Low Anterior Resection – Left Vascular Approach – A Video Illustration

Vivek Sukumar
Department of Surgical Oncology, Tata Memorial Hospital, India

Introduction

The concept of total mesothelial excision (TME) was the most important event in surgery for rectal cancer in the last two decades, decreasing both local recurrence and overall survival. Occasionally the disease is not confined within the TME, even after neoadjuvant therapy; thus requiring a surgical approach beyond the standard TME plane to enable complete resection of the tumor.

Purpose

To demonstrate feasibility of robotic surgery in a patient of locally advanced rectal cancer using the left vascular approach

Material & Methods

A 51-year-old gentleman was diagnosed with locally advanced rectal cancer. He received NACTRT of 50G in 25 fractions over 5 weeks with concurrent capecitabine. After 8 weeks, patient underwent robotic assisted low anterior resection – left vascular approach with single docking, single phase daVinci Xi system using 5 ports (4 robotic and one assistant port).

Results

Total operative time was 400 minutes which included docking time of 60 minutes. Postoperative course was uneventful and patient was discharged on the 5th post operative day. Post op Histopathology revealed residual viable poorly differentiated adenocarcinoma. All margins were free. Seven of the 12 nodes dissected were involved by the tumor.

Conclusions

Although Total mesorectal excision is the gold standard for rectal cancers, it may be essential to go beyond the mesorectal plane in certain unique situations such as the one demonstrated in this video. Pre operative assessment of the extent of disease along with identifying the challenges prior to surgery are essential to obtain complete resection.

Low anterior resection, left vascular approach
Introduction

The concept of total mesothelial excision (TME) was the most important event in surgery for rectal cancer in the last two decades, decreasing both local recurrence and overall survival. Occasionally the disease is not confined within the TME, even after neoadjuvant therapy; thus requiring a surgical approach beyond the standard TME plane to enable complete resection of the tumor.

Purpose

To demonstrate Robotic assisted low anterior resection with en bloc seminal vesicle excision for a patient of locally advanced rectal cancer.

Material & Methods

A 59-year-old gentleman was diagnosed with locally advanced rectal cancer. He received NACTRT of 50G in 25 fractions over 5 weeks with concurrent capecitabine. After 8 weeks, patient underwent robotic assisted low anterior resection with en bloc seminal vesicle excision – with single docking, single phase Da Vinci Xi system using 6 ports (4 robotic and 2 assistant port).

Results

Postoperative course was uneventful and patient was discharged on the 5th post operative day. Post op Histopathology revealed no residual viable adenocarcinoma. All margins were free. None of the 9 nodes dissected were involved.

Conclusions

Although Total mesorectal excision is the gold standard for rectal caners, it may be essential to go beyond the mesorectal plane in certain unique situations such as the one demonstrated in this video. The excision of the seminal vesicles may be essential in certain situations to ensure complete excision of the disease. Pre operative planning including optimal imaging is essential prior to surgery.

Low anterior resection, seminal vesicle excision, robotic
Laparoscopic Low Anterior Resection with Extended Total Mesorectal Excision

Sanket Subhash Bankar¹, Barath Rajkumar¹, Diwakar Pandey¹, Ashwin deSouza¹ and Avanish Saklani²*

¹Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Introduction

Achieving negative surgical margins is the most important factor in determining the incidence of local recurrence. In this video, we demonstrate the feasibility of laparoscopic surgery for patients with locally advanced rectal cancer planned for low anterior resection requiring imaging suggestive of doubtful planes with adjacent structures.

Objectives

To demonstrate a systematic approach for performing laparoscopic low anterior resection with prehypogastric fascia excision for locally advanced rectal cancer.

Methods

A 58-year-old female with no major comorbidities presented with altered bowel habits for 2 months. Per rectal examination revealed stricturous growth at 8 cms from the anal verge. Flexible sigmoidoscopy revealed an ulceroproliferative growth starting at 7 cms from anal verge with significant luminal narrowing. Biopsy showed moderately differentiated adenocarcinoma. MRI pelvis showed an upper and mid rectal lesion with contiguous mesorectal deposit. The mesorectal deposit appeared to infiltrate the mesorectal fascia. The patient received neoadjuvant chemoradiation (NACTRT). Post-NACTRT magnetic resonance imaging (MRI) revealed the partial response of primary with CRM positive posteriorly presacral fascia involved in the first and second sacral vertebral region. The patient received four more cycles of chemotherapy with post-chemo MRI showing persistent mesorectal fascial involvement. Results: Patient underwent laparoscopic anterior resection with prehypogastric fascia excision. Operative time 280 mins and blood loss of 150 ml. Postoperative period uneventful. Patient discharged on day 5. Histopathology showed residual viable moderately differentiated adenocarcinoma of the rectum. TRG of 3/5. Tumour involved the subserosa with 0/13 nodes (ypT3N0).

Conclusions

Laparoscopic low anterior resections can be safely and effectively performed for locally advanced rectal cancers and can be beneficial in doing surgeries involving extended total mesorectal excision.

Rectal cancer, Total Mesorectal Excision, Extended TME, Laparoscopic Surgery
Inadvertent Bleeding during Laparoscopic Lower GI Surgeries and its management

Diwakar Pandey 1*, Sanket Bankar 1, Vivek Sukumar 1, Ashwin deSouza 1 and Avanish Saklani 1

1 Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Background

One of the dreaded complication and reason to conversion from minimally invasive to open surgery is iatrogenic bleeding. We present here a demonstration of iatrogenic bleeding and its management during laparoscopic Lower GI Surgery.

Purpose

We choose following unique situations leading to bleeding as follows:
1) Injury to accessory vessel from left colic artery / IMA and its management
2) Slippage of clip from left colic artery
3) Slippage of clip on inferior mesenteric artery while removing gauze piece
4) Inadvertent injury of a branch from internal iliac vessel

Methods and result

The basic principle of controlling bleeding vessel is to remain calm, ask for help, hold the bleeding vessel and dissect the tissue around and identify its origin followed by clipping or coagulation. Sound knowledge of Surgical Anatomy is paramount as well.

Lower GI Surgery, Intraop Bleeding, MIS
Robotic Total Pelvic Exenteration For Advanced Rectal Cancer-A Video Illustration

Sanket Bankar¹, Vivek Sukumar¹, Diwakar Pandey¹, Ashwin Desouza¹ and Avanish Saklani¹*

¹Surgical Oncology, Tata Memorial Center, Mumbai, India

Objective

To present a systematic approach to Robotic Pelvic Exenteration for Advanced Rectal Cancers

Method

A 61 years old Gentleman with locally advanced carcinoma rectum(cT4N1M0) who had received Capecitabine based NACTRT was taken up for Single docking, single-phase Robotic Total Pelvic Exenteration. Surgical Procedure was uneventful with Operative time of 460minutes and Blood Loss of 160ml

Conclusion

Robotic exenterative surgeries are a feasible alternative to Laparoscopic surgeries with a better degree of freedom and tremor cancellation

robotic, pelvic exenteration
Laparoscopic Management of Lower Rectal tumor

Danish Ali1*, Awais Amjad1 and Farooq afzal1

1Surgical Unit 1, Lahore General Hospital, Pakistan

This is a video showing a case of Cancer of the lower rectum. The patient underwent neoadjuvant chemoradiotherapy and then underwent laparoscopic Assisted Abdominoparineal resection. Post op period was uneventful for any complication.

laparscopic APR, colorectal cancer.
Laparoscopic Extralevator Abdominoperineal Resection (PRONE) and Lateral Pelvic Lymph Node Dissection

Anadi Pachaury

Department of surgical Oncology, Tata Memorial Hospital, Mumbai, India, India

Background

Anorectal Melanoma is a rare and aggressive disease. It invades early and progress rapidly. Often misdiagnosed as benign condition as haemorrhoids, so diagnosis usually delay. 5 year survival is less then 20%. No definitive role of Neoadjuvant treatment is established. Conventional treatment includes surgical excision. Adjuvant therapy in form of immunotherapy have shown some benefit.

Objectives

To demonstrate systematic approach to Laparoscopic Extralevator Abdomino-perineal resection (ELAPR) with lateral pelvic lymph node dissection with posterior vaginal wall excision and V-Y Plasty for Locally advanced Anorectal melanoma.

Material & Methods

A 44-year-old lady presented to us with bleeding per rectum of 6 months duration. Clinical examination revealed an ulceroprolifirative lesion 1 cm from anal verge and left inguinal lymph node. It Biopsy suggested Melanoma. MRI Pelvis showed an Anorectal involving anal canal and lower rectum with abutment of rectovaginal septum and posterior wall of vagina. Metastatic work up showed no distant metastasis. Patient underwent Laparoscopic extra-levator Abdominoperineal resection with lateral Pelvic lymph node dissection with left groin dissection and V-Y plasty.

Results

The surgery was uneventful with an operative time of 380 minutes. Postoperative course was uneventful and patient was discharged on the 6th post-operative day. Post op Histopathology revealed Malignant melanoma. All margins including circumferential margin were free. Tumor involve perirectal fat. 2 of the 20 meso-rectal nodes and 1 of 6 groin nodes were involved by the tumor.

Conclusions

The literature on anorectal melanoma has lots of controversy regarding optimal management strategy. Aggressive surgical approach which includes complete excision of tumor with involved nodes. We suggest ELAPR is optimal treatment of advanced lesions and laparoscopic route is feasible and safe. Lateral pelvic lymph node resection can be performed using laparoscopy, with minimal morbidity.
Total Robotic Right Hepatectomy: Anterior Approach with Minimal Instrumentation in a Resource Constraint Setting

Shraddha Patkar¹, Amit Gupta¹, Swapnil Patel¹ and Mahesh Goel*¹

¹Gastrointestinal and Hepatobiliary Division of Surgical Oncology, Tata Memorial Hospital, India

Objective

We present our experience with total robotic right hepatectomy in resource constraint settings using bipolar and monopolar scissors for liver transection.

Methods

56-year-old lady, with no co-morbidities, presented with abdominal pain of two months duration. Contrast enhanced CT scan of chest and abdomen revealed mass in the segment VI and VII of liver and a replaced right hepatic artery with no evidence of distant metastases. Liver function tests were normal and CA19-9 levels were 171876 U/ml. FLR for right hepatectomy was 47 percent. A robotic right hepatectomy with da-Vinci Xi system using 6 ports (4 robotic and 2 assistant ports) was performed after initial staging laparoscopy. Liver transection was performed using bipolar and monopolar scissors. Specimen was extracted in a bag from a small incision at assistant port.

Results

The procedure was performed in 300 minutes with a blood loss of 400 mL. Final histopathology report revealed moderately differentiated intrahepatic cholangiocarcinoma with negative margins (R0 resection)

Conclusions

Robotic right hepatectomy is an oncologically acceptable approach. However, careful selection of patients is essential. Development of cost effective instrumentation paralleling laparoscopic instrumentation is the key to its wider acceptability.
Single Incision Laparoscopic Distal Gastrectomy with D1+ Lymphadenectomy for Early Gastric Cancer

Koy Min Chue¹, Hyung Ho Kim² and Guo Wei Kim¹, ²*

¹University Surgical Cluster, National University Health System, Singapore
²Department of General Surgery, Seoul National University Bundang Hospital, Korea

Since the introduction and wide-spread adoption of laparoscopy in the treatment of gastric cancers, single incision laparoscopic gastrectomy has been successfully performed and reported for selected patients. Some reported potential benefits of single incision gastrectomy include improved cosmesis, decreased wound complications and reduced pain. Varying techniques of performing gastrectomy via a single incision have been described, with differences in dissection, retraction and reconstruction. This video showcases our technique of single incision laparoscopic distal gastrectomy with D1+ lymphadenectomy for early gastric cancer, with the aid of a laparoscopic organ retractor to provide sufficient retraction and exposure. Roux-en Y reconstruction was performed with the jejuno-jejunostomy performed extracorporeally and the gastro-jejunostomy intracorporeally.

Gastric Cancer,
Technique of Fourth Jejunal Artery Based Pedicled Jejunal Conduit for Robotic Esophagojejunostomy after Esophagogastrectomy

Kalayarasan Raja

Surgical Gastroenterology, JIPMER, India

Introduction

Locally advanced Siewert’s type II esophagogastric junction tumor can have significant involvement of stomach and distal esophagus requiring total gastrectomy with resection of more than distal 5cm of the esophagus. Conventional roux limb of jejunum may not reach the thorax for intrathoracic esophagojejunostomy. The technique of fourth jejunal artery based pedicled jejunal conduit for robot-assisted esophagojejunostomy after esophagogastrectomy using DaVinci Xi Robotic Surgical System is described in this video.

Method

The procedure was performed with patient in supine with split leg position. Four robotic and two assistant ports placed in abdomen. Total gastrectomy with a standard D2 lymphadenectomy was performed. After hiatal dissection, the esophagus was divided 3 cm proximal to GE junction with the laparoscopic linear cutter. The total gastrectomy with distal esophagectomy specimen was extracted through small midline laparotomy incision. The jejunum was divided distal to the first jejunal artery. A pedicled jejunal conduit based on the fourth jejunal artery was prepared after confirming the patency of jejunal arcade using vascular clamps. After Jejunoejunostomy and feeding jejunostomy, the midline incision was closed, and the jejunal conduit was placed in the mediastinum. Thoracic procedure was performed in the prone position with three robotic ports and one assistant port. Additional esophageal clearance and subcarinal lymphadenectomy was performed. An intrathoracic esophagojejunosotomy was performed at the level of the carina.

Results

Four patients underwent this procedure with a median (range) operating time (in minutes) of 405 (330-540) and the median (range) blood loss (in mL) of 320 (260-530). None of the patients had conduit ischemia or anastomotic leakage. Two patients developed postoperative pneumonia. Median (range) postoperative hospital (in days) stay was 9 (8-15).

Conclusion

Pedicled jejunal conduit based on the fourth jejunal artery without augmentation is safe for intrathoracic anastomosis after esophagogastrectomy for locally advanced tumors of the gastroesophageal junction.

fourth jejunal artery, gastroesophageal junction, siewert's type II
Progression of Ileus to Complete Gut Obstruction Secondary to Congenital Adhesion Band after Laparoscopic Cholecystectomy: A Case Report

Pompe Pilpa

Surgery-Section of Minimally Invasive Surgery, Asian Hospital and Medical Center, Philippines

Pompe M. Pilpa MD, Lucas Riel B. Bersamin Jr. MD, Orlando Diomampo MD

Background

Laparoscopic cholecystectomy has become the dominant procedure for gallbladder surgery. In terms of technique, laparoscopic cholecystectomy is now the gold standard for the treatment of symptomatic gallstone disease. This procedure is also not without complication and usually these are common bile duct injury, bile leak, injury to viscera, hemorrhage, retained stone, and biliary strictures. Bowel obstruction is a rare complication of laparoscopic cholecystectomy specially if it’s caused by another primary disease which is congenital adhesive band.

This is a case of a 71 yo Male underwent laparoscopic Cholecystectomy for Acute Calculous Cholecystitis with a post op diagnosis of Gangrenous Cholecystitis. At 5th day post operation the patient presented with complete bowel obstruction and then underwent diagnostic laparoscopy, exploratory laparotomy to find out an adhesive band at the terminal ileum that is causing the obstruction, meckels diverticulum was also seen about 15 cm from ileocecal valve.

Conclusion

Laparoscopic procedures can also cause or aggravate small bowel obstruction that has an asymptomatic congenital band. During abdominal survey in laparoscopic procedures, if a congenital band is seen, it has to be evaluated if release is needed or addressed.

Laparoscopy Complication
Surgical Management of Oligometastatic Disease in Gastric Cancer

Jin Peng¹ and Tian Yantao¹*

¹Department of Pancreatic and Gastric Surgery, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, China

A distinctive subset of metastatic gastric cancer (MGC) is oligometastatic disease (OMD), which is characterized by metastatic lesions limited in number and location. Although growing evidence mainly based on retrospective analysis or single center case series has shown favorable prognosis in the management of OMD in gastric cancer with aggressive local treatment, no existing guidelines explicitly address the definition of OMD and there are still controversial opinions on how to proceed in a new era with more effective systemic therapy selection. In this review, we present the current advances and evidence as well as controversial on the management of OMD in MGC, including the definition, diagnosis, local aggressive treatments especially surgery, prognostic factors, current ongoing randomized clinical studied as well as challenges facing the field.
Which Size Is the Best Cutoff for Primary Small Gastric Gastrointestinal Stromal Tumors?

Zifeng Yang

Department of Colorectal surgery, the Sixth Affiliated Hospital, Sun Yat-sen University, Guangzhou, Guangdong, P.R. China, China

Background

The biological behavior of primary small gastric gastrointestinal stromal tumors (gGIST) is indolent. The cutoff size categorizing small gGISTs continues to be controversial. We aimed to find a new cutoff size.

Methods

Retrospective clinicopathological and prognosis data of patients with small gGISTs from January 1998 to January 2015 were collected among five medical centers in southern China. We compared the clinicopathological index and prognosis between two groups and identified a new cutoff size to define small gGIST.

Results

There were 276 patients with primary small gGIST treated at these five medical centers. The range of tumor size was 0.2-2.0 cm. The median tumor size was 1.0 cm. The median follow-up time was 38 months (3-156 months). Two cases had recurrences. The 5-year overall survival rate was 98.7% in the entire group. Using Pearson correlation analysis, there was a positive correlation between the mitotic count and tumor size as a continuous variable ($r = 0.164$, $p = 0.006$). The patient group was divided into two groups: $< 1$ cm gGISTs (Micro group) and 1-2 cm gGISTs (Small group). Using the receiver operating characteristic curve (ROC curve), we observed that 1.15 cm was the new cutoff size to separate low-risk cases and intermediate/high-risk cases (AUC = 0.707, $P = 0.004$, sensitivity = 0.824, 1-specificity = 0.429).

Conclusions

Primary small gGIST has a good prognosis; gGIST tumors $< 1$ cm can be regarded as benign tumors that only requires endoscopic ultrasonography (EUS) follow-up. The proportion of potential intermediate/high-risk disease is high for patients with 1-2 cm gGIST tumors. These patients should be treated with caution and the tumors should be resected if necessary. These results indicate that 1.15 cm may be the new cutoff size to separate small gGIST from large gGIST, but further studies are needed for verification.
The Technique of Making Anastomosis before Cutting Stomach in Laparoscopic Totally Intracorporeal Distal Gastrectomy for Advanced Gastric Cancer

Hiep Pham Van¹, Nguyen Anh Tuan¹* and Cuong Luong Ngoc¹

¹Digestive Surgery Department, 108 Military Central Hospital, Viet Nam

Background

Difficulties to widely implement laparoscopic gastrectomy in Vietnam are high surgical costs and long operative time. Most of those are assisted extracorporeal anastomosis. Selecting suitable approach to reduces the number of staplers and operative time is essential.

Objectives

Evaluate the feasibility, safety of laparoscopic totally intracorporeal Finsterer anastomosis which making anastomosis before cutting stomach for advanced gastric cancer.

Materials and methods

From 1/2019 to 12/2019, 60 patients of 1/3 middle and 1/3 lower gastric cancer with less than T4b tumor were performed laparoscopic distal gastrectomy, D2 lymph nodes dissection, totally intracorporeal Finterer anastomosis which making anastomosis before cutting stomach by the same team.

Result

There were 43(71.67%) male, 17(28.33%) female. Mean age: 57.44 ± 12.19. Mean BMI: 20.82 ± 2.40 kg/m². 1/3 middle: 22(36.67%); 1/3 lower: 38(63.33%). T1a:25%, T2:25%, T3:30%, T4a:20%; N0: 36(60%), N1: 6(10%), N2:11(18.33%), N3:7(16, 67%). Mean tumor size: 3.34 ± 1.38 cm (1 - 6.5). The mean number of retrieved lymph nodes was 28, 5 ± 10, 6. The total number of harvested lymph node: 1710 with 9, 01% was metastasis lymph node. The mean distance from the proximal edge to the tumor was 7.00 ± 3.24 cm (1, 5 - 6). Mean distance from the distal edge to the tumor: 3.09 ± 1.13 cm (2, 3 - 15). There was no metastasis at cutting edge and open conversion. The mean operating time was 147,20 ± 25,48 min, the mean time for making anastomosis was 19.02 ± 6.84 min, mean blood loss was 18,12 ± 11,3 ml, and the mean hospital stay was 9 days. 50(83, 3%) patients used 4 stapler, 10(16, 6%) used 5 stapler. 1 case of postoperative bleeding. There were no postoperative mortality, Anastomosis leakage.

Conclusion

Laparoscopic totally intracorporeal Finsterer anastomosis which making anastomosis before cutting stomach is feasibility, safety procedure reducing operative time and stapler in distal gastrectomy for advanced gastric cancer.

Intracorporeal Finsterer anastomosis, Laparoscopic distal gastrectomy, gastric cancer
Laparoscopic Sentinel Node Navigation Surgery versus Laparoscopic Standard Gastrectomy with Lymph Node Dissection for Early Gastric Cancer: Short-term Outcomes of Multicenter Randomized Controlled Trial (SENIORITA)

Jae-Seok Min1*, Ji Yeong An2, Hur Hoon3, Young Joon Lee4, Gyu Seok Cho5, Young-Kyu Park6, Mi Ran Jung6, Ji-Ho Park4, Woo Jin Hyung7, Sang-Ho Jeong4, Young-Woo Kim8, Hong Man Yoon8, Bang Wool Eom8, Myeong-Cherl Kook8, Mira Han9, Byung-Ho Nam10 and Keun Won Ryu8

1Department of Surgery, Dongnam Institute of Radiological and Medical Sciences, Korea
2Department of Surgery, Samsung Medical Center, Korea
3Department of Surgery, Ajou University School of Medicine, Korea
4Department of Surgery, Gyeongsang National University, Korea
5Department of Surgery, Soonchunhyang University College of Medicine, Korea
6Department of Surgery, Chonnam National University School of Medicine, Korea
7Department of Surgery, Yonsei University College of Medicine, Korea
8Center for Gastric Cancer, National Cancer Center, Korea
9Biostatistics Collaboration Team, National Cancer Center, Korea
10Clinical Design Research Center, HERINGS The Institute of Advanced Clinical & Biomedical Research, Korea

[PURPOSE]
Risks and benefits of laparoscopic sentinel node navigation surgery (LSNNS) compared with laparoscopic standard gastrectomy (LSG) with lymph node dissection (LND) for early gastric cancer (EGC) are unknown. The SENORITA trial investigated clinical impact of LSNNS for EGC regarding short-term surgical and long-term survival outcomes.

[PATIENTS AND METHODS]
The SENORITA trial was designed as an investigator-initiated, open-label, parallel-assigned, non-inferiority, prospective, multicenter, randomized controlled phase III trial conducted in Korea. The short-term surgical outcomes including morbidity and mortality within 30 postoperative days were evaluated as one of the endpoints of SENORITA trial.

[RESULTS]
From March 2013 to December 2016, 580 patients were randomized (LSG, 292; LSNNS, 288). Fifty-three patients dropped out before surgery due to various reasons. Surgery was performed for 527 patients (LSG, 269; LSNNS, 258) representing full analysis set. LSNNS was not performed in 13 patients due to unexpected intraoperative findings. According to protocol, LSNNS was conducted in 245 patients, and detection of sentinel basin was possible for 237 patients (96.7%, 237/245). Stomach-preserving surgery was performed in 210 patients (81.4%, 210/258). Median number of sentinel nodes in frozen sections was eight (interquartile range, 1~34). Postoperative complications occurred in 51 LSG patients (19.0%, 51/269) and 40 LSNNS patients (15.5%, 40/258) (P=0.294). Clavien-Dindo grade III or higher complications occurred in 16 LSG patients (5.9%) and 13 LSNNS patients (5.0%) (P=0.647). Postoperative mortality occurred in one LSG patient. The median times to first flatus and of postoperative hospital stay were significantly shorter for LSNNS group than for LSG group (P<0.001, P<0.001).

[CONCLUSION]
LSNNS for EGC is a safe procedure in terms of short-term outcomes including postoperative morbidity and mortality when compared with LSG with LND. Considering the faster recovery induced by the lesser extent of resection, LSNNS would be a good surgical option for EGC after confirming its oncological safety.

Laparoscopy, Sentinel node navigation surgery, Early gastric cancer, Morbidity
Lymph Nodes Metastasis Is the Most Important Factor Associated With Pattern of Recurrence Following Curative Resection of Gastric Adenocarcinoma

Yi-Hui Tang¹, Zu-Kai Wang¹, Jian-Xian Lin¹ and Chang-Ming Huang¹*

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

To analyse recurrence patterns in completely resected gastric cancer (GC) with negative (pN0) or positive (pN+) lymph nodes.

Background

Lymph node status is among the most important predictors of recurrence after curative gastrectomy. However, the impact of lymph node status on recurrence patterns remains unclear.

Methods

We retrospectively assessed 1694 patients who underwent curative gastrectomy from January 2010 to August 2014. Patients were divided into pN0 (n=655) and pN+ (n=1039) cohorts. Timing and site(s) of recurrence and post-recurrence survival were examined.

Results

Of all, 517 (30.5%) patients developed recurrent disease, and complete data on recurrence could be obtained in 493 patients. For the pN0 cohort, the patterns of recurrence were different according to pT stage: locoregional recurrence was the most common in patients with pT1-2 disease (57.1%), distant metastasis was the most common in patients with pT3 disease (57.1%), and peritoneal recurrence was the most common in patients with pT4a disease (66.7%). For the pN+ cohort, distant metastasis was the most common pattern irrespective of pT stage. The site-specific trend of recurrence showed that locoregional recurrence increased within 5 years in patients with pN0-2 disease but plateaued 3 years after surgery in patients with pN3 disease. Time to recurrence was significantly longer for the pN0 cohort compared with the pN+ cohort (median: 25 vs 16 months, P=0.001). Moreover, post-recurrence survival was significantly better for the pN0 cohort than for the pN+ cohort (median: 12 vs 6 months, P<0.001), especially in patients with non-peritoneal recurrence, late recurrence, single recurrence, and receipt of potential curative treatment.

Conclusions

There was a significant difference in recurrence patterns survival between node-negative and node-positive patients. For node-negative patients, follow-up strategies should be considered according to pathologic T stage, while the key to follow-up for node-positive patients is distant metastasis.

Recurrence patterns; Lymph node status; Post-recurrence survival; Disease-free survival; Gastric cancer.
Red Cell Distribution Width and Mean Corpuscular Volume Ratio as a Promising New Marker for Chemotherapy Effects in Remnant Gastric Cancer: An Analysis of a Multi-Institutional Database

Ze-Ning Huang¹, Zhi-Yu Liu¹, Si-Jin Que¹ and Chang-Ming Huang¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

OBJECTIVE

To study the value of the ratio of the red blood cell distribution width (RDW) to the mean corpuscular volume (MCV) (RMR) in predicting the efficacy of adjuvant chemotherapy (AC) in residual gastric cancer (RGC).

METHODS: A total of 379 patients who underwent resection for RGC at 7 hospitals in China from January 2004 to January 2016 were analyzed. A nomogram predicts survival was established to evaluate the effect of RMR through a decision curve.

RESULTS

According to the RMR cut-off point (0.177), all patients were divided into Group L (RMR<0.177) (n = 179) and Group H (RMR ≥ 0.177) (n = 160). Patients with stage II and III disease with a high RMR who received AC had a significantly better 3-year OS than those who did not receive AC (P = 0.048 and 0.044), while AC had no significant effect on the survival of patients with low RMR. The independent prognostic factors for OS in patients with RGC who underwent AC were used to establish a nomogram. The C-index was 0.795, and the decision threshold was 0-85%. According to the nomogram, patients were divided into low-benefit patients with AC (point < 102 points) and high-benefit patients with AC (point ≥ 102 points).

Conclusion

The predictive model based on RMR in this study can provide a simple and accurate indication for postoperative AC in patients with RGC. It is recommended that postoperative AC be administered to high-benefit patients with a score of ≥102 on the nomogram.

Red cell distribution width, mean corpuscular volume ratio, chemotherapy effects, remnant gastric cancer:
MCV-The Ideal Answer to Predict the Prognosis of Remnant Gastric Cancer: An Analysis from a Multi-Institutional Database

Ze-Ning Huang1, Zhi-Yu Liu1, Qing Zhong1 and Chang-Ming Huang1*

1Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objective

To investigate the mean hemoglobin volume (MCV) in predicting the prognosis of residual gastric cancer (RGC).

Methods

A total of 225 RGC patients who underwent R0 resection in three hospitals in China from January 2003 to June 2015 were enrolled. The 3-year survival time were compared. Two-step regression was performed to analyze the effect of MCV on prognosis in RGC patients.

Results

A total of 208 patients were included in the final analysis, including 135 in Group L (MCV < 100 fl) and 73 in Group N (100 ≤ MCV < 120 fl). In different hospitals, there were different RGC occurrence times and initial gastric surgery intervals and different initial surgical reconstruction methods, the MCV value was not significantly correlated with hemoglobin content (R2=0.397). Comparing the 3 years overall survival time (OS) and disease-free survival time (DFS) with Group L, Group N patients were all better (P < 0.001). The stratified analysis showed that for stage III, with no anemia or mild anemia and chemotherapy, Group N patients had significantly better OS and DFS than the Group L patients (P < 0.05). Two-step multivariate analysis showed that MCV was an independent factor for the OS and DFS, and both the OS and DFS decreased as the MCV decreased (P<0.001).

Conclusion

MCV showed significant heterogeneity in patients with different RGC. Patients with low MCV have a significantly poor prognosis, and the MCV can therefore be a simple and effective indicator for assessing the prognosis of patients with RGC.
Indocyanine Green Tracer-Guided Lymph Node Dissection in Laparoscopic Radical Gastrectomy for Gastric Cancer: A Randomized Clinical Trial

Qing Zhong¹, Qi-Yue Chen¹, Zhi-Yu Liu¹ and Chang-Ming Huang”¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background

Application of indocyanine green (ICG) imaging in laparoscopic radical gastrectomy remains in the preliminary stage of clinical practice, and its safety and efficacy remain controversial. To investigate the safety and efficacy of ICG near-infrared imaging tracing in guiding laparoscopic D2 lymph node (LN) dissection for gastric cancer.

Methods

From November 2018 to July 2019, 266 patients with potentially resectable gastric adenocarcinoma (cT1-4a, N0/+, M0) were enrolled in a prospective randomized controlled trial at a tertiary referral teaching hospital. In total, 133 patients were randomly assigned to undergo conventional laparoscopic surgery and another 133 were randomly assigned to undergo ICG tracer-guided laparoscopic surgery. The number of retrieved LNs, LN dissection noncompliance, and postoperative recovery were compared between the groups in a modified intention-to-treat analysis. The ICG group underwent laparoscopic gastrectomy under near-infrared imaging after endoscopic peritumoral injection of ICG to the submucosa one day before surgery.

Results

Overall, 258 (ICG: 129 and non-ICG: 129) patients were included in the modified intention-to-treat analysis. The mean number of LNs retrieved in the ICG group was significantly more than in the non-ICG group (50.5 ± 15.9 vs 42.0 ± 10.3; P<0.001). Significantly more perigastric and extraperigastric LNs were retrieved in the ICG group than in the non-ICG group (all P<0.05). The noncompliance rate of the ICG group (31.8%) was lower than that of the non-ICG group (57.4%) (P<0.001). The postoperative recovery process was comparable between the two groups (all P >0.05). There was no significant difference in the incidence (15.5% vs. 16.3%, P=0.859) and severity (P=0.913) of complications within 30 days after surgery between the two groups.

Conclusions

ICG can noticeably improve the number of LN dissections and reduce LN noncompliance in D2 lymphadenectomy without increased complications. ICG fluorescence imaging can be performed for routine lymphatic mapping in laparoscopic gastrectomy.

Indocyanine Green, Lymph Node, Laparoscopic Radical Gastrectomy, Gastric Cancer
An Intraoperative Model for Predicting Survival and Deciding Therapeutic Schedule: A Comprehensive Analysis of Peritoneal Metastasis in Patients with Advanced Gastric Cancer

Zhi-Yu Liu1, Qi-Yue Chen1, Qing Zhong1 and Chang-Ming Huang1*

1Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background and Objective

No specialized prognosis model for gastric cancer patients with peritoneal metastasis (GCPM) exists for intraoperative clinical decision-making. This study aims to establish a new prognostic model to provide individual treatment decisions for GCPM.

Method

This retrospective analysis included 324 GCPM diagnosed pathologically by laparoscopy from January 2007 to January 2018 who were randomly assigned to different sets (227 in the training set and 97 in the validation set). A nomogram was established from preoperative and intraoperative variables determined by the Cox model. The peritoneal metastasis nomogram (PMN), was compared with the 15th peritoneal metastasis staging system (P1abc) for its predictive ability and clinical applicability.

Results

The median follow-up period was 8 (range, 1-90) months. In the training set, each PMN substage had significantly different survival curves (P<0.001), and the PMN was superior to P1abc based on the results of time-dependent receiver operating characteristic curve, C-index, Akaike information criterion and likelihood ratio chi-square analyses. In the validation set, the PMN was also better than P1abc in terms of its predictive ability. Of the PMN1 patients, those undergoing palliative resection (PR) had better OS than those undergoing exploratory surgery (ES) (P<0.05). Among the patients undergoing ES, those who received chemotherapy exhibited better OS than those who did not (P<0.05). Among the patients with PR, only PMN1 patients exhibited better OS following chemotherapy (P<0.05).

Conclusion

We developed and validated a simple, specific peritoneal metastasis model for GCPM that can predict prognosis well and guide treatment decisions.

gastric cancer; peritoneal metastasis; preoperative blood index; prognosis model; therapy
Prognostic Analysis of Patients with Intra-Abdominal Infectious Complications after Laparoscopy and Open Gastric Cancer Radical Resection—A Propensity-Matched Study

Si-Jin Que1, Zhi-Yu Liu1, Qing Zhong1, Jia-Bin Wang1 and Chang-Ming Huang1*

1Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objective

To investigate the difference of the incidence and prognosis of abdominal infectious complications after laparoscopic and open radical gastrectomy for gastric cancer.

Method

The clinicopathological data of patients who underwent radical surgery for gastric cancer from January 2000 to December 2014 in the affiliated Union Hospital of Fujian Medical University were collected retrospectively. (LAG) (n=1417), in laparoscopic assisted group and open operation group (OG) (n=1417) were matched by 1:1 propensity score matching method. The incidence of postoperative abdominal infectious complications and its effect on the prognosis of patients in the two groups were analyzed.

Result

After the propensity score was matched there was no significant difference in general clinical data between the two groups. The in-hospital mortality rate of LAG was significantly lower than that of in OG group (LAG vs OG: 0.7% vs 1.6% and p= 0.048). Prognostic analysis showed that abdominal infectious complications were an independent prognostic factor for the overall survival of patients undergoing radical resection of gastric cancer (HR: 1.65, 95%CI: 1.23-2.20, p=0.001). The overall 5-year survival of patients with abdominal infectious complications in the LAG group was significantly better than that in the OG group (51.1% vs 32.4%, p=0.042). Further analysis showed that laparoscopic surgery was a protective factor for the survival of patients with abdominal infectious complications (HR 0.54, 95%CI : 0.31-0.96, p=0.036). Only preoperative factor analysis showed that the independent preoperative risk factors for postoperative abdominal infectious complications included female (OR1.82, 95%CI: 1.01-3.27, p=0.046) and BMI ≥ 25 (OR 1.88, 95%CI: 1.10-3.20, p=0.021).

Conclusion

Compared with open surgery, relatively good postoperative nutritional and immune status after laparoscopic surgery can improve the prognosis of patients with abdominal infectious complications after radical resection of gastric cancer.

intra-abdominal infectious complications, laparoscopy, open surgery, gastric cancer radical resection, propensity-matched study
Prognostic Importance of Dynamic Changes in Systemic Inflammatory Markers for Patients with Gastric Cancer

Ying-Qi Huang¹, Jian-Xian Lin¹, Chang-Ming Huang¹* and Chao-Hui Zheng¹

1Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Purpose

To investigate the effect of dynamic changes in systemic inflammatory markers (SIM) on long-term prognosis of patients with gastric cancer (GC).

Methods

The prospectively collected data from 2180 patients with GC who underwent radical gastrectomy between January 2009 and December 2014 at Fujian Medical University Union Hospital (FMUUH) were retrospectively analyzed. Changes in SIM between preoperatively and 1-6 months and 12 months postoperatively were reported. Cox univariate and multivariate analyses were performed to determine the prognosis of GC.

Results

In multivariate analysis, higher preoperative systemic inflammation score (pre-SIS) was independent predictor of poor prognosis (P <0.05). Further analysis showed that the area under the curve (AUC) of pre-SIS for prediction of 5-year overall survival (OS) was highest [0.605 (95% CI 0.584-0.625)]. The optimal time of remeasurement was 12 months postoperatively, based on a longitudinal profile of SIS and accuracy in predicting 5-year OS [AUC: 0.712 (95% CI 0.630 - 0.785)]. According to the association between the conversion of SIS and OS, we classified patients into three risk groups. Kaplan-Meier (K-M) curves showed significant differences in OS among risk groups. Further Cox multivariate regression analysis showed that only risk groups of SIS and pTNM stage were independent prognostic factors for OS.

Conclusion

The efficacy of SIS in predicting prognosis 12 months after surgery is superior, and the elevation of SIS 12 months after surgery predicts poor prognosis. These findings provide support for the remeasurement of SIS 12 months after surgery.
Effect Of Sarcopenia On Short- And Long-Term Outcomes Of Patients With Gastric Neuroendocrine Tumor After Radical Surgery: Results From A Large, Two-Institutional Series

Zhen Xue¹, Bin-Bin Xu¹ and Chang-Ming Huang*¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objective

This study was designed to explore the effects of sarcopenia on the long-term and long-term outcomes of patients with gastric neuroendocrine tumors after radical surgery.

Methods

The clinical data of 138 patients with gastric neuroendocrine tumors who underwent radical gastrectomy from December 2000 to December 2015 at two centers were retrospectively collected. The third lumbar skeletal muscle index (SMI) was obtained by determining the area of the skeletal muscle at the third lumbar level by preoperative CT image. The SMI diagnostic threshold for sarcopenia was determined using X-tile software. Multivariate COX proportional hazard regression models were used to identify independent risk factors for 3-year overall survival rates (OS) and 3-year recurrence-free survival rates (RFS).

Results

In the whole group, 59 patients (42.8%) were sarcopenic. The overall postoperative complication incidences were 33.9% and 30.4% in the sarcopenic group and the nonsarcopenic group, respectively (P>0.05). And the serious postoperative complication incidences were 0% and 3.7%, respectively (P>0.05). The 3-year OS rates and the 3-year RFS rates were significantly worse in the sarcopenic group than in the nonsarcopenic group (42.37% vs 65.82%, p<0.05; 42.37% vs 62.02%, p<0.05). Multivariate analysis showed that ASA score, pathological N (pN) stage, Ki-67 positive index≥60% and sarcopenia were independent risk factors for 3-year OS rate and 3-year RFS rate in the whole group. A stratified analysis based on histological type (NET, NEC, MANEC) revealed that the KM curve was only statistically different in GMANEC patients (OS: 40.00% vs 71.79%, p=0.007; RFS: 40.00% Vs 66.67%, p=0.015); further multivariate analysis showed that sarcopenia was an independent prognostic factor for GMANEC patients (p<0.05).

Conclusion

Preoperative sarcopenia has no impact on the incidence of postoperative complications of G-NENs. Preoperative sarcopenia is only an independent prognostic factor for 3-year OS rate and 3-year RFS rate of patients with GMANEC after radical surgery.
Application of Artificial Neural Network for Predicting Chemotherapy Benefit of Patients with Gastric Cancer after Radical Surgery

Zhen Xue¹, Bin-Bin Xu¹, Jun Lu¹ and Chang-Ming Huang¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

OBJECTIVE

This paper aims to establish an ANN model that can predict the benefits of postoperative chemotherapy in patients with stage II/III gastric cancer.

METHODS

This study included the data of 1258 patients undergoing radical surgery in the Fujian union hospital from January 2010 to September 2014. According to the average survival time of the operation group, the postoperative chemotherapy group was divided into benefit group and no benefit group, and the chemotherapy benefit ANN model (CT-benefit-ANN) was established, the prognosis evaluation ability was compared with 8th AJCC-pTNM.

RESULTS

A total of 1258 patients were included, with a median follow-up time of 63 months (1-116 months). Univariate analysis of the modeling group showed that age, CA-199 level, CEA level, NLR, PLR, SII, tumor location, tumor size, pT, pN, lymphatic vessel invasion, and differentiation were independent factors for chemotherapy benefit in patients (p all<0.05). The above variables were used as input layer variables to construct the CT-benefit-ANN model. The prediction accuracy was 76.2%, sensitivity was 78.3%, positive predictive value was 87.7%, C index was 0.749(95%CI:0.723-0.776) in modeling group; in the validation group, survival predictive accuracy was 77.1%, model sensitivity was 81.2%, positive predictive value was 68.1%, and C index was 0.777(95%CI:0.740-0.814). The predictive accuracy (AUC) was better than that of 8th-AJCC-pTNM in both groups. The survival curve showed that the chemotherapy benefit score generated by the CT-benefit-ANN could well stratify the prognosis of patients (p<0.05).

CONCLUSION

The CT-benefit-ANN accurately predicts postoperative chemotherapy benefit in gastric cancer patients, and its generated individualized chemotherapy benefit score can well predict the prognosis of postoperative chemotherapy patients.

gastric cancer; artificial neural network; chemotherapy benefits.
Long-Term Survival Outcomes of Single-Incision Distal Gastrectomy Compared With Multiport Distal Gastrectomy Using Propensity Score Matching

So Hyun Kang¹, Sangjun Lee¹, Yongjoon Won¹, Kanghaeng Lee¹, Young Suk Park¹, Sang-Hoon Ahn¹, ², Yun-Suhk Suh¹, ² and Hyung-Ho Kim¹, ²

¹Surgery, Seoul National University Bundang Hospital, Korea
²Surgery, Seoul National University College of Medicine, Korea

Introduction

Single-incision laparoscopic surgery is becoming more feasible due to improvements in surgical devices and techniques. This study aims to analyze the long-term oncological safety of single-incision distal gastrectomy (SIDG) by comparing it with the traditional multiport laparoscopic distal gastrectomy.

Methods

Patients diagnosed clinically with early gastric cancer (cT1) that underwent laparoscopic distal gastrectomy from January 2010 to August 2014 were enrolled in the study. Those who had open conversion or palliative surgery were excluded from the study. Medical records were followed to observe the 5-year overall survival (OS) and 5-year disease-free survival (DFS) of the SIDG group and LDG group as primary endpoints. Operative time, blood loss, postoperative complications, and 3-year survival were secondary endpoints. Propensity score matching was done in 2:1 ratio for gender, age, body mass index, and comorbidity score.

Results

A total of 1955 patients were enrolled in the LDG group, and 270 patients in the SIDG group. Mean age was 60.4±12.4 and 58.7±13.7 years in the LDG and SIDG group respectively (p=0.058). Five-year OS was 95.1% in the LDG group and 96.5% in the SIDG group (p=0.688). Five-year DFS was 94.8% in the LDG group and 96.5% in the SIDG group (p=0.455). Subgroup analysis was done for each TNM stage, and there was no difference in the two groups. Operation time was faster in the SIDG group (140.6±43.3 vs 177.5±58.4 mins, p<0.001). There was no difference in other postoperative results or complications. After propensity score matching, 270 SIDG patients were matched with 540 LDG patients, and there was no difference in long-term survival (5-year OS: LDG=95.9%, SIDG=96.5%, p=0.819; 5-year DFS: LDG=95.7%, SIDG=96.5%, p=0.627).

Conclusion

SIDG is safe and feasible with good long-term outcomes for patients clinically diagnosed with early gastric cancer.

stomach neoplasm, laparoscopy,
Objective

There is a prevailing belief that the application of 3D laparoscopic system may be more beneficial to enhance the inexperienced surgeons' skill rather than the experienced surgeons' one. We compared the surgical outcomes of 3D and 2D laparoscopic gastrectomy according to surgeon's experience, to evaluate the usefulness of 3D laparoscope for young surgeons.

Methods

A total of 423 patients who underwent laparoscopic distal or total gastrectomies for gastric cancer was included for this study (298 patients in an experienced surgeon and 125 patients in an inexperienced surgeon). Clinical confounding factors such as type of surgery or reconstruction method were adjusted using propensity score matching for the analyses.

Results

After matching, there was no difference in clinical characteristics between 3D and 2D groups. In the experienced surgeon's population, there was no difference in intraoperative or postoperative outcomes (Op time 148.6 vs. 151.9 min, p=0.691; EBL 67.7 vs. 105.8 ml, p=0.109; Overall complication 17.5 vs. 15.0%, p=0.724; Time to soft diet 4.3 vs. 4.6 days, p=0.304; Hospital stay 6.5 vs. 6.9 days, p=0.400). However, in the inexperienced surgeon's population, there were several differences in surgical outcomes (Op time 180.9 vs. 195.7 min, p=0.066; EBL 61.1 vs. 95.7 ml, p=0.010; Overall complication 18.3 vs. 23.8%, p=0.501; Time to soft diet 3.8 vs. 4.5 days, p=0.003; Hospital stay 6.1 vs. 7.2 days, p=0.027). There was no difference in the number of harvested LNs.

Conclusion

The application of 3D laparoscope for laparoscopic gastrectomy for gastric cancer may enhance surgical performances and short-term outcomes in the inexperienced young surgeons, in terms of less blood loss and faster recovery after surgery.
MOBS versus Intracorporeal Esophagojejunostomy Using Circular Stapler: Mid-term Outcomes Including Late Complications

Soomin Lee¹, Hyuk-Jae Kwon¹, Bo Wang¹, Chul Kyu Roh¹, Sang-Yong Son¹, Hoon Hur¹ and Sang-Uk Han¹

¹Department of Surgery, Ajou University School of Medicine, Korea

Objective

We have introduced a novel technique, 'MOBS (modified overlap method using barbed sutures)' for intracorporeal esophagojejunostomy after total gastrectomy in the previous report. However, the mid-term or long-term outcomes of this technique has not been evaluated. Herein, we compared the surgical outcomes of MOBS with historical control, those of conventional circular stapler method.

Methods

A total of 231 patients (91 circular stapler and 140 MOBS) between January 2012 and December 2018 were included for this study. Historical comparisons of surgical outcomes between two methods were conducted and risk factors for overall complications were analyzed.

Results

More advanced T stages with larger size and D2 lymphadenectomy were identified in the MOBS group. There was no difference in operation time (185.8 in MOBS vs. 183.3 min in Circular, p=0.691), however blood loss was less in the MOBS group (99.1 vs. 178.1 ml, p<0.001), start of diet was faster (5.0 vs. 5.5 days, p=0.034), and overall or major complications were less (17.6 vs. 30.8%, p=0.005; 5.7 vs. 19.8%, p=0.001, respectively). Notably, 9 cases of anastomotic stricture were identified only in the circular method group, and anastomosis-related complication decreased over the years (linear association value 7.254, p=0.007). Numeric pain intensity scale showed significant differences between two groups from POD 1 to POD 3. In multivariate analysis, MOBS was favored than circular method in terms of relatively lower odds ratios.

Conclusion

MOBS is a safe procedure with less late complications for intracorporeal esophagojejunostomy after laparoscopic total gastrectomy, in comparison of conventional circular stapler method.

Gastric cancer, Laparoscopy, Total gastrectomy, Reconstruction
KSELS Video 02

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01. Bariatric & Metabolic

MIDSLEEVE™ Used as a Calibration Probe during Laparoscopic Sleeve Gastrectomy

Manabu Amiki¹, Manabu Goto¹, Atsuhiko Sugiyama¹, Yuki Tomizawa¹, Ryota Sakon¹, Yasuhiro Ishiyama¹, Shingo Ito¹, Reiko Shimojima¹, Yoshiaki Hara¹, Kazuhiro Narita¹, Yuji Tachimori¹, Syozo Fujino¹ and Masataka Oneyama¹

¹Department of surgery, Kawasaki Saiwai Hospital, Japan

Introduction

In Japan, laparoscopic sleeve gastrectomy (LSG) was approved for payment by the national health insurance system, and the number of bariatric surgeries performed annually has increased gradually. Although the procedure is technically simple, the vertical transsection of the stomach with a calibration tube is technically demanding for inexperienced bariatric surgeons. We consider that the ideal calibration tube should have enough rigidity, secure removal system of air or fluid in the stomach, and reproducible calibration of residual volume of the antrum. Since faucher tubes do not meet our demands, we have used MIDSLEEVE™ because it completely meets our ideal.

Methods

We introduced LSG in December 2019. The case group comprised three consecutive patients who underwent LSG using MIDSLEEVE™. Our technique is described below. Starting 4 cm from the pyloric ring, the omentum along the greater curvature of the stomach is progressively freed up to the gastroesophageal junction. The gastric fundus is fully mobilized, the left crus is completely exposed. MIDSLEEVE™ is advanced transorally along the lesser gastric curvature. A 60-mm endoscopic linear stapler is then used to divide the stomach. The video shows our laparoscopic technique of the LSG using MIDSLEEVE™, especially how to advance the MIDSLEEVE™ and fix the balloon in the antrum.

Results

The mean operative time was 120 min. Upper gastrointestinal series with water-soluble contrast swallow on postoperative day one was performed in all patients. It showed no evidence of leak and stenosis; all patients then started an oral diet on postoperative day one. All patients were discharged on postoperative day three without any adverse events.

Conclusions

Using the MIDSLEEVE™ has the potential to ensure a safe and excellent quality of LSG, even though it is performed by inexperienced bariatric surgeons.
Background
The caudate lobe is a distinct liver lobe and surgical resection requires expertise and precise anatomic knowledge owing to its location between the inferior vena cava and the portal bifurcation and its relationship to the hepatic veins. The aim of this report is to present laparoscopic isolated resection of caudate lobe with anterior transhepatic approach.

Methods
A 65-year-old man was admitted with liver metastases during follow-up for sigmoid colon cancer after had a laparoscopic assisted anterior resection and twelve times of adjuvant chemotherapy with FOLFOX. Magnetic resonance imaging showed 18mm metastatic cancer in caudate lobe. We performed laparoscopic isolated caudate lobectomy by anterior approach and wedge resection of segment 8. Laparoscopic surgery was performed in the lithotomy position and six trocars were inserted. After mobilization of the liver, the caudate branch of portal vein and short hepatic vein were ligated and dissected. Liver resection was performed, exposing the right side of middle hepatic vein. And posterior segment of the right lobe and the right edge of the caudate lobe was resected with enough resection margin from tumor. Finally, the paracaval portion of the caudate lobe was resected.

Results
The operative time was 675 minutes and estimated blood loss was 50ml. There were no major intraoperative complications. There was minor bile leakage, however after ENBD insertion, the postoperative course was uneventful.

Conclusion
Considering that laparoscopic surgery is difficult to bleeding control, anterior transhepatic approach may be a good choice when performing the laparoscopic isolated caudate lobectomy.
Since the robotic surgical system was first launched in 2005, the number of robotic surgery has been gradually growing in Korea. The proportion of general robotic surgery is relatively higher than the western countries, but robotic liver resection, especially living donor right hepatectomy is one of the most complex procedures among robotic general surgery. Since its introduction in 1994, living-donor liver transplantation (LDTL) was the standard treatment for both hepatocellular carcinoma and for patients with the end-stage liver disease. Our hospital started robotic living donor program in 2016. Since then, more than 70 cases of robotic living donor hepatectomy have been successfully performed. In this video, we introduce our current standardized procedure of robotic living donor right hepatectomy from hilum dissection, parenchymal transection, bile duct division to caudate lobe transection, also the ligation of vessels. In addition, we explain how to manage unexpected events during robotic surgery and our journey to expand the indication of donors from favorable to unfavorable anatomy.

Robotic surgery, living donor hepatectomy
Robotic Inguinal Hernia Repair for Complex Post-Operative Recurrent Hernias

Hong Bae Choi¹, Jiseon Kim¹, Tae-Hoon Lee¹, Guglielmo Niccolò Piozzi², Hyunmi Park¹, Se-Jin Baek¹, Jung-Myun Kwak¹, Jin Kim¹ and Seon-Hahn Kim¹

¹Department of Surgery, Korea University College of Medicine, Korea
²Department of Surgery, Korea University College of Medicine, Italy

Background

The use of robotic minimally invasive surgery for hernia repairs is gaining momentum, with its benefits maximized in recurrent or complex hernias.

Purpose

We describe our initial experiences of robotic inguinal hernia repair for a recurrent hernia following an open hernia repair and a case where the inguinal hernia developed after urologic surgery.

Method

1st case: A 50-year-old male was diagnosed with a recurrent right inguinal hernia two years after an open herniorrhaphy. Robotic transabdominal preperitoneal approach was performed with the da Vinci-Xi surgical system using three arms. The camera port was placed in the umbilicus and both working ports were placed horizontally 10cm either side from the camera port. The peritoneal incision started from the anterior superior iliac spine to the median umbilical plica and symphysis pubis. A three-dimensional polypropylene mesh (Bard 3D Max™) was placed after dissection of the hernia sac. The peritoneum was repaired by continuous suture with a self-locking barbed STRATAFIX™.

2nd case: A 60-year-old male presented with an inguinal swelling and pain 2 months after a robot-assisted laparoscopic radical prostatectomy, and was found to be a right inguinal hernia on abdominal ultrasonography. The working ports of the da Vinci-Xi surgical system were placed in the previous scar in the right upper quadrant and left lower quadrant. The intracorporeal procedure was identical to the first case, but a multifilament polyester anatomical mesh (Parietex™) was used and fixed with three stitches.

Result

These patients were discharged on the first postoperative day after confirmation of self-urination and pain relief. Robotic inguinal hernia repair can be a safe and alternative option for patients with complex recurrent hernias or hernias arising after previous abdominal surgery.

Robotic herniorrhaphy, inguinal hernia
Introduction

Total mesorectal excision is the gold standard for the treatment for mid and low rectal tumors. This includes removal of all lymph nodes in the mesorectum which results in improved pathological and oncological outcomes. The management of spread in the lateral pelvic lymph nodes differ in Western and Japanese guidelines, with the former considering it to be an advanced form of the disease and the latter considering it to be a local disease which is treated with lymph node dissection with or without neoadjuvant treatment.

Purpose

We aim to demonstrate Robotic lateral lymph node dissection along with abdominal perineal resection in a case of locally advanced rectal cancer.

Materials & Methods

55-year-old gentleman presented with locally advanced rectal cancer along with enlarged right pelvic nodes. He received NACTRT of 55G in 25 fractions over 5 weeks with concurrent capecitabine. After 8 weeks, patient underwent robotic assisted abdominal perineal resection with right pelvic lymph node dissection.

Results

Postoperative course was uneventful and patient was discharged on the 5th post operative day. Post op Histopathology revealed residual viable moderately differentiated adenocarcinoma. All margins were free. 3 out of 28 nodes dissected were involved by the tumor.

Conclusions

The role of lateral lymph node dissection remains a matter of debate, however emphasis has to be given to identifying them pre operatively and the application of lateral lymph node dissection in a select group of patients who may benefit from it, needs to be identified in future studies.

robotic abdominoperineal resection, lateral lymph node dissection
Laparoscopic Abdominoperineal Resection, Left Pelvic Node Dissection for Anal Melanoma with Novel Bakri Balloon to Prevent Empty Pelvis Syndrome-A Video Demonstration

Diwakar Pandey1*, Sanket Bankar1, Vivek Sukumar1, Jayesh Gori1, Ashwin deSouza1 and Avanish Saklani1

1Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Introduction

Anorectal melanoma is a dreaded disease with poor outcomes. Surgery (abdominoperineal resection or local excision) is the most effective treatment available. There is currently no consensus about appropriate adjuvant treatment but immunotherapy protocol for skin melanomas are usually used.

Objectives

To demonstrate a systematic approach to Laparoscopic Abdominoperineal resection (APR) with Left Pelvic Lymph node dissection (PLND) for Anorectal Melanoma along with use of bakri balloon to prevent empty pelvis syndrome

Material && Methods

A 53 year Gentleman presented to us with bleeding per rectum for 1 year duration. Digital rectal examination elicited a lesion 1cm from the anal verge, revealing Melanoma on Biopsy. MRI Pelvis showed Polypoidal Lower rectal lesion 2cm from anal verge with the involvement of Right external sphincter and left internal iliac and obturator Lymph nodes

Metastatic workup with Whole Body PET CECT was Normal. He was scheduled for Laparoscopic APR with Left PLND with use of bakri balloon with a capacity of 300 ml

Results

The surgery was uneventful with an operative time of 210 minutes. The Blood loss was 200ml. The postoperative course was uneventful. The Baloon was removed on POD 4 patient was discharged on Post-operative day 6

Conclusions

APR is usually the choice of surgery for anorectal melanomas. The use of minimally invasive techniques including laparoscopic and robotics can greatly reduce the overall pain, hospital stay and postoperative complication in such patients. Additionally, the nodal clearance is improved by enhanced and magnified vision.

Anal Melanoma, Laparascopic Colorectal surgery, Empty Pelvis Syndrome,
Laparoscopic Surgery for the Advanced Gallbladder Cancer Invaded the Duodenum and the Transverse Colon

Yong Jun Jeon¹ and Eui Chul Jeong¹*

¹Surgery, Chinjujeil Hospital, Korea

Background

The radical cholecystectomy is standard procedure for advanced gallbladder cancer. But locally invaded to other organs were not easy with laparoscopy.

Purpose

We introduce laparoscopic surgery for advanced gallbladder cancer which invaded duodenum and transverse colon as well.

Methods

We performed most procedures laparoscopically. The sequence of the procedures was below: Omentectomy, antrectomy, division the distal transverse colon, non-anatomical liver resection with lymph nodes dissection, division of the duodenum, division of the proximal transverse colon, jejunojejunostomy (extracorporeal), fusion of the hepatic duct, hepaticojejunostomy, anastomosis of the transverse colon (extracorporeal), gastrojejunostomy, and insertion of drainage tubes.

Results

We successfully performed laparoscopic surgery for advanced gallbladder cancer to other organs without definite complication.

Gallbladder cancer, Radical cholecystectomy, Laparoscopy
Endoscopic Characteristics of Upper Gastrointestinal Tract in Children with Choledochal Malformation

Makhmud Aliev², Rustam Yuldashev¹, Jamshid Yodgorov¹, Gulnora Adilova¹ and Shoikhom Shokhaydarov¹

¹Pediatric surgery, Republican Specialized Scientific Practical Medical Center Of Pediatrics, Uzbekistan
²Pediatric Surgery, Tashkent Pediatric Medical Institute, Uzbekistan

Aims
To study the features of upper gastrointestinal tract after surgical treatment of various types of choledochal malformations in children

Methods
Fourteen children with various types of choledochal malformation were included in this study. We analyzed results of pre- and postoperative upper gastrointestinal (UGI) endoscopy, abdominal US and MRI cholangiography.

Results
According to abdominal US and MRI most children (n=7) had cystic dilatation of extrahepatic bile ducts (type I of CM), four had multiple cystic dilatation of the intrahepatic and extrahepatic bile ducts (type IVa), and three had Caroli syndrome (association of cystic dilatation of intrahepatic bile ducts - type V and associated liver fibrosis). All children with Caroli’s syndrome had esophageal varices on UGI endoscopy. Four patients underwent hepaticoduodenostomy (HD), seven hepaticojejunostomy (HJ), and three operations of gastroesophageal disconnection. The incidence of complication following choledochal cyst incision were more common after HD. According to upper GI endoscopy after HD bile reflux gastritis was observed in 75% of cases. Following HJ this late complication observed only in one patient (14.3%). None of the patients with Caroli syndrome has recurrent gastroesophageal bleeding episodes

Conclusions
Hepaticoduodenostomy has advantages of relative simplicity, shorter operative times, reduced adhesive obstructions and the potential physiologic superiority of bile drainage into the duodenum but may counter balance the bile reflux gastritis handicap.
Long-term Comparison of Robotic and Laparoscopic Gastrectomy for Gastric Cancer

Hojung Shin

Department of Surgery, Ajou University School of Medicine, Suwon, Korea, Korea

Background

Minimally invasive surgical approaches for gastric cancer (GC) are increasing, yet limited evidence exists for long-term outcomes of robotic gastrectomy (RG). To compare long-term outcomes between RG and laparoscopic gastrectomy (LG) approaches using propensity score weighting based on a generalized boosted method to control for selection bias.

Methods

Patients (n = 2084) with GC stages I-III who underwent LG or RG between 2009 and 2017 were analyzed. Generalized boosted method was used to estimate a propensity score derived from all available preoperative characteristics. Long-term outcomes were compared using the adjusted Kaplan-Meier method and the weighted Cox proportional hazards regression model.

Results

After propensity score weighting, the population was balanced. Patients who underwent RG showed reduced blood loss (16mL less, P = 0.025), sufficient lymph node harvest from the initial period, and no changes in surgical outcomes over time. With 52-month median follow-up, no difference was noted in 5-year overall survival in unweighted [91.5% in LG vs 94% in RG; hazard ratio (HR), 0.71; 95% confidence interval (CI), 0.46–1.1; P = 0.126] and weighted populations (94.2% in LG vs 93.2% in RG; HR, 0.88; 95% CI, 0.52–1.48; P = 0.636). There were no differences in 5-year recurrence-free survival (RFS), with unweighted 5-year RFS of 95.4% for LG and 95.2% for RG (HR, 0.95; 95% CI, 0.55–1.64; P = 0.845) and weighted 5-year RFS of 96.3% for LG and 95.3% for RG (HR, 1.24; 95% CI, 0.66–2.33; P = 0.498).

Conclusions

After balancing covariates, RG demonstrated reliable surgical outcomes from the beginning. Long-term survival after RG and LG for GC was similar.
Is Totally Laparoscopic Total Gastrectomy Better Than Laparoscopy-Assisted Total Gastrectomy For Early Gastric Cancer? A Propensity-Score Matched Analysis

Shin-Hoo Park¹, ² and Yun-Suhk Suh¹, ², ³*

¹Department of Surgery, Seoul National University College of Medicine, Korea  
²Department of Surgery, Seoul National University Hospital, Korea  
³Department of Surgery, Seoul National University Bundang Hospital, Korea

Background

This study aimed to evaluate the surgical outcome and quality of life (QoL) of totally laparoscopic total gastrectomy (TLTG) compared with laparoscopy-assisted total gastrectomy (LATG) in patients with early gastric cancer.

Methods

From 2011 to 2018, the patients with early gastric cancer who underwent TLTG (n=223) including the first case with intracorporeal hemi-double stapling were matched to those who underwent LATG (n=121) with extracorporeal circular stapling, using 2:1 propensity score matching (PSM). Prospective collected morbidity were compared between TLTG and LATG groups in conjunction with learning curve. EORTC QLQ-C30, STO22 and OG25 were prospectively surveyed during postoperative 1 year for subgroup patients with informed consent.

Results

After PSM, grade I pulmonary complication was significantly lower in TLTG (n=215) than in LATG group (n=112) (0.5% vs. 5.4%, P=0.007). Other morbidity including anastomotic complications were not different between two groups. The learning curve of TLTG was overcome at the 26th case in terms of comprehensive complication index. TLTG group after learning curve showed significantly lower grade I pulmonary complication than matched LATG group (0.5% vs. 4.5%, P=0.026). Regarding postoperative QoL, TLTG group (n=57) revealed less dysphagia (P=0.018), pain (P=0.043), eating restriction (P=0.024), eating (P=0.026), and odynophagia (P=0.041) than LATG group (n=17). Multivariate analyses for each QoL item demonstrated that TLTG was the only common independent factor for better QoL.

Conclusions

TLTG reduced pulmonary complication and provided better QoL in terms of dysphagia, pain, eating, and odynophagia than LATG for patients with early gastric cancer.

Gastric cancer, Totally laparoscopic total gastrectomy, Laparoscopy-assisted total gastrectomy, morbidity, Quality of life, hemi-double stapling
Post Esophagectomy Diaphragmatic Hernia (PEDH): An Experience of a Dedicated Cancer Center of Pakistan

Masood Ur Rehman

Surgical Oncology, Shaukat Khanum Memorial Hospital and Research Center Lahore, Pakistan

INTRODUCTION

Esophageal cancer is a leading cause of cancer in the world. The treatment of the disease is combination of chemotherapy, radiotherapy and surgery. Diaphragmatic is fatal complication after esophagectomy. Treatment of the disease is still controversial but favors towards early surgical intervention.

METHODOLOGY

We conducted a retrospective case series among patients underwent surgical resection for esophageal cancer. Shaukat Khanum Memorial Cancer Hospital and Research Centre SKMCH&RC is a tertiary care hospital dedicated to treat cancer patients from all over Pakistan and Afghanistan as well. Demographic and variables related to diaphragmatic hernia and its management were recorded and analyzed.

RESULTS

Out of 590 patients, 10 patients developed post esophagectomy diaphragmatic hernia. All patients received neoadjuvant chemo-radiotherapy. 8 patients underwent three stage esophagectomy, one had Ivor Lewis esophagectomy and one had transhiatal esophagectomy. CT scan was used as a modality of choice for the diagnosis. Two patients developed hernia during their hospital stay and 8 patients presented late. Laparoscopic surgical management was performed in 5 patients. Five patients had primary tension free closure while five patients had mesh repair. Two patients had recurrence. There was no 30 days mortality.

CONCLUSION

Diaphragmatic hernia is a serious complication. Early surgical intervention is needed for the treatment. With minimally invasive techniques, incidence has increased. For standardization of management and quality of care, randomized control trials are needed.
INTRODUCTION

After establishing a foothold in the west, the pandemic of obesity now threatens the developing countries of Asia like Pakistan, which has witnessed an unprecedented growth of obese individuals, causing serious public health concerns. Bariatric surgery is now established as the first-line treatment for weight loss for morbidly obese patients. The treatment, however, is costly and carries its own risks and benefits. Although bariatric surgery has been practiced in Pakistan for more than 10 years now, its use is still only limited to private hospitals as a treatment option for the very few who can afford it. But things are changing now as we have started the first Bariatric Surgery Program for the public sector in Lahore. We would like to share our initial experience here in this study.

METHODOLOGY

From January 2019 to January 2020, a total of 45 cases have been performed. Demographics, gender, co-morbidities, preop weight and BMI of all patients were recorded. Informed consent had been taken from all the patients. All the equipment and gadgets had been arranged and managed by the hospital and department of surgery unit-I at LGH. Type of procedure and procedure-related complications were recorded. All the patents had been planned to have followed up at 1st, 3rd, 6th, 12th and 24th months. Post-op weight, excess weight loss, and resolution of comorbidities were also recorded.

RESULTS

Total 45 cases, 32 underwent sleeve gastrectomy, 6 MGB, 6 RYGB, and 1 redo surgery. The mean age was 30 years. Their mean body weight and body mass index (BMI) before surgery was 110kg and 44.8kg/m2. There were no major perioperative complications. The mean BMI decreased to 30 kg/m2 after a mean follow-up of 6 months. The percent excess weight loss (%EWL) at 1, 3, 6, and 12 months postoperatively were were 17.6, 37.9, 52.6, and 74.2% respectively.

obesity, bariatric, sleeve gastrectomy, RYGB
Short-Term Results of Laparoscopic Sleeve Gastrectomy with Proximal Jejunal Bypass: A Prospective Observational Study

Young Suk Park1, Sang-Hoon Ahn1, Do Joong Park1 and Hyung-Ho Kim1

1Surgery, Seoul National University Bundang Hospital, Korea

Background

The proportions of people with type 2 diabetes mellitus (T2DM) and obesity have increased throughout Asia. Roux-en-Y gastric bypass has the disadvantage of being difficult to detect gastric cancer using the endoscopy, and this could be more problematic in areas with a high incidence of gastric cancer. Sleeve gastrectomy with duodenojejunal bypass can be an alternative, however, it has the technical difficulty and irreversibility of anastomosis. Sleeve gastrectomy with proximal jejunal bypass (SG-PJB) has the advantages of technical simplicity and reversibility of anastomosis, although it must prove that blind loop syndrome does not occur after surgery. We performed the prospective observational study of SG-PJB.

Methods

Twenty-four patients with obesity and T2DM underwent SG-PJB in a single institution between January, 2019 and December, 2019. In this study, a total of 18 patients who have at least 3 months of follow-up was analyzed. SG-PJB consisted of sleeve gastrectomy and bypassing proximal jejunum about 250 cm in length.

Results

Preoperative body mass index was 37.6±8.4 kg/m2. Preoperative HbA1c and ABCD scores were 7.9±1.6% and 5.3±2.1. The operation time was 139.2±32.3 minutes, and hospital stay was 5.1±1.4 days. The percentage excess weight loss was 65.1±26.3% (n=18), 84.2±31.3% (n=13) and 80.1±19.1% (n=9) at postoperative 3, 6, and 9 months, respectively. The rate of T2DM remission (defined as HBA1c <6.0% without medications) was 53.8% (7 out of 13) and 55.6% (5 out of 9) at 6 and 9 months after surgery. Any postoperative morbidities did not occur during the follow-up period. There was no diarrhea, liver failure, and infection possibly caused by small intestine bacterial overgrowth or blind loop syndrome.

Conclusions

SG-PJB is a feasible and effective metabolic surgery for the treatment for Asian obese patients with T2DM. Long-term follow-up should be required to assess the safety and efficacy of SG-PJB further.

Metabolic surgery, Obesity, Diabetes, Asia
Removal and Revision for Failed Adjustable Gastric Band

Sang-Moon Han\textsuperscript{1*}, Yeon-Ju Huh\textsuperscript{1}, Kyong Min Park\textsuperscript{1} and Nan Hee Kim\textsuperscript{1}

\textsuperscript{1}Surgery, Bariatric and Metabolic Surgery Center, Korea

Background

The operation rate of adjustable gastric banding (AGB) is decreasing due to weight loss failure and long-term complications in Korea. The aim of our study is to investigate reasons and outcomes of removal of gastric band (RGB) and evaluate the weight loss results.

Methods

A retrospective review of a prospectively maintained database was collected from January 2013 to December 2018.

Results

A total of 180 patients underwent RGB in this period. The mean age was $35.5 \pm 8.7$. The mean weight and body mass index (BMI) at primary gastric banding (PGB) were $90.6 \pm 20.0$ kg and $33.8 \pm 6.7$ kg/m$^2$, respectively. The average time from PGB to RGB was $51.6 \pm 24.2$ months. Mean BMI decreased after PGB, from $35.5 \pm 8.7$ to $29.8 \pm 6.5$ kg/m$^2$. The mean percentage of excess body mass index loss was $45.7 \pm 79.7\%$ at RGB. Revisions amounting to $138$ (76.7\%) were band removal only, $20$ (11.1\%) were band removal with conversion sleeve gastrectomy, $3$ (1.7\%) were band reposition and $1$ (0.6\%) were band replacement. The most common indications for revision were weight loss failure ($n=91$, 50.6\%), Pouch dilatation ($n=34$, 18.9\%), Band slippage ($n=26$, 14.4\%), Intolerance ($n=18$, 10.0\%), and band erosion ($n=16$, 8.9\%). Two out of 180 (1.1\%) patients had complications during revisions. However, there was no postoperative 30 days mortality.

Conclusion

The most common indication for RGB was weight loss failure. Band slippage and gastric pouch dilatation were frequent complications for revisions. Although AGB is believed to be a reversible procedure, simultaneously conversion procedures were considered for treating weight loss failure.
Background

Obesity is one of the greatest public health problems in Asian and the rate of increase shows no sign of slowing. Nowadays bariatric surgery has proved to be an effective strategy in treating obesity after failure of behavioral and pharmacologic weight loss therapies. Sleeve gastrectomy and Roux-en-Y gastric bypass is two most common procedure in bariatric surgery. Most of the weight loss after bariatric surgery happens within the first year. Long term data about weight regain after both procedure still controversial especially in Asian people. The purpose of this study was to understand medium and long-term weight loss outcomes in Asian people.

Methods

A retrospective review of a prospectively collected database. Total 86 patient who undergoing 1st bariatric surgical procedure in King Chulalongkorn memorial hospital between 2003-2018 and has history record follow up at least 5 years. Changes in weight, body mass index (BMI), percent weight loss (%WL), and percentage of excess weight loss (%EWL) were recorded.

Result

Patient who performed LRYGB is 50 patient and patient who performed LSG is 36 patient. In LSG %EWL was 50% and in LRYGB were 50.64%, 5 years after surgery. Weight regain was 36.1% in LSG and 24% in LRYGB after 5 years. Most of patients reached nadir weight in 1-2 years after surgery.

Conclusion

Comparing the 5-year success rate of these two techniques, LRYGB seems to be superior to LSG, with lower weight regain and higher weight loss.
**Evaluation of the Achievement of Target Anti-Factor Xa Levels in 2 Regimens of Enoxaparin for Venous Thromboembolism Prophylaxis in Bariatric Surgery**

Kritsa Kongsawat¹ and Suthep Udomsawaengsup¹*

¹General Surgery, King Chulalongkorn Memorial Hospital, Thailand

**Background**

Morbidly obese is a risk factor for venous thromboembolism (VTE). The appropriate dosing regimen of enoxaparin for VTE prophylaxis in morbidly obese is not clearly defined. The monitoring of anti-factor Xa levels are recommended.

**Purpose**

To evaluation the achievement of target anti-factor Xa level after the administration of enoxaparin 40mg or 60mg subcutaneously for VTE prophylaxis in patients planned for bariatric surgery.

**Methods**

We conducted a randomized controlled trial including morbidly obese patients scheduled for bariatric procedure in King Chulalongkorn Memorial Hospital between April 2019 and February 2020. All recruited patients randomly received 40 mg or 60 mg of enoxaparin subcutaneously 12 hours before the scheduled operative time. Blood specimens for peak 4-hour anti-factor Xa level were collected at 4 hours after the administration of enoxaparin. The target range of anti-factor Xa level was defined between 0.2-0.5IU/ml.

**Results**

There were 50 patients that underwent bariatric procedure during our study period. 25 patients received 40mg of enoxaparin while 25 patients received 60mg randomly. The mean anti-factor Xa levels were 0.209IU/ml and 0.316IU/ml respectively (p<0.001). The percentage of target level achievement in both groups were 64% and 88% respectively (p-value=0.047). Subgroup analysis focusing on the patients that BMI under 40kg/m² (n=13) there was no significant achievement of target level in both groups 75% and 87.5% respectively (p-value=0.71). There was no significant estimated blood lost (EBL) in 2 groups mean EBL were 25.4ml in the 40-mg group versus 24.4ml in the 60-mg group (p=0.84). No patient obtained levels exceeding 0.5IU/ml of anti-factor Xa and no occurrence of VTE in both groups. we conclude that enoxaparin dosage at 60mg is more achieved the desired target levels of anti-factor Xa than 40mg. However enoxaparin dosage at 40mg may still have a role in BMI under 40kg/m2 patients.

venous thromboembolism, prophylaxis, bariatric surgery, morbid obesity, enoxaparin, Anti-factor Xa
Straightforward Achievement of Theoretic Full D3 Dissection in RHC: Single-port Laparoscopic SOLO Surgery

Sang Chul Lee1*, Won Jun Jeong1 and Byung Jo Choi1
1General Surgery, the Catholic University of Korea, Korea

Background (Aims)
In colon cancer surgery, accomplishment of CME + CVL or D3 dissection is the standard for stubborn surgery. Today, most surgical diseases are resolved by laparoscopic surgery, and the intention and preference of minimally invasive surgery has led to single-port laparoscopic surgery, and the application of single-port laparoscopic surgery to colorectal cancer has been in place for more than 10 years. In terms of the results, it is comparable to the existing conventional surgeries. And advances in the equipment related to the surgery have minimized the number of surgical personnel. As a result, in recent years, SOLO surgery has been performed in earnest among some surgeons. Even minimally invasive surgery is important for oncology and compliance with the law as it is for carcinomas.

Purpose of Research
Theoretically, the range of D3 dissection means the three-dimensional removal of the mesentery (soft tissue), including the lymph nodes around the superior mesenteric vessels, to the lower border of the pancreas. However, the range of conventional D3 dissections to date includes only the anterior and right margins covering the superior mesenteric artery. Authors who have been applying SOLO surgery to colorectal cancer surgery since 2013 have been doing it intermittently since the first D3 dissection in November 2018. Although technical difficulties and risks are clearly present, we hope to proceed with this technique in the hope that compliance with the principle D3 dissection will enhance oncological rigidity.

Methods
Fifteen patients with Principal D3 dissection from November 2018 to January 2020 were reviewed for postoperative hospital stay, intraoperative and postoperative complications. All patients underwent single-port laparoscopic SOLO surgery with the help of camera holder applied to the rail of operating table. Extracorporeal end-to-side anastomosis was performed by using of circular stapler. All the specimen were placed in the endo-catch bag and removed through the umbilical incision.

Results
Eight of fifteen patients underwent extended right hemicolecctiony. The dissection around the superior mesenteric vessels proceeded inf-to-sup in nine patients and sup-to-inf or in combination in six patients. En-bloc gastrectomy was performed in one stent state patient, and one patient had a colo-colic intussusception. The average length of stay after surgery was 2.87 days (0 ~ 6) and the last three patients discharged on operation day. The mean number of harvested lymph nodes was 38.3 (24 ~ 54). Diet began on the day or the day after surgery. There were no major complications including reoperation. One patient showed umbilical wound infection and another patient readmitted due to melena originated from esophagitis.

Conclusions
Performing a principle range of D3 dissection in right hemicolecctiony is technically challenging and also a very risky task. However, the authors have experienced and achieved the satisfactory results with the safety without any complications. In the future, there is a need for extensive research involving more patients, which will enable true evaluation.

Single-port, Solo, D3 dissection,
Transabdominal Robotic-Assisted Intersphincteric Dissection for Very Low-lying Rectal Cancer: Focus on Anatomical Landmarks

Guglielmo Niccolo Piozzi¹*, Hyunmi Park¹, Hong Bae Choi¹, Jiseon Kim¹, Tae Hoon Lee¹, Se-Jin Baek¹, Jung-Myun Kwak¹, Jin Kim¹ and Seon-Hahn Kim¹

¹Department of Surgery, Korea University College of Medicine, Korea

Background

Ultralow anterior resection (uLAR) and intersphincteric resection (ISR) requires a dissection of the low rectum down to the upper anal canal along the intersphincteric plane (IP). Transabdominal intersphincteric dissection (ISD) is a technically demanding procedure that requires deep anatomical knowledge of the lower pelvis and fully benefits from the application of minimally invasive approaches, especially robotic surgery.

Purpose

Describe the anatomical landmarks for transabdominal ISD in order to correctly identify the IP.

Methods

We have been performing robotic transabdominal ISD in our institute since 2006 as a standardized step-by step procedure in a total of 180 uLARs and 122 ISRs.

Results

Completed the total mesorectal dissection, the pelvic floor exposure starts posteriorly and proceeds spirally with an anti-clockwise direction. Three anatomical landmarks are fundamental during ISD. Firstly, the hiatal ligament (HL), located around 5 cm from the anal verge, is a fibrous tissue connecting posteriorly the distal rectum to the coccyx. The HL should be dissected closely to the viscera in order to correctly proceed into the IP. Secondly, the dissection should be performed laterally, after the complete exposure of the levator ani muscle (LAM), in order to separate it from the rectum/anal canal. In order to better identify the edge of the puborectalis muscle an electrical stimulation test can be performed. Finally, the rectourethralis muscle (RU) is located anteriorly deep in the pelvis below the prostate. The RU is composed of smooth muscle cells as an anterior continuation of the rectum’s longitudinal muscle. The dissection should be performed posteriorly to the RU in order not to injure the urethra and the cavernous nerve. ISD takes full advantage of the robotic’s enhanced 3D view and endowrists system allowing sphincter saving oncologically safe surgery for low rectal cancers. This video clearly shows and reports all the three pelvic landmarks fundamental during ISD.

Transabdominal intersphincteric resection, Rectal cancer, Robotic surgery
Optimization of Fluorescent Lymph Node Mapping Using Indocyanine Green for Laparoscopic Colorectal Cancer Surgery

Gyung Mo Son
Surgery, Pusan National University Yangsan Hospital, Korea

Purpose
This prospective study aimed to establish the optimal protocol of preoperative colonoscopic submucosal indocyanine green (ICG) tattooing to obtain a successful fluorescent lymph node mapping (FLNM) during laparoscopic colorectal surgery.

Methods
Colorectal cancer patients (n=192) were enrolled from May 2017 to Dec 2019. Endoscopic submucosal ICG tattooing was performed by the 12 to 18 hours before surgery. ICG tattooing protocols were modified based ICG dilution concentration (mg/ml), injection volume (ml) and tattooing site number (single vs. multiple) during study period. The quality of FLNM was evaluated under near infrared (NIR) laparoscopic camera system. The successful FLNM (sFLNM) was defined as distinct fluorescent lymph nodes found in the colonic mesentery under the NIR image. The dilution concentrations of ICG were gradually decreased from standard dose (2.5 mg/ml) to minimum dose (0.2 mg/ml). Patient’s clinicopathologic factors were compared between sFLNM and non-sFLNM group to find favorable factors that affect fluorescent lymph node mapping.

Results
ICG lymph node mapping was successful in 70.3%. Harvested lymph nodes (≥12) were higher sFLNM group (n=135) than non-sFLNM group (n=48) (96.3% vs. 84.2%, respectively, p=0.003). The number of D3 lymph nodes were also greater in the sFLNM group (8.02±6.1 vs. 4.7±6.6, respectively, p=0.002). The successful FLNM was related with ICG dilution concentration (0.5-1 mg/ml, p=0.001), multiple submucosal injection (p=0.003), distinct fluorescent tumor localization (p<0.001), LASER light source system (p<0.001) and lower BMI (p=0.01). On the multivariate analysis, BMI (HR 2.898, 95% CI. 0.137-0.675, p=0.004) and light source (HR 3.290, 95% C.I. 1.481-7.311, p=0.003) were independent factors for sFLNM.

Conclusions
The successful FLNM could increase the harvested lymph node number especially in the D3 lymph node area. The success rate of FLNM could be improved using the optimal protocol of preoperative colonoscopic submucosal ICG tattooing.

indocyanine green (ICG), colonoscopic submucosal tattooing, fluorescent lymph node mapping
Background

Anastomosis is a very important part of the surgery of the intestine and outcomes depend on its stubbornness. Automatic anastomosis is relatively easy and safe enough. In particular, anastomosis performed deep in the pelvic cavity can be a significant procedure. In general, it is commonly recognized as an assistant’s role to apply EEA through the anus in the surgery of the left colon or rectum. However, in recent years as SOLO surgery has progressed, the use of the EEA through the anus can be performed skillfully by the operator.

Purpose of Research

Authors who have applied SOLO surgery to colorectal cancer surgery since 2013 have already performed SOLO EEA application in 112 cases of right colon cancers. And recently the operator was able to apply the EEA safely through the anus by himself. Perform the procedure directly.

Methods

Eight patients, who were operated from November 2019 to early January 2020, were reviewed for postoperative hospital stay, intra and postoperative complications. All patients underwent single-port laparoscopic SOLO surgery. The operation was performed using a camera holder applied to the rail of the operating table. Anastomosis, the application of EEA through the anus was performed by operator without assistant’s help. Check of blood flow by ICG injection was routinely performed right after the anastomosis.

Results

Seven of eight patients underwent anterior resection, and the rest underwent ileo-rectal anastomosis after total colectomy. Two patients underwent surgery without bowel preparation, four patients had been performed splenic mobilization and three had no drain after operation. The average length of postoperative hospital stay was 2 days (0 ~ 6 days). One patient who discharged on the 6th day after surgery, had the condition of preoperative panperitonitis associated with liver abscess. Surgery was performed without bowel preparation in two patients. Diet began on the day or the day after surgery. One patient was re-admitted due to temporary intestinal obstruction but was resolved after non-surgical treatment.

Conclusions

The application of EEA through the anus, which is directly performed by a surgeon, is a technically feasible procedure for SOLO surgery. The procedure did not affect the results or complications. Further extensive research including more patients is needed in the future for the expansion of application of SOLO surgery.
Background

The lateral pelvic sidewall is one of the major sites of local recurrence after radical resection of rectal cancer. Salvage lateral pelvic node dissection (LPND) can be the only way to cure lymph node recurrence at this site.

Purpose

We aimed to demonstrate the safety and feasibility of robotic and laparoscopic salvage LPND for suspicious recurrent rectal cancer.

Materials and Methods

Between 2011 and 2019, 36 patients who underwent salvage surgery for the recurrence at lateral pelvic lymph nodes (LPNs) were retrospectively analyzed.

Results

Of 36 patients, 11 patients underwent the salvage LPND by a robot and 14 underwent it by laparoscopy. The median interval between index surgery and salvage LPND was 20.8 months (range, 7.9-72.0). The median size of recurrent LPNs diagnosed through pelvic MRI was 10 mm (range, 6-25). There were four cases of open conversion during the laparoscopic approach due to uncontrolled bleeding. Metastatic LPNs in all those patients were suspected of iliac vessel invasion and were identified having larger size (median 15 mm; 12-20) than it in successful LPND by the minimally invasive approach (10 mm). The median operation time was 100 minutes (60-420), and the median estimated blood loss was 40 mL (10-300). Five patients underwent en bloc resection of iliac vessels for the safe removal of suspicious recurrent LPNs. The median number of metastatic LPNs was 1(range, 0-3) and number of harvested LPNs was 6(range, 1-16). A total of six patients (24.0%) experienced postoperative complications. During follow-up (median 34.2 months; 2.5-101.7), eight patients developed recurrences, mainly including the lung and para-aortic lymph nodes, and one patient developed pelvic sidewall recurrence after laparoscopic salvage LPND.

Conclusion

Robotic and laparoscopic salvage LPND for treating local recurrence at LPNs is safe and feasible. Therefore, the robotic and laparoscopic approach can be considered a treatment option for local recurrence in selected patients.

rectal cancer; lateral pelvic node dissection
Management and Prognosis Following Right Sided Colonic Resection for Cancer among Elderly Patients

Masood Ur Rehman

Surgical Oncology, Shaukat Khanum Memorial Hospital and Research Center, Pakistan

BACKGROUND

Colo-rectal cancer is the most frequent cancer and the second most common cause of death in Europe. Colon cancer pre-dominantly affects elderly population with median age exceeding 70 years. Surgery plays an integral part in the curative management of colonic cancer with adjuvant chemotherapy if required.

METHODOLOGY

We retrospectively analyzed elderly patients (greater than 65 years of age) with diagnoses of right sided colonic carcinoma over a period of 10 years. Data was collected through electronic system of the hospital. Demographic, clinic-pathological factors, and prognostic factors were recorded. SPSS 20 was used for the data analyses.

RESULTS

A total of 230 patients were registered in SKMCH and RC with diagnoses of right sided colon carcinoma over the period of five years. Among them, 39 patients belong to older age group more than 65 years i.e. 16.95%. Mean age was 71.3 +/- 5.18 years. 27 patients were males and 12 were females. 18 patients had clinically T3 cancer, 2 had T4, 1 had T1. 15 patients had nodal disease on pre-operative imaging. Most common presentations were per rectal bleeding (13 patients), altered bowel habits (10 patients), weight loss (7 patients) and abdominal pain (7 patients). Most frequently encountered tumor site is the ascending colon (n=17), followed by caecum (9) and hepatic flexure (n=5). Due to high incidence of ascending colon and hepatic flexure carcinoma, right hemicolectomy (n=29) was performed more frequently than extended right hemicolectomy (n=10). We used laparoscopic (n=16) and open technique (n=16) in the same proportion; however 6 patients had laparoscopic to open conversion intra operatively. On histopathology specimen, pathological T3 was the commonest stage among all (n=31). Fifteen patients received CapOX in adjuvant setting. 2 patients had recurrence and both of them were treated both surgically and chemotherapy. Metastases were seen in 8 patients. Peritoneal (n=4) and liver (n=3) were the
Background

Various studies have reported the safety and usefulness of robotic minimally invasive pancreaticoduodenectomy. Revo-i robotic surgical system was approved for clinical use in minimally invasive surgery by KFDA. Currently, the second clinical trial is ongoing for the potential application of Revo-i in far advanced minimally invasive surgery.

Case

A 37-year-old man, without any underlying medical condition, presented in the emergency department with seizure and laboratory result showed hypoglycemia (40mg/dL). A screening test was performed to identify reasons of hypoglycemia, and a 2.5 cm solid nodule in the pancreatic head was found in MRI. The signal characteristics partly fit the diagnosis of neuroendocrine tumor. A minimally invasive PPPD was offered to the patient as the best treatment option available. Resection was performed in laparoscopically and Revo-i assisted anastomosis (PJ, and HJ) was conducted. Remnant soft pancreas with less than 2mm need to be managed. Neuroendocrine tumor, grade 1 was reported. After the surgery, neuroglycopenic symptoms related to insulinoma were totally resolved. The patient recovered without any postoperative complications.

Conclusion

Revo-i is feasible and safe even in performing minimally invasive PPPD. Clinical application of Revo-i can be acceptable in well selected patients. Further study is mandatory.

Robot surgery, Revo-i, Pppd
Feasibility and Safety of Re-Laparoscopic Pancreatectomy following Minimally Invasive Initial Pancreatectomy

Munseok Choi¹ and Chang Moo Kang¹∗

¹Department of Surgery, Yonsei University College of Medicine, Korea

Background

Laparoscopic pancreatectomy is increasing with the advance of surgical experiences, improved surgical technique, perioperative management, and accumulating scientific evidence. However, re-laparoscopic pancreatectomy is still uncommon as an alternative approach to open surgery because of the oncological perspective and technical feasibility. Herein, we present our experience, which, to the best of our knowledge, is the largest series reported to date.

Methods

Over the period of March 2014 to May 2019, we performed 8 cases of re-laparoscopic pancreatectomy following minimally invasive initial pancreatectomy at a single institution. The cases include five laparoscopic completion total pancreatectomy and three cases of laparoscopic segmental resection of the pancreas.

Result

Three males and five females in the age range of 32 – 74 years underwent operation. Among them, five cases were laparoscopic completion total pancreatectomy, and three cases were laparoscopic segmental resection of the pancreas. The tumor diameter ranged from 0.7 cm to 4.2 cm. The mean operating time was 304.38 ± 96.12 min. The mean hospital stay was 8.38 ± 2.45 days. So far, there was no major complication higher than the Clavien-Dindo classification grade III.

Conclusion

Re-laparoscopic pancreatectomy could be a good alternative option for well-selected patients with recurred pancreatic tumors.

re-laparoscopic, pancreatectomy, completion pancreatectomy,
Robotic Anatomical Segment IVb and V Resection Using Miyazaki Technique with Radical Lymphadenectomy for Gallbladder Cancer

Kalayarasan Raja
Surgical Gastroenterology, Jimper, India

Introduction

Anatomical segment IVb and V resection with radical lymphadenectomy is the preferred treatment for gallbladder cancer stage T1b and above. Conventionally it is performed by an open approach. The technique of robotic anatomical segment IVb and V resection using the Miyazaki technique not previously reported in the literature is shown in this video.

Method

Four robotic trocars and 2 assistant trocars are used with the patient in the supine position. Anatomic segment IVb and V resection involve two critical steps namely identification of transection line between segment V and VI and identification of transection line between segment IVa and segment IVb. The portal vein and hepatic artery branches to right posterior sector of the liver is clamped with the vascular clip to identify the demarcation between right anterior and posterior sector. This helps to define the transection line between segment V and VI. The transection line between segment IVa and segment IVb is identified by clamping segment IVb branches arising from right side of umbilical portion of left portal vein. The horizontal line of demarcation between segment IVa and IVb is extended along right to meet the line of demarcation between segment V and VI. Parenchymal transection is performed along the marked transection lines using ultrasonic scalpel and electrocautery. Lymphadenectomy includes sampling of 16b1 nodes and complete clearance of station 8, 12 and 13.

Results

Three patients underwent this procedure. The duration of surgery was 310 (28-340) minutes and blood loss was 120 (100-300) mL. All three patients had an uneventful postoperative course and discharged between the fifth and eighth postoperative day.

Conclusion

Robotic anatomical segment IVb and V resection using Miyazaki technique is feasible in high volume centers.
Laparoscopic Revision of Hepaticojejunostomy for Anastomotic Stricture

Sung Hoon Choi

Surgery, Bundang CHA Medical Center, CHA University, Korea

Introduction

Hepaticojejunotomy anastomotic stricture is a rare complication. But once a stricture occurs, the patient’s quality of life is significantly reduced and a long treatment period is required because endoscopic approach is inaccessible for these patients with surgically altered anatomy. As increasing the minimally invasive surgery for hepaticojejunostomy, second operation in case of anastomotic stricture would be feasible because of lesser adhesion compared to open surgery. This video demonstrates the technique of laparoscopic revision of hepaticojejunostomy for anastomotic stricture after left heptectomy and Roux-en Y hepaticojejunostomy.

Methods

The patient was a 43-year-old female who underwent robotic left heptectomy and hepaticojejunostomy for type IV-A choledochal cyst 5 years ago. In the first operation, two small right anterior and posterior hepatic ducts of 2 to 3 mm in size were anastomosed with jejunal limb. Stricture occurred in both hepatic ducts and two separate percutaneous bile duct drainages were required. But the patient refused a long-term period treatment and requested reoperation. Re-operation was performed by laparoscopic approach and revision-anastomosis was made using an articulating laparoscopic needle holder (Artisential®, Livsmed, Korea).

Results

The total operation time was 370 minutes and the estimated blood loss was 150 mL without transfusion. Near complete strictures of previous anastomosis were identified and the stricture sites were excised using a laparoscopic scissor and two openings of hepatic ducts were made into one opening by septoplasty. Duct-to-mucosal anastomosis was made by all interrupted sutures using PDS 5-0 and short silicon catheters were indwelled into the anastomosis site. Her postoperative course was uneventful and discharged on postoperative day 7.

Conclusion

Laparoscopic revision operation could be a good alternative option for hepaticojejunostomy stricture.

Laparoscopic, hepaticojejunostomy, anastomosis, stricture
Early Experiences of Laparoscopic Distal Pancreatectomy Using Articulating Laparoscopic Instruments

Woohyung Lee¹ and Song-Cheol Kim¹ *

¹Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, University of Ulsan College of Medicine, Asan Medical Center, Korea

Background

Although the robotic system has articulating instruments, laparoscopic system usually has straight instrument. Recent articulating laparoscopic instruments were introduced in Korea, and we reported early experience of laparoscopic distal pancreatectomy using articulating instrument.

Methods

Three patients underwent laparoscopic distal pancreatectomy (LDP) from December 2019 and February 2020 using articulating laparoscopic forceps. Operative procedures and perioperative outcomes were described using video.

Results

Three patients underwent LDP for intraductal papillary mucinous neoplasm, and pancreatic cancer. The mean operative time was 180 minutes and estimated blood loss was 120cc. The mean hospital stay was 7 days and there was no severe postoperative complication more than grade III using Clavien-Dindo classification.

Conclusion: Articulating laparoscopic instruments have several advantages such as wide range of motion, easy access for suprapancreatic and perisplenic area. However, surgeon needs proper trocar placement and overcome steep learning curves to clinical use.

articulating instrument, laparoscopic distal pancreatectomy
Intraductal papillary mucinous neoplasms (IPMN) are the most common pancreatic cystic neoplasm. Because of the possibility of progression as malignant features of IPMN, surveillance and timely surgical intervention is very critical in management for IPMN.

We reviewed a 54-year-old female patient with huge pancreatic mass that was 10.5cm multiloculated cystic lesion in pancreas head, branch duct type Intraductal papillary mucinous neoplasms (IPMN) with high risk stigmata, which compressing and abutting to SMV, PV, and CHA. In our center, we already used a stepwise approach and standardized our surgical technique for laparoscopic PPPD. But in this case, we properly modified our standardized technique to overcome the demanding condition. The following issues need to be considered; 1) Indication, 2) preventing cyst rupture, 3) safe dissection of vascular structures, 4) obtaining adequate margin, and 4) potential risk of total pancreatectomy. This video showed the technical feasibility and safety of lap PPPD even in case of huge tumors interfering with surrounding anatomy.

Intraductal papillary mucinous neoplasms
Robot / Endoscope Assisted Neck Dissection by Retroauricular Approach in Early cN0 Oral Cancers - A Preliminary Experience

Ankush Sarwal†, Rajeev Sharan1, Pattatheyil Arun1, Kapila Manikantan1 and Prateek Jain1

1Surgical Oncology, Tata Medical Center, Kolkata, India

Objective

To evaluate feasibility, safety, cosmesis and nodal yields in robotic/endoscopic neck dissection by retroauricular approach in early cN0 oral cancer

Materials and methods

Robot/ endoscope assisted neck dissection by retroauricular approach was done in a total of 24 patients of early cN0 patients between September 2016 and September 2019. Level IIb and part of IIa was dissected under direct vision while level Ia, Ib, Ila, III and IV nodes were dissected with the help of endoscope or da Vinci SI robotic system. The operation time, duration of drain, length of hospital stays, complications, number of retrieved lymph nodes, and cosmetic outcomes were studied

Results

Out of 22 neck dissections, 11 cases were done using endoscope and the 11 neck dissections were done with da Vinci SI robotic system using all three robotic arms. Mean age was 46 years. Out of 24 patients, 11 were male and 11 were female. Twenty patients had tongue cancer. Mean time for skin flap raising was 45 minutes, docking time was 10 minutes. Mean robotic console time was 222 minutes in first 5 cases and 150 minutes in the following 6 cases for completing level I to IV neck dissection. Mean time to removal of drain was 4 days and mean hospital stay was 5 days. Mean number of retrieved nodes were 35.85, ranging from 15 to 73 nodes. Seven patients had positive neck nodes. With median follow up of 13 months (range 1.5 to 34 months), 3 patients developed recurrence (1 local, 1 locoregional and 1 regional).

Conclusions

Robot/ endoscope neck dissection by retroauricular approach in early cN0 oral cancer patients is feasible and safe, but takes longer time. Nodal yields are adequate and better cosmetic outcomes are achieved.

Endoscopic or robotic neck dissection
Transanal Total Mesorectal Excision: The Clinical Experience with 64 First Consecutive Patients in Vietnam

Tuan Nguyen Anh¹, Hiep Pham Van¹ and Khuong Ngo Tien¹

¹Digest, 108 Military Central Hospital, Viet Nam

Background

By giving the enhances visualization of the surgical planes in the mid- and low mesorectum, transanal total mesorectal excision (TaTME) allows the surgeons to get more careful dissection compared to conventional TME. This study aimed to prospectively evaluate the short-term outcomes of TaTME for rectal cancer in Vietnam.

Methods

64 patients who underwent TaTME in Gastrointestinal Surgery Department, 108 Military Central Hospital from July 2017 to July 2019 were included in this study. The data of preoperative stages, tumors’ locations, operative morbidities, macroscopic quality of mesorectal specimens, circumferential resection margins, and anal sphincter functions were collected. The method popularized by Quirke, Kirwan’s classification was used to assess to quality of the mesorectal specimens and the sphincter function respectively. Patients were checked at two weeks post-operation and then every three months in the first year. Statistical analysis was performed using SPSS 20.0.

Results

The mean age of the patients was 66.4± 11.7 years. The mean operative time was 145.7 ± 22.6 mins. Operative morbidity rate was 23.4 % and there was no operative mortality. Regarding the quality of mesorectal specimen, 82.8% was complete and 14.1% was nearly complete. The circumferential resection margin negative rate was 95.2% and the mean follow-up time was 10.0 ± 3.9 months. Disease-free survival and overall survival rates were 98.2% and 100%, respectively. The sphincter function at 12 months post-operation was: 30.8% (Kirwan I), 42.3% (Kirwan II) and 26.9% (Kirwan III).

Conclusion

The TaTME technique is safe and feasible with acceptable results, especially in the quality of mesorectal specimen and sphincter function.

Transanal total mesorectal excision, Rectal cancer
Remote Center Motion of a Surgical Assisted Robot for In-situ Collaboration

Jun Seok Park\textsuperscript{1} and Sangrok Jin\textsuperscript{2}

\textsuperscript{1}Colorectal Cancer Center, Kyungpook National University Chilgok Hospital, Korea
\textsuperscript{2}School of Mechanical Engineering, Pusan National University, Korea

Background

Robot surgery is the latest trend in minimally invasive surgery. Most of surgical robot system have the remote control consoles, and the surgeon is separated from the operating table. However, many surgeons want to freely interfere in robotic surgery and deal with unexpected situation smartly.

Purpose

This paper presents a surgical assisted robot for in-situ collaboration with surgeons on the operating table.

Materials and methods

The robotic platform consists of collaborative robot, end-effector, and cart. Multiple platform can be installed to the operation room depending on surgery. The collaborative robot has 6 revolute joints, and the end-effector which is equipped to the robot has a prismatic joint and a revolute joint. The robot can help surgeons with laparoscope holding or traction of forceps. Surgeons can control the robot through direct teaching, small joysticks, or other intelligent human-robot interfaces on the operating table. Remote center motion is an essential function for surgical robot to maintain the position of the insertion port during the operation. General laparoscopic surgery needs 4DoF motions including rolling, pitching, yawing motions and forward/backward motion. We propose a control strategy for remote center motion with a conventional articulated robot. The motion of laparoscope is divided into two groups. The first group includes pitching and yawing motion, and the second group has rolling and forward/backward motion.

Results

The proposed control strategy for remote center motion was tested using MATLAB GUI. 3D mouse is used for joystick in real time simulation. The position error between the predefined point and the actual remote center during 4 DoF laparoscopic movement. All processes are based on position control to solve the inverse kinematics via sequential quadratic programming.

Conclusions

After tuning to improve performance, the control algorithm will be applied to the actual robot system.

Robot, Remot Center Motion, Collaboration
Comparison of Postoperative Pain After Needle Grasper Assisted Single Incision Laparoscopic Appendectomy versus Single Incision Laparoscopic Appendectomy: Prospective Randomized Controlled Trial

Hochang Chae¹, Jong Won Kim¹*, Joong-Min Park¹, Byung Kwan Park¹, Suk Won Suh¹ and Yong Gum Park¹

¹Department of surgery, Chung-Ang University Hospital, Korea

Purpose

To evaluate the efficacy of our newly developed needle grasper (Endo ReliefTM) assisted single incision laparoscopic appendectomy (NASILA) comparing to single incision laparoscopic appendectomy (SILA).

Methods

A small umbilical incision for Glove Port (as small as for 12-mm trocar) and 2.5 mm suprapubic incision for a needle grasper were made, in NASILA. Total 110 patients who suffered from acute appendicitis without peri-appendiceal abscess on CT scan were randomly divided into SILA group (n=54) and NASILA group (n=56) from December 2017 to August 2018, and 6 patients were dropped out. Postoperative pain score, operation time, main wound incision size and 1 month later telephone interviews for scars were evaluated.

Results

SILA group (male: 61.2%) included 49 patients and NASILA group (male: 54.5%) included 55 patients. Age, body mass index, abdominal operation history, symptom duration and usage of PCA were not significantly different between the two groups. About CT findings, the diameter of appendix were significantly larger in SILA group than in NASILA group. (1.224±0.319 vs 1.102±0.269 cm, p=0.036) Peri-appendiceal fluid were significantly more frequent in NASILA group than in SILA group. (23.6% vs6.1%, p=0.013) There was neither open conversion nor additional incision in both groups. Main wound size was significantly less in NASILA group than in SILA group. (1.8±0.4 vs 2.2±0.4 cm, p=0.001) Operation time and estimated blood loss were not significantly different between the two groups. The immediate postoperative pain score which was the primary end point was significantly lower in NASILA group than SILA group. (2.33±0.98 vs 2.82±1.29, p=0.031) The result of interview for scar on 1month later after surgery was not significantly different between two groups.

Conclusions

NASILA was not inferior to SILA considering cosmetic results but could minimize postoperative pain by minimizing the main wound.

Appendectomy, Laparoscopy, Needle grasper, Reduced port, Single incision
Laparoscopic appendectomy (LA) is increasingly performed as a short-stay however, some patients require prolonged hospitalization because of postoperative ileus and pain; therefore we introduced clipless LA, using an ultrasonic energy device only for coagulation. A total of 1013 patients (clipless LA; n=290 and conventional LA; n=723) who underwent LA at our hospital between January 2015 and February 2018 were analyzed. The mean operative time was shorter (P<0.001) and postoperative pain score at 24h was lower (P<0.001) for clipless than for conventional LA. There were no significant differences in postoperative complications, except regarding early postoperative ileus (clipless LA; 18.1% vs. conventional LA; 31.6%, P=0.025) and operative method had significantly influenced on early postoperative ileus (relative risk, 0.505; 95% confidence interval, 0.257-0.994; p=0.048). In conclusion, clipless LA had comparable operative safety with significantly reduced postoperative ileus and pain, compared to conventional LA.

Clipless surgery, Laparoscopic appendectomy, Postoperative ileus, postoperative pain
Utility of A Versatile Sponge Device in Laparoscopic Surgery for Non-Skilled and Skilled Surgeons As Well

Mikako Shiba¹, Satoshi Matsumoto², Yoshiharu Nakamura³ and Hiroshi Yoshida³

¹Department of Surgery, Shiba Hospital, Japan
²Department of Surgery, Nippon Medical School Chiba Hokusoh Hospital, Japan
³Department of Gastrointestinal and Hepato-Biliary-Pancreatic Surgery, Nippon Medical School, Japan

Background

According to the health care statistics in Japan, there are approximately seventy-three hundred general hospitals nationwide and 70% of these hospitals have less than two hundred beds. In Japanese health care, centers of excellence have not been established and many general surgeries are performed in each general hospital. Therefore, it’s necessary to keep technical quality and safety among not so many operation opportunities. We make a report of utility of a versatile device to perform easier and safer laparoscopic procedures.

Novel device

Securea (Hogy medical co., Japan) was developed as a sponge device for laparoscopic surgery, which consists of polyurethane with a radiopaque string.

Procedure and function

Securea can be taken in and out via a 10mm trocar easily, so it’s inserted in the abdominal cavity at the initial stage of operations. This sponge device can be used as an atraumatic versatile tool to clean and keep dry the surgical field at various situations throughout the operation without exchange of new one. It can be also handled easier by non-skilled surgeons as well and be useful for atraumatic lifting or retraction of any organs, gentle blunt dissections, atraumatic space-occupation, and control of bleeding. In particular, Securea allows the surgeon easier aspiration of any intra-abdominal fluid without suctioning of the omentum or intestine and suction-induced trauma. This device is useful for safe efficient control not only minor oozing but also major hemorrhage as a gentle compression tool without adhering tissues.

Conclusions

We demonstrate utility of the new versatile sponge device. This device allows easier and safer laparoscopic procedures without any special preparations in general hospitals.

laparoscopic new device, sponge device
Does an Experienced Laparoscopic Surgeon Need a Long Learning Curve to Start Robotic Single Site Cholecystectomy?

Kwan Woo Kim¹*, Sung Hwa Kang ¹ and Eun-Jeong Jang ¹

¹Surgery, Dong-A University Hospital, Korea

Purpose

It is well known that a laparoscopic single site cholecystectomy has significant limitations associated with proper triangulation and instrument crowding and collisions. Although the da Vinci Single Site robotic system has been proposed to overcome these problems, the Single Site technology is non-wristed and, unlike other conventional robotic instruments, only provides rotation, the ergonomics. Therefore, many surgeons are reluctant to start robotic single site cholecystectomy (RSSC). The purpose of this study is to demonstrate that an experienced laparoscopic surgeon can safely RSSC with less learning curves using the robotic single site platform by showing objective data obtained from consecutive patients who underwent RSSC by single experienced surgeon.

Methods

Demographic, perioperative, and postoperative data of thirty nine patients who underwent RSSC between April 2019 and Oct 2019 were collected retrospectively.

Results

The mean age and BMI was 45.2 years, 24.69 kg/m2. Male/female ratio was 7/23 (27.3/72.7 %). The mean docking time was 10.2±2.85 min. The mean operation time (skin to skin) was 48.2 min (range, 29–65 min). The operation time is slightly longer than conventional laparoscopic cholecystectomy and shorter than the single site laparoscopic cholecystectomy. None of the patients required an additional laparoscopic arm, an additional robotic arm, or conversion to conventional laparoscopic cholecystectomy. There were not also any specific complications related robotic surgery.

Conclusion

Although our cases are small, the results show that RSSC is a safe, feasible and useful operative procedure. In addition, our study results indicate that experienced laparoscopic surgeons can do RSSC with less learning curve because total operation time is almost the same as conventional laparoscopic cholecystectomy except for the docking time.

robotic single site cholecystectomy
Comparing Laparoscopic and Open Pancreaticoduodenectomy in Octogenarians with Periampullary Tumors

Jisu Kim
Department of Surgery, Yonsei University College of Medicine, Korea

Background
With continued technical advances in surgical instruments and growing expertise, many surgeons have safely performed laparoscopic pylorus-preserving pancreaticoduodenectomies (LPDs) with good results, and the laparoscopic approach is being performed more frequently. Interest in treatments for elderly patients has increased with life expectancy. Here, we investigated safety and feasibility of LPD in octogenarians.

Methods
From September 2012 to May 2019, LPDs were performed for 30 octogenarians at the Yonsei University Severance Hospital. Patients were divided into two groups: those who underwent open PPPD (OPD) (n = 19) and those who underwent LPD (n = 11). We retrospectively analyzed the demographic and surgical outcomes.

Results
The LPD group showed lesser operation time than the OPD group (519.4 min vs. 378.6 min; \( p = 0.002 \)), both group showed similar intraoperative blood loss (332.2 ml vs. 219.0 ml; \( p = 0.119 \)). Other groups showed similar rates of negative resection margins (99.1% vs. 96.2%; \( p = 0.196 \)). Overall delayed gastric emptying rates significantly differ between OPD and LPD group (\( p = 0.007 \)). The clinically relevant postoperative pancreatic fistula (POPF) rates in the OPD and LPD groups was not different between the two group (15.8% vs. 0.0%, \( p = 0.092 \)).

Conclusions: LPD can be a good alternative option for octogenarians with periampullary lesions requiring PD.
Laparoscopic Liver Resection: Current Role and Limitations (Review of Foreign Literature)

Kolbayeva Kazna

Surgery, Regional Medical Center, Kazakhstan

Laparoscopic liver resection (LLR) for the treatment of benign and malignant liver lesions is often performed at specialized centers. Technological advances, such as laparoscopic ultrasonography and electrosurgical tools, have afforded surgeons simultaneous improvements in surgical technique. The utilization of minimally invasive techniques for liver resection has been reported to reduce operative time, decrease blood loss, and shorten length of hospital stay with equivalent postoperative mortality and morbidity rates compared to open liver resection (OLR). Non-anatomic liver resection and left lateral sectionectomy are now routinely performed laparoscopically at many institutions. Furthermore, major hepatic resections are performed by pure laparoscopy, hand-assisted technique, and the hybrid method. In addition, robotic surgery and single port surgery are revealing early promising results. The consensus recommendation for the treatment of benign liver disease and malignant lesions remains unchanged when considering a laparoscopic approach, except when comorbidities and anatomic limitations of the liver lesion preclude this technique. Disease free and survival rates after LLR for hepatocellular carcinoma and metastatic colon cancer correspond to OLR. Patient selection is a significant factor for these favorable outcomes. The limitations include LLR of superior and posterior liver lesions; however, adjustments in technique may now consider a laparoscopic approach as a viable option. As growing data continue to reveal the feasibility and efficacy of laparoscopic liver surgery, this skill is increasingly being adopted by hepatobiliary surgeons. Although the full scope of laparoscopic liver surgery remains infrequently used by many general surgeons, this technique will become a standard in the treatment of liver diseases as studies continue to show favorable outcomes.

Laparoscopic liver resection, laparoscopic hepatectomy, minimally invasive liver surgery, hand-assisted technique, hybrid technique.
The Safety and Feasibility of Single Incision Laparoscopic Cholecystectomy for Acute Cholecystitis: Comparison with Conventional Laparoscopic Cholecystectomy

Seung Jae Lee¹, Ju Ik Moon¹ and In Seok Choi*¹

¹Surgery, Konyang University Hospital, Korea

Background

Single incision laparoscopic cholecystectomy (SILC) is a considerable option in benign gallbladder surgery. However, the safety and feasibility of SILC in acute cholecystitis has not been confirmed. We report our surgical outcomes of SILC in acute cholecystitis compared with conventional laparoscopic cholecystectomy (CLC).

Methods

386 patients who underwent SILC and 592 patients who underwent CLC for acute cholecystitis between April 2010 and December 2018 in single institution were retrospectively reviewed the preoperative characteristics and surgical outcomes.

Results

The patients in CLC group were older (55.1 vs 65.0 years, p<0.001), higher ASA score (12.7 vs 35.5% in over III, p<0.001), and higher incidence of preoperative percutaneous transhepatic gallbladder drainage (PTGBD) than the patients in SILC group. According to Tokyo guideline 18, the patients above grade 2 were more common in the CLC group (15.8 VS 24.3%, p=0.001). There is no statistical significance in operative time, Blood loss, intra-operative transfusion, adjacent organ injury, open conversion, postoperative complication, incisional hernia, and mortality. The length of postoperative hospital stay was significantly shorter in SILC group. On multivariable analysis, grade II or III acute cholecystitis according to Tokyo guideline 18 (TG18), was risk factor for major complication and prolonged operative time.

Conclusion

In our experience, SILC can be a safe and feasible treatment for acute cholecystitis, if appropriate experience and when expertise is available. However, in case of grade II or III acute cholecystitis according to TG18, SILC should be selected carefully.

Single-incision, Laparoscopy, Cholecystectomy, Acute cholecystitis
Comparison of Laparoscopic Common Bile Duct Exploration Combine with Cholecystectomy and Laparoscopic Cholecystectomy with Preoperative Endoscopic Sphincterotomy: In Terms of Surgical Outcomes and Recurrences

Seung Jae Lee¹, Ju Ik Moon¹ and In Seok Choi¹*

¹Surgery, Konyang university hospital, Korea

Background

It is controversial whether Laparoscopic common bile duct exploration (LCBDE) combine with laparoscopic cholecystectomy (LC) is better than LC with preoperative endoscopic sphincterotomy (pre-EST) for management of choledocholithiasis.

Methods

157 patients who underwent LCBDE+LC and 278 patients who underwent pre-EST+LC from January 2010 to December 2018 in single institution were retrospectively reviewed the preoperative characteristics, surgical outcomes, and recurrence of choledocholithiasis.

Results

The patients in LCBDE group were older (70.9 vs 63.5 years, p<0.001) and higher ASA score (38.2 vs 28.8% in over III, p=0.043) than the patients in the pre-EST+LC group. The maximum CBD diameter (13.2 vs 9.5mm, p<0.001) and the maximum stone size (11.4 vs 6.3mm, p<0.001) was significantly larger in patients who underwent LCBDE+LC than pre-EST+LC. Multiple stones were also frequently found in LCBDE group (54.8 vs 43.0%, p=0.017). The operative time (111.4 vs 55.6 minutes, p<0.001) was significantly longer in LCBDE group, while duration of hospital stays after first procedure (6.2 vs 9.8days, p<0.001) was significantly shorter in LCBDE group. There is no statistical significance in conversion to open surgery (1.9 vs 0.4%, p=0.104), retained stones rate (3.2 vs 1.4%, p=0.219), and recurrence rate of choledocholithiasis (8.3 vs 9.4%, p=0.707) between the two groups. In multivariate analysis, old age (over 70years) and CBD dilatation (over 8mm) were risk factor for recurrence of choledocholithiasis.

Conclusion

In our experience, LCBDE+LC can be a safe and feasible management for choledocholithiasis, if appropriate experience and when expertise is available. High risk group of recurrence of CBD stone with old age and dilated CBD should carefully follow-up.

Laparoscopy, Endoscopic sphincterotomy, Choledocholithiasis, Common bile duct exploration, Cholecystectomy
The Chronological Change of Indication and Outcomes for Single Incision Laparoscopic Cholecystectomy - Multicenter Study

YoungHoon Roh¹, Woohyung Lee², Chung Yun Kim³, YoungRok Choi⁴, Hyungjoon Han⁵, Chang Moo Kang⁶, Sung Hoon Choi⁷, Tae-ho Hong⁸ and InSeok Choi⁹*

¹Department of Surgery, Dong-A University Hospital, Korea
²Division of Hepatobiliary and Postgraduate School Department of Surgery, Asan medical center, University of Ulsan College of Medicine, Korea
³Department of Surgery, Cheongdam Cham TNTN Hospital, Korea
⁴Department of Surgery, Seoul National University Bundang Hospital, Korea
⁵Department of Surgery, Korea University Ansan Hospital, Korea University, Korea
⁶Department of Surgery, Severance Hospital, Yonsei University, Korea
⁷Department of Surgery, Bundang Cha Hospital, Korea
⁸Department of Surgery, Seoul Saint-Mary Hospital, Catholic University, Korea
⁹Department of Surgery, Kunyang University Hospital, Korea

Background
Although single incision laparoscopic cholecystectomy (SILC) has been widespread, the change of indication and perioperative outcomes was not analyzed according to the times and accumulation of experiences.

Methods
We collected clinical data of the patient who underwent SILC in nine experienced centers between 2009 and 2018, and perioperative outcomes were compared.

Results
In this period, 6497 patients underwent for gallbladder (GB) stone (2583, 39.7%), GB polyp (774, 11.9%), chronic cholecystitis (994, 15.3%) and acute cholecystitis (1492, 23%). And 162 (2.5%) patients experienced postoperative complication with 20 (0.2%) patients of biliary leakage including 10 patients of intraoperative CBD injuries. The patients who underwent SILC for acute cholecystitis (AC) was increased over time (p = 0.028) and accumulation of experience (early vs late period; 23.7 vs 27.4 %, p = 0.002). The patients with late period was related with more frequent previous laparotomy (29.5 vs 20.2 %, p = 0.006), shorter operation time (47.0 vs 58.8 minutes, p < 0.001), and comparable severe complication rate (0.7 vs 0.4 %, p = 0.574) compared with early period. The patients with GB perforation showed higher postoperative complication rate (5.1 vs 2.3 %, p = 0.001) such as wound problem, fluid collection, or biliary leakage and more frequent AC patients (21.6 vs 11.7 %, p = 0.001).

Conclusion
AC became expanded indication of SILC in experienced stage. In this period, the patients with previous laparotomy were found more frequently, they showed shorter operation time and comparable severe complication rate despite of more AC patients.

Acute cholecystitis, Single incision laparoscopic cholecystectomy, Parkland classification, Tokyo guidelines, Intraoperative finding
Early Experience of Ambulatory Laparoscopic Cholecystectomy in Thailand

Nattawut Keeratibharat

Surgery, Institute of Medicine, Suranaree University of Technology, Thailand

Background

The benefits of laparoscopic cholecystectomy (LC) include faster recovery, earlier return to work and less postoperative pain when compared to open cholecystectomy. Ambulatory laparoscopic cholecystectomy is an established practice in the western country due to cost effectiveness and safety, but it is not well established in Thailand.

Purpose

The aims of our study are to demonstrate the applicability and safety of ambulatory laparoscopic cholecystectomy from our early experience.

Methods

Data was collected retrospectively for ambulatory laparoscopic cholecystectomy from January 1, 2018 to June 30, 2018. Patient demographic data, peri-operative data and post-operative data were collected and analyzed.

Results

Six patients were underwent ambulatory laparoscopic cholecystectomy in our hospital and all patient were discharged on the day of surgery. Patients satisfaction rate was 100%. Mean operative time was 55 minutes and mean blood loss was 13.7 ml. There were no unexpected hospitalization and prolong stay in our study.

Conclusion

Ambulatory LC can be performed safely in our early experience. Ambulatory LC in Thailand is still new method for patients and some physicians. The further study from our hospital may encourage ambulatory LC for standard method in gallstone disease in Thailand.

Ambulatory laparoscopic cholecystectomy,
Safe Cholecystectomy Using an Indocyanine Green (ICG) Fluorescence Cholangiography during Needlescopic Grasper assisted Single Incision Laparoscopic Cholecystectomy (nSILC)

Kee Hwan Kim* and Yong Seon Kim

1Surgery, Uijeongbu St. Mary's Hospital, The Catholic University of Korea, Korea

Background

Bile duct injuries are the most dismal complication in cholecystectomy. The Critical View of Safety (CVS) has been shown to be a good way to obtain the secure anatomical identification.

Purpose

We try to get an early detection of imaginatory dissection line for obtaining the CVS using an ICG fluorescence cholangiography during needlescopic grasper assisted single incision laparoscopic cholecystectomy (nSILC).

Methods: Fifteen patients underwent needlescopic grasper assisted single incision laparoscopic cholecystectomy (nSILC) using an ICG cholangiography. Basic information about the patient and diagnosis was collected. The surgical outcome that was composed with early detection time and rate of imaginatory dissection line, critical view of safety (CVS) time, major procedure time and total operation time, and the postoperative complication was made.

Results

ICG cholangiography group was consisted of 3 male (20%) and 12 female (80%). The average age of nSILC group was 43.5 ± 11.0 years old. There were no statistical differences in height, weight, body mass index, and post-operative hospital stay. The diagnosis was gallbladder stone, gallbladder polyp, gallbladder adenomyomatosis, acute cholecystitis. CVS time of nSILC group was 22.5 ± 9.6 min, major procedure time (skin incision to GB removal from liver bed) of nSILC group was 40.1 ± 21.7 min. Total operation time(skin to skin) of nSILC group was 67.9 ± 24.1 min. Imaginatory dissection line obtaining rate showed all patients (15/15) and, confirmatory dissection line obtained all patients.

laparoscopic cholecystectomy, Indocyanine green(ICG) fluorescence cholangiography , needlescopic assisted single incision laparoscopic cholecystectomy

Gang Xu¹, Junxiang Tong², Zhixiang Hong³, Jiajun Ji⁴ and Shunda Du¹*

¹Liver Surgery, Peking Union Medical College Hospital, China
²Hepatobiliary Surgery, Chinese PLA General Hospital, China
³Hepatobiliary Surgery, Fifth Medical Center of Chinese PLA General Hospital, China
⁴Hepatobiliary Surgery, Beijing Tongren Hospital, China

Background

Caudate lobectomy via laparoscopic surgery has rarely been described. This multicenter, propensity score-matched (PSM) study was performed to assess the safety and efficacy of laparoscopic caudate lobectomy (LCL).

Purpose

The purpose of the study was to compare the safety and perioperative outcomes of LCL with open caudate lobectomy (OCL) based on a large data collected from four institutions in China by using PSM.

Methods: A multicenter retrospective study was performed including all patients who underwent LCL and open caudate lobectomy (OCL) in four institutions from January 2013 to December 2018. In total, 131 patients were included in this study and divided into LCL (n = 19) and OCL (n = 112) groups. LCLs were matched to OCLs (1:2) using a propensity score matching (PSM) based on 9 preoperative variables, including patient demographics and tumor characteristics. The pathological results, perioperative and postoperative parameters, and short-term outcomes were compared between the two groups.

Results

After PSM, there were 18 and 36 patients in the LCL and OCL groups, respectively. Baseline characteristics were comparable after matching. LCL was associated with less blood (100 vs. 300 ml, respectively; P < 0.001) and a shorter postoperative stay (6.0 vs 8.0 days, respectively; P = 0.003). Most patients’ resection margins were >10 mm in the LCL group (P = 0.021), and all patients with malignancy in both groups achieved R0 resection. In terms of early postoperative outcomes, the overall morbidity rate was identical in each group (11.1% vs. 11.1%, respectively; P = 1.000). No mortality occurred in either group.

Conclusions

Laparoscopy is a feasible choice for resection of tumors located in the caudate lobe with acceptable perioperative results.

Caudate Lobectomy, Laparoscopic Surgery, Multicenter
Combined Laparoscopic and Endoscopic Treatment for Choledocholithiasis at Intermed Hospital of Mongolia

Gendensuren Dorjkhorloo¹ and Enkh-Amgalan Tsiiregzen¹*

¹Surgery Department, Intermed Hospital of Mongolia, Mongolia

Background

To summarize our experience and results of combined endoscopic and laparoscopic treatment for choledocholithiasis retrospectively, and to evaluate the safety of the minimally invasive approach.

Patients and Methods: During the time period from January 2017 until Jan 2020, 15 patients with choledocholithiasis were managed at Intermed hospital. Data of the surgical procedure, as well as post operative complications were retrieved from the medical records retrospectively. Regarding the patient characteristics, mean age was 55 years (29-90 years), 8 (53%) patients were female.

Results

Mean combined operation time was 149min (80-256min), mean blood loss 13ml (0-100ml). Mean hospital stay after treatment was 4.2days (2-13 days). In terms of complications, there were no complication occurred during the combined operations. However, postoperatively 1 patient had a ERCP induced acute pancreatitis, graded as a Clavien-Dindo grade II. Open conversion rate was 0%.

Conclusion

Combined laparoscopic and endoscopic method is safe and feasible approach for treatment of choldocholithiasis.

Choledocholithiasis, Cholecystitis,
**Robotic Single Site plus One port: Choledochal Cyst Excision**

*Jae Uk Chong¹, Jin Ho Lee¹ and Kuk Hwan Kwon¹*

¹Surgery, National Health Insurance Service Ilsan Hospital, Korea

**Background**

Choledochal cysts in adults are rare and the treatment requires complete excision of the cyst with bilio-enteric reconstruction. With the advancement in technology, robotic surgical system now provides advantages over the limitations of conventional laparoscopic surgery. Here, we present three cases of robotic single site plus one port choledochal cyst excision with roux-en-Y hepaticojejunostomy.

**Methods**

Da Vinci single-site surgical platform (DVSSP) with one additional port was used. The additional robotic 8mm-port was placed on patient's right side, along the level of DVSSP. Choledochal cyst was dissected from the level of hepatic hilum to intrapancreatic common bile duct and distal part of cyst was ligated with hemoclips. After transecting proximal part of cyst at the level of hilum, roux-en-Y hepaticojejunostomy was performed intracorporeally in a retrocolic manner. Drain was inserted at the additional port site.

**Results**

Patient #1 was a 54 year-old female diagnosed with Type I choledochal cyst, measuring 3.7 x 1.8cm. Total operation time was 420 minutes. Patient was discharged on POD #7.
Patient #2 was a 45 year-old female diagnosed with Type I choledochal cyst, measuring 6.3 x 3.1cm. Total operation time was 485 minutes. Patient was discharged on POD #8. Postoperative pancreatitis was resolved after conservative care.
Patient #3 was a 59 year-old male diagnosed with Type IVa choledochal cyst, measuring 8.7 x 6.4cm. Total operation time was 520 minutes. Patient was discharged on POD #13. Bile leakage was resolved after delayed removal of the drain.

**Conclusion**

Robotic single site plus one port choledochal cyst excision seems feasible and safe with better anatomic visualization and increased dexterity for bilio-enteric reconstruction.
Comparison between Conventional Laparoscopic Splenectomy and Robotic Reduced-port Splenectomy using Single-site Platform

Kyungyeon Hwang\(^2\), Jae Hoon Lee\(^1\), Dae Wook Hwang\(^1\), Ki Byung Song\(^1\), Woohyung Lee\(^1\), Jaewoo Kwon\(^1\) and Yejong Park\(^1\)

\(^1\)Division of Hepatobiliary and Pancreatic Surgery, Asan Medical Center, Korea
\(^2\)Department of Surgery, Kangdong Sacred Heart Hospital, Korea

INTRODUCTION

The Da Vinci Robotic reduced-port splenectomy using Single-site platform permits greater freedom of movement and higher levels of accuracy than previous laparoscopic surgery through two small incisions.

METHODS

We performed a retrospective review of all patients who underwent laparoscopic splenectomy and Robotic reduced-port splenectomy using Single-site platform at our institution between January, 2015 and December, 2018.

For robotic procedure, the patient is positioned supine and then rolled 45 degree to the right. One 3 – 4 cm long periumbilical incision was made for Glove port insertion and the other 8mm long incision was made at left side of abdomen for additional 8mm port insertion.

Laparoscopic procedure requires four trocars (two 10mm and 5mm). The surgical technique is very similar in both groups.

RESULTS

A total of 36 patients (29 laparoscopic vs 7 robotic splenectomies) were included in the study. The indications were: hematological disease (N=12), splenic mass (N=17), others (N=7). No significant difference were seen preoperative patients demographics. There were no intraoperative complications and conversion to open surgery in both groups. The median operative time tend to longer in robotic group compared to laparoscopic group (137.5min vs. 85min). The postoperative morbidity tends to higher in laparoscopic group (14.28% vs. 27.59%).

In robotic group, one patient experienced PVT, but resolved without any treatment. In laparoscopic group, 7 patients experienced portal vein thrombosis or splenic vein thrombosis and 3 of them needed anticoagulation therapy. There was no significant difference in hospital stays after operation and postoperative pain scales between two groups.

CONCLUSIONS

Robotic reduced port splenectomy is associated with better cosmetics, surgeon’s convenience of ergonomics and longer operative time than the laparoscopic procedure. We think 8mm additional port allows to use Endo-wrist Da Vinci instruments such as Vessel sealer which enhances dissection efficiency and safety of procedures.
Endobiliary Stenting at Cicatricial Strictures of the Extrahepatic Biliary Tract and External Biliary Fistula

Abror Azzamov¹, Umidakhon Karimova²* and Khuseyn Gadaev¹

¹Faculty Surgery, Tashkent Medical Academy, Uzbekistan

Objective

To improve the results of surgical treatment using endoscopic technologies.

Materials and methods

Endoscopic retrograde pancreatocholangiography (ERCP) occupies a leading position in the diagnosis of CSEB and EBF, as well as polypropylene fistulography in the recognition of pathology and the choice of tactics for its detection. Over the past 10 years, 649 ERCPs with endoscopic papillosphincterotomy (EPST) have been performed in 256 patients. In the presence CSEB, biliostentation of segments was undertaken. Both standard endobiliary stents and biliostents designed in our institution were used.

Results

52 endoscopic biliostentations were performed in CSEB and EBF. In 10 cases, a critical characteristic of progressive obstructive jaundice was observed. In 28 cases, pathology was detected in the fusion zone of the bile and cystic ducts. In 14 observations, obstruction of the outflow of bile was found in the distal part of the common bile duct. As a result of endoscopic treatment after the initial course, recovery of bile outflow was achieved in 46 (89.4%) patients, in 6 (10.6%) cases within 6–8 months relapses of stenosis were noted. Due to relapse, 3 patients underwent reconstructive surgery, 3 other elderly patients who were repeatedly operated on on the biliary tract, underwent repeated courses of endoscopic treatment. At different times (from 6 to 10 months), stents were removed during duodenoscopy.

Conclusions

The method of endobiliary stenting is progressive and direct in nature, in which the patient is not at risk of general anesthesia, which requires complex reconstructive interventions and related further specific complications. The effectiveness of endoscopic interventions in the presence of NSS, the highest in the distal location of the pathology. According to our data, endoscopic intervention was ineffective in 24.2% at the proximal location of the EBF, while only 3.5% at the distal location.

ERCP, endoscopic papillosphincterotomy
Clinical Feasibility of Duct-to-mucosa Pancreaticojejunostomy in Laparoscopic Pancreaticoduodenectomy: Comparison with the Same Technique in Open Pancreaticoduodenectomy

JaRyung Han¹, Young seok Han¹*, Hyung Jun Kwon¹ and Sang geol Kim¹

¹HBP surgery and Liver transplantation, Kyungpook National University Hospital, Korea

Background

With advances of laparoscopic surgery, laparoscopic pancreaticoduodenectomy (L-PD) was adopted by a few experienced surgeons. Characteristics of PD including 3 reconstructions and complex vascular anatomy has been an obstacle to the adoption of L-PD.

Purpose

Duct-to-mucosa pancreaticojejunostomy (DM-PJ) is one of the most commonly used technique in pancreaticoduodenectomy (PD). However, DM-PJ can be considered technically a challenge procedure in laparoscopic PD (L-PD), especially in cases with small pancreatic duct. Therefore, we will present the clinical feasibility and technical tips for DM-PJ in L-PD compared to open PD.

Methods

Between January 2016 and December 2019, we performed 120 cases of PD. Among them, 60 patients underwent totally L-PD. We retrospectively reviewed the medical records to ascertain the safety and the reproducibility of DM-PJ and compared with open DM-PJs.

Result

Significant pancreatic fistula [International Study Group on Pancreatic Fistula (ISGPF) grade B or C] in L-PD was less than 10%, and this complication was even more higher than open DM-PJ group. The postoperative mortality in L-PD was nil and this result was also lower than open DM-PJ. The postoperative complication than Clavien-Dindo classification III was identified in 4 patients in L-PD, but recovered by interventional management. The conversion to open PD was required in one patient with tumor invasion to the superior mesenteric vein, but there was no open conversion because of technical difficulty of DM-PJ. We believe that DM-PJ in L-PD can be the standard method as in open PD, because of the magnification of laparoscope and advancement of laparoscopic techniques. And, further development of laparoscopic instruments is essential.

laparoscopic pancreaticoduodenectomy, duct-to-mucosa pancreaticojejunostomy
Gallbladder Clear Cell Carcinoma: a Case Report

Batsuuri Bayanduuren

General Surgery, Grandmed hospital, Mongolia

Bayanduuren B*, Altanhuyag B, Enkhhayag, Batbaatar G, Mishigdorj L, Bulgan ch, Gonchigsuren D
Grand med Hospital, Ulaanbaatar, Mongolia
*Email: mgl_bayanaa@yahoo.com

Introduction

Worldwide, the highest incidence rates (up to 7.5 per 100,000 in men and 23 per 100,000 in women) occur among populations in the Western part of South America (Chile and Peru), in North American Indians, in Mexican Americans, and in northern India. The best characterized risk factor for the development of gallbladder cancer is chronic inflammation associated with gallstones.

Case presentation

54-year-old female, with no prior medical conditions presented with a 10 days history of upper abdominal pain. Last 4 days ago right abdomen upper quadrant pain, vomiting. Routine hematological leukocytosis and biochemical tests were CRP increased. An abdominal ultrasound revealed the gallbladder is enlargement, about 6.0*3.0 cm like the mudstone in the gallbladder. GB wall thickening/double/. Common bile duct is dilated /1.2cm/. Computed tomography imaging: Moderate thickening with surrounding mild edematous changes in wall of the gallbladder. Size of the GB is moderated dilated with diffuse sludges. IHBD is no dilated, CBD is mild dilated 1.2 cm and no sign of biliary tract obstruction. An open cholecystectomy. Upon pathologic investigation, the morphologic and immunophenotypic features supported a diagnosis of clear cell variant of gallbladder carcinoma.

Discussion

Clear cell gallbladder carcinoma was first reported in 192. Clear cell carcinoma represents on average over 90% of all malignancies of the kidney. Approximately 20%-30% of patients with clear cell carcinoma have metastatic disease at presentation and nearly 50% of patients with advanced disease die within 5 years of diagnosis.

Conclusion

Clear cell carcinoma, gallstone disease, open cholecystectomy, intraoperative cholangiogram, gallbladder cancer,
Liver Abscess Secondary to Acute Cholecystitis

Muhammad Zakria

Surgery, Wapda Medical Complex, Lahore, Pakistan

INTRODUCTION

Acute cholecystitis is managed conservatively and then definite treatment is surgery. Sometimes patients present late or they have stone impacted in the neck of gall bladder and have many other associated morbid conditions. They are also diagnosed with liver abscess along with cholecystitis. Abscess can be found anywhere in the liver but if we found abscess in the base of the gall bladder bed, specially segment IV b and V, then it is most likely to be bacterial liver abscess secondary to the cholecystitis or empyema gall bladder.

METHOD

A 55 years old male presented with pain right side abdomen, fever, and vomiting. His laboratory tests were showing high leucocyte count. Ultrasound and CT scan abdomen were showing distended gall bladder with signs of inflammation around the gall bladder wall was edematous. There was also hypo echoic area at bed of the gall bladder about 4x3 cm. It was confirmed as abscess and later on the case was managed conservatively. Abscess was resolved and interval cholecystectomy was done after 2 weeks.

RESULT

Post-operative recovery was unevent full and patient was discharged safely after one day.

CONCLUSION

Liver abscess at the base of gall bladder bed can be due to the complication of Acute Cholecystitis. It is mainly bacterial in natural rather amoebic. Initial treatment should be intravenous antibiotics and then depending upon the condition of the patient early or late surgery for gall bladder is the answer of this issue. This picture is mainly observed in immunocompromised patients or diabetic or renal diseases.

Liver abscess, Cholecystitis,
Feasibility of Laparoscopic Liver Resection in Stage 2 and 3 Gall Bladder Carcinoma

Mizelle DSilva1 and Ho-Seong Han1*

1General Surgery, Seoul National University Bundang Hospital, Korea

Background

Over the last few decades, laparoscopic liver resection particularly for hepatocellular carcinoma and liver metastasis, is being gradually adopted at high volume centers. Gallbladder cancer (GBC) in itself is a controversial issue in the field of minimal invasive hepatobiliary surgery. Concerns ranging from, port site recurrence, bile spillage causing cancer dissemination, to safety of liver resection, are some of the issues faced by hepatobiliary surgeons.

Purpose

Our aim was to study the outcomes of patients who underwent laparoscopic liver resection in GBC in comparison to those that underwent open surgery.

Methods

All patients admitted to Seoul national University Bundang Hospital with stage 2 or 3 GBC requiring liver resection along with cholecystectomy and lymphadenectomy were retrospectively analysed. The thickness of the resected liver specimen was evaluated on pathology report, and only those patients with liver specimen thickness more than 2 cm were included in the study. Data was analysed using SPSS version 20.

Results

A total of 65 patients of stage 2 and 3 GBC were included in the study, 24(36.9%) patients underwent a laparoscopic approach while 41 (63.1%) patients underwent open surgery. Preoperative characteristics were comparable between both groups. Intraoperative factors like blood loss and operative time were similar between the laparoscopy and open group (P=0.269, P=0.672, respectively). Similarly median hospital stay (P=0.912), number of lymph nodes resected (P=0.087), and postoperative major complications (P=0.398) were similar between both groups. There was no significant difference in 5 year disease free and overall survival rates (P=0.286, P=0.167; respectively)

Conclusion

Laparoscopic liver resection when extended to gallbladder cancer can provide outcomes similar to those with open surgery. With increasing experience laparoscopic liver resection in gallbladder cancer can be a viable alternative to open surgery

Laparoscopic liver resection, Gall bladder carcinoma
Rare Case of Type Va Extrahepatic Bile Duct Anomaly

Ashish Prasad Rajbhandari
Surgery, GI unit, Nepal Medical College, Nepal

Double common bile duct (DCBD) is an extremely rare congenital anomaly in which two common bile ducts exists. There are five different types of this anomaly and we present a unique variant of a duplication of an extrahepatic biliary system of type Va variety.

A 63 year female presented with a history of right upper abdomen pain, intermittent fever and jaundice for few months. On general examination she had icterus with a normal abdomen examination. LFT was raised and Magnetic resonance cholangiopancreatography (MRCP), the IHBDs from the right lobe of liver drains into the right hepatic duct that forms a separate CBD. The cystic duct opens into it. The IHBDs from the left lobe of liver drain into the left hepatic duct that forms a separate CBD. Both CBD appeared mildly dilated proximally and descended separately till a point where there was a stone.

Intra-operative findings were contracted gall bladder with multiple tiny calculi, two separate draining bile ducts which were fused just before opening to ampulla, common duct contained calculi of 1x1 cm2, and cystic duct opened on right duct. Diagnosis of type Va DCBD with choledolithiasis with choledocholithiasis was made. Cholecystectomy was done, common duct explored and stone was extracted. The right duct was divided just proximal to opening of cystic duct, left duct also divided at the same level and short segment of both ducts excised. After closing distal common CBD stump, reconstruction done by ductoplast (joining two ducts) with hepatico-jejunostomy in Roux-En-Y fashion.
Laparoscopic cholecystectomy is now regarded as the gold standard treatment for symptomatic cholelithiasis. Muscle splitting mini cholecystectomy is a good alternate option for those who are not fit for the laparoscopic procedure and in those institutes where the laparoscopic facilities are not available. It is the muscle division which is supposed to be responsible for postoperative pain and the resultant local and systemic effects. All cases of symptomatic cholelithiasis were advised laparoscopic cholecystectomy and only those cases which opted for open cholecystectomy or were not fit for the laparoscopic procedure were included in the study. 25 cases of consecutive open cholecystectomies underwent muscle splitting procedure from June 2016 to May 2018 at Stupa Community Hospital, Jorpathi, Kathmandu, Nepal. 17 were female and age ranged from 19 – 82 years. 1 case was of morbid obesity with a weight of 99.6 kg and BMI of 44. 2 cases were of preoperative diagnosis of empyema gallbladder and 1 case was of perforated gall bladder. The subcutaneous fat thickness ranged from 1.5 to 4 inches. All cases had a transverse incision in the RUQ around the tip of the 9th coastal cartilage; the length was usually around 5 cm (mini cholecystectomy) except for the complicated cases which extended to 7 cm. Drain was kept in the 3 complicated cases. The duration of surgery varied from 35-85 mins. Post operative pain scale was taken in all cases, on 1st post operative day pain scale ranged from 4-6 and on 2nd post operative day 2-5. 22 cases (except the complicated cases) were discharged on the 2nd post operative day. All cases with drain had an uneventful period with no leakage of bile and were removed on the 3rd post operative day and discharged on the 5th post operative day after completion of a course of antibiotics. Muscle splitting cholecystectomy
**Laparoscopic Endocystectomy in Patients with Liver Echinococcosis**

Klyshbekov Asylbek

Surgery 2, Regional Medical Center, Kazakhstan

AIM. To evaluate the efficiency and to review the indications for laparoscopic endocystectomy in liver echinococcosis.

METHODS. The results of laparoscopic endocystectomy in 86 patients treated for liver echinococcosis compared to cystectomy by laparotomy in 159 patients are presented. RESULTS. Optimal characteristics for laparoscopic endocystectomy were types CL, CE1-CE3 of cystic echinococcosis according to cystic echinococcosis ultrasonic classification by H.A. Gharbi (1981) modified by World Health Organization (2003) with cysts localized in 2-6 liver segments; partial superficial location of cysts; cyst size not less than 5 cm; no cysts in 1, 7 and 8 liver segments or deeply located cysts of any size, as well as cysts of CE4-CE5 types.

Of the 86 cases in which laparoscopic endocystectomy was completed successfully, in 4 patients the surgery was continued by a laparotomy access. The reasons for the continuation with laparotomy were unsuccessful attempts for stable hemostasis at resection of liver fibrous capsule excesses (1 case), presence of large fistula between the cyst and components of the biliary system at the bottom of the fibrous cavity (2 patients), and location of the second cyst in the segment unavailable for laparoscopic manipulation (1 case). The frequency of early complications after laparoscopic endocystectomy was 15.1% (p=0.23). Relapse occurred in 1 (1.2%) patient (p=0.23). Comparative assessment of echinococcosis recurrence risk in different periods (Kaplan-Meier analysis) after laparoscopic interventions and laparotomy, both followed by albendazole treatment, did not identify any statistically significant differences. CONCLUSION. The early and long-term effects of laparoscopic endocystectomy in liver echinococcosis are not inferior to conventional laparotomy if indications are strictly followed.

Laparoscopic endocystectomy, liver echinococcosis
The 56-year-old male patient has suffered from intermittent colicky pain on right upper quadrant and visited to OPD of department of surgery at university hospital in 2010, January 17. He was performed MRI of liver in 2010, 1.17 and diagnosed as aberrant cystic duct originated from cdb, long cystic duct and later he doesn't have no symptom and has long term follow up.

Aberrant cystic duct is very rare anomaly of bile duct and the cause of its is still unknown. The one case of double cystic duct as aberrant cystic duct arose from cystic duct, communicated with intrahepatic duct of right posterior segmental branch was reported after laparoscopic cholecystectomy. The others were right hepatic duct draining into cystic duct, left main hepatic duct draining into cystic duct. The surgeon must identify and diagnose the bile duct anomaly preoperatively or intraoperatively for cholecystectomy or hepatobiliary surgery. Because, it was occured bile leak of iatrogenic injury after cholecystectomy and laparoscopic cholecystectomy and may turn out to be serious complications.

We have to perform ultrasonography and CT scan, MRCP to diagnose aberrant cystic duct and other bile duct anomaly and also carefully perform laparoscopic surgery intraoperatively.

The author reports aberrant cystic duct originated from common bile duct and long cystic duct in korea for the first time.
Optimization of Tactics of laparoscopic Cholecystectomy in Patients with Adhesive Disease

Farukh Makhmadov¹, Jamshed Mirbegiev¹, Paimon Karimov¹ and Haem Mahmaderov¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan

Introduction

Improving the results of laparoscopic cholecystectomy in patients with adhesive disease by reducing the frequency and severity of the adhesive process in the abdominal cavity.

Methods

The study is based on an analysis of 120 patients with calculous cholecystitis with adhesive disease who were treated from 2010 to 2018. There were 41 men (34.2%), women - 79 (65.8%). The main group included 70 (58.3%) patients who underwent laparoscopic cholecystectomy (LCE), and the control group included 50 (41.7%) patients who underwent traditional cholecystectomy (TCE).

Results

In 25 (20.8%) patients, the postoperative period proceeded with a prolonged paresis of the gastrointestinal tract, in 28 (23.3%) - the postoperative adhesion process was combined with repeated episodes of hepatic colic in the anamnesis, and in 45 (37.5%).

In 12 (17.1%) cases, when the adhesions of the upper floor of the abdominal cavity were separated and the neck of the bladder was isolated, the presence of Mirizzi's syndrome was suspected, which was confirmed by intraoperative cholangiography. Mirizzi type I syndrome was diagnosed in 9 (75%) patients. Mirizzi type II syndrome - in 3 (25%) cases.

With Mirizzi type I syndrome, we performed LCE. With Mirizzi syndrome of type II, in the case of the formed cholecystocholedochoheal fistula, a conversion was performed, TCE with intraoperative choledochoscopy. Intraoperative complications with LCE were noted in 11.4% of cases, unlike 20.0% with TCE. In the postoperative period, surgical complications were 5.7% and 14.0%, respectively.

The duration of hospital stay after surgery in patients of the main group was 4.9±1.1 days, in the control - 7.7 days.

Conclusion

Using the developed LCE techniques allows reducing the duration of the operation, reducing the number of intra- and postoperative complications, and thereby improving the results of surgical treatment of this severe contingent of patients.

laparoscopic cholecystectomy, adhesiolysis, Mirizzi syndrome
Criteria for Selection of Laparoscopic Cholecystectomy in patients with Adhesive Disease

Farukh Makhmadov¹, Jamshed Jamshed Mirbegiev¹, Paimon Karimov¹ and Haem Mahmaderov¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan

Introduction

To study the selection criteria for laparoscopic cholecystectomy (LCE) in patients with adhesive disease.

Methods

The study is based on an analysis of 70 patients with adhesive disease who underwent LCE. Women were 48 (68.6%), men - 22 (31.4%). All examined patients had a history of previous surgery on the upper floor of the abdominal cavity, such as: resection of the stomach (n=7), suturing of perforation of gastric ulcers and 12 duodenal ulcers (n=19), echinococcectomy from the liver (n=16), operations about a hernia of the white line of the abdomen (n=26), injuries and stab wounds to the abdomen (n=2). Of these, 24 (34.3%) patients had previously undergone 2 or more operations on the upper floor of the abdominal cavity. In 62 (88.6%) cases, patients needed simultaneous surgery - adhesiolysis.

Results

In particular, in 43 (61.4%) patients, adhesions had echo positive inclusions of an elongated form or in the form of small-dot formations. In 12 (17.1%) cases, after echinococcectomy (n=5) and suturing of perforation of stomach ulcers and 12 duodenal ulcers (n=7), they had a picture of adhesions merging with each other by the formation of small block conglomerates of irregular oval configuration. A combination of cicatricial changes of various forms was noted in 13 (18.6%) patients. And in 7 (10%) adhesions the process was represented by an echo positive heterogeneous cord. In 16 (22.8%) cases, the first trocar was introduced using the Hassan open method. The average duration of simultaneous surgery with adhesiolysis increased by 15-30 minutes and amounted to 59.6 ± 6.1 minutes. The average stay of patients in a bed after surgery was 4-5 days.

Conclusion

Correct preoperative diagnosis of patients with adhesive disease allows you to effectively perform laparoscopic cholecystectomy.

laparoscopic cholecystectomy, adhesiolysis, Mirizzy syndrome
The Choice of the Method of Cholecystectomy in Acute Calculus Cholecystitis in Persons with High Operational Anesthesiological Risk

Farukh Makhmadov¹, Jamshed Mirbegiev¹, Paimon Karimov¹ and Haem Mahmaderov¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan

Introduction

To determine the indications for non-standard laparoscopic cholecystectomy in acute calculous cholecystitis in patients with high operational and anesthetic risk.

Methods

The features of non-standard LCE of 89 patients with high operational and anesthetic risk at the age of 58-84 years, operated on for acute calculous cholecystitis for the period 2007 to 2017, are analyzed. According to the testimony, non-standard LCE, such as LCE from the bottom (n=29), subtotal LCE (n=15) and laparoscopic variant of the Pribram operation (n=6), were used according to the method developed by the authors. For the objectification of assessing the severity of the general condition, the Simplified Acute Physiology Score - SAPS II scale was used.

Results

The average SAPS II in patients with LCE was 31.9±1.6 points. In 10 (11.2%) cases with a score of 30 to 32 and an estimated risk of death of 10.8±0.4%, the operation was started laparoscopically using the minimum pressure in the abdominal cavity, however, due to uncropped arrhythmia during operations in 3 patients - there was a forced transition to laparotomy. In other cases, it was possible to produce different versions of LCE. Postoperative complications were noted in 8 (9.0%) cases.

Conclusion

Patients with acute calculous cholecystitis with high operative-anesthetic risk require individual surgical tactics. At the same time, the SAPS II scale helps to choose the most rational method of surgical treatment. Different versions of LCE allow low-impact operation of this heavy contingent of patients, with good results.
Development of Methods of Laparoscopic Cholecystectomy in Patients with High Anesthesiological Risk

Farukh Makhmadov¹, ², Jamshed Mirbegiev¹, Paimon Karimov¹ and Haem Mahmaderov¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
²Department of Abdominal Surgery and New Technologies, Istiqlol Medical Complex, Tadzhikistan

Introduction

To study the results of the developed methods of laparoscopic cholecystectomy in patients with high operational risk.

Methods

The results of surgical treatment of 132 patients with gallstone disease with high operational risk were studied. Elderly patients accounted for 34.8% (n=46), grade III-IV obesity - 24.3% (n=32), patients who had previous operations on the upper floor of the abdominal cavity - 18.2% (n=24) and patients with the so-called "difficult" gallbladder - 22.7% (n=30). In 89 (67.4%) cases, LCE was performed, in 43 (32.6%) - traditional cholecystectomy (TCE).

Results

All LCE were distributed according to the degree of complexity, correlated with the classification of LCE classes according to Iannet. 87 (97.8%) patients and technical difficulties that occurred at various stages of the operation were attributed to "complex" LCE: with the imposition of pneumoperitoneum and the installation of trocars in patients with obesity (n=24) and with adhesive disease after undergoing abdominal operations (n=16). "Dangerous" LCE was observed in 2 (2.2%) patients with Mirizzi II syndrome - the type that was converted. In 43 cases, traditional cholecystectomy was performed in patients with CC, in particular, non-standard TCE (62.6%) were produced. Non-standard interventions included: Pribram cholecystectomy (n=11), from the bottom (n=5) and by lumping (n=5). After performing 43 TCE in the postoperative period, 7 (16.3%) patients experienced postoperative complications with 1 (2.3%) fatal outcome. In LCE, suboperative complications were observed in 11.2% of cases in the form of bleeding from the gallbladder bed (n=6) and bile leakage through the control drainage (n=4), opposite to 20.6% in TCE. In the postoperative period, one patient (1.1%) died of pulmonary embolism after LCE.

Conclusion

The application of the developed methods reduces the duration of the operation, reduces the number of complications and thereby improve the results of surgical treatment.
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EP01-26
07. Liver

The Role of Renal Resistive Index in Assessment of Functional Renal Impairment in Patients with Liver Cirrhosis

Randa Seddik
Liver, Assistant Lecturer, Egypt

Background and study aim

Renal dysfunction often develops in patients with liver cirrhosis. Hepatorenal syndrome (HRS) represents the end-stage of reduction in renal perfusion. Duplex Doppler ultrasonography of the kidneys is a non-invasive method to assess blood flow and arterial vascular resistance as a parameter for vasoconstriction. This study aimed to assess the role of renal resistive index as a non-invasive marker for early detection of functional renal impairment in patients with liver cirrhosis.

Patients and Methods

This study was conducted on 20 patients with liver cirrhosis without ascites vs. patients with liver cirrhosis and ascites and 20 healthy subjects as control group. Patients and control were subjected to complete blood picture, liver and kidney functions, serum electrolytes, twenty four hours urinary sodium, abdominal ultrasonography and duplex Doppler evaluation of the renal arteries with calculation of mean renal RI.

Results

Highly significant difference between cirrhotic patients with ascites and cirrhotic patients without ascites and controls regarding mean renal resistive index for both kidneys (P<0.001). At Cutoff point of renal RI 0.71, the sensitivity, specificity and accuracy to predict HRS were 100%, 80% and 82% respectively with AUC= 0.997. A statistical high significant positive correlation between RI and serum creatinine, child class, MELD score and MELD-Na (r=0. 0.818, r= 0. 0.539, r= 0.739 r= 0.807 respectively and P<0.001). A statistical high significant negative correlation between RI and serum sodium, Session [UserIDID] hours urinary sodium, and platelets (r= -0.778, r= 0. -0.688, r= -0.422 respectively and P<0.001).

Conclusion

Renal duplex Doppler ultrasound is useful as a non-invasive method for the evaluation of the renal hemodynamic changes in cirrhotic patients and can predict HRS.

Functional renal impairment; liver cirrhosis; Renal resistive index
Currently there are 10 types of hepatitis B virus genotypes, from A to J, and 4 types of serotypes namely adw, adr, ayw, and ayr. This study aims to determine the genotype and serotype of the hepatitis B virus that has potential as a hepatitis B vaccine candidate. One effective method at present is bioinformatics, a multidisciplinary web-based biological science that can explore various sequences and see phylogeny. The first stage is the collection and selection of nucleotide DNA sequences or hepatitis B virus amino acids. All data on nucleotide DNA sequences and hepatitis B virus amino acids with the target genotype and serotype are accessed and collected from genbank. Next, a kinship tree is made. This kinship tree is designed with multiple alignment, phylogeny, and tree viewers using phylogeny.fr. The data obtained shows that there are 43 sequences with the same subtype, Adw, but the genotype and distribution of the spread of hepatitis B virus are different. Genotype A originates from Somalia (Africa), and the Philippines (Asia), genotype B originates from Indonesia and China. Genotype C explains that genotype C is found around South Asia and East Asia, genotype H obtained information from America and Mexico, and genotype I originates from China. Sequence data that can be candidates for hepatitis B vaccine design are hepatitis B virus genotype B with subgenotype B3, genotype C with subgenotype C6 for the scope of Indonesia, while for the scope of the world obtained the potential of the Adw serotype.
Laparoscopic Common Bile Duct Exploration Using Cholangioscopy through Modified Percutaneous Choledochostomy Plastic Tube for the Treatment of Hepato-Choledocholithiasis

Hieu Le Trung¹, Thanh Le Van¹*, Quang Vu Van¹ and Loi Le Van¹

¹HBP Surgery and Liver Transplant, 108 Military Central Hospital, Viet Nam

Introduction

To evaluate the results of laparoscopic common bile duct (CBD) exploration to remove hepato-choledocholithiasis using cholangioscopy through modified percutaneous choledochostomy plastic tube

Methods: In patients who had hepato-choledocholithiasis, the technique of cholangioscopy through modified percutaneous choledochostomy plastic tube via laparoscopic was used from March 2018 to July 2019 were retrospectively studied. This study aimed to describe this technique and report the preliminary outcomes.

Results

52 patients with hepatolithiasis (intrahepatic stones) with or without choledocholithiasis underwent laparoscopic CBD exploration to remove stones using cholangioscopy through modified percutaneous choledochostomy plastic tube. There were 16/52 cases (30,7%) with a history of laparotomy (1-4 times). The success rate of postoperative stones clearance was 30/52 (57,7%). When retained intrahepatic stones found on postoperative cholangiography and postoperative transabdominal ultrasonography, cholangioscopy via a T-tube tract required. The stones were successfully removed with retained postoperative examination in 44/52 (84,6%). The major factors that associate with postoperative stones clearance include: biliary stenosis and intrahepatic stones location. There were no intraoperative complications occurred; 2 cases of postoperative complication of bile leak, no treatment were necessary. The average operative time was 126 ± 36 minutes; Average stone removal time was 52 ± 26 minutes.

Conclusions

Laparoscopic CBD exploration to remove hepato-choledocholithiasis using cholangioscopy through the transcholedochal tube tract yields the safety and effectiveness

Laparoscopic common bile duct exploration, cholangioscopy, modified percutaneous choledochostomy plastic tube
Pure Laparoscopic Left Hepatectomy Using Arantius' Ligament Approach Combined Glissonean Pedicle Approach

Hieu Le Trung1, Thanh Le Van1 and Quang Vu Van1

1HBP Surgery and Liver Transplant, 108 Military Central Hospital, Viet Nam

INTRODUCTION

We describe a novel extra-glissonian approach combined Arantius' ligament approach for totally laparoscopic left hepatectomy. The extra-glissonian approach and Arantius' ligament approach have proven useful in open surgery for left hepatectomy. And these approaches could be even more useful in the laparoscopic context.

METHODS

The study included 31 patients who underwent totally laparoscopic left hepatectomy between July 2017 and September 2019. Arantius’ ligament was then identified, encircled and divided. Retracting the caudal stump of the ligament revealed a space between the left Glissonean pedicle and the liver parenchyma. The left Glissonean pedicle was encircled extrahepatically with a cotton tape and transected with an endostapler. The parenchymal dissection then proceeded to the left hepatic vein, which was finally divided. The specimen was placed in a plastic endobag, and extracted through a suprapubic incision.

RESULTS

No postoperative mortality was encountered and no Glissonean injuries, including bleeding or biliary leakage, occurred. The mean length of surgery was 290±113 min, and the mean blood loss was 350±187 ml. The mean duration of hospital stay was 11.7±3.5 days. Pathology showed free surgical margins.

CONCLUSION

The Arantius' ligament approach combined Glissonean pedicle approach appears to be feasible and safe for successfully performing totally laparoscopic left hepatectomy.

Glissonean pedicle approach, Pure laparoscopic left hepatectomy, Arantius' ligament approach,
07. Liver

Diagnosis of Liver Disease Based on Artificial Intelligence Systems Using the Decision Tree Algorithm Implementation

*Rifaldy Fajar* and Prihantini Jupri

1Computational Biology, Yogyakarta State University, Indonesia

The liver is one of the most important organs of the human body. The function of the liver is to detoxify poisons in the human body and control cholesterol and fat in the human body. If the liver is damaged, then health will be disrupted and even death can occur. So an effort is needed to detect liver disease early. This study will discuss the classification of liver disease using the Decision Tree C4.5 Algorithm using Indonesian Liver Patient Dataset Datase. This study will also prove the most influential variable of the 11 variables that determine liver disease. The research conducted includes processing the dataset using the help of the Rapidminer data mining application. The dataset used in this study was taken from The Ministry of Health of the Republic of Indonesia Database. Indonesian Liver Patient Dataset contains 583 clinical data with 10 attributes with 416 positive liver output targets and 167 negative. Based on 583 processed data, 433 data are used as training data and 150 data are used as test data. This study shows that only 2 variables (Almine Alminotransferase and Age) among the 11 variables in the dataset are the most influential in determining the classification of liver disease. This study also showed an accuracy of 72.7% in determining the classification of liver disease using the Dataset of the Ministry of Health of the Republic of Indonesia. The conclusion in this study is that the detection or classification results can be said to be quite good based on an accuracy value of more than 70%.

Diagnosis, Liver, Decision Tree Algorithm, AI
Comparison the Operative Outcomes of Laparoscopic Right Posterior Sectionectomy (RPS) and Open RPS

Rukhsora Sultonova¹ and Yang Seok Koh¹

¹HBP surgery, Chonnam National University, Korea

Purpose

We aimed to compare the operative outcomes of laparoscopic right posterior sectionectomy (RPS) and open RPS and evaluate the feasibility of laparoscopic RPS.

Methods

From January 2009 to December 2017, laparoscopic liver resections were performed in 235 patients at Chonnam National University Hwasun Hospital, South Korea. We retrospectively analyzed the clinical data of 16 patients who underwent laparoscopic RPS and compared the outcomes with those who underwent open RPS (n = 17).

Results

The laparoscopic group had a mean tumor size of 3.82±1.73cm(open group[OG]; 4.18±2.07cm, p=0.596), mean tumor-free margin of 10.44±9.69mm(OG; 10.06±10.62mm, p=0.657), mean operation time of 412.2±102.2 min(OG; 275.0±60.5, p<0.001), mean estimated blood loss of 339.4±248.3mL(OG; 236.4±102.7mL, p=0.631), mean postoperative hospital stay of 11.63±2.58 days (OG; 14.71±4.69 days, p=0.027), and mean postoperative peaks of aspartate aminotransferase, alanine aminotransferase, total bilirubin, and prothrombin time of 545mg/dL, 538mg/dL, 1.39mg/dL, 1.41 international normalized ratio (OG; 237(p<0.001), 216(p<0.001), 1.52(p=0.817), and 1.45(p=0.468)), respectively. There were no deaths or major complications in either group. There were no cases of open conversion. Laparoscopic RPS was associated with a shorter hospital stay, prolonged operation time and lower complication rate. With long-term prognosis, no difference was found in overall survival rate and disease-free survival rate between the two groups.

Conclusion

Laparoscopic RPS can be performed, but the problems of long operative time and a decrease in liver function should be resolved.

Hepatectomy, Laparoscopy, Liver neoplasms
07. Liver

**Exclusively Indocyanine Green Fluorescence-Guided Surgery in Liver Metastases from Colorectal Cancer**

Francesco Mallozzi s. Maria¹*, Annalisa Lo Conte¹, Massimo Pezzatini¹, Camilla Romano¹, Germano Mariano¹,
Matteo Gasparrini¹, Antonio Brescia¹ and Marcello Gasparrini¹

¹Division of Week and Day Surgery, Department of Surgery, Sant'Andrea Hospital, Faculty of Medicine and Surgery "Sapienza" University, Rome, Italy, Italy

We herein report our first experience of laparoscopic liver resection guided exclusively by fluorescence imaging using Indocyanine Green (ICG) in a 72-years-old patient who had undergone laparoscopic anterior resection of the rectum in September 2017 for rectal cancer (histological study: pT3 pN0 M0). The patient developed liver metastases in VI segment after 1 year, treated with chemotherapy (Folfox + Cetuximab) followed by thermoablation. TC scan performed in July 2019 showed progression of disease with two lesions confined to the VI segment. The patient underwent laparoscopic resection of VI segment guided by fluorescence Imaging, using ICG, administered intravenously 48 hours before the procedure. Even during surgery, a second bolus of ICG was administered showing good vascularization of liver remnant and no fluorescence on shearing section. Hemostasis was performed by bipolar forceps and Arista™ Absorbable Hemostat. Postoperative course was uneventful. The patient was discharged on the forth postoperative day. Histopathology demonstrated a R0 resection of 2 liver metastases from colorectal cancer. In conclusion, ICG-fluorescence imaging can be used safely and easily to identify liver tumors in real time during laparoscopic hepatobiliary surgery (1), especially in parenchymal sparing surgery for colorectal liver metastases. Further studies will be necessary to confirm these conclusions in a larger population.

liver, liver metastases, colorectal cancer, indocyanine green fluorescence, Mini-invasive Surgery
The Prognostic Role of Neutrophil to Lymphocyte Ratio (NLR) in Hepatocellular Carcinoma (HCC) after Curative Hepatic Resection

Atika Budhy Setyani¹*, Andi Khomeini Takdir Haruni² and Erick Werner Nicolay Akwan³

¹Research and Development, Cempaka Putih General Hospital, Jakarta, Indonesia
²Internal Medicine, Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia
³Surgery, General Hospital of Dok 2, Jayapura, Indonesia

Background

The outcome of HCC after hepatic resection remains unsatisfactory regarding the high number (40-50%) of recurrences and poor survival. Recent publications identified that NLR was useful biomarker in various medical conditions. However, the role of NLR in predicting this issue was still inconclusive. Thus, we conduct a study to investigate the association between preoperative NLR and prognosis of HCC after curative hepatic resection.

Method

Major medical databases were systematically searched for observational study evaluating the utility of preoperative NLR on determining the prognosis of HCC patients undergone curative hepatic resection, published until January 2020 with predefined protocol and without language restriction regarding PRISMA guideline. The selected studies were assessed with the GRADE approach. The endpoints of this study were overall survival (OS), recurrent-free survival (RFS), and disease-free survival (DFS). The analysis was performed in RevMan 5.3 to provide pooled measures for hazard ratio (HR).

Results

Twenty-three studies were enrolled comprising 6,874 patients in all-stage of HCC. Higher NLR was indicated as an independent predictor for inferior OS compared to lower NLR without significant heterogeneity (HR=1.53, 95%CI [1.41, 1.68], p<0.00001, I²=37%). Subgroup analysis also showed that higher NLR was a predictor of inferior short- (1-year), medium-, (3-year), and long-term (5-year) OS after hepatic resection with HR=1.71 (p<0.0001, I²=0%), HR=1.79, (p<0.00001, I²=18%) and HR=1.44 (p<0.00001, I²=42%), respectively. In comparison to lower NLR, higher NLR was also significantly associated with inferior RFS (HR=1.93,[1.61, 2.32], p<0.00001, I²=53%), including short- (1-year), and long-term (>3-year) RFS with HR=1.77 (p=0.007) and HR=1.99 (p<0.00001), respectively. Higher NLR was also an independent predictor of inferior DFS compared to lower NLR without significant heterogeneity (HR=1.55 [1.38, 1.75], p<0.00001, I²=18%).

Conclusion

Higher NLR was an inferior independent predictor for OS, RFS, and DFS among HCC patients after curative resection. The potential value of NLR should be emphasized regarding its affordability and simplicity.

Neutrophil to Lymphocyte Ratio, Hepatocellular Carcinoma, Curative hepatic resection, Prognosis
Indocyanine Green Near-Infrared Fluorescence Cholangiogram during Pure Laparoscopic Living Donor Hepatectomy for Optimal Bile Duct Division

JaRyung Han¹, Young seok Han¹*, Jae Min Chun¹ and Yoon Jin Hwang¹

¹HBP Surgery and Liver Transplantation, Kyungpook National University Hospital, Korea

Background

Because biliary complications in living donor liver transplantation are most common and troubled problem to liver transplant surgeons, various method to decease biliary complications has been studied and determining the optimal bile duct division point is important to decrease complication rate. Intraoperative cholangiogram has been standard method to determine the optimal bile duct division point for conventional donor hepatectomy, but in laparoscopic donor hepatectomy, indocyanine green (ICG) near-infrared fluorescence cholangiogram is alternative option of intraoperative cholangiogram.

Purpose

We compared conventional cholangiogram and indocyanine green (ICG) near-infrared fluorescence cholangiogram to determine optimal bile duct division point in pure laparoscopic living donor hepatectomy.

Method

From May 2016, 80 cases of pure laparoscopic donor hepatectomy has been performed in Kyungpook national university hospital. Conventional cholangiogram was used in 45 cases, ICG near-infrared fluorescence cholangiogram was used in 35 cases. We compared two groups in preoperative bile duct anomaly of donor, operative time and postoperative complications.

Result

In bile duct anomaly of donors, there were no differences between two groups. Operative time was much longer in conventional cholangiogram group because conventional cholangiogram procedure itself was time consuming. In one donor of conventional group, biliary complication occurred. Bile leakage from the cutting edge of the remnant right hepatic duct was identified, resolved by ERCP and ERBD insertion. ICG near-infrared fluorescence cholangiogram is more easier and convenient method to determine proper bile duct division point and is helpful to decrease biliary complications by confirming the real time fluorescence image of bile duct.

Biliary complications, ICG near-infrared fluorescence cholangiogram, Pure laparoscopic living donor hepatectomy
Significance of Ultrasound during Liver Resection

Byambadash Bat-Orshikh

Hepato-Biliary-Pancreato departments, National Cancer Center of Mongolia, Mongolia

Background

Liver resection has been reported as a safe and effective approach for the management of hepatocellular carcinoma (HCC). However, liver resection has not been recommended for patients with multiple HCC because of high recurrence rate and lack of survival benefit.

Purpose

The aim of this study is to evaluate the usefulness of ultrasound intraoperatively during liver resection.

Methods

Patients diagnosed with HCC admitted for treatment and enrolled in this study. We analyzed 50 patients with multiple HCC who underwent hepatic resection. We evaluated tumor size, location, TNM stage, number of tumor, AFP level and liver cirrhosis.

Results

We resected liver tumors under ultrasound control and detected new lesions, which is not seen in preoperative ultrasound and computed tomography. Patients with higher stage cirrhosis and multiple HCC had the worse prognosis. In this study, we have demonstrated that radical liver resection is still suitable for the HCC patients with multinodular lesions under ultrasound guidance. Patient should be selected carefully and needed sufficient preoperative evaluation. Intraoperative ultrasound might contribute to radical and successful liver resection as well as intraoperative evaluation of hepatic vasculature.

hepatocellular carcinoma, liver resection, ultrasound
Ultrasonic Monitoring of Primary and Metastatic Liver Cancer Cryodestruction

Abror Abror¹ and Umidakhon Karimova¹*

¹Faculty Surgery, Tashkent Medical Academy, Uzbekistan

Objective

To determine the capabilities and techniques of ultrasound (ultrasound) control during cryodestruction of primary and metastatic liver damage.

Materials and methods

In the period from 2012 to the present, cryodestruction of malignant neoplasms of the liver was performed in 14 patients (men – 8 (57.1%), women – 6 (42.9%), average age - 54 ± 3 years): metastatic lesion (MTS) of the liver - 8, hepatocellular cancer (HCR) - 5, cholangiocellular cancer (HCR) - 1. For cryodestruction, the KRIOMT and CRIO-01 ELAMED devices were used. Intervention was performed from laparotomic access under ultrasound guidance. The size of the lesions in the liver was from 1.5 to 9 cm, the number of lesions was from 1 to 10 (4 ± 3). The duration of cryodestruction was from 2 to 5 min of freezing at t from 175 to 186 ° C.

Results

The following complications of cryodestruction were noted: intra-abdominal bleeding (n = 3), suppuration of the postoperative wound (n = 1). In 2 cases, due to bleeding, relaparotomy was required; in one case, hemostasis was performed by applying endovascular techniques. There were no fatal outcomes in the postoperative period. In 5 cases moderate hydrothorax was noted; no puncture interventions were required. In contrast to the quite common ascites after cryotherapy on pathological pancreatic lesion ascites manifestation after cryodestruction of the neoplasms liver was noted in only 1 case.

Conclusion

Ultrasonic monitoring is an affordable, convenient and simple method of control at all stages of cryodestruction and in the postoperative period in patients with primary and metastatic liver cancer.

cryodestruction, metastatic liver damage.
The First Case of Middle Hepatic Artery from Left Hepatic Artery in Korea

Youngmoon Jang
Surgery, Jeonbuk National University Hospital, Korea

The 56 year old patient had performed MRI of liver at department of surgery of university hospital on January 17, 2010. The patient was diagnosed middle hepatic artery from left hepatic artery. The middle hepatic artery occurred very rarely and there are several variations, anatomical variations of the MHA, a hilar artery that primarily supplies hepatic segment 4. An MHA was present in 103 (71%) of the subjects. In livers that had a replaced left hepatic artery, the MHA originated from the right hepatic artery; in livers that had a replaced right hepatic artery, it originated from the left hepatic artery. It always arose directly or indirectly from the common hepatic artery, from which the gastroduodenal artery also arose. A very rare case of middle hepatic artery encountered in the Calot's coursing over the gall bladder and travelling extraparenchymal into segment IV is reported. Identification and preservation of the middle hepatic artery is essential to prevent the possibility of hepatic artery thrombosis and ischemic injury and to avoid ischemic cholangiopathy of segment IV duct. Iatrogenic injury of hepatic artery was reported and it is possible and at best provable that is made tension free anastomosis of near artery like gastroduodenal artery, etc.

Injury of hepatic artery occurred during laparoscopic cholecystectomy and open surgery.

The author reports the first case of middle hepatic artery from left hepatic artery in Korea with reviews of literature.

references


middle hepatic artery
Medicinal Importance and Pharmacological Potential of Corylin in the Human Disorders: Therapeutic Potential in the Medicine

Dinesh Kumar Patel¹ and Kanika Patel²

¹Department of Pharmaceutical Science, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India
²Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh 212111, India

Background/Purpose

Herbal medicine have been used in the traditional system of medicine and modern medicine for the treatment of numerous human health complications. Corylin is a flavonoidal compound which has been separated from Psoralea corylifolia and applicable in the medicine for the treatment of cancer and different types of inflammatory disorders.

Methods

Medicinal importance and biological potential of Corylin for the treatment of cancerous disorders have been investigated in the present investigation through analysis of various research work of Corylin from the literature. Pharmacological activities of Corylin have been evaluated in the present investigation through data analysis of different scientific research from the literature work. Collected information of Corylin form various scientific research works have been analyzed to know the medicinal importance of Corylin in the health sectors.

Results

Analysis of various research works of scientific field from the literature revealed the medicinal importance and pharmacological activities of Corylin. Data analysis of literature work revealed that Corylin is found to be present in the Psoralea corylifolia which is well known medicinal plant in the traditional system of medicine for their therapeutic potential and medicinal benefit. Medicinal application of Corylin in the bone differentiation and inflammation has been evaluated through data analysis of different literature work of the scientific field. Literature study also signified the biological application of Corylin in the various form of cancerous disorders of liver. Scientific data analysis of different research work revealed the therapeutic potential of Corylin for the treatment of hepatocellular carcinoma.

Medicinal importance, Corylin, Therapeutic approach, molecular study, Hepatocellular carcinoma
Hepatoprotective Activity of Fraxin in the Modern Medicine through Scientific Data Analysis and Molecular Mechanism

Dinesh Kumar Patel1* and Kanika Patel2

1Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India
2Department of Pharmaceutical Science, Krishnarphit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India

Background/Purpose

Natural medicine has been used in the history by the human being for the treatment of different disorders due to their pharmacological action and important phytochemical present it in. Fraxin is one of the important phytochemical present in the Acer tegmentosum and Cortex Fraxini which have therapeutic benefit on the various forms of oxidative stress induced disorders.

Methods

Fraxin have important place in the medicine due to their medicinal importance and health beneficial properties. In order to know the benefit of fraxin in the medicine numerous scientific research works data have been collected and analyzed in the present investigation through literature database. Pharmacological activities of fraxin have been studied in the present investigation through databases analysis of literature work. Hepatoprotective role of fraxin for the treatment of numerous health complication have been analyzed in the present investigation through various scientific research work of the literature.

Results

Analysis of different research works of the scientific field from the literature databases revealed the medicinal uses and therapeutic application of fraxin in the medicine. Hepatoprotective activity of fraxin have been studied through literature database analysis of some scientific research work and found that fraxin have significant hepatoprotective activity in the mice. In another scientific research work fraxin showed hepatoprotective activity mainly through suppressing oxidative stress and enhancing antioxidant activity. Literature database analysis also revealed the biological importance of AST, GSH and MDA in the hepatoprotective activity of natural compound in the medicine which could be used for the development of better and effective medicine against treatment of liver disorders. Scientific data analysis of different research work of fraxin revealed their medicinal important and pharmacological activities in the medicine which also signified their biological importance in the liver disorders.

Hepatoprotective, Phytocompound, Fraxin, Molecular study, Herbal medicine
07. Liver

**Therapeutic Benefit and Biological Importance of Glycitin in the Modern Medicine: Biological Role in the Hepatic Disorders and Related Complications**

*Dinesh Kumar Patel* and *Kanika Patel*

1Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India

2Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India

**Background/Purpose**

Medicinal plants have been applicable in the medicine due to their medicinal properties and different pharmacological activities. Glycitin is a valuable flavonoidal compound having therapeutic potential in the medicine due to their different pharmacological activities.

**Methods**

In order to investigate the biological activities of glycitin in the medicine for the treatment of numerous human health complications including hepatic disorders, here in the present study numerous scientific research work have been collected and analyzed to get the scientific information of glycitin. Effectiveness of glycitin in the medicine for their therapeutic potential against liver disorders has been studied in this work through literature database analysis. Literature data have been correlated with the biological potential of glycitin to get better molecular approach for their effectiveness against liver disorders.

**Results**

From the analysis of different literature work of glycitin in the present study it was found that glycitin is an important flavonoidal compound present in the various food products. Literature data analysis of different research work revealed their biological potential in the medicine due to their pharmacological activities against liver disorders. Literature data analysis revealed their biological importance in the medicine against various forms of cancers and oxidative induced disorders. Literature works also signified their biological potential in the treatment of inflammatory disorders and beneficial role of glycitin in the medicine is mainly due to their important pharmacological activities. Present investigation revealed the biological important of glycitin in the medicine for the treatment of liver disorders.

Biological, Glycitin, Medicine, Hepatic disorders, Molecular mechanism, Phytochemical
Hepatoprotective Potential of Kakkalide in the Modern Medicine: Physiological Role with Scientific Databases Analysis

Kanika Patel¹ and Dinesh Kumar Patel²

¹Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India
²Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Payagraj 211007, Uttar Pradesh, India

Background/Purpose

Natural medicine is basically composed of medicinal plants and their derived products including pure phytoconstituents. From the very ancient time to till the date in the modern medicine, natural products have been used for the treatment of numerous human disorders. Kakkalide is a flavonoidal class chemical comes to the isoflavone category and found to be present in the Pueraria lobata.

Methods

To know the medicinal importance and pharmacological activities of kakkalide in the medicine, here in the present investigation data of kakkalide have been collected from literature sources and analyzed for their therapeutic potential. Molecular data have been also searched to know the therapeutic potential of kakkalide for the treatment of hepatic and liver disorders. Molecular data collected from various literature sources have been correlated with pharmacological activities to know the better results.

Results

Data analysis of literature work of current research revealed the medicinal importance of kakkalide in the medicine. Data analysis of literature work signified the presence of kakkalide in the flowers of Pueraria lobata which have numerous biological activities including anti-inflammatory, anti-hyperlipidemic and anti-oxidative activity. Hepatoprotective activity of kakkalide in the liver has been studied in the literature and signified the biological importance of alanine aminotransferase and aspartate aminotransferase in the liver disorders. Further data analysis also revealed the effectiveness of kakkalide against ethanol induced liver damage. From the study of literature data of scientific work in the present investigation it was found that kakkalide is better molecule for the treatment of hepatic disorders.

Hepatoprotective, Kakkalide, Phytoconstituents, Therapeutic potential, Modern medicine
Therapeutic Potential of Aloin against Liver Disorders: Phytochemical for the Treatment of Hepatocellular Carcinoma

Kanika Patel¹ and Dinesh Kumar Patel²

¹Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India
²Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Payagraj 211007, Uttar Pradesh, India

Background/Purpose

Pure phytoconstituents in the medicine have been used for the development of newer and better drugs due to its medicinal benefit and therapeutic potential. Medicinal plants based natural drugs have been used in the history for the treatment of numerous human disorders as it contain numerous pure phytoconstituents.

Methods

Medicinal importance and pharmacological activities of aloin an important phytochemical of Aloe vera plants have been investigated here in this study through scientific literature database. Therapeutic potential of aloin have been analyzed in the present investigation for their effectiveness against various forms of cancerous disorders through literature databases analysis. Effectiveness of aloin for their therapeutic potential against Hepatocellular carcinoma has been also analyzed in the present investigation through scientific literature database analysis.

Results

Literature data base analysis of current scientific research work revealed the medicinal importance of aloin in the medicine and other allied health sectors. Literature database analysis revealed that aloin is an important plant phytoconstituents present in the Aloe vera with mixture of two diastereoisomers, aloin A and aloin B. Data analysis revealed their therapeutic benefit in the medicine due to their laxative properties which have been used in various pharmaceutical products. Literature database analysis revealed the biological importance of aloin for the treatment of cancerous disorders which signified their importance in the medicine for the treatment of numerous health complications with special attention of hepatocellular carcinoma.

Aloin, Liver disorders, Phytochemicals, Hepatocellular carcinoma, Hepatotoxicity
Hepatoprotective Activity of Rhamnazin as Phytoagents: Therapeutic Role in the Medicine for the Treatment of Liver Disorders

Kanika Patel¹ and Dinesh Kumar Patel²

¹Department of Pharmaceutical Science, Krishnapit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India
²Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Payagraj 211007, Uttar Pradesh, India

Background/Purpose

Flavonoidal compound have been well known for their therapeutic importance and antioxidant activity are the most one in case of all the flavonoidal class chemical. Flavonoids have been used for the treatment of numerous human health complications in the world and the best examples are quercetin and rutin.

Methods

In order to know the therapeutic potential of rhamnazin in the medicine, different literature data have been collected from various scientific research works in the present investigation. Biological importances of rhamnazin to treat hepatocellular carcinoma have been investigated through literature database analysis of different scientific works. Hepatoprotective activities of rhamnazin have been investigated through database analysis of various literature works.

Results

Analysis of the current literature databases of current scientific work revealed the biological potential of rhamnazin in the medicine and other health sectors. Literature database analysis revealed that rhamnazin is an important flavonoid found to be present in the Artemisia, Betula, Alnus, and Rhamnus spp. Literature analysis revealed the therapeutic benefit of rhamnazin in the medicine due to their antioxidant and anti-tumor activity. However databases analysis also signified the biological role of rhamnazin in the lipid peroxidation which could be beneficial for the treatment of liver disorders. Present study signified the medicinal importance and therapeutic benefit of rhamnazin for the treatment of Hepatic disorders and associated complications.

Hepatotoxicity, Rhamnazin, Hepatoprotective, Phytoagents, Reactive oxygen species, Herbal medicine
Outcomes and Complications of Laparoscopic Ventral Hernia Repair

Thabet Alghazal

General Surgery, King Fahad Specialist Hospital- Dammam, Saudi Arabia

Purpose

Laparoscopy is being used increasingly in ventral hernia repair due to the potential benefits of a shorter hospital stay, decreased wound complications, and a lower recurrence rate. The purpose of this study was to review our experience with laparoscopic ventral hernia repair (LVHR).

Methods

A retrospective, IRB-approved review was performed on 332 consecutive patients who underwent LVHR at our institution from January 2009 to February 2019. Means and standard deviation of preoperative and postoperative variables including patient characteristics, defect and mesh size, operating time, perioperative complications and recurrence rates were calculated in standard manner.

Results

A total of 327 patients underwent LVHR (152 male, 175 female) with a mean age of 58.7 ± 14 years and a mean body mass index of 33.1 ± 8 kg/m2. There were 112 recurrent ventral hernias (34.3%), with a mean of 1.9 previous repairs (range, 1-12). Nine cases (2.8%) were converted to open operation. The mean defect size was 145.7 ± 140 cm2, and mean mesh size utilized for repair was 439.7 ± 243 cm2. The mean operating time was 186.0 ± 80 minutes and postoperative hospital stay averaged 4.3 ± 3 days. Perioperative complications occurred in 110 cases (34.5%). The most common complications were gastrointestinal [ileus (n=31)] and respiratory (n=22). There were 2 (0.6%) enterotomies, 3 (0.9%) mesh infections and 10 (3.1%) wound infections. There were 2 (0.6%) mortalities. The recurrence rate was 2.8% (n=9) and occurred at a mean of 7.8 months postoperatively. Complications occurred in 7 of the 9 patients who experienced a hernia recurrence.

Conclusion

Laparoscopic ventral hernia repair is effective for the majority of patients with primary and recurrent ventral hernias. Perioperative morbidity is acceptable and recurrence rates are less than 5% on short-term follow-up. Will be presented as a Poster Presentation.
Diagnosis and Laparoscopic Hernioplasty for Strangulated Inguinal Hernias in the Elderly

Farukh Makhmadow\textsuperscript{1, 2} and Rahmonali Sultonov \textsuperscript{1}

\textsuperscript{1}Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
\textsuperscript{2}Department of Abdominal Surgery and New Technologies, Istiqlol Medical Complex, Tadzhikistan

Introduction.

To study the results of laparoscopic hernioplasty in elderly and senile patients with strangulated inguinal hernias.

Methods.

The paper presents the results of examination and treatment of 47 elderly and senile patients with strangulated inguinal hernias, for the diagnosis and treatment of which laparoscopy was used. Among patients with inguinal hernias, men 39 (83.0\%) predominated. The age of patients ranged from 60 to 81 years. 32 (68.1\%) patients were admitted within 2 hours from the moment of infringement, however 13 (27.6\%) patients were admitted 4 hours after infringement, and 2 (4.2\%) patients 2 days after infringement of inguinal hernias. 35 (74.5\%) patients had right-sided inguinal hernias, 8 (17.0\%) had left-sided hernias, and 4 (8.5\%) had bilateral hernias with impaired one of them.

Results.

Ultrasound was performed for all patients, in which the contents of the hernial sac were determined. Five (10.6\%) patients had spontaneous or (and) random iatrogenic reduction of the hernia within 2 hours from the time of its infringement. In 2 (4.2\%) cases with doubtful viability of the small intestine during laparoscopy, a solution of novocaine was injected into the mesentery of the small intestine, and relaparoscopy was performed after 8-12 hours. In both cases, the infringing part of the intestine was viable, and thus resection was avoided. In the observations, when patients were hospitalized 2 days after the moment of infringement, phlegmon of the hernial sac was detected laparoscopically, which was a transition to conversion. In the remaining 45 (95.7\%), laparoscopic hernioplasty (TAPP) was performed. Postoperative complications reached 6.4\%. There were no fatal outcomes.

Conclusion.

The use of laparoscopy in the diagnosis and treatment of strangulated hernias in elderly and senile patients significantly improves the results of treatment and reduces the frequency of performing unnecessary and unnecessary laparotomy.
Use of Perioperative Tamsulosin to Prevent Postoperative Urinary Retention Following Day Case Laparoscopic Inguinal Hernia Repair

Thabet Alghazal

General Surgery, King Fahad Specialist Hospital-Dammam, Saudi Arabia

Postoperative urinary retention is one of the more common complications following laparoscopic inguinal hernia repair (LIHR). We hypothesized that the oral α1 adrenergic blocker Tamsulosin, (Flomax, Boehringer Ingelheim) could be used to decrease the incidence of urinary retention after LIHR.

Methods

Data from all patients undergoing laparoscopic total extra peritoneal (TEP) inguinal hernia repair by a single surgeon from June 2012 through June 2017 were collected prospectively. Patients received Tamsulosin (Flomax) 0.4 mg/day orally for a total of five days beginning two days prior to surgery. All TEP procedures were done under general anesthesia without a urinary catheter in place. Patients were discharged home after voiding in the recovery area. Data are expressed as mean ± SD.

Results

Flomax was administered to 30 of 32 consecutive patients undergoing outpatient TEP inguinal hernia repair. Mean patient age was 51.3 ± 10.5 years (28-72 years). Ten (32.2%) patients were operated on for recurrent inguinal hernias, 14 (45.1%) had bilateral hernias repaired, and 4 (12.9%) had concomitant umbilical hernia repair. Average operative time was 60 ± 24 minutes. The mean amount of intraoperative fluids given was 998 ± 297ml. Two patients were excluded from the study because they required a urinary catheter in the operating room for other reasons (one requiring concomitant cystoscopy and one with anticipated complicated repair in patients who had 3 prior open inguinal hernia repairs and did not take Flomax). None of the patients given Flomax perioperatively developed urinary retention and all were discharged home the same day of surgery. In contrast, the 2 patients undergoing TEP repairs who did not receive Flomax perioperatively both developed urinary retention that required catheter placement.

Conclusions

Perioperative administration of Tamsulosin (Flomax) in the setting of laparoscopic inguinal hernia repair under general anesthesia was associated with no cases of post-operative urinary retention in this small pilot study. The use of perioperative Tamsulosin (Flomax) should be evaluated further to determine its impact on the postoperative urinary retention rate following LIHR. This approach has the potential to shorten outpatient recovery room stays, reduce patient risks, and may result in health care savings.

Will be presented as a Poster Presentation

Inguinal Hernia, Urinary retention, Tamsulosin (Flomax)
BACKGROUND

The purpose of this study is to report two patients referred to our hospital after developing unusual complications attributed to prior open preperitoneal tension-free inguinal hernia repair.

CASE # 1

A 75 year old male developed a left proximal thigh abscess requiring incision and drainage five years after open prosthetic, preperitoneal inguinal hernia repair with single-layer mesh. A pelvic CT scan demonstrated an abscess in the left inguinal preperitoneal space as well as diverticulosis but no diverticulitis. A colonoscopy was negative for any additional findings. The patient underwent groin exploration, debridement of the inguinal canal and sinus tract, and mesh resection followed by JP drain placement. The inguinal defect was repaired utilizing the Shouldice technique. Intraoperative cultures revealed penicillin-resistant Staphylococcus Aureus. The drain was removed on postoperative day nine, and his recovery remains uneventful without hernia recurrence or infectious complications at 11 months follow-up.

CASE # 2

An 82 year old man developed progressive left lower extremity edema and disabling claudication one month after open prosthetic inguinal hernia repair with a bilayer disc mesh. Venous duplex imaging revealed compression of the left common femoral and external iliac veins. A CT angiogram demonstrated left external iliac and common femoral artery thrombosis and a 5.2 cm fluid collection consistent with hematoma. An IVC filter was placed. The common femoral artery was controlled after initial exploration revealed a common femoral artery pseudo aneurysm. The mesh was densely adherent to the external iliac vein and was thus not resected. The common femoral artery pseudo aneurysm was repaired and the profunda femoris artery over sewn. An external iliac to superficial femoral artery 8 mm PTFE bypass graft was placed. The patient was discharged on systemic anticoagulation without claudication on postoperative day thirteen.

SUMMARY

Laparoscopic inguinal hernia repair and novel, open techniques and mesh devices have popularized placement of mesh in the preperitoneal space. Acute, severe vascular complications and latent infectious complications can occur after open, preperitoneal tension-free inguinal hernia repair and may require remedial surgery. CT scans and Angiogram pictures are available. Will be presented as a Poster Presentation.
Persistent Complex Seroma treated by Capsulectomy and Argon Beam Coagulator

Thabet Alghazal

General Surgery, King Fahad Specialist Hospital - Dammam, Saudi Arabia

[Background]
Seroma formation is one of the most common events following ventral hernia repair. When mesh is used for repair of larger and more complex incisional hernias, the risk of seroma formation increases. The mesh onlay technique, which requires more extensive dissection, is associated with an even greater incidence of seroma formation. Treatment options for postoperative seromas include observation for spontaneous resolution, percutaneous aspiration, closed suction drainage, abdominal binders, and sclerosant.

[Purpose]
The aim of this report is to present a definitive management of a very challenging case of abdominal wall chronic complex seroma following herniorrhaphy with mesh approached by open capsulectomy and scarification of the remnant pseudocapsule.

[Case Report]
Our patient is a 60 years-old male status post low anterior resection with covering loop ileostomy for rectal cancer. His diverting stoma was taken off after completing the adjuvant chemotherapy treatment. Seven months later, patient has developed an enlarging midline incisional hernia. This hernia was subsequently repaired by primary fascial closure with suprafascial onlay polypropylene mesh. Postoperatively, he developed a subcutaneous seroma which was initially treated with an abdominal binder without success. Over the following 3 months of observation, seroma was increasing in size.

Investigation
The Abdominal CT scan revealed a large well defined extraabdominal fluid collection. Four times attempts of fluid aspiration under guidance of Ultrasound were performed in deferent occasions. Despite these attempts, the seroma recurred. Six months post seroma development, patient started to have small area of skin necrosis and ulceration which progress badly to form a continuously discharging coagulated blood sinus which was requiring limited incision and drainage of the dark brownish collected fluid and catheter insertion with frequent irrigation of saline and Hydrogen peroxide solution. Patient was covered with sporadic broad-spectrum Intravenous Antibiotics.

[Discussion]
Having recovered his acute condition, surgical intervention was planned. The patient underwent an excision and evacuation of the complex seroma and pseudocapsule. A 12-cm midline incision was made in line of the previous incision used for the hernia repair. The pseudocapsule of the seroma was encountered when the subcutaneous tissue was incised. The incision was carried superior, inferior, and laterally and the capsule was exposed. The seroma opening sinus was expanded and fluid was evacuated. There was some fibrous dead tissues and coagulated dark blood. The anterior and lateral aspects of the pseudocapsule were excised. Furthermore the posterior aspect was cleaned carefully using the curettage instrument without affecting the integrity of the mesh which was looking healthy and intact and without causing injury to the intraabdominal contents. Argon beam coagulator was used to scarify the remaining posterior aspect attaching to the mesh. Hemostasis was secured and the wound was closed over a Jackson-Pratt drain. A pressure dressing and abdominal binder were applied.

[Results]
Patient recovered well and was discharged home in a very good condition. Drain was removed almost 7 days post-surgery and he was advised to apply the binder for 6 weeks. The Surgery was on October 2017, since that time the patient has no recurrence of the seroma and he is very happy about the result.

[Conclusion]
Factors leading to seroma following incisional herniorrhaphy are poorly understood. Many options are available for treating complicated abdominal wall seromas. Capsulectomy and scarification of the remnant pseudocapsule was good option for the treatment of persistence complex seroma.

We have a nice pictures (Pre OP, Intra Op and Post Operation) In addition to the CT scan Pictures.

Seroma post Ventral Hernia repair, Hernia Repair Complication
Hydrocele of the Canal of Nuck after Indirect Inguinal Hernia Repair

Myung Jin Kim¹, Sung Ryul Lee¹*, Bum Hwan Koo¹ and Geon Young Byun¹

¹General Surgery, Damsoyu Hospital, Korea

Background

Hydrocele of the canal of Nuck (HCN) has been reported as a rare disease in woman. In particular, no cases of HCN following inguinal hernia surgery have been reported.

Purpose

The symptom of HCN is very similar to inguinal hernia. Physical examination alone is difficult to diagnose, so further evaluations such as ultrasonography are necessary. Laparoscopic surgery, which is diagnosed as an inguinal hernia, cause recurrence as inguinal hernia or HCN in the future if hernia sac was not removed completely.

Methods

The patient was a 21 year old woman. She visited our hospital with a hard, painless, and fixed mass in right inguinal area. She had been diagnosed with right inguinal hernia at the age of 11 and had been performed laparoscopic hernia repair. There was no evidence of recurrence for 10 years after the first operation. The inguinal protruding mass was diagnosed as HCN on ultrasonography, and there was no findings of inguinal hernia. The treatment was planned for laparoscopic excision of HCN. Intraabdominal findings were right indirect inguinal hernia and HCN. Internal Inguinal ring was open and the encysted HCN was located on distal end of hernia sac. Laparoscopic excision of hydrocele, and iliopubic tract repair was done.

Results

HCN should be considered in the differential diagnosis in female children presenting with an inguinal swelling. It should not be confused with indirect inguinal hernia, and hernia sac must be totally removed during surgery.

Hydrocele of the canal of Nuck, Inguinal hernia, Laparoscopic hernia repair
1. A Case of Herniation through the Broad Ligament

Guan-hong Min

Department of Surgery, Hallym University Dongtan Sacred Heart Hospital, Korea

BACKGROUND AND OBJECTIVE:

We present the case of a female patient 34 years of age with antecedents of laparoscopic small bowel reduction and laparoscopic peritoneal repair of space through the right broad ligaments.

METHODS:

The patient was admitted to the hospital's emergency room for abdominal pain in the epigastrium, transfixing, irradiating to both upper quadrants and to the lumbar region, accompanied by nausea and gastrobiliary vomiting. ESR was 34mm/hr, CRP was 31.8mg/L. Other laboratory findings were normal. Plain abdominal films on the patient's admission were normal, and computed tomography (CT) showed dilatation of small bowel, first transition zone and second transition zone are almost same location. Without improvement during the patient's hospital stay, pain and vomiting increased in intensity and frequency.

RESULTS:

New abdominal x-rays revealed dilatation of small bowel loops. Management was begun for intestinal obstruction, with intravenous hydration and placement of a nasogastric tube without a good response. 7 days later a diagnostic laparoscopy was performed, revealing a 3-cm internal hernia in the left broad ligament in which a 20-cm segment of terminal ileum was encased. We performed liberation of the ileal segment and closed the hernial orifice by using the laparoscopic approach.

CONCLUSION:

The patient's evolution was excellent.

broad ligament hernia, ileum hernia, small bowel hernia
Our Experience of Laparoscopic Hernia Repair at Public Sector Hospital

Zulqarnain Hyidar and Prof. Mahmood Ayyaz

Department of General Surgery, Services Hospital/ Sims, Lahore, Punjab, Pakistan

Background

Hernia repair is one of the most common procedures performed worldwide. Laparoscopic hernia repair is established as a safe and effective technique currently, laparoscopic inguinal hernia repair is not only widely accepted, but in many cases, especially with recurrent hernia or bilateral inguinal hernia, this approach has become a method of choice and for selected patients with primary unilateral inguinal hernia as well. Two laparoscopic techniques for laparoscopic inguinal hernia repair are used currently: a totally extra peritoneal technique (TEP) and a trans-abdominal pre-peritoneal technique (TAPP).

Material & Methods

This study was conducted in Surgical Unit I of Services Hospital, Lahore. In this study, 39 patients of uncomplicated inguinal hernia repair by different laparoscopic methods of repair in the period of three years with follow up from 6 months to 1 year were included. According to indications and choice of surgeon two laparoscopic surgical methods were used to repair inguinal hernia and reviewed for best method in terms of recurrence and other complications.

Results

There were no major complications except superficial wound infection (Surgical Site Infection or SSI) and pain over inguinal region which is comparable to other studies. There was no recurrence. Post-operative morbidity in form of pain in inguinal region was noticed in 3 patients, all of which were relieved after 6 months to 1 year. Pain was becoming less in severity with time. There were no incidences of mesh rejection or gross wound infection deeper than subcutaneous tissue of abdominal wall.

Conclusion

Overall, the data conclude that in experienced hands, complication and recurrence rate is low with TAPP technique, but surgeons should tailor their surgical approach based on their experiences with laparoscopic hernia repair.

Tapp vs Tep
Endoscopic Rives-Stoppa Repair for Umbilical hernia

Pakkavuth Chanswangphuana¹ and Ajjana Techagumpuch¹

¹Surgery, Thammasat University, Thailand

Background

Because of significant reduction of recurrence, mesh repair become the standard treatment for umbilical hernia in adults. The Rives-Stoppa technique, also known as retro-muscular repair with mesh, is increasingly becoming the standard approach for ventral hernia repair. Endoscopic technique is a valid and safe approach for the treatment of abdominal wall hernias. To combine the advantages of endoscopic surgery with those of retro-muscular repair with mesh, we propose the Endoscopic Rives Stoppa Repair as a safe and feasible approach for the treatment of umbilical hernias.

Methods

In this prospective study, we assessed 12 primary umbilical hernias with an average defect area of 13.1 cm² that were repaired using Endoscopic Rives Stoppa Repair.

Results

All procedures were successfully performed without conversion to an open operation. The mean operative time was 106.6 ± 29.1 min. Postoperative pain was mild and the mean visual analog scale (VAS) under physical stress was 2.4 at the third postoperative day. The average postoperative hospital stay was 2.8 ± 0.8 days. 2 patients developed postoperative seroma, without final adverse effect. No recurrence nor readmissions within 30 days was observed during a mean follow-up of 9.2 ± 4.4 months.

Conclusions

Initial experiences with this technique show that Endoscopic Rives Stoppa Repair is safe and reliable, requires no specific instruments, and is highly reproducible and feasible approach for the treatment of umbilical hernias.

Umbilical hernia
ABS-0017
EP02-10
06. LGI

**Gunsight Suture Significantly Reduces Surgical Site Infection after Ileostomy Reversal Compared with Linear Suture**

Chuangkun Li

Department of Colorectal Surgery, The Sixth Affiliated Hospital of Sun Yat-sen University, China

**Background**

Surgical site infection (SSI) was one of the most common postoperative morbidities of ileostomy reversal. And several skin closure procedures have been developed to reduce the infection rate. However, to our knowledge, the optimal one is not determined. This article retrospectively compared the effect of two surgical techniques for wound closure following ileostomy reversal: gunsight suture (GS) and linear sutures (LS).

**Methods**

233 patients who underwent loop ileostomy at the Sixth Affiliated Hospital, Sun Yat-sen University from 2014 to 2018 were retrospectively analyzed regarding SSI and associated risk factors. A total of 130 patients received LS in 2014, and 103 patients received GS (January 2015 – December 2017). Results: Both groups successfully underwent surgery. The mean age of the GS group was significantly lower than the LS group (56.84 years vs 53.11 years, P=0.023). The rate of SSI was significantly lower in the GS group (n=2, 0.02%) compared to the LS group (n=16, 12.00%, P=0.013). The length of hospital stay after the operation in the GS group was significantly shorter than that in the LS group (8.10 days±3.15 days vs. 10.79±5.44, P<0.001). Multivariate analysis showed that gunsight suture was independent protective risk for SSI. (OR=0.212, P=0.048).

**Conclusion**

Compared with the linear suture technique, this retrospective study shows the gunsight suture technique can significantly decrease the rate of SSI, and shorten the length of hospital stay after the operation. As a result gunsight suture technique should be recommended for wound closure following ileostomy reversal. Large randomized controlled trials are needed to confirm these findings.

Ileostomy reversal, linear suture, gunsight suture, surgical site infection
Laparoscopic Colon and Rectum Surgery Regional Medical Center Kyzylorda, Kazakhstan

Klyshbekov Nurzhan

Surgery, Regional medical center, Kazakhstan

Objectives

To analyze the first experience of laparoscopic colon and rectal surgery. Methods. The laparoscopic surgeries (n=16) of the colon and rectum were performed. There were 6 men and 10 women out of 16 operated patients. The age of patients was 63±10, 4 yrs. The reason for interventions were as follow: 8 cases of colorectal cancer, 1 diverticulitis of the sigmoid colon, four dysplastic villous polyps (grade 3), 1 large lipoma, 1 carcinoid, 1 functional sigmoidostomy. Six sigmoid resections, one lower anterior resection of the rectum, three right-sided and one left-sided hemicolectomy, two resections of the ileocecal angle, two total mesorectumectomies, one closure of sigmoidostomy had been carried out.

Results

Postoperatively patients’ activation began within 12 hours after surgery. Duration of the patient’s stay in the intensive care unit was 24±11, 5 hrs. Duration of operations composed 264±88, 8 min. Duration of hospital stay in the postoperative period was 8±5,1days. One patient was underwent to relaparotomy due to peritonitis on the 7th postoperative day caused the formed defect of the ileum wall in the deserosation region at adhesiolysis. All patients were discharged with satisfactory results.

Conclusion

The first experience shows that the treatment of surgical pathology of the colon and rectum laparoscopically is justified and highly effective. In performing surgical interventions due to the colorectal cancer, a complete fulfillment of oncological protocols concerning volume of resection and lymphadenectomy is complied. The introduction of laparoscopic surgery for the management of the colon and rectum cancer reduces the amount of intraoperative blood loss, reduces the length of stay of patients and their rehabilitation, and minimizes the development of postoperative complications.
Background

Emerging techniques in minimally invasive rectal resection include Robotic Total Mesorectal Excision (R-TME). R-TME has shown steady increase during recent times. A standardized and step-wise technique is the key aspect to perform a complex surgical procedure.

Purpose

To analyze our initial experience of R-TME with Davinci XI platform in terms of oncological resection quality, morbidity and mortality.

Methodology

A retrospective review of prospectively maintained colorectal database identified 178 R-TME between 30.05.16 to 19.11.19. Patient demographic, clinic-pathologic, procedure, and outcome data were gathered and analysed. Result: Of the 178 patients, 117 (65.7%) and 31 (17.4%) patients had lower and mid third rectal cancer. 100/178 (56.2%) underwent sphincter preserving TME. 87 (48.8%) were grade II adenocarcinoma and Non-mucinous histology dominated, 138 (78.4%). 101 cases (56.7%) were pT3. Median number of lymph-node yield was 11 (range 0-11). Distal resection margin and Circumferential resection margin were positive in 3 (1.68%), 12 cases (6.74%) respectively. 8 cases (4.5%) had to be converted to open TME. Median blood loss was 245ml, median duration of surgery was 220 minutes. 5% cases had an anastomotic leak. 10 (5.5%) and 4 (2.2%) had Grade IIIa-IIIb Clavien Dindo (CD) morbidity score and 1 (0.6%) had grade IV CD complication. Median length of hospitalisation was 8 days.

Conclusion

R-TME for rectal cancer is a feasible procedure with low morbidity and a low conversion rate, and acceptable oncological results.

Rectal cancer, Robotic Total Mesorectal Resection, Da Vinci XI
Robotic Colectomy Using Da Vinci Xi Platform: Evaluation of First 32 Cases for Malignant Disease

Pavan Sugoor1, Ramachandra Chowdappa1, Ravi Arjunan1, Syed Altaf1 and Srinivas C1

1Surgical Oncology, Kidwai Memorial Institute of Oncology, India

Background

Minimally invasive surgery has been demonstrated to have the same oncological results as open surgery, with better clinical outcomes. Robotic assistance is an evolution of minimally invasive technique.

Purpose

This study aims to evaluate surgical and oncological short-term outcomes of robotic-assisted colon resection in malignant disease

Methodology

32 consecutive patients affected by colon cancer were operated between May 2016 to November 2019 the Da Vinci XI platform. Data regarding surgical and early oncological outcomes were systematically collected in a colorectal specific database for statistical analysis.

Results

29 (91.7%) and 3 (9.3%) patients underwent right and left hemicolectomy, extracorporeal anastomosis was performed in all 32 cases. Median age was 55 years. Median operative time was 200(180-250) min. Median blood loss was 247ml (180-450ml). Conversion rate was 6.5% (2 cases). 65.8% (21 cases) were pT3, median number of harvested lymph nodes was 15 (range 2-50). 2/32 (6.2%) had a documented anastomotic leak requiring exploratory laparotomy and diversion proximal ileostomy. Surgery-related grade IIIb Calvien Dindo morbidity were noted in 2/32 cases (6.2%).

Conclusion

Robotic assistance allows performance of oncologically adequate dissection of the right colon with radical lymphadenectomy as in open surgery, confirming the safety and oncological adequacy of this technique, with acceptable results and short-term outcomes

Robotic Colectomy, Da Vinci XI
Background

Rectal gastrointestinal stromal tumor (GIST) is a rare digestive disease that originates in mesenchymal tissues and has malignant tendencies. At present, no standard treatment has been developed, and surgical approaches and the resection scope of rectal GIST are controversial.

Methods

The clinical, surgical, pathological and prognosis data of patients with primary rectal GIST at the Sixth Affiliated Hospital of Sun Yat-sen University from January 2008 to January 2019 were retrospectively collected. The patients were divided into the radical excision (RE) and local resection (LR) groups.

Results

In all, 537 GIST cases were collected from 2008 to 2018, and 64 patients with primary rectal GIST were included in this study, including 25 cases in the RE group and 39 cases in the LR group. Tumor size (p = 0.013), distance from the anus (p = 0.038), NIH (National Institutes of Health, NIH) criteria (p = 0.001), preoperative adjuvant therapy (p = 0.016), postoperative adjuvant therapy (p = 0.028), blood loss (p = 0.048), operative time (p = 0.020) and duration of hospitalization (p = 0.021) were statistically different between these 2 groups. The mean overall follow-up time was 46 months (range, 1-122 months). Disease recurrence was observed in 12 patients. No statistical differences were observed in the 5-year DFS (disease-free survival, DFS) (93.3% vs 92.6%, p = 0.952) or the OS (overall survival, OS) (90.0% vs 91.6%, p = 0.832) between the RE group and the LR group.

Conclusion

Our study showed that local resection has the advantages of short operation time, less blood loss and fast recovery. Moreover, local resection has a similar prognosis to that of radical excision with respect to DFS and OS. Therefore, local excision is an effective method for resection of rectal GIST, which is worthy of clinical endorsement.
Laparoscopic versus Open Complete Mesocolic Excision with Central Vascular Ligation in Right Colon Cancer

Mahmoud Alabassy
General surgery, Lecturer, Egypt

Background

The purpose of this study was to compare between laparoscopic and open complete mesocolic excision (CME) with central vascular ligation (CVL) in right colon cancer.

Methods

From January 2017 December 2019, a prospective cohort study of 60 patients who diagnosed as operable right sided colon cancer was performed. The patients were classified into laparoscopic CME with CVL and open CME with CVL groups. Demographic variables, comorbidities, tumor location, intraoperative parameters, duration of hospital study, histopathological findings, postoperative complications and follow up data were compared between the two groups. Demographic variables included age and sex distribution. Intraoperative parameters included incision length, operative time and operative blood loss.

Results

60 patients were selected in this study. Both groups were the same in the age and sex distribution, potential comorbidities and tumor location. Patients in the Laparoscopic CME with CVL group had shorter incision lengths, longer operative times, less operative blood loss, shorter hospital stay, less number of retrieved lymph nodes, the same TNM (tumor nodes metastasis) classifications, similar histopathological findings and comparable incidence of postoperative complications.

Conclusion

Laparoscopic CME with CVL procedure is a safe, valid and feasible surgical method for right colon cancers.

Right colon cancer, Mesocolic excision
The Trend of Sphincter Preservation in Low Rectal Cancers-10 Years Audit from an Indian Tertiary Cancer Centre

Diwakar Pandey,1 Sanket Bankar, Vivek Sukumar, Jayesh Gori, Ashwin deSouza and Avanish Saklani

1Division of Colorectal Services, Department of Surgical Oncology, Tata Memorial Centre, Mumbai, India

Background

Colorectal cancer is 3rd most common cancer worldwide, accounting for almost 10% deaths due to all cancers. For a century, the gold standard treatment for rectal cancer was Abdominoperineal resection (APR) but introduction of Total mesorectal excision (TME) and Neoadjuvant Chemoradiation, has witnessed a paradigm shift in its management. Later on, sphincter preservation was revolutionised with the introduction of intersphincteric resection (ISR), Transanal minimally invasive surgery (TAMIS) and Transanal TME.

Purpose

This audit aims to evaluate 10 years trend of sphincter preservation for low rectal cancers from a tertiary care centre in India.

Methods

This is a retrospective analysis of a prospectively maintained database from a Tertiary care centre in India. All curative intent Low rectal cancer resections performed between January 2010 till October 2019 were included. Low rectal cancers were defined as all tumours within 5cm from anal verge. All patients went through a Multidisciplinary tumour board. Data were analysed by calculating the proportion of patients undergoing Sphincter preservation each year. Similarly, short term outcomes of ISR were analysed.

Results

A total of 1377 patients were included in the study with 63% males and 37% females. Sphincter preservation could not be achieved in 859 (APR n=787, Pelvic Exenteration n=72) and rest 518 underwent Sphincter Preservation Procedures (ISR n=236, Low Anterior resection n=157, Ultra LAR n=74, Transanal excisions n=35, TEMS with TEO platform n=11, Supralevator Pelvic exenteration n=5). Yearly sphincter preservation rates were 18.5%, 18.9%, 10.3%, 32.17%, 39.62%, 43%, 51.4%, 52.2%, 36.6%, 44.4% in year 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, till October 2019 respectively. Sphincter preservation in the majority of our patients was achieved with ISR. Out of 236 undergoing ISR, 213 (90.2%) received neoadjuvant chemoradiation. 33% underwent Open resection, 40.1% Laparoscopic resection and 26.9% Robotic resection. The Median Blood loss was 350ml. Mean nodal harvest was 12.14 (+/- 6.4). Mean distal margin was 1.6cm with a distal margin positive rate of 1.4% and CRM positive rate of 3.6%. Anastomatic dehiscence occurred in 15(6.3%) patients and grade III or more Clavien Dindo morbidity occurred in 7.2%. The present audit shows an improving trend in the adaptation of Sphincter preservation over the years.

Low rectal Cancers, Sphincter preservation, Intersphincteric resection, TAMIS, Transanal TME, TME,
Colorectal Cancer 5 Year Survival Rate Of Post-Surgery in NCC of Mongolia

Chinzorig Munkhjargal¹, Ganbaatar Rentsenbalbar⁷ and Tuvshin Bayasgalan¹

¹General Surgery Department, National Cancer Center of Mongolia, Mongolia

Colorectal cancer in one of the commonest cancer in Mongolia, incidence rate was 3.6% in 2017. In Mongolia, the overall cure rate of colorectal cancer has not examined, precisely. 5 year survival rate of colorectal cancer in Asia showed 60%. This study therefore investigated the survival rate of colorectal cancer and its prognostic factors among at National Cancer Center of Mongolia.

Method

In this retrospective cohort study, total of 108 patients diagnosed with CRC from 2013 to 2015 at the General Surgery Department of NCCM were employed. The survival graphs were obtained using the Kaplan-Meier method and compared by the Log-rank test. All analysis was performed by SPSS version 22.0.

Results

The median survival time was 42 months 95% CI (38.55-45.66). The overall survival for CRC over the 5 years period was 59.3%. The survival rates of at the I, II, III, IV stages were 100%, 75%, 64.4%, and 12.5%. There was a significant difference in the survival rate of colorectal cancer according to the different stages (p=0.0001). Adjuvant chemotherapy (p=0.0003) was the significant social and clinical factors influencing the overall survival. Pathological factors such as TNM tumor stage (p=0.0001), distant metastasis (p=0.0001) were significantly associated with overall survival.

Conclusion

Survival rate of colorectal cancer in NCCM is identical as in Asia. Significant clinical and pathological prognostic factors were; adjuvant-chemotherapy, aging, TNM tumor stage, lymph node metastasis, distances metastasis. This study showed that we need for promote awareness about surgery of colorectal cancer and comprehensive screening programs which will greatly improve survival through early detection.

Colorectal, 5 yearl survival rate, Mongolian surgery, postoperative surveilance
Diverting Ileostomy and Anastomotic Leaks after Laparoscopic Resection of Rectum for Cancer

Sergey Baydo¹ and Dmytro Golub†

¹Surgery, LISOD - Israeli Oncological Hospital, Ukraine

Objectives

Anastomotic leak (AL) is one of the most serious complication in colorectal surgery and can vary from 3 to 20%, and reach 35% after low rectal resection. In this paper, we analyse the incidence of AL after laparoscopic rectal resections for cancer in our clinic and role of ileostomy in prevention of AL.

Methods

Since 2010 we performed 180 laparoscopic resections for rectal cancer. Upper rectal tumours were in 40 patients (22.2%). In 140 cases (77.8%), there was mid- and lower rectal cancer, and the total mesorectumectomy (TME) was performed. 123 patients (87.8%) of this group received neoadjuvant radiation therapy (RT). Interventions were performed through 4 ports, with an ultrasonic scalpel for dissection and circular staplers for anastomoses. In 119 patients (85% with low resection), protective ileostomy was fashioned.

Results

AL was diagnosed in 26 patients (14.4%), with the lowest incidence after high resection - 2.5%. In 17 cases of low resection without radiation therapy, AL occurred in 2 patients (11.8%). The greatest number of leaks was in patients with low resection after RT - 23 cases (18.7%). The incidence of AL in this group was different in patients with or without protective stoma - 17 and 33%, respectively. Conservative treatment was effective in 74% of patients with stoma and only in 33% with no protection. Repeated operations performed in 9 of 26 patients (34.6%): relaparoscopy and ileostomy (7), disconnection of the anastomosis with end colostomy (1), reanastomosis (1). Conservative treatment included drainage of pelvic abscess (5); endo-VAC (3), antibiotic therapy with transrectal lavage (9). There were no lethal cases due to the AL.

Conclusions

The highest incidence of AL is observed after low resections of rectum after RT. Protective stoma can significantly reduce AL rate and number of repeated operations in case of leakage in patients from high-risk groups.

resection of rectum, anastomotic leak, diverting ileostomy
Pioneering Minimally Invasive Surgical Training Colorectal Surgery in West Borneo: One Year Analysis

Muthu Viknesh Kunasaikaran¹, Aini Fahriza Ibrahim² and Ismail Sagap³

¹Department of General Surgery, Sarawak General Hospital, Malaysia
²Department of Surgery, University Malaysia Sarawak (UNIMAS), Malaysia
³Department of Surgery, Universiti Kebangsaan Malaysia Medical Centre, Malaysia

Background

West Borneo, in particular the state of Sarawak, Malaysia faced an enormous challenge in trying to compete with advanced development from other parts of Malaysia due to its geographical location and lack of adequate infrastructure. The size of Sarawak is equivalent to nearly the size of Peninsular Malaysia, thus creating logistic issues and difficulty in ensuring standard distribution of healthcare services to the people. Nevertheless, tremendous effort have been made to train junior surgeons posted to rural Sarawak, especially in minimally invasive colorectal surgery. A programme called ‘Advanced Colorectal Surgery’ (ACrS) Training, championed by Professor Ismail Sagap from National University of Malaysia, aimed to train qualified junior general surgeons in laparoscopic surgery for colorectal cases. We analysed our one year data since the induction of this programme in our institution.

Method

Data of all minimally invasive colorectal surgery cases performed from November 2018 to November 2019 were extracted from our Colorectal Unit Database. Demographic data, procedural, morbidity and mortality data were analysed accordingly.

Results

We performed a total of 29 cases of minimally invasive colorectal surgery, with up to 20.1% conversion rate (6/29). Mean average age is 66 years old, with 55.2% male (16/29) and 44.8% (13/29) were female patients. Cases performed were laparoscopic anterior resection (44.8%), laparoscopic low anterior resection (24.1%), laparoscopic ultra-low anterior resection (10.3 %), laparoscopic abdominoperineal resection (6.9%) and laparoscopic right hemicolecetomy (13.8%). Mean duration time for surgery was 274 minutes (4.6 hours). Overall, we reported about 10.3 % morbidity (all due to anastomotic leak) and nearly 13.8 % mortality rate (multifactorial factors e.g premorbid conditions, anastomotic leak etc.)

Summary

In conclusion, training programme of young surgeons in minimally invasive colorectal surgery is feasible without compromising laparoscopic colorectal surgery,
Empowering Young Surgeons in Laparoscopic Colorectal Surgery Training: Histopathological Analysis from a Single Institution in West Borneo

Aini Fahriza Ibrahim¹, Muthu Viknesh Kunasaikaran² and Ismail Sagap³

¹Department of Surgery, Universiti Malaysia Sarawak, Malaysia
²Department of General Surgery, Sarawak General Hospital, Malaysia
³Department of Surgery, University Kebangsaan Malaysia Medical Centre, Malaysia

Background

Minimally invasive procedure in colorectal surgery is becoming more common especially amongst young general surgeons. In our institution, Sarawak General Hospital in West Borneo, our young surgeons faced a steep learning curve to empower themselves in laparoscopic colorectal surgery skills. We embarked on a programme called ‘Advanced Colorectal Surgery Training’ (AcRS), a specially arranged public-private partnership to train these young surgeons. Since the commencement of the programme, more than 10 young general surgeons have benefitted from the novel mentoring from a highly certified laparoscopic colorectal surgeon. We analyse our histopathological specimen from all cases operated by the surgeons under this training programme from November 2018 to November 2019.

Method

Histopathological data of all colorectal surgery cases performed from November 2018 to November 2019 in our institution were analysed from our Colorectal Unit Database. Demographic data from the patients were also extracted.

Results

We performed a total of 29 cases of laparoscopic colorectal surgery, with 20.7% conversion rate (6/29). Mean age of patients are 66.0 years, with 55.2% (16/29) patients are male and 44.8% (13/29) patients are female. The resected specimens consisted mainly of rectosigmoid colon (51.7 %), rectum (20.1%) and sigmoid colon (13.8 %). Adequate lymph nodes were obtained from 89.7% (26/29) of the specimens, with clear margin resection achieved in 96.6% (28/29) of all the cases. Average tumour length was 41.0 mm (range 13 - 80.0 mm) and average tumour size was 41.4 mm (range 10.0 - 209.0 mm).

Conclusion

In summary, minimally invasive colorectal surgery cases performed by trained young surgeons in our institution were able to achieve comparable histopathological outcomes in comparison to other colorectal surgical cases.

colorectal surgery,
Minimally Invasive Surgery for Total Mesorectal Excision for Rectal Cancers in a Tertiary Cancer Centre—Our Experience of Rectal Cancers Operated Over Period of Ten Years

Sanket Bankar¹, Vivek Sukumar¹, Diwakar Pandey¹, Siddharth Nekkanti¹, Ashwin deSouza¹ and Avanish Saklani†

¹Surgical Oncology, Tata Memorial Centre, Mumbai, India

INTRODUCTION
Total mesorectal excision is (TME) the standard treatment modality for rectal cancer. Minimally invasive TME surgeries are complex and technically challenging. We present our experience of minimally invasive rectal surgeries with an aim to study the short term outcomes of 792 minimally invasive rectal surgeries undergoing TME.

METHODS
This is a retrospective analysis of prospectively maintained database of 792 minimally invasive total mesorectal excision surgeries performed over a period of 10 years (from September 2009 to September 2019). All patients went through a Multidisciplinary tumour board before treatment planning.

Inclusion criteria-
1. TME for rectal cancers laparoscopic and robotic.

Exclusion criteria
1. Open TME surgeries
2. Extended or beyond TME procedures
3. Tumor specific mesorectal excision for rectosigmoid and upper rectal cancers. No
4. Non adenocarcinoma histologies
5. Procedures involving lateral pelvic lymph node dissection.

RESULTS
A total of 792 consecutive minimally invasive TME procedures which include low anterior resection (LAR), abdominoperineal resection (APR), intersphincteric resection (ISR) were performed alongwith training for fellows being incorporated in the programme. 602(76%) patients underwent laparoscopic TME, 4(0.5%) patients underwent laparoscopic assisted TME, 8(1%) patients undergoing laparoscopic surgery were converted to open whereas 178 (22.5%) patients underwent robotic surgery and none of the patients planned for robotic surgery were converted to open surgery. The median blood loss was 150 ml (range of 30-3000ml). Overall CRM positive rates were 3.5%, for sphincter preservation surgeries (LAR+ISR) the CRM positivity rate was 1.2% whereas the CRM positivity rate for APR was 7.1%. Out of a total of 471 ISR and LAR patients leaks occurred in 33 patients with a leak rate of 7%. Grade III or more Clavien Dindo morbidity occurred in 7.4% of the patients.

CONCLUSION
Minimally invasive surgeries for TME alongwith training for trainees can be performed safely in Indian subcontinent with acceptable outcomes.

Total mesolectal excision, minimally invasive surgery, trainee,
Impact of Surgical Energy Device on Operative and Oncologic Outcomes of Minimally Invasive Colorectal Cancer Surgery

Woo Jin Song1, Sung Uk Bae1*, Kyeong Eui Kim1, Min Jun Kin1, Woon Kyung Jeong2 and Seong Kyu Baek2

1Department of Surgery, School of Medicine, Keimyung University and Dongsan Medical Center, Korea
2Department of Surgery, School of Medicine, Dongsan Medical Center, Keimyung University, Korea

The safety, efficiency and versatility of novel surgical energy devices have been proved by recent studies. The aim of this study is to investigate the impact of surgical energy device on operative and oncologic outcomes of minimally invasive colorectal cancer surgery.

The study group included 80 patients who underwent a minimally invasive colorectal cancer surgery with conventional monopolar device and 217 patients with surgical energy devices including ultrasonic shear or integrated bipolar and ultrasonic device between August 2015 and December 2017. The propensity scoring matching with Hosmer–Lemeshow test (p=0.382) for tumor’s lesion, pre-operative CEA, operation technique, pathologic T stage and lymphovascular invasion produced 63 matched pairs.

In patient characteristics, there was no significant difference between two groups after the propensity scoring matching. The amount of blood loss (72 vs. 54, p=0.123) and conversion cases to another surgery (11.1% vs. 4.8%, p=0.187) tended to be higher in monopolar group, while operation time and intraoperative complications were not significantly different. The short-term clinical outcomes including time to soft diet, the length of hospital stays and the morbidity within 30 days after surgery and pathologic outcomes were comparable between two groups. During the median follow-up periods of 29.0 months and 23.7 months in the monopolar and energy device groups, the 3-year overall survival rates of the monopolar and energy device groups were 88.2% and 93.7% (p=0.438), and the 3-year disease-free survival rates were 83.3% and 88.7% (p=0.619), respectively. Multivariate analysis showed that differentiation (p<0.001), tumor budding (p=0.010), and the sidedness of tumor (p=0.013) were independent prognostic factors for overall survival, and age (p=0.016), differentiation (p=0.002), and perineural invasion (p=0.003) were independent prognostic factors for disease free survival.

The use of surgical energy device based on surgeons' preference did not show the significant impact on operative and mid-term outcomes compared with conventional monopolar device in colorectal cancer.
The Advisability and Safety of Transperitoneal Laparoscopic Nephrectomy for Renal Parenchymal Tumors

Abdraimova Zhanna

Surgery, Regional Medical Center, Kazakhstan

Objective

To assess the advisability and safety of transperitoneal laparoscopic nephrectomy for renal parenchymal tumors. The investigation enrolled 163 patients with clinically localized renal parenchymal tumors that had been resected through laparoscopic (n = 81 (49.7 %)) and open (n = 82 (50.3 %)) accesses. The groups of patients operated on via laparoscopic and laparotomic accesses were matched for demographic characteristics, somatic status, baseline renal function, and nephrometric signs of tumor nodules, except the involved side (7 patients in the laparoscopic group had bilateral renal tumors). Renal resection was carried out in all the patients; a contralateral kidney tumor was also removed in 7 patients with a bilateral lesion (nephrectomy and kidney resection were done in 3 and 4 patients, respectively). Histological examination verified benign tumors in 15 (9.2 %) cases, renal cell carcinoma in 148 (90.8 %), including all bilateral renal tumors [pT1a (n = 135 (91.2 %) cases; pT1b (n = 4 (2.7 %); pT3a (n = 9 (6.1 %)); according to the pT category, the distribution of patients in the laparoscopic and open resection groups was even (p = 0.586). No additional treatment was performed in any case. The median follow-up was 48.2 ± 11.8 months.

Results

The use of the laparoscopic access significantly increased the frequency of intraoperative complications (6.1 and 16.0 %; p = 0.037), but failed to affect that of postoperative complications (13.0 and 18.3 %, respectively; p = 0.291) versus the open access. Laparoscopic versus conventional techniques did not cause any reduction in 5-year overall, specific, and relapse-free survival rates (93.3, 100.0, 80.0 % and 97.1, 100.0, 98.5 %, respectively; p > 0.05 for all). The rate of acute renal dysfunction and its distribution by the RIFLE classes, the rate and level of a decrease in glomerular filtration rate in transperitoneal laparoscopic nephrectomy for renal parenchymal tumors.
10. Retroperitoneal

**Tactics of Operative Treatment with Results of Combined Cystosis Diseases of the Kidneys and Abdominal Organs**

Farukh Makhmadov¹, Olimjoni Abdualim¹ and Guljahon Rajabova²

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
²Department of Obstetrics and Gynecology №2, Tajik Institute of Post-Graduate Education of medical Staff, Tadzhikistan

**Introduction**

To study the results of simultaneous minimally invasive interventions in patients with combined cystic formations of the kidneys and abdominal organs.

**Methods**

The work is based on clinical studies conducted in 38 patients with cystic diseases of the kidneys and abdominal organs over the past 12 years. Patients with concomitant cystic diseases of the kidneys and liver accounted for 13 (34.2%) and cystic pathologies of the genital organs - 25 (65.8%). In 3 (7.9%) cases, cystic formations of both kidneys occurred. All patients underwent simultaneous laparoscopic operations and interventions under ultrasound control.

**Results**

In 24 (63.1%) cases, the kidney cysts were intraparenchymal, and in size varied within 2.5-5.6 cm. In all cases, the cysts were simultaneously eliminated by interventions under ultrasound control. In 9 (23.7%) cases, simultaneous laparoscopic echinococcectomy from the liver was performed, in 4 (5.3%) - using PAIR technology. First of all, minimally invasive interventions in the kidneys were performed, the second stage was interventions on the abdominal organs. The duration of operations was 50-70 minutes. In the immediate postoperative period, the pain associated with the operation and requiring the use of analgesics was 2.1 ± 0.3 days. The postoperative rehabilitation period is on average 10 days.

It was noted that when using this method, the volume of intraoperative blood loss decreases, the intensity and duration of pain in the postoperative period decreases, which is manifested by a decrease in the number and frequency of the use of painkillers, and an improvement in the patient's subjectively evaluated comfort in the postoperative period.

**Conclusion**

Simultaneous minimally invasive interventions allow you to perform the planned volume of surgery in 100% of cases, with an improvement in the immediate results of treatment of patients with combined cystic pathologies of the kidneys and abdominal organs.

Simultaneous minimally invasive interventions, combined cystic formations of the kidneys and abdominal organs, simultaneous laparoscopic echinococcectomy
Ldh/Ast Ratio as a Predictor of Pancreatic Necrosis in Acute Pancreatitis Taking CT Scan as Gold Standard

Dr. Saad Tahir¹, Dr. Samiullah Bhatti¹, Dr. Shabbar Hussain Changazi¹, Dr. Mahmood Ayyaz², Dr. Zulqarnain Hyidar³ and Dr. Zubair Ahmed¹

¹Surgical Unit 1, Services Institute of Medical Sciences/Services Hospital, Lahore, Pakistan

Introduction/Background

Acute pancreatitis is acute inflammation of the pancreas and necrosis of pancreas is most dreadful complication. Lactate dehydrogenase/Aspartate aminotransferase (LDH/AST) ratio has been found to be most useful markers to predict necrosis of pancreas biochemically. This study was done to determine the diagnostic accuracy of LDH/AST ratio in detection of necrosis in acute biliary pancreatitis by taking CT scan as Gold standard.

Methods and Procedures

This cross sectional study was done in department of Surgery, Services Hospital Lahore. 150 patients who gave informed consent and Full-filling the inclusion criteria were admitted through the emergency department. Serial levels of AST and LDH at 1st, 3rd, 5th and 7th post admission day were done. Pancreatic necrosis was labelled if LDH/AST ratio was above 20. CT scan was done to confirm the findings. Primary outcome measure was to detect presence of necrosis as predicted by LDH/AST ratio and CT scan.

Results

Out of 150 patients 65.3% (98) were females while 34.6% (52) were males. Mean age of the patients was 42.57 +/- 5.27 years. Out of 150 patients 31 (20.6%) were predicted to have developed pancreatic necrosis on LDH/AST ratio. And among them 29 (93.5%) were confirmed to have pancreatic necrosis on CT scan as was our primary outcome measure. Agreement between pancreatic necrosis prediction on LDH/AST ratio and CT scan was found to be 93.5% with a kappa coefficient of 0.958 and p-value of 0.001.

Conclusion

LDH/AST ratio >20 is strongly associated with the development of pancreatic necrosis and can be used as biochemical marker of pancreatic necrosis.

ACUTE PANCREATITIS, LDH/AST RATIO, PANCREATIC NECROSIS
10. Retroperitoneal

Comparison of Laparoscopic and Open Radical Nephrectomy of Renal Cell Cancer in National Cancer Center of Mongolia

Sarantulga Chuluun*, Haliunaa Battulga¹ and Erdenebulgan Baatar¹

¹General Surgery Department, National Cancer Center Of Mongolia, Mongolia

In Globocan-2018, Kidney cancer is the 7th most common cancer in Mongolia and we need full study in Kidney cancer surgery treatment and compare surgery methods in RCC patients. Our study is aimed at comparing advanced open surgery and abdominal laparoscopic surgery methods to localize advanced treatment methods and comparing the recent results of surgical interventions in RCC.

Objective: The aim of this study is summarize the current evidence of laparoscopic radical nephrectomy (LRN) and open radical nephrectomy (ORN) in the treatment of RCC in National Cancer Center of Mongolia in 2003-2019.

Method

We collected data who underwent Radical nephrectomy by open and laparoscopic method between 2013 to June 2019 and pathologic diagnose approved RCC. We used case control study method and case group was LRN and control group was ORN.

Result

We evaluated surgical blood loss, surgical time, postoperative complications. In 2013-2019, total operation was 342 in that laparoscopic: open was 132:210. Surgical blood loss of 7 years was 166.13ml in control group and 309.88ml in case group in contrast last 2 years/2018-2019/ in control group was 142.29ml and case group was 111.91ml, p was<0.0001. SMD between groups was 129.13:26.96 control: case group that illustrated blood loss of case group is significantly stable.

We compared OP time, overall study period/7 years/ was 74.92min in case group and 111.68min in control group and 74.17min case group, 160.3min in control group between 2013-2017 but last 2 years 77.38:92.58 control:case group and p value was <0.0001.

We compared surgical blood loss and analyzed Odds ratio in whole period of study/2013-2019/ was 0.7 but last 2 years/2018-2019/ OR was 0.3.

Conclusion

LRN is approved one of the surgical method of nephrectomy in RCC patients and found to significantly lower complication rate, surgical time compared ORN. We need study overall and disease free survival rate of radical nephrectomy

National cancer center of mongolia, renal cell carcinoma, mongolia
**E-Poster 03**

**ABS-0113**

**EP03-01**

**01. Bariatric & Metabolic**

**Micro-Nutrition Status among Bariatric Surgery Patients in Korea**

Bo Chuan Tan¹,² and Young Suk Park*¹

¹Department of Surgery, Seoul National University Bundang Hospital, Korea
²General Surgery, Khoo Teck Puat Hospital, Singapore

**Background**

Micro-nutrition deficiency is common among obese patients even before Bariatric surgery. American Society for Metabolic and Bariatric Surgery (ASMBS) and British Obesity and Metabolic Surgery Society (BOMSS) have different recommendation in micro-nutrition screening before surgery. The prevalence of micro-nutrition deficiency among Bariatric patients in Korea has not been studied.

**Objective**

To evaluate micro-nutrition status of patients In Korea undergoing Bariatric surgery.

**Material and Methods**

Cross-sectional study involving all patients underwent Bariatric surgery in a tertiary hospital in Korea from January to August 2019. All the patients underwent blood check prior to Bariatric surgery. Data were extracted from Bariatric surgery database.

**Result**

A total of 139 patients were included. Mean subjects’ age was 37.9±10.5 years with mean BMI 39.0±5.7kg/m². 64.7% of the subjects were women. 113 subjects (81.3%) underwent laparoscopic sleeve gastrectomy (LSG), 20 subjects (14.4%) underwent LSG with proximal jejunal bypass, 3 subjects (2.2%) underwent LSG with duodenal-jejunal bypass and 3 subjects (2.2%) underwent laparoscopic resection gastric bypass. 21.8% of the subjects has vitamin D insufficiency and 68.3% has vitamin D deficiency (mean 18.0±7.1ng/ml). 28% of the subjects had folate deficiency (mean 9.4±4.8ng/ml), 22.7% of the subjects had vitamin B1 deficiency (mean 3.1±1.0mcg/dl), 9.3% of the subjects had Zinc deficiency (mean 88.3±12.6mcg/dl), 7.6% of the subjects had vitamin B12 deficiency (mean 674.9±313.0pg/ml), 6.1% of the subjects had iron deficiency (mean 230.3±236.9ng/ml), 1.3% of the subjects had Copper (mean 106.8±18.8 mcg/dl) and Selenium deficiency (mean 123.9±14.7ng/ml). None of the subject had magnesium deficiency (mean 2.2±0.1 mg/dl).

**Conclusion**

Prevalence of vitamin D insufficiency and deficiency (90.1%) are very high among obese patients in Korea, followed by folate, vitamin B1, Zinc, vitamin B12 and Iron. Screening of these micronutrients may routinely be considered. Further studies will be needed with a larger cohort of patients and to establish confounding factors associated with micronutrient deficiency.

Bariatric, Nutrition, Obesity
Initial Experience with Laparoscopic Mini-gastric Bypass in Korean Obese Patients

Sanghyun Kim1*, Kyung Yul Hur1 and Yong Jin Kim2

1Surgery, Soonchunhyang University Hospital Seoul, Korea
2Surgery, H plus Yangji Hospital, Korea

Purpose
To report our initial experience with laparoscopic mini-gastric bypass (LMGB) in Korean obese patients.

Materials and Methods
From July 2016 to February 2018, 14 male patients underwent LMGB for morbid obesity at a single institution. Five trocars were placed in a U-shape formation and 1 trocar was placed at the epigastrium as a liver retractor; a window was created between the vagal nerve and lesser curvature at the gastric angle for entering the lesser sac; a narrow gastric tube (∼100-120 ml volume) was made; a linear-stapled gastrojejunostomy was created after bypassing the jejunum 200 cm from the Treitz’ ligament; and the Petersen defect was closed to prevent internal hernia. Patient demographics, operative time, estimated blood loss, postoperative hospital stay, complications, weight loss, and resolution of comorbidities were evaluated during 1 year of follow-up.

Results
All procedures were successful by laparoscopy. The average age was 29 (19-49) years; weight, 164.9 (127-250) kg; and body mass index, 51.0 (42.4-81.6) kg/m2. In 1 case, nephrectomy was simultaneously performed for early renal cell carcinoma. The mean operative time was 148.8 (120-175) min. The mean postoperative hospital stay was 1.9 (1-4) days. The percentage excess weight loss at 1, 3, 6, 9, and 12 months was 16.6%, 31.0%, 41.4%, 45.4%, and 50.4%, respectively. The resolution rate of type 2 diabetes mellitus, hypertension, and dyslipidemia was 75%, 40%, and 66.7%, respectively. There was no major complication including mortality during the follow-up.

Conclusion
LMGB is a technically simple, safe, and effective procedure in Korean obese patients.

Mini-gastric Bypass, Bariatric surgery, Metabolic Surgery, Morbid Obesity
01. Bariatric & Metabolic

**Mid-Term Data about Improved Renal Function after Bariatric Surgery**

**Yeon-Ju Huh**¹, Kyong Min Park², Nan Hee Kim³ and Sang Moon Han¹*

¹Surgery, Bariatric and Metabolic Surgery Center, Cheil General Hospital, Korea
²Family Medicine, Bariatric and Metabolic Surgery Center, Cheil General Hospital, Korea
³Internal Medicine, Bariatric and Metabolic Surgery Center, Cheil General Hospital, Korea

**BACKGROUND**

Bariatric surgery can lead to improvement of renal function by reducing weight and improving co-morbidity, but the mid to long term results are very rare. The aim of this study was to investigate changes in the glomerular filtration rate (GFR) in morbidly obese patients 3 year after bariatric surgery.

**METHODS**

GFR was measured in 438 morbidly obese patients before surgery, and of them 53 patients with GFR results more than 3 years after the bariatric surgery were analyzed. Patients were separated by baseline GFR: hyperfiltration, normal, CKD stage 2, and CKD stage 3 (GFR>125, 125-90, 89-60, and 59-30 mL/min, each).

**RESULTS**

Of the 53 patients, 35 (66.0%) had normal and 18 (34.0%) had CKD stage 2. There were no patients with hyperfiltration or CKD 3 stage. The mean GFR was 103.4±8.2 mL/min in the normal group and 77.7±5.5 mL/min in the CKD stage 2 group preoperatively. The mean GFR continued to increase postoperatively, and GFR of the normal and the CKD 2 stage group were 104.4±18.3, 90.0±18.6 mL/min after 1 year, 102.9±16.2, 100.6±12.2 mL/min after 2 years, and 114.3±17.3, 109.9±15.6 mL/min after 3 years, respectively.

**CONCLUSIONS**

Renal decline associated with morbid obesity was normalized one year after surgery and has continued to increase until 3 years.

Bariatric surgery, Renal function, GFR
Background

The number of bariatric surgeries that have been performed has gradually increased in our tertiary hospital since the national health insurance covered the expenses in January 2019. This study aims to examine the feasibility and the effectiveness of laparoscopic sleeve gastrectomy by analyzing the early surgical outcomes.

Methods

We retrospectively reviewed and analyzed the data of 29 patients who underwent laparoscopic sleeve gastrectomy by five experienced surgeons who performed about 100 to 300 cases of gastrectomy annually between November 2018 and September 2019 at Asan Medical Center (Seoul, Korea). Patient information such as age, body mass index, weight, the presence of comorbidities, operation time, hospital stay after surgery, and postoperative complication was collected. Data regarding postoperative excess weight loss was also gathered.

Results

Our finding shows that the mean age, body mass index and weight was 37.48±10.28 years, 39.59±6.19 kg/m² and 113.58±20.46 kg. The mean operation time was 112.97±26.85 minutes, and patients stayed an average of 5.10±1.21 days at the hospital after surgery. There were no reported postoperative complication such as leakage, bleeding and wound complication. Excess weight loss after 1 month of operation was 27.50±14.59%, and 37.61±10.16% after 3 month. Finally, information on 6 month postoperative excess weight loss was collected for two patients, and they were 36.60% and 52.85% respectively.

Conclusion

The laparoscopic sleeve gastrectomy is a safe and effective procedure for experienced gastric cancer surgeons.

Laparoscopy, Gastrectomy, Bariatric surgery, Metabolic surgery
Background/Purpose

Medicinal plant and Herbs have been well documented in the traditional medicine from very old age to till modern age because of their medicinal importance and pharmacological activities. In the modern medicine, People’s have been using natural medicine for the treatment of numerous disorders due to their belief on better health aspects compared to the allopathic medicine. Triterpene saponins are found to be present in the Centella asiatica an important medicinal plant of Indian traditional medicine having rich source of asiaticoside. Asiaticoside is the triterpene saponins class phytochemical containing sugar moiety in the side chains of their chemical structure.

Methods:

Centella asiatica have been used in the medicine for the treatment of numerous neurodegenerative disorders of human being. In order to know the medicinal importance of an active phytoconstituents of Centella asiatica i.e. asiaticoside in the medicine, here in the preset investigation data of different research work have been collected from literature sources and analyzed. However hepatoprotective activity of asiaticoside has been investigated in the scientific research work and data were collected from literature databases. Biological importance of various enzymes such as superoxide dismutase (SOD), catalase (CAT), and lipid peroxide (LPO) in liver disorders has been also correlated through literature database analysis.

Results

Data analysis of literature work revealed the asiaticoside is a pentacyclic triterpenoid saponin found to be present in the medicinal plants. Literature databases revealed the biological importance of asiaticoside in the medicine for their effectiveness against liver disorders. Databases analysis of various scientific research works revealed the therapeutic importance of asiaticoside in the medicine due to their anti-inflammatory and anti-oxidant potential. However other scientific study also signified their importance to improve cognitive impairment in animals. Present investigation revealed the biological potential of asiaticoside in the research field for the treatment of liver disorders.
Biological Importance of Delphinidin in Hepatic Cell Injury: Therapeutic Benefit in the Medicine through Scientific Data Analysis

Kanika Patel¹ and Dinesh Kumar Patel²

¹Department of Pharmaceutical Science, Krishnapit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India
²Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Payagraj 211007, Uttar Pradesh, India

Background/Purpose

Traditional system of medicines contains various type of preparation which mainly contains plants and their derived product. Attractive colour shades of the plant material in the nature are because of the presence of various class of phytochemical and most important one are anthocyanins. Delphinidin have been known for their attractive colour in the plant material and found to be present in the fruits and vegetables too.

Methods

In order to know the health beneficial potential of delphinidin in the medicine for their effectiveness against human health complication, here in the present investigation scientific data of delphinidin have been collected and analyzed from literature work. Pharmacological activities of delphinidin have been analyzed in the present investigation through data analysis of different research works in the present investigation.

Results

Data analysis of delphinidin from different research work of literature revealed the health beneficial properties in the medicine and other allied health sectors. Literature study revealed that delphinidin is an anthocyanidins class phytochemical responsible for the attractive colours of the flowers and fruits. Pharmacological data of literature work revealed their therapeutic value in the medicine due to their significant antioxidant, antimitaggenesis and anti-inflammatory activities. Scientific research work of the literature database revealed the biological importance of delphinidin for the treatment of liver disorders due to their significant free radicals scavenging potentials. Scientific research work from literature database revealed the medicinal importance and pharmacological activities of delphinidin in the medicine and other allied health sectors for the treatment of liver disorders.

Delphinidin, Hepatic injury, Hepatoprotective, Molecular mechanism
01. Bariatric & Metabolic

Therapeutic importance of Hispidulin against Nonalcoholic Fatty Liver Disease (NAFLD): Biological Importance in the Medicine

Dinesh Kumar Patel1* and Kanika Patel2

1Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India
2Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh , India

Background

Herbal medicine has been used in the history for the treatments of human disorders due to their beneficial potential in the medicine. Hispidulin is the naturally occurring pure phytochemical of medicinal importance found to be present in the Saussurea involucrate and Salvia species.

Methods

In orders to know the medicinal importance and pharmacological benefit of hispidulin for the treatment of numerous human disorders, here in the present investigation numerous scientific research works have been collected and analyzed. Medicinal application of Hispidulin for the treatment of various form of liver disorders have been investigated in the present work through data analysis of various literature work. Effectiveness of Hispidulin for the treatment of nonalcoholic fatty liver disease has been investigated in the present investigation through data analysis of different literature work. Molecular study data of different research work have been also collected and analyzed to know the effectiveness of hispidulin in the medicine for the treatment of liver disorders.

Results

Literature database analysis of various scientific research works revealed the biological importance of hispidulin in the medicine. Investigation of pharmacological activities of hispidulin through literature search revealed their medicinal value in the health sectors. Literature work signified the biological importance of hispidulin in the liver disorders through inhibitory mechanism against various enzymes in the nonalcoholic fatty liver disease. Molecular study data from the literature work have been analyzed together with other pharmacological data available in the scientific field to know their effectiveness against liver disorders.

Hepatoprotective, Hispidulin, NAFLD, Nuclear factor-κB, Cytochrome P450, Herbal medicine
**Therapeutic Potential of Hyperin as Valuable Dietary Flavonoid against Various Form of Liver Disorders: Role of Metabolic Enzymes in the Liver System**

*Dinesh Kumar Patel*¹ and *Kanika Patel*²

¹Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India

²Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India

**Background/Purpose**

Natural medicine and their derived primary and secondary metabolite have numerous biological applications in the medicine for the treatment of human disorders. Hyperin is an important flavonoidal compound separated and isolated form Hypericum perforatum and Drosera rotundifolia.

**Methods**

Scientific research of hyperin revealed their beneficial effect in the medicine due to their important pharmacological activities. In order to know the medicinal importance of Hyperin for the treatment of hepatic disorders of human being, here in the present investigation numerous scientific research data have been collected from different literature work and analyzed. Pharmacological data of hyperin have been collected from different literature databases and analyzed for their therapeutic value in the medicine. Biological importances of TNFα, ALT and AST in the medicine for the treatment of hepatic disorders have been also investigated through data analysis of various literature works.

**Results**

Literature database analysis revealed that hyperin is well known phytochemical of flavonoidal class which has been known for their biological activities in the medicine. Data analysis of different literature work revealed the pharmacological activities of hyperin against various types of disorders including liver disorders. Data analysis of different scientific research work from the literature revealed the the biological potential of hyperin in the medicine due to their inhibitory potential on LDL oxidation and free radical scavenging activity. Some other research work revealed the medicinal importance of hyperin against cytotoxicity in hepatocytes. Therapeutic potential of hyperin for the treatment of liver disorders revealed their biological importance in the modern medicine. Present study signified the therapeutic benefit and medicinal importance of hyperin in the hepatic disorders.

Hyperin, Flavonoid, LDL oxidation, Free radical scavenging activity, Hepatoprotective, Phytochemical
The First Experience of Video Laparoscopic Assisted Gastroectomy in the Treatment of Stomach Cancer

Sadykova Assel
Surgery 1, Regional Medical Center, Kazakhstan

This clinical case represents an example of successful application of the technical aspects of laparoscopic gastrectomy with intracorporeal formation of esophageojunoanastamosis, lymphodissection of D2 in the surgical treatment of stomach cancer pT3N2M0 IIIA stage. Conducting laparoscopic gastrectomy and resection of the stomach with D2 lymphodissection is a technically feasible intervention, while achieving the necessary radicality and good cosmetic result, which is an important aspect for patients.

Key words

gastric cancer, laparoscopic gastrectomy, lymphadissection D2.

Conclusion

This case report is an example of successful use of gastric laparoscopic gastrectomy with D2 lymph node dissection in the surgical treatment of gastric cancer. Of course, laparoscopic surgical interventions in the treatment of gastric cancer should be the prerogative of specialized cancer centers, which have high-tech equipment and a staff of specialists, and in which the concentration of patients with this pathology is possible. Laparoscopic gastrectomy and gastric resection with D2 lymphadenectomy is a technically feasible intervention, while achieving the necessary radicality and adequacy of lymphadenectomy, as well as a good cosmetic result, which improves the quality of life of patients.
Successful of Advanced Third-space Endoscopic Surgery by Per-oral Endoscopic Myotomy for Zenker’s Diverticulum: A Report of 2 Cases and Review of Literature

Chonlada Krutsri1, Chainarong Phalanusitthepha2, Pitichote Hiranyatheb1, Preeda Sumpritpradit1, Somchai Leelakusolvong2, Asada Methasate3, Pongsasit Singhatat1, Thanida Janhavonkij3 and Pattawia Choikrau1

1Surgery, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand
2Surgery, Faculty of Medicine, Siriraj Hospital, Mahidol University, Thailand

Background

Zenker’s diverticulum is a rare condition causes by herniation of mucosa at pharyngoesophageal junction leads to dysphagia. Nowadays, a third-space endoscopic surgery plays an important role which facilitates a precise surgery with good outcomes.

Aim

To demonstrate technical steps and outcomes of per-oral endoscopic myotomy (Z-POEM).

Method

We reported 2 cases of Z-POEM and literature review from international databases.

Results

A 71 and 75 years-old man presented with dysphagia. An esophagograms revealed a 2.1 cm and a 2 cm of Zenker’s diverticulum, respectively. The diagnostic gastroscopes found the diverticuli 17 cm from incisors with tighten and thicken septal muscle and no cancer detected by narrow band imaging (NBI). A submucosal injection was created 2 cm above the septal muscle. The 2 cm of mucosal incision was made by triangle knife then a submucosal tunneling was created by spray coagulation and the scope was advanced into submucosal space both oesophageal lumen and diverticulum site until clearly identifying the bottom of the diverticulum. The septal muscle was completely divided. The scope can pass easier immediately. The mucosal defect was reapprroximated by hemoclips. Postoperative esophagogram reported a complete resolution of the diverticulum. The review literature found an average diverticulum size of 3.2 cm (2-6 cm). Different types of endoscopic knife and lifting materials used provide the same outcomes. Most of the cases use Though-The-Scope Clips (TTC) for mucosal defect closure.

Conclusion

Z-POEM can treat the Zenker’s diverticulum precisely. The safety and success results from an intact mucosal integrity, clearly identifying the bottom of the diverticulum during creation of submucosal tunneling to prevent perforation, and completely seen entire septal muscle to prevent inadequate myotomy. Major complication and recurrent from Z-POEM is rarely occur.

Z-POEM, Zenker’s diverticulum, third-space endoscopic surgery
Laparoscopic Gastrectomy for Patients with Serosa Positive Gastric Cancer

Zhang Heng¹, Liu Fenglin¹* and Li Ruochen¹

¹General Surgery Department, Zhongshan Hospital, Fudan University, China

Background

Although laparoscopy gastrectomy has been accepted as a standard treatment strategy for early and some local advanced gastric cancer, its clinical significance in serosa invasive tumor is still unclear and controversial. Preoperative clinical diagnosis often underestimates the final pathological tumor stage diagnosis. Therefore, many patients with serosa invasive tumor received laparoscopy surgery owing to preoperative diagnosed as serosa negative.

Purpose

Is laparoscopic gastrectomy safe and effective for treating serosa invasive gastric cancer aroused our interest.

Methods

A total of 108 patients received laparoscopy gastrectomy in our center range from June 2009 to July 2017 with detailed clinicopathological and follow-up information who were first diagnosed as serosa negative disease on the bases of computer tomography, endoscopy examination but then diagnosed as serosa invasive tumor upon final pathology were candidates for current study. 108 serosa positive patients received open gastrectomy were competitive enrolled as control group. Their clinical outcomes were analyzed.

Results

The clinicopathological factors, including age (p=0.790), sex (p=0.318), tumor size (p=0.513), tumor location (p=0.152), tumor differentitiaton (p=0.131), lymph node resection (p=0.628), tumor stage (p=0.517) were similar between the two groups. The laparoscopic group had less surgical blood loss (p<0.001), less wound infection (p=0.029), shorter operation time (p<0.001) and shorter hospital days (p<0.001) compared with open surgery group. The surgical complication rate were comparable between the two groups (p=0.698), including pulmonary infection (p=0.721) and anastomosis leakage (p=0.683). The 5-year overall survival were comparable between the laparoscopy and open surgery groups (p=0.338). However, all these patients were all macroscopic diagnosed serosa negative but then microscopic diagnosed serosa positive.

Conclusions

Laparoscopy gastrectomy may be safely applied in patients with microscope serosa-positive tumors. Whether laparoscopy gastrectomy could be used in macroscopic serosa invasive tumor need further study.

laparoscopic gastrectomy, gastric cancer, serosa invasive, overall survival
Correlation between Grades of Esophagitis Grade with Dyspepsia Symptoms: An Evidence from Developing Country

HENING Tirta Kusumawardani1*, ETRA Ariadno2 and EKO Budi Prasetyo1

1Anesthesiology and Intensive Therapy Departments, Dr. Mintohardjo Naval Hospital, Jakarta, Indonesia
2Internal Medicine Departments, Cilandak Marine Hospital, Jakarta, Indonesia

Background

Esophagitis is a chronic disease that need a longtime treatment, resulting in a reduction of quality of life and productivity, therefore it needed early diagnostic. In most cases, esophagitis symptoms are not specific and often overlap with dyspepsia symptoms. Therefore, we conducted a study to know the clinical presentation of esophagitis, the proportion of each esophagitis grade based on endoscopy, and the correlation of esophagitis grade with the severity of dyspepsia symptoms in Indonesia.

Methods

This research is a cross sectional retrospective study. Subjects were obtained from multi-center hospital in Indonesia those fulfilled inclusion criteria. Then, the subjects were interview to get the identity and dyspepsia symptoms.

Results

There were 1123 eligible patients during January 2012 until December 2019. Incidence of esophagitis we found higher in patient with male gender 585 (52%) and 30-59 years old group 615 (54.8%). Patients with grade A esophagitis was found in 770 (68.6%), grade B in 246 (21.9%), grade C in 76 (6.8%), and grade D in 31 (2.7%). Statistically there were correlation between esophagitis grade severity with dyspepsia symptom such as heart burn (p value = 0.001), epigastric pain (p value = 0.029), and vomit (p value = 0.01). There were no correlation between esophagitis severity with nausea and belching symptom.

Conclusions

The most esophagitis was grade A esophagitis. There are tendency severities of heart burn, epigastric pain, and vomit with grade of esophagitis that found based on endoscopic examination.
Short-Term Results of Robotic Assisted McKeown Esophagectomy: 70 Consecutive Cases

Uday Karjol1*, Ramachandra Chowdappa1, Ravi Arjunan1, Syed Altaf1, Srinivas C1 and Pavan Sugoor1

1Surgical Oncology, Kidwai Memorial Institute of Oncology, India

Background

Minimally invasive esophagectomy is associated with reduced perioperative morbidity. However, most studies so far have evaluated thoracoscopic approach. We describe our initial experience with robotic assisted McKeown esophagectomy (RAME) using the da Vinci Xi platform.

Methods

A retrospective review of a prospectively maintained esophageal cancer database identified 70 patients with curative RAME performed between May 2016 to November 2019. We here report our initial results of RAME in terms of quality of oncological resection, morbidity and mortality.

Results

70 of the 325 curative esophagectomies were performed by robotic approach. We performed the thoracic part in the prone position and the abdominal part in a supine position. 44 (62.9%) had lower third esophageal cancer. Squamous cell carcinoma was a predominant histology, 60 (85.7%). The thoracic component of the procedure was completed robotically in all 70 patients. For the abdominal approach, 5 (7.1%) patients underwent gastric mobilization by the robotic approach, and 65 (93.9%) by laparotomy. Standard two field (infracarinal and abdominal) lymphadenectomy was performed. The median age was 58 years. 33 (47.1%) had pT3 tumors and 36 (50.5%) were node positive. The median blood loss was 245ml. Median duration of surgery was 155 minutes. Pulmonary complications were seen in 9 (12.8%), 7 (10%) had Calvein Dindo grade III complications. Anastomotic leak was noted in 6 (8.6%). 30 day mortality was 1.4%. Median length of hospitalization was 9 days.

Conclusion

Robotic assisted McKeown esophagectomy is safe, feasible approach with low morbidity and acceptable Oncologist results.

Robotic Esophagectomy, McKeown esophagectomy, esophageal cancer
Choose Tactics of Minimally Invasive Treatment of Combined Pathologies of Abdominal Bodies and Genital

Farukh Makhmadov¹, ², Guljahon Rajabova³ and Gulshan Ashurova¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
²Department of Abdominal Surgery and New Technology, Istiqlol Medical Complex, Tadzhikistan
³Department of Obstetrics and Gynecology №2, Tajik Institute of Post-Graduate Education of Medical Staff, Tadzhikistan

Introduction

Improving the results of surgical treatment of emergency combined pathologies of the abdominal cavity and pelvic organs, using minimally invasive technology.

Methods

The material includes the results of treatment of 92 women with combined surgical and gynecological pathologies operated on for the period 2012 to 2019. Upon admission to patients, the whole range of clinical, laboratory and instrumental studies was performed.

Results

The most common combination of surgical and gynecological pathologies was acute appendicitis, which amounted to 91.7%. The combination of acute calculous cholecystitis with diseases of the pelvic organs was found in 16.3% of patients.

Indication for laparoscopic simultaneous interventions was inserted based on the degree of operational-anesthetic risk for ASA. Mostly the operated women belonged to the I and II degrees of operational and anesthetic risk. Among the women examined, 54 (58.7%) had concomitant somatic diseases.

In 3 (3.3%) cases of acute calculous cholecystitis, uterine fibroids were detected in women. In one woman with laparoscopy, a massive adhesive process of the small pelvis was found. In this connection, LCE + adhesiolysis + uterine amputation was performed. 71.8% of women accounted for a combination of acute appendicitis and the presence of adnexal adhesions, which in particular were the causes of secondary infertility in women of childbearing age. In 29 (43.9%) women, adhesions of the first degree were established, in 30 (45.4%) - II, in 5 (7.6%) - III, and in 2 (3.1%) - IV degrees of adhesions process. In all cases, laparoscopic adhesiolysis was performed with the restoration of the normal anatomy of the internal genital organs. Complications after interventions were noted in 8 (8.7%) women.

Conclusion

The use of video laparoscopy in women with combined surgical and gynecological pathologies, with the right individual selection, can significantly reduce the invasiveness of surgical intervention.

combined pathologies of the abdominal cavity and pelvic organs, minimally invasive technology, surgical intervention
CDK5RAP3 Negatively Regulate Self-Renewal and Invasion and Is Inhibited by Erk1/2 Signaling in Human Gastric Cancer Stem-Like Cells

Jian-xian Lin¹, Chang-ming Huang* and Sam S. Yoon²

¹Fujian Medical University Union Hospital, No. 29 Xinquan Road, Fuzhou 350001, Fujian Province, China.
²Department of Surgery, Memorial Sloan Kettering Cancer Center, H-1209, 1275 York Avenue, New York, NY 10021, USA

Toward identifying new strategies to target gastric cancer stem-like cells (CSCs), we evaluated the function of the tumor suppressor CDK5 regulatory subunit-associated protein 3 (CDK5RAP3) in gastric CSC maintenance. We show that CDK5RAP3 is weakly expressed in gastric CSCs and is negatively correlated with the gastric CSC marker CD44. CDK5RAP3 overexpression decreased expression of CSC markers, spheroid formation, invasion and migration, and reversed chemoresistance in gastric CSCs in vitro and vivo. CDK5RAP3 expression was found to be regulated by extracellular-related kinase (ERK) signaling. ERK inhibitors decreased spheroid formation, migration and invasion, and the expression of epithelial-to-mesenchymal transition (EMT)-related proteins in both GA cells and organoids derived from a genetically engineered mouse model of GA. Finally, CDK5RAP3 expression was associated with reduced lymph node metastasis and better prognosis, even in the presence of high expression of the EMT transcription factor Snail, among patients with CD44-positive GA. Together, our results demonstrate that CDK5RAP3 is suppressed by ERK signaling and negatively regulates the self-renewal and EMT of gastric CSCs.

Gastric adenocarcinoma; Cancer stem-like cell; self-renewal; invasion; CDK5RAP3; ERK signaling
Background

There are controverted whether the long-term use of proton pump inhibitors (PPI) will increase the risk of gastric cancer. We performed a meta-analysis to assess the risk of gastric cancer in PPI users compared with non-PPI users.

Methods

The main inclusion criteria were original studies reporting the incidence of gastric cancer in PPI users compared with non-PPI users. Key outcomes were the risk ratios (RR) for gastric cancer in association with PPI users or non-PPI users. Results: We analyzed data from 8 studies, comprising more than 927,684 patients. The risk of gastric cancer in PPI users was significantly higher than in non-PPI users [RR= 2.10, 95% CI (1.17-3.97)]. The risk of gastric cancer was similar between the 2 groups when the duration was ≤1 year [RR= 2.18, 95% CI (0.66-7.11)]. While the risk of gastric cancer for PPI users was higher than in non-PPI users when the duration was between 1-3 years, ≥1 year, ≥3 years and ≥5 years. The risk of non-cardiac gastric cancer for PPI users was higher than for non-PPI users [RR= 2.66, 95% CI (1.66-4.27)], and the risk of non-cardiac gastric cancer for PPI users was higher than for non-PPI users when the duration ≥1 year [RR= 1.99, 95% CI (1.03-3.83)], but the risk for cardiac gastric cancer was similar between the 2 groups [RR= 1.86, 95% CI (0.71-4.89)].

Conclusions

We found the long-term use of PPI (duration ≥1 year) was significantly associated with a higher risk of non-cardiac gastric cancer.
11. UGI

Prognostic Significance of Preoperative and Postoperative Tumor Markers for Patients with Gastric Cancer

Jun-Peng Lin¹, Jian-Xian Lin¹ and Chang-Ming Huang*¹

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, Fujian Province, China, China

Objective

To evaluate the prognostic value of a combination of carcinoembryonic antigen (CEA) and carbohydrate antigen (CA) 19-9, measured before and after surgery, on survival in patients with resectable gastric cancer (GC).

Background

In clinical practice, CEA and CA19-9 are the most commonly markers measured before and after surgery for GC. However, which preoperative or postoperative combined tumor markers (CEA and CA19-9) have more prognostic value remains unclear.

Methods

Consecutive patients undergoing a resection for GC at the Fujian Medical University Union Hospital were included as a discovery database between January 2011 and December 2014. The prognostic impact of preoperative and postoperative tumor markers was evaluated using survival analyses. The results were then externally validated.

Results

A total of 735 patients were identified in the discovery cohort. Overall survival rates clearly decreased in a stepwise manner in association with the numbers of preoperative and postoperative positive tumor markers (both P<0.001). Multivariate analysis revealed that the number of preoperative positive tumor markers was an independent prognostic factor (P<0.05). For patients with abnormal preoperative tumor markers, normalization of tumor markers after surgery is an independent prognostic protective factor (HR=0.618; P=0.018), and patients with both positive postoperative tumor markers had double the risk of overall death (HR=2.338; P=0.033). Similar results were observed in the internal validation and external validation cohorts.

Conclusion

Preoperative tumor markers have a better discriminatory ability for postoperative survival in GC patients than postoperative tumor markers, and the normalization of tumor markers after surgery was associated with better survival.

Preoperative, Postoperative, Tumor Markers, Gastric Cancer, Prognosis
Low Expression of CDK5RAP3 and UFM1 Indicates Poor Prognosis in Patients with Gastric Cancer

Ning-Zi Lian, Jian-Xian Lin and Chang-Ming Huang

1Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

To investigate the correlation between different expression of CDK5RAP3 and UFM1 and the long-term survival of patients undergoing radical gastrectomy.

Methods

The expression of CDK5RAP3 and UFM1 in cancer and adjacent tissues of gastric cancer patients were detected, and their relationship with clinical pathological parameters and long-term prognosis were analyzed. Results Low expression of CDK5RAP3 was detected in 102 patients (78.5%), and UFM1 expression was low in 99 patients (76.2%), and the expression of the two was significantly positively correlated. Based on the co-expression of CDK5RAP3 and UFM1, we found that the low expression of CDK5RAP3 and UFM1 was closely related to the depth of invasion (P = 0.041), lymph node metastasis (p = 0.006), and TNM stage (P = 0.000). In Kaplan-Meier analysis, the prognosis of patients with low expression of CDK5RAP3 and UFM1 was significantly poorer than that of patients with high expression of CDK5RAP3 or UFM1 (p = 0.005), and could be used as an independent risk factor for the prognosis of the entire group of patients. The co-expression of CDK5RAP3 and UFM1 had the largest area under the ROC curve, and the patients’ long-term prognosis was better than the TNM stage alone, and has statistical significance (p < 0.05).

Conclusion

The expressions of CDK5RAP3 and UFM1 are significantly reduced in gastric cancer tissues. The co-expression of CDK5RAP3 and UFM1 is an independent prognostic factor for gastric cancer. Combining the expression of the two can provide a more accurate prognostic model for predicting the overall survival of gastric cancer.
Prognostic Value of Lymph Node Staging Based on the Number and Metastatic Rate of Lymph Nodes in Patients with ≤15 Dissected Lymph Nodes

Ru-Hong Tu¹, Jian-Xian Lin¹ and Chang-Ming Huang*¹

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

To investigate reasonable lymph node (N) staging for gastric cancer patients with ≤15 dissected lymph nodes (LNs).

Methods

The clinicopathological and follow-up data of patients with ≤15 LNs were obtained from the US Surveillance, Epidemiology, and End Results (SEER) database to analyze the impact of the number of lymph nodes dissected and metastatic status on the prognosis of patients and to establish reasonable lymph node staging. In addition, external validation was achieved from two medical centers in China.

Results

A total of 18,139 gastric cancer patients with 1-15 dissected LNs from the SEER database were enrolled and randomly divided into the training group (12,705 cases) and the internal validation group (5,434 cases). A new lymph node staging, mNr staging (mNr0-4; 5 stages), was established according to the number and metastatic rate of LNs. Compared with TNM staging and TNrM staging, the misclassification rate of mTNrM staging decreased to 23.4% from 50.4% and 62.5%, respectively. Furthermore, there was a significance difference in the 5-year overall survival (OS) rate between the mTNrM staging subgroups (p<0.05); however, no significant difference was found in the 5-year OS rate of partial adjacent stages in TNM staging (8th edition) and TNrM staging (p>0.05). Similar results were obtained in the external validation cohorts.

Conclusion

mNr and mTNrM staging can efficiently distinguish a survival difference in patients who undergo gastrectomy with ≤15 dissected LNs, with more accuracy in predicting the 5-year OS rate of patients compared with that of TNM staging and TNrM staging.

Gastric neoplasm; Gastrectomy; Stage; Prognosis
The Prognostic Value of Adjuvant Chemotherapy for Patients with Resectable Gastric Neuroendocrine Carcinomas and Mixed Adenoneuroendocrine Carcinomas a Multicentric Propensity Score Matching Analysis

Junpeng Lin¹, Jianxian Lin¹ and Chang-Ming Huang¹*

¹Department of Gastric Surgery, Fuzhou Medical University Union Hospital, Fuzhou, Fujian Province, China, China

Background

The aim of this study was to evaluate whether adjuvant chemotherapy (ACT) provides a survival benefit in patients with resectable gastric neuroendocrine carcinomas (G-NECs) and mixed adenoneuroendocrine carcinomas (G-MANECs).

Methods

Patients with resectable G-NECs and G-MANECs from 21 centers in China between 2004 and 2016 were identified. Propensity score matching (PSM) analysis was used to reduce the selection bias, and Kaplan-Meier curves were used to compare the overall survival (OS) of patients in different treatment groups.

Results

In total, 804 patients with resectable G-NECs and G-MANECs were included. Of these, 490 patients (60.9%) received ACT. After PSM, the OS of the ACT group was similar to that of the no ACT group for patients with G-NECs and G-MANECs. For patients with G-NECs, the 5-Fu (fluorouracil)-based ACT group did not have a survival benefit compared with the non-5-Fu-based ACT group and the no ACT group. Similarly, etoposide plus cisplatin or irinotecan plus cisplatin did not have a positive prognostic impact on OS for patients with G-NECs. However, for patients with G-MANECs, the OS of the non-5-Fu-based ACT group was significantly worse than that of the 5-Fu-based ACT group and the no ACT group (both P<0.05). Patients with G-MANECs also did not derive survival benefit from platinum-based ACT.

Conclusion

Our multicentric data showed that patients with resectable G-NECs and G-MANECs did not derive survival benefits from ACT. More studies are needed in the future to explore novel postoperative ACT to improve the prognosis of patients with G-NECs and G-MANECs.

Adjuvant Chemotherapy, Gastric Neuroendocrine Carcinomas, Multicenter, Propensity Score Matching, Mixed Adenoneuroendocrine Carcinomas
Impact of Increasing Age on Cancer- and Noncancer-Specific Mortality in Patients with Gastric Cancer Treated by Radical Surgery: A Competing Risk Analysis

Long-Long Cao¹, Jun Lu¹, Bin-Bin Xu¹ and Chang-Ming Huang¹*

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

To perform competing risk analysis and evaluate cancer- and noncancer-specific mortality in patients with gastric cancer after radical surgery.

Methods

A total of 5051 patients from our department (as training set) and a total of 7123 patients from the Surveillance, Epidemiology, and End Results (SEER) database (as validation set) were enrolled in the study. The cumulative incidence of cancer and noncancer-specific mortality was determined by univariate and multivariate competing risk analysis.

Results

The five-year cancer- and noncancer-specific cumulative incidence of death (CID) in the training set were 36.9% and 2.5%, respectively, which were significantly lower than that in the validation set (48.2% and 8.6%, respectively). Multivariable analysis showed that age, tumor site, tumor size and pTNM stage were independent predictors of gastric cancer-specific mortality and overall survival, whereas age was an independent predictor of gastric noncancer-specific mortality. Noncancer–specific CID surpassed cancer-specific CID for pTNM stage I patients after approximately 8 years of surgery, but never for stage II and III patients. Moreover, for stage I patients, the time point when noncancer–specific CID surpassed cancer-specific CID become earlier as age increasing, with only 3.5 years after surgery for patients more than 74 years of age.

Conclusions

Age is an independent predictor of gastric cancer- and noncancer specific mortality and overall survival for patients after radical surgery. For patients with stage I gastric cancer, noncancer-specific mortality is a significant competing event, with an increasing impact as age increases.
A Nomogram for Predicting the Benefit of Adjuvant Chemotherapy after Resection in Patients with Borrmann Type IV Gastric Cancer

Jun Lu\textsuperscript{1}, Bin-Bin Xu\textsuperscript{1} and Chang-Ming Huang\textsuperscript{1*}

\textsuperscript{1}Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

This study sought to explore prognostic factors for patients with Borrmann type IV gastric cancer and to establish a predictive model for survival benefit of postoperative adjuvant chemotherapy in such patients.

Method: This study reviewed the clinical data of patients who underwent curative surgery at Fujian Medical University Union Hospital from 2006 to 2014 for Borrmann type IV gastric cancer using a prospective database. Cox regression analyses were performed to identify prognostic factors that formed the basis for a nomogram and risk groups. Establishment of risk groups to identify patients with Borrmann type IV gastric cancer who would benefit from adjuvant chemotherapy.

Results

265 patients who underwent R0 resection were included in this study. Multivariate analysis showed that BMI, tumour differentiation, pT stage, pN stage, and ASA score were independent prognostic factors. Patients in the ACT-group had longer OS than patients in the SA-group, although the p-value for this difference was marginally above the threshold for statistical significance (23.8\% vs. 10.9\%, p=0.057). Stratified analysis showed that there was no significant difference in OS between the ACT-group and the SA-group for each AJCC stage. A nomogram was established based on these independent risk factors, and nomogram scores were used to divide all patients into a high-risk group (score>16), an intermediate-risk group (8<score≤16) and a low-risk group (score≤8). Further stratified analysis based on AJCC stage showed that 3-year survival rate was higher in the adjuvant chemotherapy group than in the surgery alone group for low- and intermediate-risk patients in each AJCC stage, while high-risk patients in stage III did not significantly differ.

Conclusion

The nomogram that we established may effectively be used to identify patients with Borrmann type IV gastric cancer who would benefit from postoperative adjuvant chemotherapy. Postoperative adjuvant chemotherapy can improve survival in low- and intermediate-risk patients.

Borrmann type IV gastric cancer; nomogram; survival benefit.
Does Smoking Modify the Association between Chemotherapy and Survival in Gastric Cancer after R0 Resection? A Decision Tree Analysis

Jun Lu¹, Zhen Xue¹ and Chang-Ming Huang”

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

This study sought to explore the prognostic factors for smoking patients with gastric cancer and to establish a predictive model for the survival benefit of postoperative adjuvant chemotherapy in such patients.

Methods

We studied 2081 patients who were diagnosed from September 2009 to September 2014 at Union Hospital of Fujian Medical University. Cox regression analyses were performed to identify prognostic factors. The Kaplan-Meier method was used to assess the effect of smoking history on the benefit of adjuvant chemotherapy after gastric cancer surgery. A decision tree algorithm was used to identify smoking patients who benefited from postoperative adjuvant chemotherapy.

Results

The median follow-up time for the whole group was 42.5 months, and the average age of all the included patients was 61.5 years. Multivariate analysis showed that age (p<0.001), BMI (p<0.001), degree of tumor cell differentiation (p<0.01), and AJCC stage (p<0.001) were independent risk factors for the prognosis of smoking patients. Based on these independent risk factors, a decision tree model for the benefit of adjuvant chemotherapy for smokers with gastric cancer was established, and the smoking patients were divided into the low-risk patients (3-year OS, 78.7%), medium-risk patients (3-year OS, 51.3%) and high-risk patients (3-year OS, 28.4%) (p<0.001).

Conclusion

Cigarette smoking may reduce the efficacy of adjuvant chemotherapy after gastric cancer surgery. Our decision tree model is simple and effective for identifying smokers who would benefit from adjuvant chemotherapy.

gastric cancer; smoking history; prediction; chemotherapy benefit.
The Prognostic Value of the Lymphocyte-Monocyte Ratio in Patients with Resectable Gastric Cancer Depends on Tumor-Associated Macrophage Status: Results of a Prospective Trial

Jun Lu¹, Bin-bin Xu¹ and Chang-Ming Huang¹*

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background

Immune function is recognized as an important prognostic indicator in gastric cancer (GC). The relationship between the lymphocyte-monocyte ratio (LMR) and tumor-associated macrophage (TAM) has received far less attention.

Methods

A total of 401 patients from a prospective trial were enrolled in this study. The relationships between the LMR, TAM, and clinicopathologic variables were analyzed using a Kaplan-Meier log-rank survival analysis, and multivariate Cox regression models were used to identify associations with recurrence-free survival (RFS) and overall survival (OS). The discriminatory power of the prognostic methods for both RFS and OS were compared.

Results

High LMR was observed in 81.5% of the 401 GC patients, and high TAM infiltration was observed in 45.9% of the patients. In a multivariate Cox analysis of all patients, LMR and TAM were both independent prognostic factors for RFS and OS. Patients with high TAM expression had similar mean LMR levels than patients with low TAM expression. Moreover, LMR appeared to lose its prognostic significance in patients with high TAM expression levels. Finally, the model that included the TAM had better predictive capability for both RFS and OS.

Conclusions

Although LMR and TAM are both independent predictors of RFS and OS in resectable GC patients, LMR may lose its prognostic significance in patients with high TAM expression. This information may be helpful in the clinical management of patients with GC. Further external studies are warranted to confirm this hypothesis.

gastric cancer; lymphocyte-monocyte ratio; tumor-infiltrating macrophage; prognosis
Prognostic Value of Tumor Regression Grading (TRG) in Patients Treated with Neoadjuvant Chemotherapy Plus Surgery for Gastric Cancer

Jian-wei Xie¹, Bin-bin Xu¹ and Chang-Ming Huang¹*

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objective

To validate the prognostic value of tumor regression grading (TRG) and explore the associated factors of TRG for advanced gastric cancer (AGC) with neoadjuvant chemotherapy (NACT) plus surgery.

Background: The factors associated with a better tumor response rate and an optimal neoadjuvant chemotherapy regimen are uncertain.

Methods

Three hundred forty-four AGC patients treated with NACT followed by gastrectomy at the Mayo Clinic, USA and the Fujian Medical University Union Hospital, China between January 2000 and December 2016 were enrolled in this study. Cox regression was used to identify covariates associated with overall survival (OS) and recurrence-free survival (RFS). Logistic regression was used to reveal factors predicting the tumor regression grading.

Results

For patients with TRG 0-1, the 3- and 5-year OS rates were 85.2% and 74.5%, respectively, when compared to 56.1% and 44.1% in patients with TRG 2 and 28.2% and 23.0% in patients with TRG 3, respectively (p=0.000). TRGs were independent risk factors for OS. Similar findings were observed in RFS. The oxaliplatin-based regimen was superior to the non-oxaliplatin-based regimen for the OS (38.4m vs 19.5m, respectively; p=0.01). Subgroup analyses by histological subtype indicated that the oxaliplatin-based regimen improved the OS in non-signet ring cell carcinoma compared to the non-oxaliplatin-based regimen (53.7m vs 19.5m, respectively; p=0.011). However, similar findings were not observed in RFS.

Conclusion

TRG was an independent factor of AGC treated with neoadjuvant chemotherapy plus surgery. Oxaliplatin-based neoadjuvant chemotherapy regimens improve tumor response and may have an overall survival benefit for patients with non-signet ring cell carcinoma.

Gastric cancer; neoadjuvant chemotherapy; tumor regression grading; signet-ring cell carcinoma; overall survival; recurrence-free survival
FOBT and Management of GC: Complication, Survival and Chemotherapy Benefit after R0 Resection

Bin-bin Xu¹, Zhen Xue¹, Jun Lu¹ and Chang-Ming Huang¹

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Background

Previous studies have shown that the all-cause mortality and non-colorectal cancer mortality of patients with fecal occult blood test (FOBT) positivity are significantly increased. We aimed to explore the relationship between preoperative FOBT results and outcomes in gastric cancer (GC) patients undergoing R0 gastrectomy.

Methods

GC patients who underwent radical gastrectomy from July 2007 to July 2014 were analyzed. Propensity score matching (PSM) was used to reduce baseline bias. Immunohistochemical (IHC) analysis was performed in paraffin-embedded tumor sections from 60 FOBT (+) patients and 60 FOBT (-) patients.

Results

There was no significant difference in demographic data between the FOBT-positive group (n=246) and the FOBT-negative group (n=984) after a 1:4 PSM. The overall postoperative complications, anastomotic leakage, major complications and overall survival were significantly worse in the FOBT-positive group. Chemotherapy benefit analysis for stage II/III patients found that only FOBT-negative group benefited from chemotherapy. Further IHC analysis (n=120) found that FOBT-positivity was significantly associated with tumor-induced macrophage (CD68) infiltration and higher expression of IL-6 and TNF-α in tumor tissues.

Conclusion

As a simple and low-cost method, preoperative FOBT results can predict both complications and survival after R0 gastrectomy for GC. More importantly, stage II/III GC patients with FOBT-positive tumors cannot benefit from chemotherapy alone and may potentially benefit from immunotherapy.

gastric cancer; fecal occult blood test; complication; adjuvant chemotherapy; prognosis; tumor immune microenvironment.
Development and External Validation of a Nomogram to Predict Recurrence-Free Survival after R0 Resection for Stage II/III Gastric Adenocarcinoma: An International Multicenter Study

Bin-bin Xu1, Jun Lu1 and Chang-Ming Huang1*

1Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

We aimed to develop and validate a nomogram to predict recurrence-free survival (RFS) and the benefits of adjuvant chemotherapy after radical resection in patients with stage II/III gastric adenocarcinoma (GA).

Summary Background Data: The benefit of adjuvant chemotherapy varies widely among patients with stage II/III GA, and tools predicting outcomes for this patient subset are lacking.

Methods

Data on patients with stage II/III GA who underwent R0 resection from January 2010 to August 2014 at Fujian Medical University Union Hospital (n=1280; training cohort) were analyzed by Cox regression to identify independent prognostic factors associated with RFS. A nomogram including these factors was externally validated in a US cohort (n=751).

Results

The multivariable analysis identified age, differentiation, tumor size, number of examined lymph nodes, pT stage, pN stage, and adjuvant chemotherapy as associated with RFS. A nomogram including the above 7 indicators was significantly more accurate in predicting RFS compared with the 8th AJCC-TNM staging system for patients in the training cohort. The risk of early recurrence and peritoneal metastasis and survival after recurrence were significantly worse among patients calculated by the nomogram to be at high risk than those at low risk. The nomogram’s predictive performance was confirmed in the validation cohort.

Conclusion

A nomogram available as a web-based tool accurately predicts long-term RFS, regardless of whether the patient received neoadjuvant chemotherapy. The tool can also be used to determine the benefit of adjuvant chemotherapy by comparing scores with and without this intervention. Further multicenter prospective validation is warranted.

nomogram, recurrence-free survival, R0 resection, stage II/III gastric adenocarcinoma
Preoperative and Postoperative C-reactive Protein Predict Recurrence and Chemotherapy Benefit for GC

Bin-bin Xu¹, Jun Lu¹ and Chang-Ming Huang¹*

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

Preoperative and postoperative C-reactive protein (CRP) levels are related to the prognosis for cancer patients. We aimed to explore the predictive value of combining the two in gastric cancer (GC) patients.

Methods

Patients from a clinical trial were analyzed. By calculating the areas under the curve (AUC) and the C-index, the discriminative ability of CRP during different periods were compared, including preoperative (pre-CRP), postoperative days 1, 3, and 5 (post-CRPs) and postoperative maximum CRP (post-CRPmax).

Results

Ultimately, 401 patients were included in this study. For postoperative recurrence, the AUC and C-index of pre-CRP were 0.692 and 0.678, higher than those for post-CRPs. Among post-CRPs, post-CRPmax had the highest AUC (0.591) and C-index (0.585). The cut-off values for pre-CRP and post-CRPmax were 3.1mg/L and 77.1mg/L. Multivariate analysis showed both pre-CRP≥3.1mg/L (high-pre-CRP) and post-CRPmax≥77.1mg/L (high-post-CRPmax) were independent factors for recurrence-free survival (RFS). Adjuvant chemotherapy (ACT) benefit analysis for stage II/III GC showed patients with pre-CRP<3.1mg/L did not benefit from chemotherapy. In the high-pre-CRP group, only patients with high-post-CRPmax but not post-CRPmax<77.1mg/L benefited from chemotherapy. Similar findings were observed for overall survival.

Conclusion

Both pre-CRP and post-CRPmax, inexpensively and easily obtained, are independent predictors of recurrence for GC. ACT significantly prolonged the RFS for stage II/III GC with high-pre-CRP and high-post-CRPmax after R0 resection.

Gastric cancer : Recurrence : Adjuvant chemotherapy : C-reactive protein
Differences in Pathology, Survival and Recurrence between Special and Nonspecial Remnant Gastric Cancer: A Multicenter Retrospective Study in China

Ze-Ning Huang¹, Zhi-Yu Liu¹, Qing Zhong¹ and Chang-Ming Huang¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objective

Aim To study the differences in pathology, survival, and recurrence between special remnant gastric cancer (sRGC) and nonspecial RGC (nRGC).

Method

A total of 366 RGC patients were analyzed in 7 hospitals in China from January 2003 to July 2015. We compared the 3-year overall survival (OS) disease-free survival (DFS) rates and used two-step regression to explore the influence of the RGC categories on patient outcomes.

Results

All of the patients divided into sRGC Group (Group S) (n=200) and nRGC Group (Group N) (n=166). The R0 resection rate and lymph node (LN) dissection number of Group S were significantly higher than Group N (P<0.05). The difference in 3-year OS was not significant (P=0.282), but the 3-year DFS of Group S was worse than Group N (P=0.042). Two-step multivariate analyses showed nRGC was an independent risk factor for poor DFS. Of the 225 patients who had undergone R0 resection, 74 patients (32.89%) suffered recurrence, and the recurrence rate of Group S was significantly higher than Group N (P=0.039), moreover, the LN recurrence rate of Group S was significantly higher than Group N (P=0.027). Cox regression analysis showed that age, CA199 level, N stage and category of RGC were independent risk factors for RGC recurrence.

Conclusion

sRGC has a higher R0 resection rate and LN dissection number than nRGC, but among patients who had undergone radical gastrectomy, sRGC patients had worse DFS and a higher tendency for LN recurrence; thus, they should be treated differently in the clinic.

pathology, survival, recurrence, remnant gastric cancer
BMI-Adjusted Prognosis of Signet Ring Cell Carcinoma in Patients Undergoing Radical Gastrectomy for Gastric Adenocarcinoma

Jia-Bin Wang\textsuperscript{1}, Man-Qiang Lin\textsuperscript{1}, Zhi-Yu Liu\textsuperscript{1} and Chang-Ming Huang\textsuperscript{1*}

\textsuperscript{1}Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China, China

Background

Compared with other histologic types, signet ring cell gastric carcinoma (SRC) has unique oncological characteristics, and its implication on the prognosis of gastric cancer patients remains unclear. The purpose of this study was to evaluate the prognostic impact of body mass index (BMI) on SRC patients.

Methods

A retrospective analysis was performed using the clinical records of 3342 patients with SRC or tubular adenocarcinoma who underwent radical gastrectomy between 2000 and 2014. Patients were divided into three groups according to histologic subtype: SRC, well-to-moderately differentiated adenocarcinoma (WMD), and poorly differentiated adenocarcinoma (PD). We compared the survival of SRC patients with that of tubular adenocarcinoma patients according to BMI.

Results

The 5-year survival of SRC was significantly worse than that of WMD (P<0.001) but superior to that of PD (P<0.001). BMI-stratified analysis showed that in the high-BMI group, the prognosis of SRC was similar to that of WMD (P>0.05) and better than that of PD (P<0.001). In normal-BMI patients, SRC had a worse prognosis than WMD (P<0.001) but a more favorable prognosis than PD (P<0.001). SRC among low-BMI patients displayed much poorer survival than did both WMD (P<0.001) and PD (P=0.005). Multivariate analysis indicated that the risk of death was lowest for SRC patients with a high BMI and highest for SRC patients with a low BMI (low-BMI hazard ratio: SRC 1 vs. WMD 0.51 and PD 0.53).

Conclusion

SRC has worse prognostic impact as BMI decreases. BMI leads to differing prognosis of SRC compared with tubular adenocarcinoma.

Gastric cancer; Signet ring cell carcinoma; Body mass index; Prognosis
Different Extents of Lymphadenectomy during Gastrectomy for Gastric Neuroendocrine Neoplasms: A Multicenter Study

Qi-Yue Chen1, Qing Zhong1, Zhi-Yu Liu1 and Chang-Ming Huang∗

1Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background

Few reports address the impact of surgery on the prognosis of rare and heterogeneous gastric neuroendocrine neoplasms (G-NENs). This study compared G-NEN treatment trends in China and analyzed the influence of surgical treatments on prognosis to provide a personalized surgical treatment strategy for G-NEN patients.

Methods

The clinicopathological data of 1126 G-NEN patients from 28 Chinese hospitals were analyzed. Cox regression analyses were used to analyze the prognostic factors affecting survival and recurrence, respectively.

Results

Cox analysis revealed that in Chinese stage I-II but not stage III NEC/MANEC patients, Extend lymph node dissection (ELND) was an independent protective factor for OS and DFS (p<0.05; p<0.05). In stage I-II, 3-year OS and DFS increased with more of LNs dissected (p<0.05), while in stage III patients undergoing ELND, the 3-year OS and DFS was similar to patients undergoing limited lymph node dissection (LLND) (p>0.05). Furthermore, among patients with stage III disease, the incidence of complications after ELND was significantly greater than that after LLND (28.4% vs. 12.1%, p < 0.001), especially severe complications (Clavien-Dindo grade III-V).

Conclusion

ELND may lead to enhanced long-term survival for stage I and II but not stage III NEC/MANEC patients. Our results in international multicenter patients do not support the routine use of ELND in stage III NEC/MANEC patients.

G-NENs; time trend; surgical treatment; LN dissection; prognosis.
Does Untimely Chemotherapy After Radical Gastrectomy Affect the Prognosis of Patients with II/III Gastric Cancer: Can We Do Better?

Qi-Yue Chen¹, Zhi-Yu Liu¹, Qing Zhong¹ and Chang-Ming Huang"¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Purpose

To investigate the prognostic effects and risk factors of the omission and delay of postoperative chemotherapy of II/III gastric cancer (GC).

Methods

The clinicopathological data of 1520 patients for II/III GC were retrospectively analyzed. Based on the correlation between the overall survival (OS) time and the first time of initiation chemotherapy, we defined the chemotherapy delayed until more than 60 days after radical gastrectomy and the complete omission of chemotherapy as unacceptable chemotherapy initiation (UAC group), while the chemotherapy conducted within 60 days of radical gastrectomy was defined as acceptable chemotherapy initiation (AC group). The survival between the two groups was compared, and the trends and risk factors of UAC in recent years were analyzed.

Results

Of all the patients, there were 539 patients with UAC, with an incidence of 35.5%. The OS and DFS of the UAC group patients were significantly inferior to those in the AC group (p<0.001). Cox multivariate analysis demonstrated that UAC is an independent predictor of OS (p<0.05). Logistic analysis showed that female sex, old age, a self-paid status, a very low social status, a high ASA score, an intra-abdominal surgery history, and serious postoperative complications (Clavien-Dindo III-IV) were independent risk factors of UAC (p<0.05). The radar chart shows that the risk factors of UAC changed with time: the number of self-funded patients with an extremely low social status gradually decreased from 2011 to April 2014 (0-3.2%); however, it increased again in 2015 (4.5%).

Conclusion

UAC after radical gastrectomy is an independent risk factor for the prognosis of II/III stage GC patients. However, no significant decline of UAC has been achieved and should call for the attention of both government departments and clinicians so that appropriate measures may be immediately implemented to improve the overall prognosis of GC.

gastric carcinoma; prognosis; chemotherapy; risk factor; intervention
Modified ypTNM Staging Classification for Gastric Cancer after Neoadjuvant Therapy: A Study Based on Eastern and Western Data Sets

Qing Zhong 1, Zhi-Yu Liu 1, Qi-Yue Chen 1 and Chang-Ming Huang 1*

1Fujian Medical University Union Hospital, Department of gastric surgery, China

Background

The benefits of neoadjuvant therapy for patients with locally advanced gastric cancer (GC) are increasingly recognized. The 8th edition of the AJCC Staging Manual first proposed ypTNM staging, but its accuracy is controversial.

Methods

Clinicopathological data of 1791 patients who underwent curative-intent gastrectomy after neoadjuvant therapy in the SEER database, as the development cohort, were retrospectively analyzed. Modified ypTNM staging was established based on overall survival (OS). We compared the prognostic performance of the AJCC 8th ypTNM staging and the modified staging for patients after neoadjuvant therapy.

Results

In the development cohort, the 5-year OS for AJCC stage I, II, and III was 58.8%, 39.1%, and 21.6%, respectively, compared with 69.9%, 54.4%, 34.4%, 24.1%, and 13.6% for modified ypTNM stage IA, IB, II, IIIA, and IIIB. The modified staging had superior discriminatory ability (C-index: 0.620 vs. 0.589, p < 0.001), predictive homogeneity (likelihood ratio chi-square: 140.71 vs. 218.66, p < 0.001), predictive accuracy (mean difference in BIC: 64.94; NRI: 35.54%; IDI: 0.032, all p<0.001), and model stability (time-dependent ROC curves) over AJCC. Decision curve analysis showed that the modified staging achieved a better net benefit than AJCC. In external validation (n = 266), the modified ypTNM staging had superior prognostic predictive power (all p<0.05).

Conclusion

We have developed and validated a modified ypTNM staging through multicenter data that is superior to the AJCC 8th ypTNM staging, allowing more accurate assessment of the prognosis of GC patients after neoadjuvant therapy.

gastric cancer; ypTNM staging; neoadjuvant therapy; modified; validation
Textbook Outcome as a Prognostic Measure in Gastric Neuroendocrine Carcinoma: A Large Sample Analysis from Multi-Center in China

Zhi-Yu Liu¹, Si-Jin Que¹, Qing Zhong¹, Qi-Yue Chen¹ and Chang-Ming Huang*¹

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background and aim

Quality assurance is considered as a key factor in assessing tumor surgical treatment. We aim to develop a comprehensive composite index, called "textbook outcome (TO)", to assess the care quality and prognosis of gastric neuroendocrine carcinoma (G-NEC) patients who underwent radical resection.

Method

G-NEC patients with radical surgery were included among 23 high-level Chinese hospitals from October 2005 to September 2018. TO is defined as receiving a complete-potentially curative, ≥15 lymph nodes (LNs) examined, no severe postoperative complication, a hospital stay ≤ 21 days, no hospital readmission. Risk-adjusted funnel plot was applied to analysis the effect of hospital on TO.

Results

The total number of G-NEC patients was 860. And 493/860(57.3%) achieve a TO. Adjusted textbook outcome of hospitals was 9.09-83.3%. The reasons and proportion of patients without TO were as below, the number of <15 LNs, no severe postoperative complication, a hospital stay ≤ 21 days and no hospital readmission was 175(20.3%), 167(19.4%), 111(12.9%), and 12(1.4%), respectively. Survival curve showed that the overall survival, recurrence free survival and disease free survival of patients with a TO were significantly better than that of without a TO (P < 0.05). Multivariate Cox analysis showed that without a TO was an independent risk factor for OS, DFS and RFS of G-NEC patients (P <0.05). Multivariate Logistic regression analysis showed that non-lower, endoscopic and robotic surgery and intraoperative blood loss > 200ml are independent risk factors of patients without a TO (P <0.05).

Conclusion

TO can be used as a reliable indicator in assessing the care quality and long-term prognosis of G-NEC patients. More than 200ml blood loss and tumor located in none-lower stomach may block to achieve a TO.
Intraoperative Surrogate Indicators of Gastric Cancer Patients Long-Term Prognosis: Lymph Node Examined Number Relies on Lymph Node Noncompliance Rate

Guang-Tan Lin¹, Qi-Yue Chen¹, Zhi-Yu Liu¹ and Chang-Ming Huang¹*

¹Department of Gastric Surgery, Fujian Medical University Union Hospital, China

Objective

To investigate the correlation between the lymph node examined (ExLNs) number and the lymph node (LN) noncompliance rate and the effect on the overall survival (OS) of patients with gastric cancer (GC).

Methods: The clinicopathological data of 1872 patients with radical GC resection from June 2007 to June 2013 were retrospectively analyzed. To analyze the correlation between ExLNs and LN noncompliance rate and the effect on the OS of GC patients.

Results

Among the 1872 patients, 941(50.3%) had complete LN compliance, 469(25.1%) had minor LN noncompliance, and 462(24.6%) had major LN noncompliance. Logistic regression analysis showed that cT staging and ExLNs were independent risk factors for LN noncompliance. In the whole group, Kaplan-Meier survival curve elucidated that OS difference of ExLNs≤25 and ExLNs>25 were statistically significant (p<0.001). COX regression analysis suggested that LN noncompliance was an independent prognostic factor for OS, while ExLNs was no longer an independent prognostic factor for OS. In addition, the OS of patients improved with the gradual increase in the number of ExLNs in the whole group (p<0.001), however, the increase in ExLNs did not significantly affect the OS rate of patients in the group with LN complete compliance (p=0.544).

Conclusion

ExLNs was negatively correlated with the rate of LN noncompliance. The increase of ExLNs can improve the OS of GC patients, which depends on the decrease of LN noncompliance rate. As surrogate indicators for long-term prognosis of GC patients, the of LN noncompliance rate was better than ExLNs.

gastric cancer; number of lymph node examined; LN noncompliance; prognosis
Apatinib Combined with Sox Neoadjuvant Therapy for Locally Advanced Gastric Cancer: A Multicenter, Single-Armed, Prospective Study

Jian-Xian Lin¹, Zu-Kai Wang¹ and Chang-Ming Huang¹*

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Background

Apatinib, an oral small molecular of VEGFR-2 TKI, has been confirmed to improve OS and PFS with an acceptable safety profile in patients with advanced gastric cancer refractory to two or more lines of prior chemotherapy. However, there is limited evidence about the safety and feasibility of apatinib combined with SOX regimen as neoadjuvant therapy for locally advanced gastric cancer (LAGC).

Objective: To validate the efficacy and safety of apatinib combined with SOX regimen in patients with LAGC as neoadjuvant therapy.

Methods

This is a multicenter, single-arm, prospective study. Patients with LAGC (cT2-4N+M0) without prior anti-cancer strategies received 2 to 5 cycles (21 days a cycle) of neoadjuvant therapy using S-1 (po, 40-60 mg bid, day1-day14), oxaliplatin (iv, 130 mg/m², day1), and apatinib (po, 500 mg qd). Apatinib was prohibited in the last cycle. The operation should be performed 2 to 4 weeks later. The primary endpoint was R0 resection rate. The secondary endpoint included safety, ORR, and DCR. This study is registered at ClinicalTrials.gov and carries the following ID number: NCT 03192735.

Results

A total of 56 patients from 10 centers in China were recruited. There were 43 patients with tumor response evaluation, 29 (67.4%) patients had partial response (PR), 12 (27.9%) had stable disease (SD), and 2 (4.6%) had progressive disease (PD). The ORR and DCR were 67.4% (29/43) and 95.3% (41/43), respectively. 35 patients received D2 gastrectomy, the R0 resection rate was 100%. 3 patients had postoperative complication (all Clavien-Dindo classification less than grade II). The most common 3/4 adverse events were neutropenia (40%), thrombocytopenia (40%), leucopenia (32.6%), vomiting (13%).

Conclusions

This prospective study shows that neoadjuvant therapy using apatinib plus SOX brings clinical benefit to AGC with a high disease control rate and tolerable adverse reactions.

stomach neoplasm; neoadjuvant therapy; apatinib; surgery.
The Relationship between Aspirin Use and Esophageal, Gastric and Colorectal Cancer Patient Survival: A Meta-Analysis of Observational Studies

Ju-Li Lin¹, Jian-Xian Lin¹ and Chang-Ming Huang¹*

¹Fujian Medical University Union Hospital, Department of Gastric Surgery, China

Objection

The aim of this study is to assess the survival benefit of aspirin use compared with non-aspirin use for patients with esophageal, gastric or colorectal cancer.

Methods

We search online databases, including PubMed, Cochrane Library, Embase and www.clinicaltrials.gov before Feb 1th, 2019 to identify all relevant studies. The overall survival and cancer specific survival of esophageal, gastric and colorectal cancer in aspirin users compared with non-aspirin users. A meta-analysis was performed to calculate the pooled risk ratios (RRs) for overall survival and cancer specific survival using either a fixed-effects or a random-effects model.

Results

17 studies were finally included in this meta-analysis, comprising more than 71,534 patients. There is no significant differences between post-diagnosis aspirin use and overall survival for esophageal and gastric cancer. The overall survival and cancer specific survival for colorectal cancer benefit associated with post-diagnosis aspirin use represented \([HR=0.82, 95\%CI(0.72, 0.94)]\) and \([HR=0.70, 95\%CI(0.57, 0.86)]\). Overall survival and cancer specific survival for colorectal cancer did not benefit associated with aspirin use pre-diagnosis. The overall survival and cancer specific survival for colorectal cancer benefit associated with both pre and post-diagnosis aspirin use represented \([HR=0.75, 95\%CI(0.61, 0.92)]\) and \([HR=0.78, 95\%CI(0.73, 0.85)]\). Besides, the survival benefit of post-diagnosis aspirin use appeared to be confined to those patients with mutated PIK3CA tumors \([HR=0.78, 95\%CI(0.50, 0.99)]\) and with positive PTGS2 (COX-2) expression \([HR=0.75, 95\%CI(0.43, 1.30)]\).

Conclusions

These findings provide further indication that post-diagnosis aspirin therapy improved overall survival and cancer specific survival of colorectal cancer, especially for patients with positive PTGS2 (COX-2) expression and mutated PIK3CA tumors. However, it don’t improve overall survival of esophageal and gastric cancer and the meta-analysis is limited mainly to retrospective studies.

Aspirin, Esophageal cancer, Gastric cancer, Colorectal cancer; Long-term survival
Infrapyloric Lymph Node Metastasis Pattern in Middle/Lower Gastric Cancer: An Exploratory Analysis of a Multicenter Prospective Observational Study (IPA-ORIGIN)

Wingyan Kwan¹, Siken Ta¹, Rulin Miao², Gang Zhao³, Fenglin Liu⁴ and Lu Zang¹*

¹General Surgery, Shanghai Minimally Invasive Center, Shanghai Ruijin Hospital, Shanghai Jiaotong University School of Medicine, China
²Gastrointestinal Cancer Center, Peking University Cancer Hospital & Institute, China
³Gastrointestinal Surgery, Renji Hospital, Shanghai Jiaotong University, School of medicine, China
⁴General Surgery, Zhongshan Hospital, Fudan University, China

Objective

Risk of No.6 lymph node metastasis varies in different parts of gastric cancer. This article aims to investigate and analyze the pattern and risk factors of No.6 lymph node metastasis in patients with middle/lower gastric cancer.

Methods

This study is an exploratory analysis that included 120 patients who underwent radical distal gastrectomy in IPA-Origin study to investigate the risk factors of No.6 lymph node metastasis.

Results

The metastatic rate of No.6 lymph node is 12.7% (7/55) in early gastric cancer and 30.8% (20/65) in locally advanced stage patients. Univariate analysis in patients underwent radical distal gastrectomy shows that tumor’s maximum diameter ≥2cm (RR: 9.04³, 95% CI: 1.164-70.291, P=0.035), neural infiltration (RR: 2.632, 95% CI: 1.094-6.332, P=0.031), vascular infiltration (RR: 3.056, 95% CI: 1.266-7.376, P=0.013), locally advanced stage (RR: 3.048, 95% CI: 1.176-7.896, P=0.022), and distal resection margin (DRM) ≤3cm (RR: 4.121, 95% CI: 1.630-10.421, P=0.003) are risk factors of No.6 lymph node metastasis. Multivariate analysis shows that the maximum diameter ≥2cm (RR: 8.079, 95% CI: 1.016-64.227, P=0.048) and the DRM ≤3cm (RR: 3.831, 95% CI: 1.485-9.884, P=0.006) are dependent risk factors of No.6 lymph node metastasis.

Conclusion

Tumor size and its location have an influence on No.6 lymph node metastasis in gastric cancer patients. DRM ≤3cm and tumor maximum diameter ≥2cm are dependent risk factors for NO.6 lymph node metastasis.

Gastric cancer, lymph node metastasis, No.6 lymph node
Impact and Outcome in Late Diagnosis of Gastric Cancer

Chinzorig Munkhjargal¹, ², Ganchimeg Dondov², Tulgaa Lonjid²*, Erkhembayar Enkhbat¹, ², Serjbayar Ganbold², Dashmaa Ambarhyasgalan², Batbold Batsaikhan², Nasanjargal Tumurbat² and Tegshjargal Badanjav²

¹General Surgery Department, National Cancer Center, Mongolia
²Oncology and Gastrointestinal Division, Institute of Medical Science, Mongolia

Introduction

Gastric cancer is still one of the most leading causes of mortality in the world. The highest mortality rate of gastric cancer is estimated in Mongolia. In Mongolia, gastric cancer is the second leading site, after liver cancer.

Materials and methods: In this study, 84 patients suffering from gastric cancer (42 patients in III, IV TNM stage; 42 patients in I, II TNM stage) were investigated in National Cancer Center, Mongolia. A research questionnaire which included age, gender, education, income, risk factors and clinical questions was detected from all patients.

Results

A seventy three (86.9%) patients were over 50 years old and the highest rates of gastric cancer were in group of 61-70 years (40.5%). From the results, the reason to visiting hospital was significantly different between two groups. 55.1% of patients suffering from early-stage gastric cancer were voluntarily diagnosed by upper endoscopy. In contrary, 55.8% of patients suffering from late-stage gastric cancer have visited the hospital due to worsening symptoms or dysphagia and vomiting. Factors such as age, gender, education, employment status and income had no significant effect on late diagnosis of gastric cancer. In totally 24 (89%) general hospitals out of 27 had upper endoscopy devices and 22 (81.5%) hospitals had endoscopist. Although 75% of total general hospitals conduct annual cancer screening, 64% of them do not perform the endoscopy in annual screening.

Conclusion

In our country, late diagnosis of gastric cancer is related to the attitudes of patients for preventing and screening disease. Therefore, it is important to improve the health education of the population and to develop healthy, right attitudes and practices. And the study revealed that general hospitals have insufficient for upper endoscopy devices and human resource.
Laparoscopic Proximal Gastrectomy with Double-Tract Reconstruction versus Laparoscopic Total Gastrectomy In Terms Of Nutritional Status and Surgical Outcome

Beom Su Kim¹*, Minha Choi¹ and Chang Seok Ko¹

¹Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Asan Medical Center, Seoul, Republic of Korea, Korea

Background

This study aimed to evaluate the early surgical and nutritional outcomes of laparoscopic proximal gastrectomy with double tract reconstruction in comparison to those of laparoscopic total gastrectomy for upper-third early gastric cancer.

Methods

We retrospectively reviewed and analyzed data of 31 patients who underwent laparoscopic proximal gastrectomy with double tract reconstruction for upper-third early gastric cancer between December 2013 and December 2018. Clinical characteristics and surgical outcomes, including operation time, length of postoperative hospital stay and postoperative complications, were obtained and included in our analyses. We also analyzed the change of body weight, serum hemoglobin, albumin and total protein to evaluate the nutritional outcomes.

Results

The mean operation time was 171.00 ± 29.36 minutes, and none of the patients required conversion to laparotomy during surgery. On average, patients stayed 8.23 ± 3.98 days in the hospital after surgery. Seven patients (22.58%) had early postoperative complications while no patient had Clavien-Dindo classification grade 3 or higher complication and anastomotic complication, within a month. The body weight decreased until the sixth month after operation and then persisted over time. The serum albumin and total protein level declined until the first month after operation and then recovered slightly over time.

Conclusions

Our study shows that laparoscopic proximal gastrectomy with double tract reconstruction is a safe and feasible procedure for upper-third early gastric cancer. Further, in the current study, this procedure also demonstrated a favorable nutritional outcome.

Laparoscopy, Gastrectomy, Stomach Neoplasms, Complication
Outcomes of Treatments for Leakages after Gastrectomy in the Gastric Cancer

Chulkyu Roh¹, Woo Jin Hyung¹, Seohee Choi¹, Won Jun Seo¹, Minah Cho¹, Yoon Young Choi¹, Taeil Son¹ and Hyoung-Il Kim¹

¹Surgery, Yonsei University College of Medicine, Korea

Objective

Anastomotic leakage is one of the major complications after gastrectomy and it is associated with high postoperative morbidity and mortality rates. Appropriate manage for anastomotic leakage will improve the outcome, however, controversy persists among conservative treatment, intervention, and operation.

Methods

The records of 14311 patients who received gastrectomy for gastric cancer from January 2005 to December 2017 at the Department of Surgery, Yonsei University College of Medicine, were reviewed retrospectively. Completion total gastrectomy (n=236) was excluded. The severity of postoperative complications was classified according to the Clavien-Dindo Classification. Anastomotic leakage was managed by conservative treatment, intervention or re-operation. The efficacy of treatment was compared with the length of hospital stays.

Results

The overall leakage rate was 1.51% (213 of 14075). The leakage rate of gastroduodenostomy, gastrojejunostomy, esophagojejunostomy, and the duodenal stump was 0.89% (50 of 5616), 0.54% (27 of 4963), 1.95% (76 of 3902), and 0.68% (58 of 8518), respectively. The leakage rate of gastroduodenostomy was significantly higher in open surgery than laparoscopy (1.22 vs. 0.38%; p<0.05). The leakage rate of esophagojejunostomy was significantly higher in robotic surgery than open surgery (5.48 vs. 1.45%; p<0.05). Leakage was detected on a median post-operative day 7 (range, 1-29). Fifteen of 213 patients with leakage died (7.04%).

Conclusions

Surgeons should be highly suspicious of leakage after gastrectomy. Efforts to establish an apppropriate treatment strategy for leakage are needed. It may be necessary to improve the surgical technique of minimally invasive surgery in total gastrectomy, especially in esophagojejunostomy.

gastrectomy, leakage, treatment
Development of a Non-radioactive Tumor Detection System for Laparoscopic Surgery by Real-time Quantitative Assessment of Fluorescence Intensity

Jae-Seok Min¹*, Jeongwoo Lim², Gi-Jung Jeon², Jin-Seon Kim³, Kyung-Hwan Seo³ and Taehoon Kim³

¹Surgery, Dongnam Institute of Radiological and Medical Sciences, Korea
²Gastroenterology, Internal Medicine, Dongnam Institute of Radiological and Medical Sciences, Korea
³International Research Team, Nawoo Vision Corporation, Korea

BACKGROUND and PURPOSE

Criteria to determine the intensity of organ perfusion or uptake of lymph nodes using fluorescence system are very subjective. Therefore subjective criteria for uptake level can be changed according to the individual operators and various situations. If the amount of fluorescence uptake can be quantitatively evaluate, we can maximize the efficiency of laparoscopic surgery. Also it can replace the use of radioactive isotopes that may be harmful to humans. We aim to develop a novel system that can assess the quantitative intensity of indocyanine green (ICG) uptake in real-time during laparoscopic surgery.

METHODS

We used prism-based multi-channel camera with 1 color bayer-sensor and 2 monochrome near infrared (NIR) sensors for the optical design. Prism divides the light into color about 700 and 800 nm bands. The signal-to-background ratio (SBR) was calculated to quantify the fluorescence image. We manufactured real-time fluorescence imaging system consist of prism based multi-channel camera, macro-zoom lens, optical filters and lasers for excitation light. We analyzed and quantified SBR from the fluorescence images by simulator experiments.

RESULTS

We found relationship between SBR and variables such as intensity of excitation light, exposure time of camera and working distance. The fluorescence intensity and background noise were fluctuating values according to operative conditions. The minimal intensity of NIR image uptake was about 3~7, also the maximal value was about 12~26. The mean value of intensity ranged 9~14 in simulator experiments. SBR of targeted site corresponding to fluorescence signal was somewhat different in simulator experiments. Even though the fluorescence and background signal value changed due to excitation light intensity and working distance, SBR can be useful to quantify the region interest.

In conclusion, we developed a novel non-radioactive tumor detection system that can quantitatively assess the intensity of ICG uptake by fluorescence imaging in real-time during laparoscopic surgery.

laparoscopy, quantitative assessment, indocyanine green, fluorescence uptake, real time
Heterotopic Pancreas a Case Presentation

Bayanduuren Batsuuri

General surgery, Grandmed hospital, Mongolia

Introduction

Heterotopic pancreas is very rare. Ectopic pancreas is defined as pancreatic tissue found outside the usual anatomic location of the pancreas. It is often an incidental finding and can be found at different sites in the gastrointestinal tract. It may become clinically evident when complicated by pathologic changes such as inflammation, bleeding, obstruction, and malignant transformation.

Case 1. 23 years old, men. Vomiting and pain of right lower abdomen. 2 days ago epigastric pain. Physical examination, tenderness right lower abdomen, blood tests increasing WBC or neutrophilia. Abdominal ultrasound is unremarkable. Computed tomography was not performed. Exploratory laparotomy. Small bowel obstruction due to heterotopic pancreas. Local resection small bowel about 8 cm, end to end anastomosis. Heterotopic pancreas is noted 3*4 cm, located in surrounding submucosal layer of the small bowel. Histology examination: heterotopic pancreas in the small bowel

Case 2. In this report, a 84 years old men with right upper abdominal pain due to acute calculus cholecystitis. Computed tomography findings are pancreas atrophy. A 3.0*2.8 cm sized large cystic mass with mural calcification between pancreatic uncinate and duodenum. No main pancreatic duct dilatation. Histology examination: ectopic pancreatic simple cyst

Case 3. A 61 years old, men was admitted to our hospital of emergency department due to a 2-days history of epigastric pain, nausea and vomiting, fever. 3 days ago using alcohol. Blood examination: increasing CRP=89.23mg/l /range 0-5.0mg/l/, increased total bilirubin=22.4μmol/l. Abdominal X ray: Subdiaphragmatic free gas. Computed tomography was not performed. Preoperative diagnosis: generalized peritonitis due to gastrointestinal perforation. Histology: perforation of heterotopic pancreas in the small bowel.

Discussion

Heterotopic pancreas has a genetic make-up, physiologic function, and local environmental exposure similar to that of the pancreas. The incidence in autopsies ranges

Heterotopic pancreas, pseudocyst, small bowel obstruction, stomach submucosal layer, recurrence of abdominal pain
Lymphadenectomy with Optimal Lymph Nodes Removed Associated with Improved Survival in Stage I-III Gastric Cancer: the More the Better?

Yang Li¹, Yantao Tian¹*, Zhikai Zhu² and Liyan Xue³

¹Dept. of Pancreatic and Gastric Surgery, National Cancer Center/ National Clinical Research Center for Cancer/ Cancer Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, China
²School of Public Health, Chinese Academy of Medical Sciences & Peking Union Medical College, China
³Dept. of Pathology, National Cancer Center/ Cancer Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, China

Background

Lymphadenectomy with at least 16 lymph nodes (LNs) has been recommended in procedure of gastrectomy by NCCN guideline to optimize node staging, but the impact of removed number of lymph nodes on survival is uncertain. Some studies found the optimal cut-off points of LNs removed number for gastric cancer patients to get a survival benefit from extended lymphadenectomy.

Purpose

In this study, we sought to investigate the impact of the optimal number of LNs removed stratified by different stages on prognosis of gastric cancer.

Methods

4,374 patients who underwent gastrectomy for gastric cancer from 2006 to 2016 at the Surveillance, Epidemiology, and End Results program (SEER) database were analyzed. Patients with M1 disease were excluded. The optimal threshold for the number of LNs was determined by the X-tile software. Competing risks regression and multivariate Cox regression were used to determine clinicopathological features associated cause-specific survival (CSS). Standard survival methods and restricted cubic spline multivariable Cox regression models were applied.

Results

Of 4,374 patients, 2,176 (49.8%) had 1–16 LNs removed and 2,198 (50.2%) had ≥16 LNs removed. The optimal thresholds for LNs were determined as 22 for all patients, and 29, 15, 22, 20, 27, 28, 39 for stage IA-IIIC separately. Compared to AJCC 8th staging, lower cumulative hazard ratios of mortality and better survivals was observed in new classification of stages by optimal cut-off LNs. As removed LNs increasing, the hazard ratios of mortality analyzed by restricted cubic splines are continuously declined.

gastric cancer, lymphadenectomy, cancer survival
Pathological N3 Stage (pN3/ypN3) Gastric Cancer: Outcomes, Prognostic Factors and Pattern of Recurrences after Curative Treatment

Anadi Pachaury

Gastro-intestinal unit of Surgical Oncology, TATA Memorial Hospital, Parel, Mumbai, India, Specialist Senior Resident, India

Background

pN3 or ypN3 stage gastric cancer (GC) is known to have aggressive clinical behaviour and portends poor prognosis. The aim of this study was to investigate factors affecting survival and pattern of recurrences of N3 stage GCs who were treated with potentially curative intent.

Methods

A total of 196 GC patients, operated at TATA Memorial Centre from 2003 to 2017 and reported as pN3 or ypN3 status on histopathology after D2 gastrectomy were included in this retrospective analysis.

Results

Median LN (lymph node) yield was 22 and mean number of positive LN per patient was 11. On univariate analysis, total LN yield (≤ 20/>20), LN ratio (≤ 0.5/>0.5) and use of NACT (neo-adjuvant chemotherapy) emerged as significant predictors for long term survival. However, only NACT and LN ratio retained their significance on multivariate analysis. The 5-year overall survival of the cohort was 16.3% (95%CI 12.8-19.8%), while 5-year disease free survival was 14.6% (95%CI 95% 12.6-20%). Patients who received NACT (n= 102) but were still harbouring N3 nodes i.e. ypN3 stage had worse prognosis than those operated upfront (n= 94) i.e. pN3 stage, with median survival of 19 months versus 21 months respectively (p =.006). Adjuvant CRT (chemoradiotherapy), though offered in small number of patients (n= 38), improved survival in patients who underwent upfront resection, but was ineffective in patients who received NACT (median survival 41 months vs 14 months, p= 0.013). Most common site of relapse was peritoneum (50.45%) followed by visceral metastases (22.52%).

Conclusion

LN ratio is important predictor of long-term survival in patients with pN3/ypN3 gastric cancer after curative treatment. Survival of post NACT patients with N3 stage i.e. ypN3 is worse than those operated upfront i.e, pN3. Adjuvant CRT may be beneficial for patients with pN3 disease who did not receive NACT.

gastric cancer, N3 stage gastric cancer, adjuvant chemotherapy, adjuvant chemoradiotherapy, D2 lymphadenectomy, lymph node ratio
Laparoscopic Retroperitoneal versus Transperitoneal Adrenalectomy for Adrenal Tumour: An Updated Meta-Analysis

Muhamad Fajri Adda'i1*, Jonathan Hasian Haposan2 and Fanny Riana Ridwan3

1Research and Development, Johar Baru Health Care, Jakarta, Indonesia
2Epidemiology, University of Pittsburgh, USA
3Urology, Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia

Background

Recent evidence showed inconclusive results regarding superior outcomes between laparoscopic retroperitoneal adrenalectomy (LRPA) and laparoscopic transperitoneal adrenalectomy (LTPA) in adult patients with adrenal tumour. Therefore, we did a study to compare the surgical outcomes of LRPA versus LTPA for the adrenal tumour in adult.

Methods

Major medical databases were systematically searched for randomized control trials (RCTs) evaluating the utilization of LRPA compared LTPA for adrenal tumour, published until January 2020. The databases were searched with predefined protocols following PRISMA guidelines and those studies were evaluated using the GRADE approach. The pooled measures for Relative Ratio (RR) and weighted mean difference (WMD) were obtained using RevMan 5.3.

Results

Six RCTs involved 163 participants in LRPA and 164 in LTPA group. Pooled meta-analysis showed that all-cause mortality did not significantly different between the two groups (RR=1.39, 95%CI [0.31, 6.26], p=0.67, I²=40%). Compared to LTPA, LPRA group had lower early (RR=0.35 [0.18, 0.68], p=0.002, I²=0%) and late morbidity (RR=0.34 [0.12, 0.95], p=0.04, I²=21%) after procedure without significant heterogeneity. LRPA also had significant lower blood loss during operation by 12.4 cc, 95% CI [-16.95, -7.82], p<0.00001, I²=37%, and 24-hour post-operative pain by 4.58 VAS score (95% CI [-7.32, -1.83], p=0.001), compared to LTPA, but not duration of surgery (WMD= -1.15 hour, p=0.89), conversion for open surgery (RR=1.79, p=0.48), hospital length of stay (WMD= -0.35, p=0.26), post-operative organ complications comprising chest infection, pleural effusion, abdominal abscess, etc (RR=0.97, p=0.98). After procedure, LRPA had significant lower time to oral intake (WMD= -8.52 hours, p=0.0006 and ambulation (WMD= -5.4 hours, p<0.00001) but not time to return to normal activity WMD= -0.75 day, p=0.56), compared to LTPA.

Conclusion

LRPA appeared superior to LTPA in terms of lower morbidity, lower post-operative pain, lower blood loss, shorter time to oral intake and ambulation. However, the other outcomes were shown comparable between those laparoscopic techniques.

Laparoscopy, Transperitoneal, Retroperitoneal, adrenalectomy, adrenal tumour
Robot-assisted Thyroidectomy with SP system via Transaxillary Approach: Minimalized Invasiveness with Double-docking Method

Jin Kyong Kim

Department Of Surgery, Yonsei University College Of Medicine, Korea

Introduction

Since the innovation of the robot-assisted thyroidectomy with SP system via transaxillary approach, the method has been confirmed to be safe and feasible. Surgical outcomes demonstrate similar results to those of conventional robot or open surgery. The aim of this study is to introduce novel surgical technique with the double-docking method, which can increase robot efficiency and minimalize invasiveness throughout the operation.

Methods

Sixty-three patients received robotic-assisted thyroidectomy using the da Vinci SP robot system between December 2018 and January 2020 at Yonsei University Health System, Seoul, Korea. Among the patients, the novel double-docking technique was applied to the recent 27 subjects, consisting a length of 4cm incision along the natural skin crease.

Result

The mean operation time of the double docking method was 128.2 ± 5.0 minutes, which was slightly longer than the conventional gasless method (120.6 ± 25.34). Although the mean console time of the double-docking method was longer (72.3 ± 30.5 vs. 55.5 ± 27.4 minutes), the time for acquiring the working space with the manual flap dissection was shorter (22.6 ± 5.0 vs. 32.4 ± 7.4) than that of the conventional gasless method. Also, through the double-docking method, the length of the incision was reduced from 4.5cm to 4cm.

Conclusion

Robot-assisted thyroidectomy with SP system via transaxillary approach is a practical surgical method with satisfactory cosmetic effects of minimal incision. Furthermore, the working space with the flap dissection is acquired more efficiently than the conventional gasless method, which lessens the workload fatigue. Through this, the innovative double-docking method enabled surgeons to perform transaxillary thyroidectomy that leads to outstanding outcomes.

robot SP, robot thyroidectomy, robot transaxillary thyroidectomy,
Introduction/Background

TransOral Endoscopic Thyroidectomy - Vestibular Approach (TOETVA), an alternative surgical technique for thyroid surgery is slowly gaining widespread popularity. Amongst all endoscopic approaches for thyroid, TOETVA leaves no cutaneous scar.

Aims & Objectives/Purpose

This series aims to study Advantages based on following criteria
- Ease of surgical dissection,
- Postoperative pain,
- Postoperative Scar,
- Intraoperative blood loss
- Occurrence of complications
- Postoperative recovery.

Methods

Total of 25 TOETVA procedures were performed. Patient selection was done with predefined criteria: Medically fit (ASA 1), Lobe size less than 6 cm, no previous neck surgery & FNAC negative for malignancy (Bethesda I, II & III). Each one of the patients were monitored for:
1. Ease of surgical dissection,
2. Surgical time,
3. Intraoperative blood loss,
4. Postoperative pain,
5. Occurrence of complications
6. Postoperative recovery.

Results

Total 25 patients were operated TOETVA Technique from May 2018 till February 2020. Five Total Thyroidectomies & 20 Hemithyroidectomies were performed. Proper patient selection (ASA 1) helped to complete the procedures without any major complications. After analysis of the patient’s data, significant advantages were observed with respect to all criteria mentioned above.

Conclusions-

TOETVA can be considered safe and feasible with several benefits such as less trauma, faster wound healing in the oral cavity, and earlier recovery with a superior cosmetic outcome. Expertise & experience of the operating surgeon in endoscopic surgeries with proper training in TOETVA technique is essential.

TOETVA,

Narendra Lohokare
Siddhakala Hospital, India
03. Endocrine (Thyroid, Adrenal gland, Breast)

**Biological Importance of Tectorigenin for the Treatment of Breast Cancer: Therapeutic Benefit in the Modern Medicine**

_Dinesh Kumar Patel¹* and Kanika Patel²_

¹Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Naini, 211007, Uttar Pradesh, India  
²Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh, India

**Background/Purpose**

Phytoconstituents present in the medicinal plant have important role in the medicine due to their medicinal importance and pharmacological activities and flavonoidal class chemical are among one of them. Different types of human cancerous disorders including the breast cancer are the challenging task of the medical field due to their high life-threatening condition in the world. Tectorigenin is active flavonoid which has been well known for their health beneficial potential in the medicine and found to be present in the Belamcanda chinensis.

**Methods**

Therapeutic benefit and medicinal uses of tectorigenin in the medicine have been investigated in the present study through analysis of different literature work of tectorigenin. Pharmacological activities of tectorigenin have been studied in the present investigation through analysis of scientific work of tectorigenin in the literature databases. Medicinal importance of tectorigenin for the treatment of numerous human cancerous disorders has been investigated in the present investigation through analysis of different literature work of scientific research.

**Results**

Analysis of various literature databases of scientific field revealed the medicinal importance and pharmacological activities of tectorigenin. Literature database analysis revealed the biological importance of tectorigenin in the medicine for the treatment of human breast cancer cells. Other scientific research studied also revealed the biological importance of tectorigenin against different human breast cancer cell lines. Literature study of scientific research work further signified the importance of tectorigenin in the medicine due to their antiproliferative, anti-inflammatory and antioxidant potential. Present study analysis revealed the biological importance of tectorigenin in the medicine which could be used for the development of better and effective medicine for the treatment of cancerous disorders in the future.

Health benefit, Tectorigenin, Breast cancer, Therapeutic role, Research analysis
Comparison of Long Term Clinical Outcome between Open and Laparoscopic Choledochal Cyst Excision in Children

Changhoon Lee¹, Jeik Byun², Joong Kee Youn² and Hyun-Young Kim²*

¹Surgery, Seoul National University Hospital, Korea
²Pediatric Surgery, Seoul National University Children's Hospital, Korea

Background

Cyst excision with hepaticojejunostomy has been the classic procedure for treating choledochal cysts, and laparoscopic treatment has been favored recently.

Purpose

The purpose of this study was to compare the safety and feasibility of laparoscopic operation with open surgery for choledochal cyst in children.

Methods

A retrospective study comparing the laparoscopic and the open procedures was performed in 185 patients with choledochal cyst in a single children’s hospital. 109 patients operated with open surgery and 76 patients operated with laparoscopic surgery. The main outcome variables included operative time, estimated blood loss, intra-operative transfusion, hospital stay, early and late post-operative complications.

Results

In patient’s demographics, there was no significant difference between the two groups. The operative time was longer in the laparoscopic group. The number of patients requiring blood transfusion intra-operatively was lower in the laparoscopic group. Hospital stay was not statistically different. Duration to resumption of diet, and duration of drainage was longer in the laparoscopic group. However, comparing recent 2 years of laparoscopic group with open group, there was no significant difference in both NPO and drainage duration. Early and late complications were not significantly different.

There was no difference in hospital stay, early- and late- complications for open and laparoscopic choledochal cyst excision in children. Laparoscopic choledochal cyst excision is safe and feasible procedure compared to open surgery in pediatric patients.

choledochal cyst, pediatric, open, laparoscopy
Clinical Outcome of Children with Esophageal Atresia and Tracheoesophageal Fistula: Early Experience in One Institute

Han-seong Lee

Department of Pediatric Surgery, Seoul National University Children’s Hospital, Korea

Purpose

Thoracoscopic repair (TR) of esophageal atresia (EA) was first performed in 1999. Recently, many pediatric surgical units perform the minimally invasive EA repair. The aim of this study is to compare early clinical outcomes between the TR and open repair (OR) for EA.

Methods

We collected the clinical data of the patients diagnosed with EA with distal tracheoesophageal fistula (Type C) from January 2012 and December 2018 retrospectively. 23 patients underwent a primary repair of the EA and enrolled in this study. TR has been performed since 2016. We compared two groups, one which included 10 TR patients after 2016 and another which included 13 OR patients before 2016, with the patients’ characteristics, operation related outcomes, and postoperative outcomes. We compared clinical outcomes including anastomosis leakage, stricture and reflux at postoperative 1-, 6-month, and 1-year follow-up.

Results

Among 23 patients, 56.5% were male and mean gestational age was 37.3 weeks. There was no major difference with age at operation (2.0 [2.0; 4.0] day vs. 2.0 [1.0; 4.0] day, p = 0.678), weight at operation (2512.3 ± 748.2g vs. 2585.0 ± 353.1g, p = 0.689) and associated anomaly. Mean operation time was 109.0 and 172.5 minutes in OR and TR group respectively (p = 0.001). There was no case with mortality. One patient, who underwent TR, needed re-operation for recurrent tracheoesophageal fistula. Comparing with the complications and clinical outcomes, anastomosis leakage rate was higher TR group (0% vs. 30%) but statistically insignificant (p=0.068). There was no significant difference in anastomotic strictures ≥ 50% at postoperative 1-year follow-up and gastroesophageal reflux rate.

Conclusion

This study showed the early experience of TR for EA. Although operation time in TR group was longer than that of OR groups, TR was feasible procedure for children in terms of anastomotic leakage, stricture and reflux symptoms after 1 year.

esophageal atresia, tracheoesophageal fistula, thoracoscopic repair, open repair, MIS
Ballon Dilation of Oesophageal Scar Strictures in Infants

Saodat Kamilova¹, Zilola Khadjieva¹, Arifdjanov Nodirjon² and Bahodir Karimov¹

¹Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Uzbekistan
²Pediatric Surgery, Republican Scientific Practical Medical Center of Pediatrics, Uzbekistan

Introduction

Stenotic benign esophageal diseases in children remain actual problem.

Research objective

Improvement of the results of treatment of esophageal stenosis in infants.

Material and methods

The results of treatment of 25 children of early age with oesophageal stenosis were analyzed. Depending on the etiological factor, patients were divided into 2 clinical groups: 1) post-burn oesophageal stenosis - 8 (32%); 2) postoperative stenosis of anastomosis - 17 (68%). For therapeutic purpose 6 children were subjected to stage bougie, 19 patients were subjected to balloon dilation of oesophagus.

Results

A 57 of bougie procedures were performed, 43 balloon dilation treatment procedures and 24 repeat courses were conducted. In 1st group, on average, there were 48 bougie procedures and 12 dilation sessions per patient and 4.5 support courses were required. In group 2, the average number of procedures: bougie-9, 18-balloon dilation and required on average 2.7 courses of maintenance treatment. The length of treatment in bougie was 9 months, with balloon dilation 6 months in patients of group 1st and 3rd months in children of group 2.

Conclusion

Balloon dilation is an effective method of treating oesophageal stenosis of various etiologies. Balloon dilation is most effective procedure in children with postoperative stenosis oesophageal anastomosis. Longer periods of treatment are required for patients with post-burn oesophageal stenosis.
09. Pediatric

Outcomes of Management of Colonic Strictures in Survivors of Necrotizing Enterocolitis

Avazjon Dekhkonboev¹, Makhmud Aliev² and Rustam Yuldashev¹, ²*

¹Pediatric surgery, Republican specialized scientific practical medical center of pediatrics, Uzbekistan
²Pediatric surgery, Tashkent pediatric medical institute, Uzbekistan

Aim

To study the incidence and clinical features of colonic strictures among survivors of necrotizing enterocolitis (NEC).

Material and methods

A total of 99 patients diagnosed NEC were retrospectively included in this study. Clinical data were related to the occurrence of colonic post-NEC strictures. Post-NEC strictures were defined as clinically relevant strictures with a radiological and/or endoscopic, surgical and pathological confirmation.

Results

Nine (13%) children developed colonic strictures after acute phase of NEC. They presented with poor weight gain, abdominal distention and vomiting. Median age at presentation clinical symptoms was 18, 87±5, 63 months. Post-NEC strictures more often (89%) developed after conservative treated NEC term infants. Post-NEC strictures often developed on the left half of the colon (67%) and predominantly (44.5%) in the descending colon. Eight children surgically managed on planned manner and in one case managed urgent because of ileus. No mortality occurred in infants with post-NEC strictures.

Conclusion

The incidence of post-NEC colonic strictures among infants surviving acute NEC is 13%, mainly among medically treated NEC term infants. For the early diagnosis of colonic strictures, there is necessity to perform a contrast enema study and/or surgery, all after the acute phase of NEC.
Diagnostic and Therapeutic Balloon Dilation of Extended Post-Burn Scar Oesophageal Strictures in Children

Bahodir Karimov

Pediatric Surgery, Republican Specialized Scientific Practical Medical Center of Pediatrics, Uzbekistan

The aim is to show the possibility of using the balloon dilation method for treating patients with extended post-burn scar oesophageal strictures and especially its diagnostic significance for detecting the heterogeneity of the scar stricture and determining further treatment tactics.

Materials and methods

We carried out a balloon dilation in 15 children with a long post burn scar stricture, including 8 boys and 7 girls between the ages of 1 to 8.

All dilation procedures were performed under X-ray control using an angiographic equipment. The X-ray length of the scar strictures, in almost all patients was significant and often captured more than two oesophageal parts. Four of the fifteen patients had complete dysphagia when treated, five had only fluid, only six of the fifteen patients could somehow take food. All patients were of reduced body weight.

Results and discussion

Despite the long X-ray lengths of the scar stricture, we managed to dilate almost all the stricture using a balloon. Already from the first attempts of dilation in patients with post burn scar stricture we have found that scar stricture - heterogeneous formation, consists of several parts, which significantly differ in density. Most often, even a large length of X-ray stratification, contains only one rigid site of significant density and is significantly smaller in length than the entire stratification.

balloon dilation, post burn scar, oesophageal stricture, X-ray
Bile Reflux Gastroesophagopathy in Children with Extrahepatic Portal Vein Obstruction

Makhmud Aliev², Rustam Yuldashev¹, ²* and Shoilkhom Shakhaydarov¹

¹Pediatric surgery, Republican specialized scientific practical medical center of pediatrics, Uzbekistan
²Pediatric surgery, Tashkent pediatric medical institute, Uzbekistan

Aim

To study influence of bile reflux gastroesophagopathy on the risk of bleeding from esophageal and gastric varices

Methods

95 children with portal cavernoma were included in this study. Patients underwent routine clinical and biochemical studies, upper gastrointestinal (GI) endoscopy, abdominal Doppler ultrasound (US), multislice and CT angiography. Children with portal cavernoma divided into two groups: group A - without bile reflux esophagitis 81 (85%) and group B - 14 (15%) children with bile reflux esophagitis and gastritis

Results

On upper GI endoscopy all children had mild to severe varices of esophagus. All children from group B had muddy bile in the lumen of the esophagus and stomach, with erosive esophagitis in distal esophagus and gastritis. Variceal bleeding occurred most commonly from the distal esophagus in group B. These children also had moderate increased levels of alkaline phosphatase - 262, 33 U/l (p<0.01), while gammaglutamyl transferase levels were normal. According to Doppler US and CT angiography all patients except signs of extrahepatic portal hypertension revealed signs of portal hypertensive biliopathy, such as thickening of gallbladder wall, dilatation of common bile duct, varices in gallbladder wall. These symptoms were more pronounced in second group and most common in children above 7 years (p<0.01)

Conclusions

Presence of muddy bile in the lumen of the stomach and sometimes in the esophagus is one of the signs of portal hypertensive biliopathy due to extrahepatic portal vein thrombosis. Bile reflux gastritis and esophagitis worsen the pathologic process in the mucosa, which leads to the development of erosion, thereby, increasing the risk of gastroesophageal hemorrhage.
**Medicinal Importance of Tricetin for the Treatment of Human Cancerous Disorders: A Phytopharmaceutical Approach**

Dinesh Kumar Patel* and Kanika Patel

*Department of Pharmaceutical Sciences, Sam Higginbottom University of Agriculture, Technology and Sciences, Payagraj 211007, Uttar Pradesh, India

2Department of Pharmaceutical Science, Krishnarpit Institute of Pharmacy, Rewa Rd, Prayagraj, Uttar Pradesh 212111, India

**Background**

Herbal medicine have been composed with different types of plant material and their derive biomolecules. Flavonoidal compounds are the important phenolic compounds separated and isolated from various plant materials of the nature. Tricetin is a flavonoid and found to be present in different parts of the plants and their derived material.

**Purpose**

The purpose of the present work is to know the scientific benefit of Tricetin in the medicine and other health sectors for the treatment of various forms of cancerous disorders.

**Methods**

Various scientific data have been collected from the literature sources and presented in the present investigation to know the scientific benefit of Tricetin in the medicine for their anticancer activity. Scientific information from various literature sources has been collected and analyzed to know the pharmacological activity of Tricetin in the medicine for the treatment of cancerous disorders of human being. Collected scientific data of different research work from various literatures have been analyzed to know the better mechanism of action of Tricetin in the medicine for the treatment of human cancers.

**Results**

Data analysis of research work from different literature database revealed that Tricetin is a natural flavonoidal compound and found to have inhibitory potential against growth of various form of cancerous disorders. Analysis of different literature work of the scientific field revealed that Tricetin has anti-metastasis activities in human osteosarcoma cells. Molecular study of Tricetin for their anticancer effects on acute myeloid leukemia cells have been investigated in the scientific research and revealed their beneficial potential on leukemic HL-60 cells. From the data analysis of various scientific research works of the literature, it was found that Tricetin have numerous medicinal applications in the medicine to treat various forms of cancers including osteosarcoma.

Therapeutic potential, Tricetin, Flavonoids, Human cancerous disorders, Phytopharmaceutical
Laparoscopic Orchidopexy for Impalpable Testes in Youth Men

Minh Nhat Vo¹, Dinh Khanh Le¹, Khoa Hung Nguyen¹ and Nhat Minh Nguyen*¹

¹Department of Urology, Hue University Hospital, Viet Nam

Introduction

Laparoscopy has steadily become the gold standard for the treatment of non-palpable testicles. We evaluate the short-term clinical outcome of the one-stage laparoscopic traction orchiopexy method in youth men (15-24 years old).

Materials and methods

Twenty youth men (ages 15 – 24 years) with a diagnosis of impalpable testes in the ipsilateral hemiscrota, one of which were bilateral, were performed one-stage laparoscopic traction orchiopexy between 2019 and 2020. We carried out an examination for ipsilateral and contralateral testes by ultrasound Doppler scan before the procedure. These men were followed up at least 6 months. At the first month and the sixth-month, position and size of the relocated testes were reassessed by clinical examination and ultrasound Doppler scan, postoperative complications were also evaluated.

Results

The mean age at surgery was 20.2 years (range: 15 – 24 years). Impalpable testes was diagnosed on the right side in 11 (55%), the left side in 8 (40%) and bilaterally in 1 patient (5%). There were 3 testes which were nonvisualized on preoperative US Doppler scan. More than half of intra-abdominal testes (12/21 testes) are located close to the internal ring, 6 testes (28.6%) were peeping testis type and 3 those (14, 3%) were detected >2 cm from the internal ring. There were 15 testes (71, 4%) relocated in scrotum, 4 were the mid lower scrotum and (19, 1%) and 2 were relocated close to the external ring. Intraoperative complication were damaging to the gonadal veins (1/21 testes). Intra-abdominal hematoma formation (3 cases) and scrotal hematoma (3 cases) were postoperative early complication. At the first month, all of 21 fixed testes was palpable and had the same size with preoperative testes. 6 months post-operation, there were 2 testicular atrophy and 2 testicular retraction which were confirmed by ultrasound Doppler scan.

Conclusion

Laparoscopic orchidopexy appeared to be safe in youth men with impalpable testes with minimum complications and high short term success rate. A larger of patients with long-term follow-up is needed to prove these effects.

laparoscopic orchidopexy
Diagnostic Yield of Ultrasound Guided Trucut Biopsy in Diagnosis of Peripheral Lung Malignancies

Mohammad Asim Amjad¹, ² and Zamara Hamid³

¹Department of Surgery, Postgraduate Medical Institute, Pakistan
²Department of Orthopedic Surgery, Postgraduate Medical Institute, Pakistan
³Internal Medicine, Islamabad Medical And Dental College, Pakistan

Introduction

While computed tomography (CT) guided lung biopsy has been standard in histological diagnosis of pulmonary lesions, its use is limited to the interventional radiologists only. Ultrasound (US) guided biopsy of pulmonary lesions, which can be performed in-clinic by the pulmonologists only, is becoming a more widespread technique. It also has the edge of real-time techniques, multi-planar imaging, and no radiation exposure to the patients.

Methods

This is a retrospective review of all the patients presenting with pleural-based lung lesions who underwent US-guided biopsy for diagnosis in the Department of Pulmonology, Liaquat University of Medical and Health Sciences Hospital, Hyderabad, Pakistan from January 1, 2013, till December 31, 2017. The diagnostic yield, sensitivity, specificity, and accuracy of US-guided biopsies were evaluated for diagnoses of peripheral lung malignancies.

Results:

Ultrasound-guided biopsies for lung lesions has a diagnostic yield of 88.3%, sensitivity of 95.80%, and specificity of 90% with an accuracy of 95.35%. Pneumothorax, as an immediate complication, was seen only in 1.5% cases.

Conclusion

US-guided biopsies are a much safer diagnostic alternative to CT-guided biopsy for lung lesions and have high diagnostic yield. It does not require special radiological interventionists but can be performed at patients' bedsides, and the equipment is not as expensive.
Prospective Randomized Controlled Trial of Metal Clips Application and Intracorporeal Suturing in Ligating Cystic Duct and Artery among Laparoscopic Cholecystectomy Patients

John Angelo Mendoza

General Surgery, Quezon City General Hospital, Philippines

Laparoscopic Cholecystectomy has been performed for decades and is a fairly standardized procedure throughout the world. Ligation of the cystic duct and artery is popularly done with the help of metal clips which is expensive in a setting of a developing country. Alternative approach is via suture ligation described by others to be technically demanding and time consuming. This is a prospective randomized controlled study conducted in Quezon City General Hospital from January to October 2019 wherein all 36 patients underwent Laparoscopic Cholecystectomy with total of 25 under suture ligation while 11 on metal clips. Results showed that the use of silk is comparable and can be used as an alternative to metal clip for ligation of the cystic duct and cystic artery (p value=0.25). Suture ligation was also shorter by 18.32 minutes (95% CI: -13.93 to 50.69) in regards to the duration of surgery. All of the patients who came for follow-up on day 7 and 1 month postop did not present any signs or symptoms of bile leak. In conclusion, suture ligation makes a substantial difference in the cost of the procedure and duration of surgery compared to metal clips application without compromising the safety and efficacy of Laparoscopic Cholecystectomy.

Laparoscopic cholecystectomy, Intracorporeal suturing
Evaluation the Results of Laparoscopic Total Mesorectal Excision after Preoperative Short-Course Radiation for Rectal Cancer

Hoai Nguyen To, Hiep Pham Van, Du Nguyen Van and Tuan Nguyen Anh

1Digestive Surgery Department, 108 Military Central Hospital, Viet Nam

Objective

To evaluate the results of laparoscopic total mesorectal excision after preoperative short-course radiation for rectal cancer.

Subject and method

70 patients stage II, III, mild and low rectal cancer were treated with short-course radiation combined with laparoscopic total mesorectal excision in 108 Military Central Hospital, from 08/2015 to 02/2019. The patient’s data were recorded: patient’s characteristics, short-term and long-term results.

Result

Mean age was 59.6 ± 10.48. Low rectal cancer was 50.0% and mild rectal cancer was 50.0%. LAR procedure was 74.3%, APR procedure was 25.7%. Ileostomy rate was 53.8%. Intraoperative complication was 5.7%, serious postoperative complication was 12, 1%. Mean operative time was 134.1 ± 32.4 minutes. Mean postoperative time was 10, 7±4, 6 days. Complete and nearly complete mesorectum were 63.6% and 36.4% respectively. Mean distal resection margin was 24.5 ± 13.6 mm. Distal margin with negative was 98.0%. Circumferential resection margin with negative was 98.5%. Overall survival and disease-free survival were 26.7 ± 9.6 months and 25.2 ± 10.9 months respectively. Recurrence rate was 12.1%. Late toxicity of the preoperative radiotherapy common grade 3 was 12.9%.

Conclusion

Laparoscopic total mesorectal excision for mild and low rectal cancer were treated with preoperative short-course radiation is safety, effect and provided oncological radicality. Overall survival and disease-free survival were 26.7 ± 9.6 months and 25.2 ± 10.9 months respectively. Recurrence rate was 12.1%.

Laparoscopic surgery, rectal cancer, short-course radiation.
Laparoscopy Efficiency in Combination of Calculosis Cholecystitis and Uterine Benefic Pathologies

Farukh Makhmadow¹, ², Guljahon Rajabova³ and Gulshan Ashurova¹

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
²Department of Abdominal Surgery and New Technology, Istiqlol Medical Complex, Tadzhikistan
³Department of Obstetrics and Gynecology №2, Tajik Institute of Post-Graduate Education of medical Staff, Tadzhikistan

Introduction

To study the effectiveness of laparoscopy with a combination of calculous cholecystitis and benign uterine pathologies.

Methods

The study is based on an analysis of 17 women who underwent simultaneous LCE and a hysterectomy. The age of women ranged from 29-46 years. Interventions were made using equipment from Karl Storz and LigaSure.

Results. The first stage was performed by LCE, after additional punctures in the area of hypogastrium, laparoscopic hysterectomies (LH) were performed. The most common indications for surgery were uterine fibroids and / or adenomyosis in combination with various menstrual irregularities. In 2 (11.8%) cases with two or more glomeruli, a history of alternative entry points was used. In one patient after abdominal delivery, for clear border identification, preliminary introduction of 100 ml of methylene blue into the bladder was used, which avoided injuries of the bladder. The size of the uterus in excess of 12 weeks of pregnancy was 17.6%. LH in 6 (35.3%) women was accompanied by removal of the uterus from one or two sides with the obligatory identification of the ureters. For hemostasis of the uterine vascular bundle, coagulation with LigaSure technology was used in 11 (64.7%) patients and uterine artery ligation in 6 (35.3%) patients. It is extremely important when performing hemostasis of the uterine vessels for the prevention of thermal damage to neighboring organs, we consider the use of "LigaSure". Extraction of the macrodrug was carried out by the method of lumping. The duration of simultaneous interventions ranged from 65 to 140 minutes. Postoperative complications were noted in 5.9% of cases.

Conclusion

Laparoscopic access for combined pathologies, such as chronic calculous cholecystitis and benign uterine pathologies, is considered the method of choice. For the purpose of hemostasis of the uterine vessels, the use of the LigaSure technology is optimal during laparoscopic hysterectomy.
Place of Minimally Invasive Technology in Diagnostics and Treatment of Cranioabdominal Injuries

Farukh Makhmadov¹, ², Narzullo Rakhimov¹ and Manuchehr Davlatov³

¹Department of Surgical Diseases №1, Avicenna Tajik State Medical University, Tadzhikistan
²Department of Abdominal Surgery and New Technology, Istiqlol Medical Complex, Tadzhikistan
³Department of Combined Injuries, Public Unit National Medical Centre "Shifobakhsh", Tadzhikistan

Introduction

To study the effectiveness of minimally invasive technology in the diagnosis and treatment of cranioabdominal injuries.

Methods

The study material was 82 patients with cranioabdominal injuries. Surgery was started within 2 hours from the moment of injury in 46 (56.1%), within 3 hours from the moment of injury in 28 (34.1%), within 6 hours from the moment of injury, surgery was started in 6 (7.3%) and later than 6 hours - in 2 (2.4%). Grade 1 traumatic shock was detected in 31 (37.9%), grade 2 shock in 41 (50.0%), grade 3 shock in 4 (4.9%), without shock in 6 (7.3%).

Results

Diagnostic laparoscopy was performed in 29 (35.4%) patients in whom abdominal damage did not exceed 1 tbsp. on the OIS scale, and the severity of the condition was no more than 2 points on the FTS scale.

Therapeutic laparoscopy of 43 (52.3%) victims, in which damage to the abdominal organs was determined 1-3 tbsp. according to OIS, the severity of the condition is 2-4 points on the FTS scale. In 10 (12.3%) cases, a conversion was performed during laparoscopy, damage to the abdominal organs was 3-4 tbsp. according to OIS, and the severity of the condition is 3-5 points on the FTS scale. Performing laparoscopy, we considered the possibility of laparoscopic surgery for liver injury 1-3 tbsp. according to OIS, injuries of the spleen, mesentery, colon and small intestine, bladder 1-2 tbsp. by OIS. In 4 (4.9%) cases, spleen rupture was estimated as 2 tbsp. according to the OIS scale, “LigaSure” technology was applied and followed by fixation to the Tachocomb rupture line. In parallel with the victims, all intensive measures were taken regarding traumatic brain injury.

Conclusion

The use of minimally invasive technology is a reasonable method of treating patients with cranioabdominal injuries.

cranioabdominal injuries, minimally invasive technology, Diagnostic laparoscopy
Are We Training Our Residents Well? Level of Satisfaction to Deal with Trauma Patients after Undergoing ATLS Course

DR. Zubair Ahmed, Dr. Samiullah Bhatti, Dr. Shabbar Hussain Changazi, Prof. Mahmood Ayyaz, Dr. Zulqarnain Hyidar and Dr. Saad Tahir

1Surgical unit-1, Services Institute of Medical Sciences/Services Hospital Lahore, Pakistan

Introduction

Advanced Trauma Life Support is a program to train medical practitioners to deal with acute trauma emergencies. The Advanced Trauma Life Support (ATLS) course was developed by the American College of Surgeons Committee on Trauma in the 1980s. This study aims to assess whether the ATLS care providers are satisfied with their performances after undertaking ATLS course.

Methods and Procedures

This is a cross-sectional survey done in College of Physicians and Surgeons of Pakistan. After taking ethical approval from SIMS ethical review board a specially designed Performa was e-mailed to 200 participants who had done ATLS courses from January 2012 till December 2016. All participants had undertaken 9th edition of ATLS course. A total of 121 participants responded to performa. 36 participants had to undertake the remedial exam and refused to fill the Performa.

Results

Out of 121 respondents 83% were males and 17% females. 79% were from surgery and allied and 21% were from other specialties. Majority of participants were Residents (84%) and only 16% were consultants. When asked whether they felt improvement in triage skill, 81% of the respondents strongly agreed and 12% agreed to the statement. 79% of the participants strongly agreed that their ability to identify and deal with respiratory tract injuries has improved and only 3% of respondents disagreed. 90% of the respondents said that they were better able to recognize shock and manage it. 73% of respondents strongly felt that they were able to deal with neurological injuries after doing ATLS.

Conclusion

A systematic approach is the need of the day for the management of trauma patients. ATLS course significantly improves the trauma management. ATLS course should be made compulsory for all surgical residents

ATLS (Advanced trauma life support) Course, Surgical trainees
Primary splenic hemangioendothelioma is vascular tumor of low or borderline risk. Diagnosis and classification of these tumors is a challenge. The define of this case is rendered by morphology of mild cellular atypia, low mitotic rate spindle cells and immunology characters of CK, CD31, SMA, Ki67, Vimentin. We report a 18 years old male patient with splenic spindle cell hemangioendothelioma managed by laparoscopic partial splenectomy, the prognosis is good and no recurrent or complication beyond follow up.

Hemangioendothelioma, spleen, Laparoscopic surgery, partial splenectomy.
Introduction

Diabetic foot ulcer treatment poses a considerable burden on the medical system with long healing times. Cellular therapy for the treatment of non-healing ulcer has been a major breakthrough in the arena of therapies. These treatment options are safe and effective and have no side effects. APRP facilitated wound healing and the ulcers improved significantly in small hard-to-heal acute and chronic wounds.

Purpose

This study aimed to compare platelet-rich plasma (PRP) versus normal saline dressing in the management of diabetic foot ulcers.

Materials and Procedure

70 Patients were recruited and randomized to undergo trial divided into two groups. Group A (N=35, 50%) underwent APRP Treatment and group B (N=35, 50%) underwent Normal Saline dressing for diabetic foot ulcers less than 5cm in greatest dimension. Follow up period was 6 weeks. Primary outcome measure was time of complete healing. Secondary outcomes measures were associated complications: infection rate, exudates, pain and failed healing.

Results

Mean age of patients was 54 years. The estimated time of wound healing was 6 weeks for 97.5% of the patients in group A (APRP) and 64.5% of the patients in group B. The PRP group was found to be more effective with fewer complications, less infection, exudates, pain, and failed healing (P=0.001). The highest healing rate was observed for both groups at the fourth week, but it was better for the PRP group (group A): 0.91±0.13 versus 0.46±0.15 sq.cm/week in group B.

Conclusion

Use of APRP in therapeutic processes in recent years in tissue regeneration therapy has promising results. APRP is a powerful tool for the treatment of diabetic foot ulcers; PRP enables healing and reduces infection rates and exudates.
Two Case of Laparoscopic Diaphragm Resection with Mesh Apply In Diaphragmatic Eventration Patients

Sang-Ho Jeong

Surgery, Gyeongsang National University Changwon Hospital, Changwon, Korea

The diaphragmatic eventration is the partial or total replacement of the diaphragm muscle fibroelastic tissue, causing the displacement of the hemidiaphragm affected to the chest by becoming weakened. In the past surgery, diaphragmatic plications were performed mainly open surgery. We would like to report two cases of laparoscopic diaphragm resection and mesh application in diaphragm eventration patients.

Case 1 is a 42-year-old male patient with no special findings in his past history. He has been suffering from shortness of breath when he bends over, and has recently felt pain, so he is visiting the hospital. Conducted by cardiology department. TTE, Treadmill test does not make any special findings and gastroscopy does not. The operation was performed with a laparoscopy. We used linear staples to resect of thinned diaphragmatic membrane and apply dual mesh. No postoperative complications. The diameter of removed diaphragm is 15* 10 cm. SOW from 6 hours after surgery, POD#1 carbohydrate rich drink, POD#2 SFD, POD#3 SBD, POD# 5 chest tube remove, POD# 11 discharge.

Case 2 74-year-old female patient has been occasionally out of breath for several years, and after eating eight months, when she walks or stoops, she is out of breath. The patient was treated with pleuritis when she was about 10 years old. It showed dextrocardia in TTE, but showed normal LV systolic function. The PFT showed the restrictive pattern. The operation was performed with a laparoscopy. We used linear staples to resect of thinned diaphragmatic membrane and apply dual mesh. The removed diameter of diaphragm is 11* 8 cm. POD#1 SOW, POD#2 carbohydrate rich drink, POD#3 SFD, POD#5 SBD, POD#7 best tube remove, POD#15 discharge. After discharge, no symptoms are detected.

Conclusion

Laparoscopic diaphragm resection with mesh apply is safe and easy treatment strategy in diaphragmatic eventration patient.

diaphragmatic eventration, laparoscopic diaphragm resection
Incidental Finding of Large Mesenteric Cyst in Young Female, Laparoscopic Excision

Thabet Alghazal
General Surgery, King Fahad Specialist Hospital - Dammam, Saudi Arabia

INTRODUCTION
Mesenteric cysts are rare intra-abdominal benign tumors. They commonly originate from the small bowel mesentery, although a proportion has been found to originate from the mesocolon (24%) and retroperitoneum (14.5%).

They are a rare cause of abdominal pain and are discovered incidentally. If symptomatic, the most common presenting complaint is abdominal pain (55-82%), followed by the complaint of abdominal mass (55-61%) and the sensation of abdominal distention (17-61%).

Diagnosis is extremely difficult since its symptomatology can resemble any abdominal disease. Performing physical examination and conducting radiological investigations such as ultrasonography (USG) and CT, are the key for the diagnosis. Surgery is the treatment of choice, as a complete resection with negative borders is curative and prevents recurrence.

We present a case of a 31-year-old patient, large cystic mass was identified in her lower abdomen. After proper evaluation and surgery patient successfully recovered. Large simple mesothelial cyst was the final diagnosis.

CASE REPORT
Patient is a 31-year-old female patient, medically free, mother of 2 children, referred to general surgery clinic due to CT scan finding of a large pelvic cyst, for further evaluation. She was complaining of vague on and off abdominal pain, mainly epigastric, lower abdomen and pelvic area for three months. She had history of abdominal distention with no other abdominal symptoms nor had a history of abdominal trauma. No H/o weight loss. On examination: there was a swelling in the lower abdomen felt. All blood investigation including the tumor markers were within normal limit including CA 19-9, CEA, alpha-fetoprotein and CA 125.

CT scan report brought from outside and suspect of lymphangioma. MRI showed a large non-enhancing fluid intensity area occupying the pelvic and lower abdomen approximately 7.4 cm * 13cm * 40 cm sized, clear fluid containing lesion in the peritoneal reflection (within the peritoneal cavity). It causes displacement of the small bowel loops superiority. The outline is flabby, no septations or mural nodules. There is an extension of the cyst in to the right side of the pelvic and abutting the right ovary, however it appears to be separated from ovarian tissue. No focal lesion seen in retro-peritoneal. There was no solid component representing lymphangioma. Possibility of omental cyst to be considered.

Decision made to do laparoscopic exploring and cystic resection. During the operation large peritoneal cyst has been evaluated located in the lower abdomen, attached to the anterior abdominal wall, pelvic and to the dome of urinary bladder. The cyst separated from its attachment by using the LigaSure energy source. Cystic fluid aspirated and sent to cytopathology lab which showed a result of negative for malignancy. After full aspiration of the fluid, the cyst is completely extracted through 10-mm trocar, specimen sent to pathology which showed a simple mesothelial cyst.

CONCLUSION
Mesenteric cyst is a rare intra-abdominal tumor, present with varied and non-specific, from asymptomatic patient to severely ill patient with peritonitis, perforation and death. Mesenteric cyst must be considered in the differential diagnosis of a cystic lesion within the abdominal cavity. Ultrasonography and CT are the most useful imaging modalities for diagnosing mesenteric cysts. The treatment of choice of mesenteric cyst is surgical resection for both benign and malignant cysts. Complete surgical excision is the treatment of choice. Following surgery, prognosis is excellent and recurrence is low. Laparoscopic resection has a high success rate with low incidence of postoperative complications.
Treatment of Cholecystocolonic Fistula Incidentally Found During Single Incision Laparoscopic Cholecystectomy, Case Report

Geon Young Byun¹, Myoung Jin Kim¹, Bum Hwan Koo¹ and Sung Ryul Lee¹*

¹Surgery, Damsoyu Hospital, Korea

Introduction

Cholecystocolonic fistula is a rare condition and is found in roughly 1 in every 10,000. It represents 6.3% to 26.5% of all cholecystenteric fistulas. Cholecystocolonic fistula is the second most common intestinal fistula after cholecystoduodenal fistula.

Case presentation

A 72-year old male presented with epigastric pain and dyspepsia. Preoperative abdominal CT and ultrasound showed segmental type adenomyomatosis, gallstones, and thickening of the fundus partial gallbladder wall. But cholecystoenteric fistula was not suspected. Surgical findings showed severe adhesion of gallbladder and omentum. There was a suspicion of fistular tract during adhesiolysis between GB fundus and T-colon. After dissection around the fistula, clipping was performed with a metal clip at colon side and ligation was performed. White bile spillage was observed in GB fundus. There was no peri-operative complication and the patient was discharged 28 hours after surgery.

Discussion

The most common presenting symptoms of non-obstructing biliary-enteric fistulas are abdominal pain, nausea, and diarrhea. In some reports, cholecystocolonic fistula is detected incidentally during a routine laparoscopic cholecystectomy, it could be approached with a laparotomy avoiding long operating time and serious intraoperative complications. However, if the diameter of the fistula tract is small and the adhesion is not severe, it can be treated by clipping or endoscopic stapling.

Conclusion

Cholecystocolonic fistula, which is found incidentally during surgery, can be treated by clipping or stapling if the diameter is not large and inflammation and adhesion are not severe.

Keyword: cholecystocolonic fistula, cholecystectomy, single incision laparoscopic cholecystectomy.
Is It Really Female, Fatty, Fertile and Forty? Gallstone Disease

Prof. Mahmood Ayyaz\textsuperscript{1} and Zulqarnain Hyidar\textsuperscript{1}

\textsuperscript{1}General Surgery, Services Hospital, Lahore, Punjab, Pakistan

Introduction

Gall stones are formed in gall bladder due to various reasons. It is a famous dictum that gall stones are present commonly in pregnant females and in old age (>40 years old) and in obese patients. In this observational study we tried to find out that gall stone disease is present not only in non obese non pregnant females but also in male and young patients in Asian population.

Material and methods

This study was conducted in tertiary care hospital (Services hospital Lahore) from June 2017 till December 2019. After taking informed consent from patient all the demographic data was recorded on pre defined questionnaire. Stone analysis was done after surgery and all the data was analyzed by SPSS version 22. Results: A total of 200 patients were enrolled in the study. Out of total 135 (67.5\%) were females and 65 (32.5\%) were males. Out of 135 females 24 (17.7\%) were pregnant. Mean age of the female patients was 33.82 ± 11 years. Mean BMI of the female patients was 25.8 ± 5.8 kg/m\textsuperscript{2}. Mean age of the male patients was 36.82 ± 11 years. Mean BMI of the male patients was 27.8 ± 5.8 kg/m\textsuperscript{2}. Analysis showed that 85\% patient had mixed stones while 15\% patients had cholesterol stones.

Conclusion

Although gallstones are more prevalent in female patients. But incidence is also increasing in young, non obese patients irrespective of gender in Asian population. Also mixed stones are more common as compared to cholesterol stones.

causes of gallstones review
The objective of the current study was to investigate the protective effects of aqueous extracts of fenugreek seeds against streptozotocin-induced diabetic rats. Thirty-two rats were fed standard diet and divided into four groups. Rats in the first and second group were normal and diabetic controls respectively. Rats in the second and third group were received aqueous extracts of fenugreek seeds. The fourth group rats were treated with allopathic drug, glibenclamide for control. All the biochemical estimations were done at two different intervals, one after the induction of diabetes and second after completion of (5 weeks), of therapy. The present study concluded that aqueous extract of fenugreek has antihyperlipidemic and antihyperglycemic effect and thus plays a protective role against STZ induced diabetes.

fenugreek seeds, antihyperglycemic effect, protective role, antihyperlipidemic,
Advance Laparoscopy in Minimal Resources: Our Two Years Experience in a Public Sector Hospital of Lahore

Danish Ali¹* and M. ADEEL KAISAR¹

¹Surgical Unit 1, Lahore General Hospital, Pakistan

Background

Laparoscopy surgery has been initiated for more than 30 years now, and it’s been progressing rapidly in recent years. Advance laparoscopy procedures are those other than cholecystectomy, appendectomy, and diagnostic laparoscopy. Almost all the procedures are now possible to do laparoscopically. The primary goal of laparoscopy is to achieve good cosmetic outcomes, shorter hospital stay, less postoperative pain, and early recovery. The main objective of this study is to evaluate the feasibility and safety of performing advanced laparoscopic procedures in a public sector hospital with minimal resources where previously basic laparoscopy was being done and to share our experience.

Methods

A prospective study of cases performed from December 1st, 2016 till Nov 30th, 2018 was done. A total of 375 patients underwent advanced laparoscopic procedures. All the cases were done by single surgical unit but with different surgical teams both as elective as well as emergency procedure. Technical feasibility, success, operative time, postoperative pain, hospital stay, and outcomes were assessed.

Results

All patients were aged 10 to 70 years, 200 males and 175 females. Almost all procedures were technically feasible except 24 converted to open due to either technical issues or any complication. The mean hospital stay was 2 to 8 days. The mean operative time was 90 minutes. All patients were satisfied with the scars.

Conclusions

Advance laparoscopy is safe and feasible and effective in the public sector hospital having minimal resources. Improvisation is the key to performing advanced procedures in setups having limited resources. Supervision, Monitoring, and evaluation in a systematic scientific manner will benefit surgeons and residents with a learning curve and thus not compromise patient welfare. It’s been always helpful if we develop a dedicated laparoscopy team.

Advanced laparoscopy; laparoscopic experience; public sector hospital; minimal resources
Lack of Awareness among Surgeons Regarding Safe Use of Electro surgery. Across Sectional Survey of Surgeons in Pakistan

Danish Ali1 and Awais Amjad1∗

1Surgical Unit 1, Lahore General Hospital, Pakistan

Objective

To assess our surgeons' perceptions regarding the safe usage of electrosurgical devices.

Methodology: This cross-sectional survey was carried out at two hospitals. Consultants, fellows and senior residents on the surgical floor were requested to fill up the questionnaire. Calculations were performed with Statistical Package for the Social Sciences (SPSS 20) for Windows version 20 statistical software. Data were described using median with minimum and maximum value for quantitative variables. For categorical variables, the number of observations and percentages were reported. The study complies with hospital guidelines on research involving human subjects.

Results

Out of 80 questionnaires 52 were filled and returned. 12 consultants, 16 fellows/Senior registrars and 24 senior residents filled their questionnaires. For the sake of anonymity, no information was obtained regarding the level of training and experience. Total of 12 questions was asked. An expert level was set for a score above 10/12. A moderate level was set on 8/12. Score of less than 8 was considered unsafe for using electrosurgical devices. Only 6 (11.5%) participants had an expert level of understanding. 16 (30.7%) had a moderate understanding. 30 (57.7%) were considered unsafe regarding the use of electrosurgical devices. 85% of participants were not aware of the correct mode of current to use for coagulating vessels. 69% of surgeons would use electrocautery to control staple line bleeds. 67% of participants weren't aware of the correct placement of the dispersive electrode. 60% couldn't identify a safe device for use in patients with a pacemaker. 46% of surgeons would cut a dispersive electrode to fit it on a child. 69% believed that the harmonic scalpel was a bipolar cautery. 61% couldn't differentiate between RFA and Microwave Ablation. 63% didn't know how to handle an operating room fire.

Conclusion

In these two hospitals, a high level of ignorance noticed regarding the procedure and indications of basic electrosurgical equipment which needs raising awareness.

Electro surgery Electrocautery FUSE Surgical energy Pakistan
Is Robotic Cholecystectomy Less Painful? Comparison of Postoperative Pain after Robotic versus Laparoscopic Cholecystectomy

Wonbin Chang¹, Tae Yoo* and Won Tae Cho¹

¹Surgery, Hallym University College Of Medicine, Korea

Background

Even if the advantages of robotic surgery is being more emphasized, robotic cholecystectomy (RC) still has several controversial issues and especially in postoperative pain, there are few studies on its comparative merit compared with standard laparoscopic cholecystectomy (LC). The aims of this study was evaluate the postoperative pain and clinical outcomes of RC compared with LC.

Purpose

This study demonstrates RC with low 3 ports incision results in reduction in postoperative pain and hospital stay. This study also shows that RC is safe with comparable rate of intraoperative complications. Therefore, RC may be beneficial for patients who expect fast pain relief and early recovery after cholecystectomy.

Methods

We prospectively analyzed data for patients who received RC (3 ports with low incision, n=50) and LC (3 ports with conventional technique, n=50) from February 2016-July 2019. These groups were compared for pain intensity (visual analog scale), analgesic requirement, hospital stay and complications.

Results

Postoperative pain score in RC group was significantly less than those of LC group during early periods (postop 2, 4, 8 hour, p=0.45, 0.28, 0.23). However, there were no pain score differences between two groups during late period (1, 12, 24 hours, p=0.48, 0.66, 0.21). LC group was related to longer hospital stay compared to RC group (2.88 vs. 2.36, p=0.01). Number of patients requiring rescue analgesic doses and intraoperative complications were not significantly different between 2 groups.
Anti-Adhesive Effects of the Anchoring Suture in Formation of Diverting Ileostomy during Minimally Invasive Rectal Cancer Surgery

Eu Tteum Choi¹, Seok-Byung Lim², Jong Lyul Lee², Chan Wook Kim², In Ho Son², Yong Sik Yoon², In Ja Park², Chang Sik Yu² and Jin Cheon Kim²

¹Department of Nursing, Asan Medical Center, Korea
²Division of Colon and Rectal Surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Background/ AIM

During the restoration of ileostomy, the degree of adhesion could affect operation time, the length of resected small bowel, and postoperative course including complication. This study aims to assess the effect of the anchoring suture between ileostomy and rectus abdominal muscle fascia on the degree of adhesion and postoperative complications in these patients.

Methods

Patients who underwent minimally invasive surgery with diverting ileostomy for rectal cancer between January 2013 and December 2017 were enrolled. The anchoring group was defined as patients who received 4-point suture fixations between ileostomy and fascia and the non-anchoring group was defined as patients without any suture fixation. Variables including the peritoneal adhesion index (PAI) score, operation time, the length of resected small bowel, operative complication, and postoperative hospital stay were collected and compared between the two groups.

Results

A total of 90 patients were included for this study including 60 anchoring group and 30 non-anchoring group. The anchoring group had shorter operation time (min, 46.88 ± 16.37 vs. 61.53 ± 19.36, p = 0.001) and lower PAI score (3.02 ± 2.53 vs. 5.80 ± 2.60, p = 0.001), compared with the non-anchoring group. There was no significant difference in the incidence of postoperative complication between the anchoring and non-anchoring group (5.0% vs. 13.3%, p = 0.24).

Conclusions

The anchoring suture during diverting ileostomy formation showed lower adhesion score and shorter operation time and it can be assumed that the anchoring suture may be effective in preventing adhesion.

Rectal cancer, MIS, ileostomy, adhesion, postoperative complication