SAFE AND EFFICIENT SURGICAL DISSECTION USING ANATOMICAL ‘GATEWAYS’ AROUND THE LIVER AND PANCREAS

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Objective: Safe and efficient tissue dissection requires division of certain critical structures which act as ‘gateways’ to progressing the dissection. The aim of this educational video is to demonstrate important gateways in liver and pancreas surgery, with a primary target audience of surgical residents and general surgeons who are occasionally involved in liver and pancreas surgery.

Methods: Using video from common liver and pancreas procedures, combined with computer generated animation, six key anatomical gateways are demonstrated. Explanations are provided on why each structure must be divided in order to progress the dissection along a plane or to expose a structure at a deeper level.

Results: The video demonstrates that division of the gastroepiploic vein and gastroduodenal artery exposes the superior mesenteric vein and portal vein, respectively, during pancreaticoduodenectomy. Division of the left gastric vein exposes the origin of the splenic artery during distal pancreatectomy and multiorgan procurement. During portal dissection for right hepatectomy the cystic duct and artery are divided in order to expose the right hepatic artery and right portal vein. The right hepatic vein, during right hepatectomy, may only be fully encircled by first dividing the hepatocaval ligament. Finally, the ligamentum venosum must be divided to allow the left hepatic vein to be fully encircled during left hepatectomy.

Conclusion: Knowledge of six key anatomical gateways in liver and pancreas surgery allows tissue dissection to proceed appropriately. By opening up these gateways, surgeons are more likely to develop safe and efficient tissue dissection.

LAPAROSCOPIC LIVING DONOR RIGHT HEPATECTOMY

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Objective: Living donor liver transplantation (LDLT) has evolved as a treatment option for patients with end stage liver disease (ESLD) because of an inadequate number of deceased donor organs available. Initially best described for adult to pediatric LDLT in 1989, laparoscopic living donor hepatectomy provides an option for living donation in adults that may result in decreased morbidity for the donor as compared to an open operation. A minimally invasive approach remains somewhat controversial as patient safety and graft integrity are primary concerns during transplantation, however, laparoscopic donor hepatectomy can achieve adequate graft outcomes as well as result in reduced complications and an improved recovery in the donor as compared to an open hepatectomy.

Methods: Here, we present a 33-year-old female living donor who underwent a laparoscopic living donor right hepatectomy. The graft-to-recipient body weight ratio (GRWR) was 0.78 and functional liver remnant (FLR) in the donor was 41%.

Results: The operation was completed laparoscopically and graft was successfully removed through Pfannenstiel incision.

Conclusion: A fully laparoscopic living donor right hepatectomy is a feasible option for adult-to-adult living donor liver transplantation.

ALDLT USING DUAL GRAFT, TECHNICAL ASPECTS OF THE FIRST CASE IN ARGENTINA

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Objective: Scarcity of liver grafts has stimulated the use of segmental liver grafts including adult to adult living donation (ALDLT). The most challenging procedure described so far is the ALDLT using dual grafts (DG). Here we aim to present the technical aspects of our first DG.

Methods: A 53 year old female, with PBC, MELD: 19; 41.5 Kgs, listed for 14 months. Her SLV was 995 grs. Her 25 year old daughter had an estimated liver volume (ELV) of 1060 grs, RL: 840 grs (79%); LL: 337 grs.. The use of the RL would have left the donor with less than 30% of remnant liver. A second 23 year old daughter was considered with a RL: 806 grs (73%) and a LL: 297 grs. For donor safety, a DG was proposed. The procedure was done sequentially, the LL (RLV: 263 grs) was rotated 180°, and implanted to the right HV, the RPV was used for inflow, and a transient PC- shunt was performed to avoid congestion of the 1st graft. Then LHA was anastomosed to the RHA, and a D-D was performed. Then the LLS was brought to the OR the PC-shunt removed, the LHV was implanted to the M and LHV; to the LPV and LHA were used for inflow, a Roux-Y was done. CIT: 140 and 95 min. respectively. Total LV: 485 grs, GRWR: 1.16. Patient was extubated on POD 1

Results: ALDLT using DG is technically feasible; it opens a new alternative for patients in need for a liver transplant.
V4

LAPAROSCOPIC REVERSAL ALPPS
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Objective: ALPPS (Associating Liver Partition and Portal vein ligation for Staged hepatetomy) was initially described for two-stage right trisectionectomy. Reversal ALPPS is a denomination where the future liver remnant is the right posterior section of the liver. Aim is to present a video of a total laparoscopic reversal ALPPS.

Methods: A 42-year-old woman with colorectal metastases in all segments, except segment 1 underwent chemotherapy with objective response and was referred for surgical treatment. CT scan shows a predominance of metastases in the left liver and in the right anterior section. Right posterior section had 3 metastases. The plan was to perform a laparoscopic reversal ALPPS (left portal vein ligation combined with in situ splitting in 2-staged left trisectionectomy). Three metastases in the right posterior section are resected followed by liver partition and left portal vein ligation. CT scan showed 70% increase of the future liver remnant. The second stage constituted of left trisectionectomy. At laparoscopy after division of adhesions, the left Glissonian pedicle was divided with endostapler. A stapler was also used to transect the left and the middle hepatic veins, and the specimen was removed through suprapubic incision.

Results: Operative time was 5 and 3 hours and the patient was discharged on the 4th and 5th day, respectively. No blood transfusion or ICU stay was necessary. Patient has no evidence of the disease 18 months after procedure.

Conclusion: Reversal laparoscopic ALPPS is feasible and safe. Laparoscopy is useful to decrease blood loss and optimizes visualization during liver transection.

V5

ROBOTIC DUODENAL SLEEVE RESECTION: THE TRANSMESENTERIC APPROACH
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Objective: Duodenal surgery can be challenging, particularly involving the second through forth portions. Considerations include its’ deep retroperitoneal location, adjacent vascular structures, and cognizance of the Ampulla of Vater. In this presentation, we describe a novel approach to the performance of a robotic duodenal sleeve resection for an adenoma just distal to the Ampulla. Duodenal exposure, dissection, and resection are performed through a mesocolic window right of the middle colic vessels with concomitant placement of common bile duct stent to aid in the visualization of the ampulla. A side-to-side anastomosis is then performed through this window. This elegant technique can become a useful component of a hepatobiliary surgeon’s armamentarium.

V6

A TECHNIQUE TO DEFINE EXTRAHEPATIC BILIARY ANATOMY USING ROBOTIC NEAR-INFRARED FLUORESCENT CHOLANGIOGRAPHY
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Objective: Biliary injury is a rare but serious complication of minimally-invasive cholecystectomy. Traditionally, intraoperative cholangiogram has been utilized to help delineate biliary anatomy, however, new modalities are available including near-infrared fluorescent cholangiography (NIFC) using indocyanine-green (ICG). The objective of the study was to evaluate if this technique may aid in safe dissection to obtain the critical view.

Methods: Twenty-one consecutive multiport robotic cholesctomies using NIFC with ICG were performed using the da Vinci Fire Fluorescence Imaging System. All patients received 2.5 mg ICG intravenously at the time of induction. No structures were divided until the critical view of safety was achieved. Real-time toggling between NIFC and bright-light illumination was utilized throughout the case to define the biliary anatomy.

Results: ICG was successfully administered to all patients without complication and in all cases the extrahepatic biliary anatomy was clearly identified in 3D. All procedures were completed without biliary injury, conversion to an open procedure, or need for traditional cholangiography to obtain the critical view. Specific examples of challenging cases where x-ray cholangiography or conversion to open was avoided and NIFC aided in safe dissection leading to the critical view are demonstrated, including (i) Evaluation for aberrant biliary anatomy (ii) Confirmation of non-biliary structures (iii) Use in cases where the cystic duct is fused to the common bile duct/Mirizzi’s Syndrome.

Conclusion: NIFC using ICG is a safe and effective technique to rapidly identify extrahepatic biliary anatomy. Techniques to utilize this technology in challenging cases are demonstrated in order to obtain the critical view of safety.

V7

LAPAROSCOPIC RADICAL CHOLECYSTECTOMY
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Objective: Demonstrate a laparoscopic gallbladder cancer resection

Methods: Laparoscopic resection of a En Bloc liver segment, gallbladder and lymph nodes of the hepatoduodenal ligament

Results: No morbidity

Conclusion: The procedure is feasible, safe and with very low morbidity
V8
TOTAL LAPAROSCOPIC RESECTION OF THE UNCINATE PROCESS OF THE PANCREAS
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Objective: Resection of the uncinated process of the pancreas is a very complex parenchymal-sparing procedure. There are only three cases of laparoscopic resection of the uncinate process of the pancreas in the literature.

Methods: A 63-year-old man with a 3-cm neuroendocrine pancreatic tumor was referred. Clinical history shows a morbidly obese patient with coronary disease. Patient was considered a high-risk for pancreatoduodenectomy. We decided to perform resection of the uncinated process by laparoscopy. The patient was placed in supine position with the surgeon standing between her legs. Five trocars were used. A Kocher maneuver was performed with complete exposure of pancreatic head and uncinate process. The uncinate process was dissected from the superior mesenteric vein. Blood supply of the duodenum was preserved. Small pancreatic branches from inferior pancreatoduodenal artery were divided. Transection of pancreatic parenchyma was performed using coagulation shears. Surgical specimen was removed through umbilical port inside a retrieval bag. A hemoabsorbable tissue was placed in the cutting pancreatic surface, and abdominal drain was left in place.

Results: Operative time was 100 minutes with minimum blood. Hospital stay was 3 days. Pathology confirmed neuroendocrine tumor with free margins. The patient is well and no evidence of the disease one year after the procedure.

Conclusion: Laparoscopic resection of uncinate process of the pancreas is safe and feasible. It is a good alternative to pancreatoduodenectomy and should be considered for patients with low-grade malignancies.

V9
TOTAL PANCREATEODOUODENECTOMY EN BLOC WITH SUPERIOR MESENTERIC ARTERY AND VEIN RESECTION
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Objective: Pancreatic cancer represents an aggressive malignancy with poor survival. Due to its particular anatomy and the close contact between the pancreatic head and major vascular structures (portal vein, superior mesenteric vessels), numerous patients already present tumoral vascular invasion at the time of diagnosis.

Vascular resections (specially arterial resections), have been always associated with a high morbidity and mortality rates and poor survival benefit.

Methods: However, in the last decade the rate of post-operative major complications became more acceptable as well as oncological benefits in a selected group of patients. Many surgeons consider that tumor invasion of the superior mesenteric artery is still a contraindication for performing resection. Usually, the presence of the tumor invasion of the superior mesenteric artery is located at the level of the uncinate process.

Results: Direct tumor invasion is not the only possible indication; other situations in which resection is needed is represented by a highly adherent tumor with no clear invasion but with high risk of arterial tear-up during dissection or peripheral and perineural microscopic invasion. In such cases, a partial resection of the artery with end-to-end anastomosis is feasible. In cases in which an adequate mobilization of both sides of the artery, in order to obtain a tension-free suture, is not feasible, a vascular graft can be used.

Conclusion: We present the case of a 45-year-old patient diagnosed with a pancreatic head tumor invading both the portal vein and superior mesenteric artery in whom a pancreatoduodenectomy with arterial and venous resection associated was performed.

V10
LAPAROSCOPIC CENTRAL PANCREATECTOMY WITH LONG SLEEVE PANCREATEICO-GASTROSTOMY (LSPG)
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Objective: To show a video of a novel technique in central pancreatic resections for benign or low grade tumours at the neck of the pancreas: a laparoscopic central pancreatectomy with long sleeve pancreatico-gastrostomy (LSPG).

Methods: A total of 5 cases performed for pancreatic and spleen preservation central pancreatectomy consisting of mucinous cystic neoplasm (n = 1), serous cystadenoma (n = 1), intraductal papillary mucinous neoplasm (n = 1), neuroendocrine tumour (n = 1) and metastatic melanoma (n = 1). Following laparoscopic central pancreatectomy, a sleeve gastric tube was created with Endo GIA for reconstruction of an end-to-end pancreateico-gastrostomy laparoscopically.

Results: Five patients underwent central pancreatectomy for resection of pancreatic lesions at body or neck of pancreas with aim to preserve pancreas and spleen to prevent long term problems related to distal pancreatectomy and / or splenectomy. None of the patients had dilated pancreatic duct on preoperative imaging. All had a soft pancreas intraoperatively. The median operative time was 240 min (150—285) with median 36 min (28—50) for long sleeve pancreatico-gastrostomy. One patient developed a grade A pancreatic fistula managed conservatively. There was no mortality.

Conclusion: Central pancreatectomy should be considered in patients with benign pancreatic tumour for spleen and pancreas preservation. A new reconstruction technique can facilitate this by making anastomosis of pancreatic stump easier and less technically demanding with fewer complications than conventional pancreaticojjunostomy in soft pancreas with non-dilated pancreatic duct.
V11
ROBOTIC TRANSGASTRIC PANCREATIC CYSTGASTROSTOMY WITH PANCREATIC DEBRIDEIMENT
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Objective: Management of post-pancreatitis peripancreatic fluid collections depends on the size, location, and contents of the collection as well as any associated symptoms. The amount of time elapsed after acute pancreatitis is also considered in international consensus guidelines. With increased surgeon experience in minimally invasive approaches, many techniques for laparoscopic treatment of these collections have been described. Advances in endoscopic modalities also allows many perigastric and peri-duodenal collections to be treated endoscopically. Rates of recurrence, repeat intervention, and procedural morbidity are considered in reviews comparing open, laparoscopic, and endoscopic approaches. We present a case of walled-off pancreatic necrosis (WOPN) treated with robotic cystgastrostomy and pancreatic debridement.
Methods: A robotic cystgastrostomy was performed in a patient who developed WOPN after acute biliary pancreatitis. Key features differentiating this procedure from laparoscopic transgastric approaches include the size of the anterior gastrotomy, the use of hand-sewn technique to mature the cystgastrostomy, and no routine use of stapling devices.
Results: The patient was discharged on postoperative day 4. Her follow-up imaging demonstrated resolution of the WOPN.
Conclusion: Use of the surgical robot confers many benefits of minimally invasive surgery to the treatment of post-acute pancreatic fluid collections while utilizing technical features of the procedure described in the open approach. Longitudinal analysis is needed to determine if the robotic approach affects surgical outcomes, rate of fluid collection resolution, or occurrence of complications.

V12
LAPAROSCOPIC CENTRAL PANCREATECTOMY WITH ROUX-EN-Y PANCREATOJEJUNOSTOMY
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Objective: Central pancreatectomy is an alternative technique for benign or low-grade malignant tumors of the neck of the pancreas. The objective is to present a video of a laparoscopic central pancreatectomy
Methods: A 48-year-old woman with a 2.5 cm incidental cystic tumor in the neck of the pancreas is referred. Pancreas is transected with an endoscopic linear stapler on the right side of the tumor followed by transection of the distal pancreas. After completion of pancreatic resection, Roux-en-Y jejunal loop is prepared. An end-to-side pancreaticojunostomy is then performed in a double layer technique duct-to-mucosa.
Results: Operative time was 4 hours with minimum blood loss. Patients was discharged on the 4th postoperative day.

Patient developed a type A pancreatic fistula that was treated by late removal of the drain. Pathology confirmed a mucinous cystadenoma with no malignant transformation. Patient did not develop exocrine or endocrine pancreatic insufficiency on late follow-up.
Conclusion: Totally laparoscopic central pancreatectomy is feasible and it is a useful technique for removal of tumors located in the neck of the pancreas.

V13
LEFT KIDNEY MOBILIZATION TECHNIQUE DURING RADICAL ANTEGRADE MODULAR PANCREATEOSPLENECTOMY (RAMPS)
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Objective: Radical antegrade modular pancreateosplenectomy, originally proposed by Strasberg, has been accepted as a standard operation for distal pancreatic cancer. This step of lateral retroperitoneal dissection is technically challenging due to the depth of organs under the left costal margin.
Methods: As the original RAMPS procedure, celiac lymphadenectomy, division of pancreas and medial retroperitoneal dissection around SMA were already completed until left renal vein is exposed as a landmark for the posterior boarder. At this point, left kidney is mobilized and medialized for further lateral peritoneal dissection. The parietal peritoneum at the left lateral gutter is incised and the plane behind the kidney is entered. This plane is always avascular and easily dissectable with the operator’s finger, up to the diaphragm superiorly, and the aorta medially. The dissected space is packed with lap sponges, which lift the spleen, tail of the pancreas and kidney up to the anterior surgical field. Then, the rest of retroperitoneal dissection was completed lateral to medial fashion using the surface of the left kidney as a posterior landmark.
Results: The advantages of mobilization of left kidney in RAMPS are two folds; (i) it can provide better exposure of left sided organs and allow meticulous retroperitoneal dissection, (ii) left kidney can be used as a landmark for a safe dissec tion boarder. We performed RAMPS with this modification on 147 patients since 2005, and achieved only 5% of positive retroperitoneal margins.
Conclusion: Left kidney mobilization technique is useful for safe, and oncologically sound lateral retroperitoneal dissection during RAMPS procedure.

V14
ROBOTIC TOTAL PANCREATECTOMY WITH SPLENECTOMY FOR MULTIFOCAL INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM
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Objective: In this video, we describe a systematic approach to a robotic total pancreatectomy for multifocal intraductal...
The patient presented to our institution with severe infected pancreatic necrosis. He underwent a laparoscopic transgastric necrosectomy after removing the previously placed cystgastrostomy. He recovered well and was discharged on postoperative day 4.

**Methods:** The patient is a 61-year-old female with a history of stage I endometrial cancer post robotic assisted total hysterectomy and salpingo-oophorectomy who was diagnosed with multifocal IPMN. Endoscopic ultrasound with fine needle aspiration of a complex cyst at the pancreas neck was significant for a CEA of 2080. She is a type 1 diabetic on an insulin pump.

**Results:** A total of 6 robotic ports were placed and the da Vinci Xi robotic system was used with the patient supine. The approach entailed: (i) Diagnostic laparoscopy (ii) Entry into the lesser sac (iii) Division of the short gastric vessels (iv) Exposure and dissection of the inferior pancreas border (v) Dissection and transection of the splenic artery (vi) Mobilization of the spleen (vii) Exposure of the splenic vein-superior mesenteric vein confluence and transection of the splenic vein (viii) Kocher maneuver (ix) Release of the Treitz and transection of proximal jejunum (x) Transection of the distal stomach (xi) Portal lymphadenectomy (xii) Dissection and transection of the gastroduodenal artery (xiii) Hepaticojunostomy (xiv) Cholecystectomy (xv) Gastrojejunostomy.

**Conclusion:** Robotic total pancreatectomy with splenectomy offers a minimally invasive approach to a major abdominal operation and is feasible in a stepwise, reproducible technique.

**V15**

**LAPAROSCOPIC TRANSGASTRIC NECROSECTOMY AFTER ENDOSCOPIC CYSTGASTROSTOMY: DEBRIDEMENT VERSUS DRAINAGE**

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**Objective:** The objectives of the video are to describe a minimally invasive technique for pancreatic necrosectomy and determine when pancreatic debridement is necessary over pseudocyst drainage.

**Methods:** Three radially dilating ports were placed through the anterior abdominal wall and through the anterior gastric wall after endoscopic insufflation. A surgical cystgastrostomy was created after removing the previously clogged endoscopic stent. Pancreatic debridement was performed through this transgastric approach until the cavity was completely cleared of debris. The gastrotomy sites were closed at the end of the procedure.

**Results:** The patient presented to our institution with severe sepsis three months after initial presentation of necrotizing pancreatitis. He was found to have a clogged stent and infected pancreatic necrosis. He underwent a laparoscopic transgastric necrosectomy for drainage of pus and complete pancreatic debridement. He recovered well and was discharged on postoperative day 4.

**Conclusion:** Laparoscopic transgastric necrosectomy allows for complete debridement with a single definitive operation. MRI is useful in the assessment of solid debris versus fluid in peripancreatic necrotic collections. This approach is an effective strategy for walled-off retrogastric pancreatic necrosis and offers significant benefits in the recovery of these patients to pre-pancreatitis health.

**V16**

**LAPAROSCOPIC LIVER SPARING RESECTIONS USING INTRAHEPATIC GLISSONIAN APPROACH**

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**Objective:** One of the main criticisms of laparoscopic liver resection, is that it is difficult, or not possible, to perform liver-sparing resections. The aim of this video is to present short videos where the intrahepatic Glissonian approach was used to perform anatomical liver segmental resections instead of a larger operation to avoid unnecessary sacrifice of the liver parenchyma.

**Methods:** We select six types of anatomical liver resections to exemplify the use of intrahepatic Glissonian approach to perform segment-oriented liver resections. These types of hepatectomies were used as alternative to right or left hepatectomy or as alternative to extended liver resections.

**Results:** The intrahepatic Glissonian approach was feasible in all cases. The use of anatomical landmarks previously described was essential to reach and control the Glissonian pedicles. Among the liver-sparing resections, we were able to perform right anterior (S5 + S8) and posterior (S6 + S7) sectionectomies, resection of segments 2, 3 and 4 and mesohepatectomy (S4 + S5 + S8). No patient presented postoperative liver failure.

**Conclusion:** Laparoscopic liver sparing resections are feasible, and may be a good alternative to hemihepatectomies, or extended liver resections. The use of intrahepatic Glisssonian approach can be useful.

**V17**

**LAPAROSCOPIC LIVING DONOR HEPATECTOMY FOR PEDIATRIC LIVER TRANSPLANTATION**

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**Objective:** To present the technique of Laparoscopic Living Donor Liver Resection of Left Lateral Segment for Pediatric Liver Transplantation.

**Methods:** Images from laparoscopic surgeries, performed by the authors, that best illustrate this technique were selected, showing the most important steps of the procedure for better understanding.

**Results:**

The video shows:

- Positioning of the patient. Trocar site and number. Liver liberation. Identification of vascular structures and control; portal vein, hepatic artery and accessory left hepatic artery, originated from the left gastric artery. Transection line demarcation with electro cautery. Transection of the parenchyma at this level. Section of the portal vein, hepatic arteries and left hepatic vein. Extraction of the Left Lateral Segment through a suprapubic incision. Hemostasis and drain installation. Time of the procedure, after the learning curve is less than 5 hours. We have no mortality, reoperations or important complications in this series of 8 patients. Post operative length of stay is between 3 and 7 days with a median of 4 days.
Conclusion: Laparoscopic Living Donor Left Lateral Liver Resection for Pediatric Transplantation is a feasible and safe procedure that permits to increase the organ pool for transplantation.

V18

LAPAROSCOPIC GLISSONEAN PEDICLE TRANSECTION METHOD (TAKASAKI) FOR NEGATIVE FLUORESCENT COUNTERSTAINING OF SEGMENT 6

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Objective: The portal pedicles are wrapped in connective tissue known as the Walaees sheath, which are abutting Laennec’s capsule covering the liver parenchyma. Precise knowledge of this anatomic relationship allows for dissection of this interspace and early control of segmental portal pedicle (Glissonian Pedicle Transection Method (GPTM)). Subsequent systemic administration of Indocyanine Green (ICG) leads to negative counterstaining of the to be resected segment.

Methods: A 60 year old healthy female patient with invasive lobular breast cancer, grade 2, ER+, PR+, Her-2 neg. Ki-67 80%, cT2N0M1. A synchronous solitary breast cancer liver metastasis was diagnosed at the border between segments 6 and 7. After treatment with Letrozole and Palbociclib for one year achieving stable disease, the patient was considered for liver metastectomy.

Results: With the patient in the French Position and following intraoperative liver ultrasound, after lowering the hilar plate, the portal pedicle of segment 6 was dissected out using GPTM approach. After test-clamping, an appropriate demarcation was observed and ICG administered systemically. This led to negative counterstaining of segment 6 and allowed for precise anatomic dissection under near-infrared vision.

Conclusion: Laparoscopic application of GPTM facilitates anatomically precise liver resection through early pedicle control. Negative counterstaining using ICG under near-infrared vision leads to visual enhancement of the anatomically precise borders. They typically do not follow straight lines and are therefore difficult to precisely dissect. ICG counterstaining reveals patient specific anatomic variations that would be a challenge to determine especially laparoscopically.

V19

STANDARDIZATION OF EXPERIMENTAL MICRO SURGICAL MODEL OF ALPPS (ASSOCIATING LIVER PORTAL VEIN LIGATION PARTITION AND STAGED FOR HEPATECTOMY) IN SPRAGUE DAWLEY RATS

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Objective: Standardize an experimental microsurgical technique of ALPPS in an in-vivo model that enables the understanding of biological phenomena involved in hepatic regenerative response.

Methods: There is structural homology between the rat liver containing 4 lobes (left lateral lobe (LL), right lateral lobe (RL), median lobe (ML) and caudate lobe (CL); and human segments, where ML represents the IV—V—VIII segments. According the principles of hepatectomy, which imply to preserve at least 2 adjacent segments in the remnant liver tissue, and assuming that it is insufficient; a procedure that involves ligation of portal branches of RL and CL, in addition to portal branch ligation that irrigates the LL and the left portion of ML was designed, being this portion homologous to human IV segment. Thus, there is only portal perfusion in the right portion of the ML, which corresponds to human V—VIII segments, equivalent 15—20% of liver. Finally, a transection is added, separating both right (remnant liver) and left portion of median lobe.

Results: This technique was performed completely or partially (only ligatures, transection or laparotomy) in n = 102 Sprague Dawley rats (200—230 g) with 8.82% perioperative mortality (9/102). In rats subjected to ALPPS procedure, the remnant liver mass to body weight ratio increased from 0.0087 ± 0.0006 to 0.0251 ± 0.002 in 7 days after surgery (p < 0.001).

Conclusion: It is feasible to perform a microsurgical experimental model of ALPPS in rats with low mortality. The capacity to induce regeneration in the liver remnant, allows to obtain samples for histological and molecular studies. FONDECYT 1130274.

V20

PERFUSION SYSTEM IN EX-VIVO MODEL FOR THE ACQUISITION OF SKILLS IN LAPAROSCOPIC HEPATECTOMY

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Objective: Laparoscopic approach for liver surgery is increasingly frequent. However, the learning curves are long due to other relative low volume of patients who undergoing this procedure and the technical difficulty produced mainly by the liver anatomy. To the date training programmes have been proposed based on models using live animal anesthetized, with important ethical limitations. For now it’s not possible to train liver surgery in laparoscopic training boxes. Develop a high fidelity and low cost model for the acquisition of skills in laparoscopic liver surgery using a training box.

Methods: An ex-vivo model of sheep liver was created, blood vessels irrigated artificial blood through an infusion pump. Experts and surgery residents performed vascular control and parenchymal transection as is described for a patient. The procedure begins with the dissection and control of the hepatic hilium; where the critical step is the identification of the left portal vein as it has intrahepatic path. Also they control the bile ducts and the left hepatic artery. The model allows to delineate the limits to resect with monopolar and then the hepatic transection is done with and harmonic scalpel, Kelly-clasias and vascular control with ligation and/or clips. Finally the left hepatic vein is sectioned with a stapler completing the transection.
Intentionally vascular structures are sectioned to demonstrate simulated bleeding.

**Results:**

**Conclusion:** The training model proposed is high fidelity, low cost and easily implemented, compared to the training with live animals. Its diffusion and implementation in different simulation centres could be a promising tool for training surgeons.

V21

**DEMONSTRATION OF A HEPP-COUINAUD ROUX-EN-Y HEPATICOJEJUNOSTOMY FOR AN E3 BILIARY INJURY**

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**Objective:** To review our step wise approach to the work-up, surgical management, and operative repair of an E3 biliary injury.

**Methods:** We prepared a video case presentation of a 47 year old female presenting from a rural hospital with a suspected biliary injury. Work-up revealed mild leukocytosis, stable vital signs, and intact vascular perfusion to the liver with a well contained bile leak. She was taken to the operating room for repair within 24 hours of her initial injury.

**Results:** An E3 biliary injury was identified and a Hepp-Couinaud roux-en-y hepaticojejunostomy reconstruction was performed. The patient did well and has resumed normal activities.

**Conclusion:** When assessing biliary injury the surgeon should consider the timing of repair relative to the injury, assess for vascular perfusion of the liver, define the patient’s anatomy, determine the extent of biliary injury and evaluate the quality of the tissues. We use this step wise approach for the evaluation and operative repair of biliary injuries.