

PG-01

## **LIVER ANATOMY FOR RESECTION – CLINICAL APPLICATIONS**

S. Orloff

Abstract not available at time of publication.

PG-02

## **PHYSIOLOGY OF LIVER BLOOD FLOW**

L. Weinberg

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The hepatic circulation is unique among vascular beds. This lecture outlines the physiological mechanism and regulation of hepatic blood flow and the physiological consequences hepatic circulatory disruption.

PG-03

## **LIVER REGENERATION, HYPERPLASIA, HYPERTROPHY AND ATROPHY: CLINICAL IMPLICATIONS**

T. M. Van Gulik

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Regeneration of the remnant liver is our most important ally in liver resection. Procedures as resection after portal vein embolization and two-stage liver resection are only possible when liver regeneration is efficient. During regeneration, the liver parenchymal cells divide at an increased rate leading to an increase of the number of cells, of which the technical term is hyperplasia. This will lead to growth, ie increase in volume of the regenerating (part of the) liver, termed hypertrophy. The reverse occurs in atrophy of the liver which results in a loss of liver volume. Atrophy usually is the result of hepatocellular necrosis or apoptosis.

Liver regeneration is induced when the metabolic demands of the organism exceed the existing liver parenchymal mass. A surplus is taken in account as after a standard right hemihepatectomy (segm5–8), regeneration of the remnant liver is efficient although not a critical proportion of total liver mass has been removed (i.e. 55–65% in a healthy liver). Atrophy is induced by some form of damage to the liver, be it toxic or because of decreased blood supply. Clinically, atrophy of (part of) the liver is seen after longstanding biliary (segmental) obstruction. The interplay of atrophy and hypertrophy is evidenced with portal vein embolization, resulting in atrophy of the embolized liver lobe, at the same time inducing a compensatory hypertrophy of the non-embolized, future remnant liver. The mechanisms governing hyperplasia and hypertrophy on the one hand, and necrosis (apoptosis) and atrophy on the other hand, are not well understood.

PG-04

## **SPECIFIC PROBLEMS OF THE CIRRHOTIC PATIENT UNDERGOING SURGERY**

B. N. J. Thomson

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Hepatic surgery in the presence of cirrhosis is more complex due to a number of factors, with an increased risk of hepatic failure, morbidity and mortality. The main concern is impairment of the liver's ability to regenerate following hepatic resection. Functional liver remnant following surgery can be as little as 20% in the normal liver however in advanced cirrhosis even minimal resection can lead to hepatic failure and death. Various grading systems exist for cirrhotic patients which include the Childs-Pugh classification and Model for End-stage Liver Disease (MELD) score. MELD scores of >9 are associated with an increased mortality following hepatic resection. These provide some prognostic value but offer only gross assessment of hepatic function. Indocyanine green retention at 15 minutes (ICG R 15) can also be useful in evaluating hepatic function and predicting hepatic failure following resection.

Another problem in cirrhotic patients is that hepatic transection is problematic due to fibrosis of the liver. Most transection techniques rely on the ability to fracture the soft hepatic parenchyma leaving the vascular and biliary structures on view. This can lead to an increase in blood loss and subsequent increase in the risk of failure of regeneration of the hepatic remnant. The presence of portal hypertension also increases the risk of bleeding, morbidity and mortality. In the post-operative period ascites can also be problematic particularly if spontaneous drainage though the surgical incision occurs.

PG-05

## **IMAGING IN SURGICAL LIVER CONDITIONS**

R. N. Gibson

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Melbourne, Australia*

The learning objectives are to understand the capabilities and limitations of current imaging modalities in liver surgery. The emphasis is on the role of ultrasound, CT, and MRI as they relate to

- detection and characterization of focal liver disease
- demonstration of liver and biliary anatomy and variant anatomy
- demonstration of vascular relationship to, or involvement by, focal liver pathology

PG-06

**CRITICAL CARE POST OPERATIVE ISSUES FOLLOWING LIVER RESECTION**R. T.-P. Poon

Abstract not available at time of publication.

PG-07

**LIVER INFECTIONS**R. M. Joshi*T.N.Medical College & Nair Hospital, Mumbai, India*

Liver comprises one-third of the RES and as recipient of both the portal and systemic circulation, plays an important role in host defense against invasive microorganisms. Because of its role as a filter, it is exposed to many systemic infectious pathogens and these may affect the liver depending on the characteristics of the pathogen.

Pathogens causing liver infections are classified as hepatotropic and non-hepatotropic and further as viruses, bacteria, protozoa, fungi and parasites. Effect of pathogens can vary greatly, presenting with a wide variety of manifestations like asymptomatic increase in aminotransaminase, hepatitis, abscess, cyst, acute liver failure, hepatic fibrosis and cirrhosis. In the global context liver infections are more common in the tropics and the disease spectrum includes amoebic or pyogenic abscess, hepatic TB, hepatic hydatosis, recurrent pyogenic cholangitis/hepaticolithiasis (due to ascariasis/liver-fluke), PHT due to schistosomiasis, cirrhosis due HBV/HCV and hepatitis due to yellow fever or dengue.

Liver infections are common in the tropics due to a wide variety of factors. However, tropical hepatic disorders are no longer restricted to the tropics as globalization & intercontinental migration have altered disease dynamics. HIV/AIDS & increase in organ transplants have led to a new population at risk for liver infection. EBV, CMV, HSV associated hepatitis are more common in liver transplant patients.

Liver infections from a surgeon's perspective are discussed in the presentation with special emphasis on liver abscesses. These infections have evoked considerable concern & continuous research due to its frequency & complications but emphasis should be on preventive measures.

PG-08

**MORTALITY AND MORBIDITY FOLLOWING LIVER SURGERY – DEFINING AND ASSESSING RISK FACTORS**R. Padbury*Flinders Medical Centre, Bedford Park, SA, Australia*

The mortality of post-liver resection in the current era is in the vicinity of 1–2%. Some higher risk groups can be easily identified – cirrhotics and jaundiced patients. The mortality in these two groups is significantly higher.

The risk of liver resection predominantly relates to the extent of the resection and the characteristics of the liver parenchyma. The larger the resection and the more compromised the liver parenchyma, the higher the risk.

The risk is greatest in cirrhotics with portal hypertension but when compared with normal parenchyma, fibrosis, steatosis and steatohepatitis also increase the risks. The ICG15

excretion is the most widely used and valuable test for calculating risk and estimates the largest volume of liver which can be resected with a reasonable margin of safety. Simple CT volumetry and estimation according to CT characteristics of the parenchyma can also be used with acceptable accuracy.

Preoperatively selective portal vein embolization has been effectively applied to increase the size of the remnant and decrease the risks of liver surgery.

Intraoperatively ischaemia reperfusion injury to the liver may increase the risk. Intermittent clamping is safer than continuous with respect to the extent of injury.

Postoperative morbidity ranges from 15–30% of patients depending on the patient population. Postoperative morbidity is important, as a number of institutions have reported significantly inferior long-term outcomes in patients who experience postoperative complications compared to those who do not.

Significant postoperative morbidity is liver dysfunction/failure, haemorrhage, bile leak and abscess formation. Generally the risks of complications are higher with larger resections and compromised parenchyma. Concomitant procedures such as bowel resection also increase the risk of significant complications and particularly septic complications.

PG-09

**TECHNIQUES TO ASSESS AND MAXIMIZE THE FLR FOLLOWING LIVER RESECTION**D. Mirza

Abstract not available at time of publication.

PG-10

**STRATEGIES TO MINIMIZE BLOOD LOSS AND PREVENT HEPATIC ISCHEMIA DURING LIVER RESECTION**K. Madhavan*National University Health System, Singapore*

In most published literature on liver resection, blood loss and blood transfusion has been independent predictors of survival. Over the years, many strategies have been developed to minimize blood loss and blood transfusion and thereby favorably influence the outcome of liver surgery.

Similarly, post-resection liver insufficiency is a small but significant cause of mortality/need for liver transplantation following liver resection. This complication may catch the surgeon and patient unaware and may present even once the patient has safely been discharged after the index admission for liver resection. Many strategies have been developed to predict the capacity of the residual liver to undergo a safe liver resection. There have also been many interventional strategies like portal vein embolization and biliary drainage to try and enhance the functional capacity of the residual liver. These will be discussed in some detail.

Finally blood loss during operation and liver function post-operatively have a close relationship in that undue blood loss may compromise the functional capacity of the residual liver and measures to control blood loss like Pringle's may have its own contribution to ischemic liver damage. IVC

clamping also may result in compromise of liver function after surgery. These issues also will be addressed with available evidence from the literature.

## PG-11

### APPROACHES AND TECHNIQUES OF LIVER RESECTION

P. Jagannath

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#### 1. Mobilization:

1.1 Posterior approach: Conventional mobilization of right lobe tumor involves significant rotation with division of the falciform, right and left triangular ligaments and the dorsal ligament over IVC. In large liver tumors it may lead to IVC compression injury and to hepatic veins.

1.2 Anterior approach is advocated for large right lobe tumors and has the advantage of hepatic venous outflow being handled at the end of transection. Liver hanging maneuver facilitates anterior approach but is not always necessary.

2. Inflow control can be by the Pringles maneuver or a selective inflow occlusion. Selective clamping does not have time constraints and blood flow to remnant liver is maintained.

3. Vascular isolation: The Glissonian approach is advantageous when the tumor is located away from hilum. Individual vessels can be identified and ligated in cases of central tumors.

4. Liver transection involves two steps i) Splitting liver parenchyma ii) Securing hemostasis.

Various devices are available for transecting liver parenchyma and include digitoclasis, Kelly-clysis, CUSA and Hydro-jet. These need additional coagulation devices like bipolar forceps or hemoclips. Pre coagulation techniques include RF-HABIB 4x, Tissue link, Ligasure and Gyrus forceps. Lateral parenchymal damage and biliary leak are the disadvantages. EndoGIA staplers have also been used for liver transection and are useful for major vessels.

Fusion technique (Focus-clysis) is a combination of Kelly-clysis and Harmonic technology that combines both steps with one instrument and with minimal lateral tissue damage and equivalent outcomes compared to other transection techniques. It's a fast and advantageous.

## PG-12

### TRANSECTION TECHNIQUES OF THE LIVER PARENCHYMA

T. C. Gamblin

Abstract not available at time of publication.

## PG-13

### LIVER TRANSPLANTATION – OVERVIEW

S. T. Fan

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Liver transplantation is the most successful treatment for terminal liver diseases, including inoperable liver cancer.

Indications of liver transplantation have expanded to include metabolic disease, hepatic trauma and neuroendocrine tumor. The expanded indication is, however, not matched with the limited supply of deceased organ. Innovations to expand the utilization of deceased donor grafts included splitting of a liver graft for two adults along the mid-plane, increased use of marginal grafts and use of cardiac death donor organs. In countries with limited supply of deceased donor organs, an increased number of living donor liver transplantation (LDLT) has been seen. The recent advance of LDLT is in the adult recipient operation for which many innovative techniques have been devised to improve the outcome. Since right liver donation carries a higher risk than left liver donation, the recent trend of LDLT is development of techniques to overcome small-for-size graft injury, an inherent problem of the left liver graft. Overall, the result of LDLT is similar to deceased donor liver transplantation. A 5-year survival rate of about 80% is expected in most of the disease conditions treated by liver transplantation. The future development of liver transplantation depends on the increased deceased organ donation rate and strategies to minimize graft injury.

## PG-14

### ENDOVASCULAR THERAPIES FOR LIVER TUMORS

M. Crawford

Abstract not available at time of publication.

## PG-15

### FOCAL ABLATION FOR LIVER TUMORS: TECHNIQUES AND OUTCOMES

W. Y. Lau

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Focal ablation has now become an established treatment for liver tumors.

Local ablative therapy involves injection of cytotoxic agents or application of an energy source resulting in destruction and extirpation of tumor. The routes of ablation include percutaneous, laparoscopic or laparotomy. Liver tumors of <3 cm are generally considered as suitable for focal ablation, 3–5 cm controversial and >5 cm not suitable. The number of tumors is usually limited to <3 per session for technical reasons. The procedure-related mortality and morbidity are low.

In cohort studies, non-randomized comparative studies and randomized comparative studies, percutaneous local ablative therapy has been shown to produce survivals similar to partial hepatectomy. Amongst the local ablative therapies, radiofrequency ablation is the most promising.

The major problems of percutaneous local ablative therapy are: (1) high local recurrence rate – this problem is now being tackled with the use of SonoVue intraoperatively to assess for completeness of ablation, and a contrast CT scan at 4 weeks followed by retreatment if necessary for early detection of residual tumor; (2) technical inability to adequately treat liver tumor because of the size, location and heat sink effect when the tumor is close to a big vessel. Studies adding TACE or using a combination of percutaneous ethanol and radiofrequency ablation have been used to solve these problems.

**Conclusion:** Local ablative therapy is a promising treatment for liver cancer. The treatment is evolving and better results are expected in improvements in treatment regimens and in technology.

PG-16

### TRAINING IN LAPAROSCOPIC HPB SURGERY

O. J. Garden

Abstract not available at time of publication.

PG-17

### METABOLIC RESPONSES AND CHANGES IN CARDIOVASCULAR DYNAMICS DURING LAPAROSCOPIC SURGERY

W. S. Helton

Abstract not available at time of publication.

PG-18

### ONCOLOGICAL IMPLICATIONS OF LAPAROSCOPIC SURGERY

M. T. Cheung

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Technique of complex laparoscopic HBP surgery is demanding, and once thought to be impossible. Increasing number has been performed successfully including formal hepatectomy and Whipples operation. However, there must be no compromise in the oncological integrity.

Anatomical resection was associated with less recurrence and better survival than wedge or tumorectomy resection in hepatocellular cancer. The negative margin rate should be as good as in open resection. The lack of tactile sensation may result in difficulty for good assess of margin during laparoscopic resection. There may also be failure to detect occult lesions.

Pneumoperitoneum may associate with a higher rate of tumor seeding or port site recurrence, despite this has been dispelled by randomized trials. In laparoscopic resection, there is significant less blood loss, a factor that has been proven to be confounding variables for better long term survival. Immune response differs in laparoscopic surgery. The degree of liver mobilization during laparoscopic resection also affects perioperative shedding of circulating tumor cells.

In a largest matched comparison, Belli et al. report a 3-year disease-free survival (52% vs 59%) that was not significantly different in hepatocellular cancer resection. Many reports also showed no significant difference in positive margins or survival. For colorectal liver metastasis resection, negative margins were achieved in 94.4% of patients and overall survivals at 1, 3, 5 years were 88%, 69% and 50%. All should however recognize the possibility of publication bias with failure to publish negative events, and all data were not from randomized controlled trials.

Laparoscopic resection minimizes postoperative adhesions and morbidity, identifies favorable histologies, which

makes it a bridging procedure for cirrhotic patients with cancer to transplantation.

PG-19

### LAPAROSCOPIC HPB SURGERY – INSTRUMENTATION

C. Palanivelu

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Laparoscopic HPB Surgery has come to stay. Complex procedures such as Hetatectomy, distal pancreatectomy, pancreaticoduodenectomy, choledochal cyst excision requires proper instrumentation for safe surgery. Handling solid organs, careful handling of friableparenchyma, getting exposure if deep seated organs, haemostatic division of highly vascular parenchyma, difficulty in bloodless dissection and difficult reconstruction with precise suturing in a delicate tissue are some of the inherent problems.

Proper instruments solve most of the problems.

Currently available imaging system of High definition camera medical monitors enable clear magnified perfect imaging for precise dissection. Fan blade or blunt tipped retractors are used to manuplate the solid organ like liver. Liver and pancreas are highly vascular and friable. Dissection and division results torrential bleeding. Harmonic scalpel versatile instrument enables precise division in a bloodless manner. Using different level for different tissue is essential. Division of liver parenchyma low speed is used for division as well as hemostasis. Smaller vessels are controlled with harmonic upto 2–3 mm vessels. Little larger vessels are managed bipolar sealing, clipping and division. Rarely sutures are placed. Ligasures are used to seal and divide without clipping. Larger vessels such as portal vein main branches and hepatic veins are controlled with stapling using vascular cartridges.

Surface hemostasis is achieved by using organ plasma coagulator. Habib probes are also found to be useful to control surface oozing of blood.

CUSA-cavitation ultrasonic suction aspirator is highly useful to fragmentthe liver parenchyma without damage to tubular structures such as blood vessels bile ducts which can be clipping or ligature. Water jets also are being used in place of CUSA.

Harmonic scalpel is highly useful in precise dissection of common bile duct, pancrease particularly in the presence of increased vascularity and inflammation. This is also used to divide the CBD pancreatic duct. In Whipple's operation harmonic is set high speed in order to prevent duct sealing particularly when the ducts are thin and non dilated. In chronic pancreatitis the ducts are easily opened longitudinally to perform lateral pancreateojejunostomy. Precise suturing is highly important in reconstruction. Hepaticojejunostomy, hepaticoduodenostomy, various types of pancreateojejunostomy are performed ideal needle holders. Most of the reconstructive procedures require roux en y formation for endostapling devises are used often white cartridges are preferred.

With currently available instruments most of the procedures are performed safely and effectively.

## PG-20

**THE ROLE OF LAPAROSCOPIC AND ENDOSCOPIC ULTRASOUND IN HPB SURGERY**J. W. Chen*Flinders Medical Centre, Adelaide, Australia*

Sonographic imaging plays an essential part in management of HPB diseases. Both laparoscopic and endoscopic ultrasound are integral part of multimodality approach in management of both benign and malignant diseases.

Their roles can be essentially divided into three components for management of neoplastic diseases. First is for diagnosis followed by staging and therapeutic guidance.

**Endoscopic ultrasound**

This modality enables diagnostic characterization of pancreatic, biliary as well as hepatic lesions. It also enables FNA as well as core biopsies especially of pancreatic lesions within the resection field. For malignancy staging, this modality is indispensable for borderline resection cases where Cross Sectional imaging such as CT or MRI may not give the finite details. The best example is the role it plays in defining resectability in pancreatic head malignancies. It is also a very useful tool for staging biliary malignancies especially with respect to staging lymph node biopsies of paraaortic and portocaval nodes in gallbladder, biliary bifurcation as well as hepatic malignancies in assessing resectability.

Endoscopic ultrasound has a range of therapeutic use. The most notable is its use in therapeutic aspiration of pancreatic pseudocysts as well as stenting of pseudocyst via transduodenal or gastric wall approach. It may facilitate cannulation of bile duct in difficult cases via non anatomical approach for drainage of obstructed biliary tree.

**Laparoscopic ultrasound** is used for similar roles for diagnosis, staging as well as therapeutic guidance in HPB malignancies. It assists in defining resectability with hepatic malignancies especially in defining relationship to vital structures. It also is useful in guiding laparoscopic biopsies as well as RFA, microwave and cryoablation of hepatic tumors. Laparoscopic ultrasound is essential in staging as well as defining adequate margin in laparoscopic resection. Both endoscopic and laparoscopic ultrasound is evolving as a vital tool in management of HPB diseases. Their roles are expanding with increasing minimal invasive surgical approaches to HPB diseases.

## PG-21

**NOTES AND ROBOTICS IN HPB SURGERY**G. V. Rao

Abstract not available at time of publication.

## PG-22

**COMPARISON OF COMPLICATIONS BETWEEN OPEN AND LAPAROSCOPIC HPB PROCEDURES**R. Bryant*Royal Brisbane Hospital, Queensland, Australia*

The goal of the laparoscopic approach in HPB surgery is to avoid the pain and complications of a major laparotomy

incision while still achieving the same clinical or oncologic aims and not increasing the rate of complications specific to the procedure. The advantages of the minimally invasive technique come at the cost of altered perception and reduced dexterity. The laparoscopic approach has been used for cholecystectomy, common bile duct exploration, pancreatic pseudocyst management, palliative bypass, distal pancreatectomy and liver resection, with good published results. The possible increase in severe bile duct injuries during the early experience with laparoscopic cholecystectomy is instructive for the diligence that must be applied as the more complex laparoscopic procedures are undertaken. CUSUM and VLAD techniques are useful for real-time performance monitoring and may be facilitated by the identification of surrogate markers of the more serious complications.

## PG-23

**LAPAROSCOPIC CHOLECYSTECTOMY – PRINCIPLES OF THE STANDARD TECHNIQUE**R. Jarmin

Abstract not available at time of publication.

## PG-24

**SINGLE INCISION LAPAROSCOPIC CHOLECYSTECTOMY**P. Rao*Mamata Hospital, Maharashtra, India*

Laparoscopic cholecystectomy has become the gold standard for the treatment of symptomatic cholelithiasis in the last three decades. The Holy Grail of scarless surgery however, has remained elusive. Surgeons have tried to minimize the scars and reduce the port sites and achieve this. Mini laparoscopy and NOTES have been steps in this direction. Transumbilical cholecystectomy using standard instruments had been described but not gained popularity. This led to the search for better avenues to perform the procedure through the umbilicus. The authors have pioneered the technique of Single Incision Cholecystectomy since May 2007, using an access as an access device and trying to mimic a standard laparoscopic cholecystectomy purely through an umbilical access. Improvements in the techniques, the access devices available and various innovative curved and articulating instruments, have led to the development of Single Incision Cholecystectomy via the umbilicus, thus mimicking a standard four-port cholecystectomy in exposure, yet minimizing the scar. There are basically two techniques, one using a single incision and multiple ports and the other using an access device, which accommodates multiple instruments. Various instruments and devices available and techniques of doing this procedure using standard as well as special instruments are described in detail.

## PG-25

**APPROACHES TO THE DIFFICULT GALLBLADDER**V. Usatoff*Alfred and Western Hospitals, Melbourne, Australia*

The difficult cholecystectomy can be predicated with some accuracy in many instances. This is helpful in allocating both

theatre resources and arranging for an appropriate level of surgical expertise or supervision. Difficulty may be predicted in older male patients who are overweight, with a thick walled gallbladder and who present with acute cholecystitis. Although conversion may be appropriate in many difficult cases, especially where adequate anatomy cannot be displayed, there is a range of technical “tricks” that can minimize the need for conversion without increasing the risk of bile duct injury. To avoid misidentification of the cystic duct anatomy, a clear demonstration of Calot’s triangle by displaying the “flag technique” (French), the “critical view” (American) or the “window technique” (English) should always be the aim of safe cholecystectomy. Understanding how the techniques of blunt dissection, gallbladder aspiration, port placement, extra port utilization, intraoperative cholangiography and even subtotal cholecystectomy can be incorporated into a management algorithm is important in safely completing laparoscopic cholecystectomy. A comprehensive understanding of the anatomical variations of Calot’s triangle and an appreciation of the applications and limitations of instrumentation is also important. This presentation will combine short video presentations and a discussion of various technical “tips and tricks” to outline how to predict a difficult cholecystectomy operation and how to minimize conversion and avoid bile duct injury.

PG-26

### LAPAROSCOPIC APPROACHES TO CBD EXPLORATION – INDICATIONS, TIMING, TECHNIQUES AND OUTCOMES

L. Nathanson

Abstract not available at time of publication.

PG-27

### CURRENT STATUS OF LAPAROSCOPIC LIVER RESECTION

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Laparoscopic surgery for liver resection is a highly specialized field, because the liver, given its unique anatomical features, presents technical difficulties for surgery such as control of bleeding and bile leakage from the intrahepatic vessels. However, important technologic developments and improved endoscopic procedures are being established. Thus, laparoscopic hepatectomy has been more actively performed recently.

The extensive survey of laparoscopic liver surgery in Japan show that hepatocellular carcinoma becomes main target in laparoscopic case in liver disease. Japanese study group of liver endoscopic surgery with large volume centers was annually held from 2007. Recently, numbers of laparoscopic hepatectomy has been remarkably increasing. Furthermore, there have been reports of totally laparoscopic right and left hemihepatectomy, and laparoscopic surgery has also been applied to the living donor’s liver for transplant.

All studies show that laparoscopic liver resection is principally feasible, less invasive and may be performed safely as long as certain indications are followed. Although, prospective randomized trials (RCT) was not performed to confirm those results, it is difficult due to limitation of indica-

tion e.g. location, operative procedure and shortage of clinical cases. Multicenter study even should be done in stead of RCT.

This procedure is expected to develop further in the future as a new surgical method, which improves patients’ QOL. While it is certain that laparoscopic hepatectomy will not totally supplant open hepatectomy altogether, the laparoscopic approach in selected patients should be considered the treatment of choice.

PG-28

### APPROACHES AND TECHNIQUES FOR LAPAROSCOPIC LIVER RESECTION

N. O’Rourke

Abstract not available at time of publication.

PG-29

### MANAGEMENT OF INTRA OPERATIVE COMPLICATIONS DURING LAPAROSCOPIC LIVER RESECTIONS

G. Wakabayashi

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Three major intra operative complications during laparoscopic liver resections are as follows.

**Bleeding:** The most common intra operative complication is bleeding, despite the recent improvements in methods of sealing parenchymal vessels. Bleeding is difficult to control laparoscopically and often leads to conversion to open surgery. It may lead to post-operative complications and the need for massive blood transfusion. Massive bleeding might occur from hepatic veins and vena cava. Don’t select patients with tumor adjacent to major vessels during the learning curve phase. Laparoscopy-assisted liver resection is another way to go for those situations. Meticulous parenchymal transection is always needed to reduce the risk of bleeding.

**Gas embolism:** Laparoscopic liver resection carries an increased risk of gas embolism when compared with an open approach. Gas embolism may be caused by pneumoperitoneum. The risk of venous gas embolism can be reduced by reducing intra-abdominal pressure with less pneumoperitoneum or by using laparoscopy-assisted procedure. This potentially dangerous complication is relatively rare and is not reported as a major problem in the largest series of laparoscopic liver resection. However, several intra operative cardiac arrests were reported while using an argon beam coagulator. Do not use an argon beam coagulator at any situation.

**Tumor dissemination:** Tumor dissemination and inadequate margins are potential disadvantages of the laparoscopic approach. A comparison of survival of patients undergoing laparoscopic malignant liver tumor resection to the open approach is not established. Controversies regarding tumor cell seeding and port-site metastases in laparoscopic liver resection of malignancies persist because of limited numbers of reported patients.

## PG-30

**LAPAROSCOPIC STAGING AND PALLIATIVE PROCEDURES FOR HPB MALIGNANCIES**E. C. H. Lai*Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Chai Wan, Hong Kong SAR, China*

Patients with potentially resectable hepato-pancreato-biliary (HPB) malignancies are frequently found to have unresectable tumors at laparotomy. Staging laparoscopy is an excellent technique to assess for occult metastatic disease and locally advanced disease. It has been shown to increase the resectability. When compared with staging at exploratory laparotomy, laparoscopic staging offers reduced surgical morbidity, decreased hospital stay, shorter recovery time, and earlier administration of palliative systemic therapy. Laparoscopy is a relatively simple procedure that is both safe and well tolerated but the yield of laparoscopy can vary tremendously depending on the extent and quality of preoperative imaging and on the histological type of HPB malignancies. Therefore, some controversy exists about its role as a routine preoperative procedure. Another natural extension of staging laparoscopy is the ability to improve the quality of life for the patient with unresectable HPB malignancies by palliating the biliary and gastrointestinal obstruction and the debilitating pain, without the need for and morbidity of open laparotomy.

Optimal palliation should guarantee the shortest possible hospital stay and as long a survival as possible with a good quality of life. To take the long-term advantage provided by surgical palliation, operative procedures must be performed with acceptable morbidity and early recovery. For those patients with unresectable HPB malignancies, palliative treatment is directed at any of the three major symptoms: obstructive jaundice, duodenal obstruction, and cancer-related pain. The advantages of laparoscopic palliative treatment are those of minimally invasive surgery, such as less postoperative pain, earlier recovery, and shorter hospital stay. Laparoscopic surgery therefore has its place in the relief of biliary and duodenal obstruction, and has its advantages over open surgical bypass, endoscopic and percutaneous stenting in patients with predicted better prognosis, though these advantages ought to be confirmed in randomized controlled trials. While laparoscopic cholecystojejunostomy and gastroenterostomy have been widely reported, laparoscopic hepaticojejunostomy has been rarely described. Thoracoscopic splanchnicectomy is also beneficial in the short-to-medium term for the palliation of intractable opiate-dependent abdominal pain of locally advanced pancreatic cancer.

## PG-31

**LAPAROSCOPIC PROCEDURES FOR ACUTE PANCREATITIS – PSEUDO CYSTS, INFECTED NECROSIS, SURGERY FOR GALLSTONE PANCREATITIS**R. Carter

Abstract not available at time of publication.

## PG-32

**THE ROLE OF ERCP IN ACUTE PANCREATITIS**T. G. Wilson*Flinders Medical Centre, Adelaide, Australia*

For more than 20 years ERCP has been accepted as having a place in the management of patients with acute pancreatitis. However, its role has been under continuous scrutiny and refinement. This is not surprising, as it remains a procedure with a significant risk of its own complications, one of which is indeed causing pancreatitis.

The early studies of its use in acute pancreatitis were flawed by inclusion of cases with cholangitis where the benefit of ERCP is not controversial, but also, interpretation of results was unclear because small sample size limited analysis within the groups of patients with mild or severe acute pancreatitis. However, it was clear that ERCP did have a benefit in patients with severe biliary pancreatitis associated with cholangitis.

More recently, several meta-analyses have shown that ERCP does not have a role in uncomplicated mild acute biliary pancreatitis and have raised significant doubts over the benefit of ERCP in patients without significant biliary obstruction. Again numbers of patients included in the studies and variability in definitions of severity made it difficult to interpret the results conclusively.

A prospective multicentre study from the Dutch Acute Pancreatitis Study Group published in 2009 has provided some certainty over the role of ERCP in severe acute biliary pancreatitis associated with biliary obstruction where significant benefit in morbidity and non-significant improvement in mortality were shown<sup>1</sup>.

**Reference:**

1. van Santvoort HC et al. Early Endoscopic Retrograde Cholangiopancreatography in Predicted Severe Acute Biliary Pancreatitis. *Ann Surg.* 2009; 250: 68–75.

## PG-33

**LAPAROSCOPIC RESECTION OF THE PANCREAS**N. Masafumi*Digestive Surgery, Kawasaki Medical School, Kurashiki, Japan*

Pancreatectomy was first reported in 1898, and it is still associated with a high rate of perioperative complications.

Laparoscopic procedures for pancreatic surgery were introduced in the 1990s. The first reported laparoscopic pancreatectomy was a pancreaticoduodenectomy (LPD) in 1992. However, it is not currently a common procedure and the operative method is still being developed.

In contrast to LPD, the use of laparoscopic distal pancreatectomy (LDP) is spreading quickly. There are two important points to consider for safe and reliable LDP. The first is prevention of a pancreatic fistula, which has been a major problem since the first open pancreatectomy was performed more than 100 years ago. Among many proposed ideas, adequate compression of the pancreas prior to firing the stapler is thought to be important for fistula prevention. The second is the technique used for splenic preservation. As a benign or borderline pancreatic tumor is a good indication for laparoscopic pancreatectomy, spleen-preserving LDP is

a required procedure for laparoscopic pancreatic surgeons. This can be undertaken with splenic vessel preservation or using Warshaw's method. Preservation of the vessels is better for splenic circulation, but is complicated and challenging in laparoscopic surgery, because they are often embedded in the sulcus on the posterior aspect of the pan-

creatic body. There is, however, almost no sulcus at the pancreatic tail or around the superior mesenteric vein. Knowledge of the anatomical configuration of the pancreas is critical for vessel preservation. An overview of laparoscopic pancreatectomy will be given with special reference to these points.