Role of Laparoscopy in Surgical Liver Resection in Primary Hepatocellular Carcinoma

Essay

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General Surgery

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دور الجراحة بالمنظار فى الإستئصال الجزئى للكبد فى حالات السرطان الأولى للخلايا الكبدية

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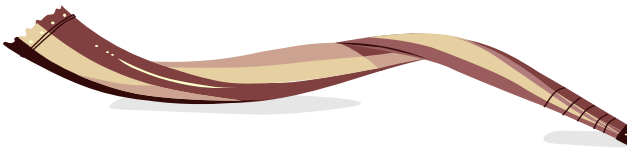

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قَالُوا سُبْحَانَكَ
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INTRODUCTION

Laparoscopic liver surgery has evolved rapidly over the past 5 years. The growing experience with these procedures has resulted in a shift in the diagnosis and therapeutic approach to common liver tumors. The fact that resection of benign and malignant hepatic masses can now be accomplished laparoscopically with relatively low morbidity has influenced the decision-making process for physicians involved in the diagnosis and management of these lesions ***(Gugenheim et al., 1996)***.

Hepatocellular carcinoma (HCC) is the third most common cause of cancer- related death worldwide and, owing to changes in the prevalence of the two major risk factors, hepatitis B virus and hepatitis C virus, its overall incidence remains alarmingly high in the developing world and is steadily rising across most of the developed world. Early diagnosis remains the key to effective treatment and there have been recent advances in both the diagnosis and therapy of HCC, which have made important impacts on the disease ***(Poon et al., 1999)*.**

The mechanism of HCC development differs according to the underlying disease.Infection with HBV can clearly lead to HCC without the intermediate step of cirrhosis, although the

majority of patients with HBV-related HCC have cirrhotic disease. Conversely, HCV-related HCC almost always arises in the setting of advanced fibrosis or cirrhosis; a direct hepatocarcinogenic role of HCV has not been clearly proven. Typically, patients who develop HCC in the setting of HBV or HCV have infection that is long-standing (i.e. more than 30 years) ***(Tong et al., 2001)*.**

Magnetic resonance imaging (MRI) is highly sensitive in distinguishing HCC from macroregenerative nodules especially with contrast Diagnostic laparoscopy and laparoscopic ultrasound should be used in preoperative staging ***(Petrson et al., 2005)*.**

Treatment options for liver cancer varies according to tumor stage. Preoperative portal vein embolization (PVE) allows safe liver resection and preoperative volumetric determination of the future liver remnant ***(Curley and Sielaff, 2006)*.**

Ultrasonography is commonly used in programs that screen high risk populations for development of Hepatocellular carcinoma and has been shown to be superior to serum alpha–fetoprotein (AFP) measurement to detect early hepatocellular carcinoma in chronic viral hepatitis .Recently investigations have been developed in detecting early hepatocellular carcinoma including: Doppler U.S and helical C.T are highly

sensitive especially dual and triple phase intravenous contrast, helical C.T can detect small liver mass less than (2cm) ***(Pateron et al., 1994)*.**

HCC can be cured by surgery if the tumor is not diffuse and the remaining liver is sufficient to maintain adequate functions. Radio frequency ablation (RFA) was recently reported to treat (HCC) ranged from 1 to 7cm by laparotomy and laparoscopic techniques ***(Curley and Sielaff, 2006)*.**

The ultrasonically activated (Harmonic) scalpel (Ethicon-Endo-Surgery, Inc, Cincinnati, Ohio)was designed as a safe alternative to electrocautery for hemostatic dissection of the tissue and was introduced into clinical use nearly a decade ago. This innovative cavitational effects provided by rapidly vibrating blade contacting various tissues. The resulting decrease in temperatures, smoke, and lateral tissue damage placed the harmonic scalpel in contrast to the effects seen with the more traditional electrocautery/cautery. In addition the elimination of inadvertent sometimes unrecognized, electrical arcing injuries with their potentially hazardous sequelae supported the role of the harmonic scalpel as a potentially safer instrument for tissue dissection. Over the past twenty years surgeons have developed new surgical procedures and techniques to firstly reduce the unnecessary resection of the liver parenchyma and to decrease intra operative blood loss ***(Curley and Sielaff, 2006)*.**

Since the clinical use of radiofrequency ablation (RFA) for human Hepatocellular carcinoma was introduced in 1996 several institutes have reported higher rates of complete necrosis with fewer treatment sessions and lower rates of local recurrence in patients treated with RFA than in those seen in patients treated with percutaneous ethanol injection therapy (PEIT), which was the first and most widely used local ablative therapy. More recently, radiofrequency ablation has become a popular method for treatment of Hepatocellular carcinoma and has been applied as an alternative primary therapeutic modality to hepatectomy in some patients with Hepatocellular carcinoma .The Surgical resection is superior to RFA in terms of local recurrence. This may be a result of the safety margin of RFA being narrower than that of surgical resection, as surgeons usually remove the entire segment containing tumors, so the clearance of tumors and any potential sites of microscopic disease will be more complete in these patients. It has been reported that intact nests of viable tumor cells can remain within an otherwise extensively necrotic HCC specimen after RFA. ***(Allgaier et al., 2001)***.

Chapter 1

HISTORICAL BACKGROUND

A discussion of the history of hepatic surgery necessitates a description of the historical consensus on the anatomy of the liver and its significance.

The Egyptians when embalming their kings, considered the liver significant enough to be carefully removed and placed, together with the other internal organs, in a separate container beside the embalmed body. Thus, the liver was considered in antiquity to be the seat of the life force: Plato believed it to be the seat of the 'organic soul' ***(Wolff, 2003)***.

The mystical elements were most prevalent in Ancient Greece, as the legend of Prometheus indicates. As we know, this story tells how Prometheus stole the secret of fire the symbol of progress, the development of creative powers, etc. from the gods, and gave it to mankind. For this Prometheus was punished by Zeus, who chained him to a rock, where, every day, an eagle fed on his liver, which, however, regenerated during the night. This martyrdom continued until Hercules finally killed the eagle. The tradition repeatedly emphasizes the intolerable pain Prometheus

had to suffer, thus underscoring the significance of the liver as the seat of salvation.

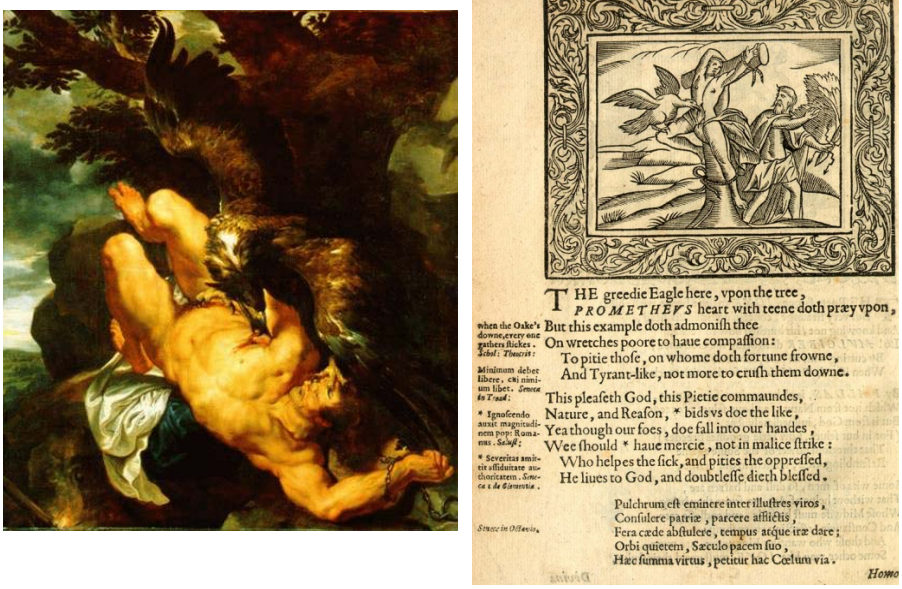

Fig. (1): Prometheus punished by Zeus, an eagle fed on his liver, which, however, regenerated during the night

New anatomical knowledge and illustrations (plates) were first published by the Italian Carpi (1470-1530), the Fleming Vesal (1514-1564), and others. These publications contained accurate descriptions of the liver, and, together with the scientific works of Harvey (1578-1656) and Glisson (1592-1656), in particular, opened up a new view of liver anatomy, which is basically still valid today ***(Wolff, 2003)*.**

Hepatic surgery in the true sense commenced in the 17"/18" centuries, as is verified by a quotation by MacPerson (England, 1688) and a report by Berta (Italy 1716) of the

successful removal of prolapsed portions of the liver following abdominal injury.

The first successful intra-abdominal liver resection in Germany was undertaken in 1886 by Karl Langenbuch. Langenbuch, born in Kiel in 1846, studied in Kiel and Berlin, Where he became director of the Lazarus Hospital in 1873. He was known to have carried out the first cholecystectomy in 1882, in the case of the partial liver resection, a so-called strangulated lobe was removed ***(Wolff, 2003).***

Fig. (2): Karl Langenbuch.

A detailed case report is also available from Luis of Italy (1886), who removed a pedicled liver tumour the size of a child's head from a 67-year-old man. However, control of the vessel stump did not succeed, and the patient succumbed to

haemorrhage 6 hours after the operation. In the USA the first liver resection was carried out by William Williams Keen in 1891 at the Jefferson Medical College in Philadelphia; this was the successful removal of a pedicled cystadenoma of the liver.

But these successful surgical outcomes should not obscure the fact that great difficulties were encountered in such resections. In particular the danger of exsanguination, and excessive blood loss, were factors limiting the number of liver resections and responsible for the high risk entailed. The search for an effective method of haemostasis began. The suggestion by Pringle in 1908 of reducing bleeding through digital occlusion of the hepatoduodenal ligament in cases of severe liver rupture, thus facilitating management, deserves particular mention ***(Fronter and Blumgart, 2001)***.

Francis Glisson of Cambridge first described the segmental anatomy of the liver in 1654 but this work remained largely forgotten for nearly 300yrs. Until a new arrangement of the right and left lobes of the liver and further refined our understanding of lobar anatomy. Probably the most important anatomical contribution to modern liver surgery comes from the work of Claude Couinaud, who in 1957 described his eight segments liver model based on portal venous inflow and hepatic venous outflow. Based on these segments the modern hepatic surgery evolved into various techniques and approaches and permitted more resection potentials for many