Laparoscopic Versus Open Cholecystectomy in Cirrhotic Patients

An Essay

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List of Abbreviations

ERCP	:	Endoscopic Retrograde Cholangiopancreatography
EUS	:	Elastography. Endoscopic ultrasonography
GRS	:	Gallbladder Radionuclide Scan
HIDA	:	Hepatobiliary Iminodiacetic Acid Scan
HRS	:	Hepatorenal syndrome
INR	:	International normalized ratio for prothrombin time
LC	:	Laparoscopic cholecystectomy
LSC	:	Laparoscopic subtotal cholecystectomy
MELD	:	Model for End-Stage Liver Disease
MMP	:	Matrix metalloproteinases
MRC	:	Magnetic Resonance Cholangiography
MRI	:	Magnetic resonance imaging scan
OC	:	Open cholecystectomy
OR	:	Odds ratio
PT	:	Prothrombin time
rFV11a	:	Recombinant factor V11
SIC	:	Small incision cholecystectomy
TIMP	:	Tissue inhibitors of metalloproteinases

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Introduction

Liver diseases are always considered risk factors in operations due to increase risks of complications and sometimes can even be the cause of death. Liver decompensation is also one reason why clinicians are hesitant to recommend surgeries due to the possible occurrence of abnormal clearance of proteins, abnormal excretion, ascites and portal hypertension. There are also factors being considered such as the patients Child-Pugh score, the length and extent of the surgery as well as postoperative complications ***(Al-Mulhim 2011)***.

Cirrhotic patients may also have other complications like bleeding disorders, platelet deficiency, hypo-albuminemia, ascities and portal hypertension. Also the liver may be enlarged or shrunken with fibrosis making it harder and difficult to retract ***(Sajid and Misbah 2012)***.

Gallstones are one of the major causes of morbidity in western society. In many persons gallstones remain asymptomatic. Treatment is required only in persons with symptomatic gallstones. Prevalence of persons with asymptomatic and symptomatic gallstones varies between 5% and 22% in the USA, and the total estimated number of people with gallstones is 20 million (based on 290 million inhabitants). Prevalence of persons with asymptomatic and symptomatic gallstones in Europe shows similar distributions varying between 25 and 50 million persons (based on 500 million inhabitants in 32 countries). It is estimated that the yearly incidence of symptomatic cholecystolithiasis is up to 2.2 per thousand inhabitants ***(Keus et al. 2010)***.

The incidence of gallbladder stones in liver cirrhosis patients is two-fold higher than the estimates for the general population ***(Wang et al. 2014)***.

Cholecystectomy is one of the most common abdominal surgical procedures in developed countries. Since its introduction in the late 1980s, laparoscopic cholecystectomy (LC) has replaced open cholecystectomy (OC) as the treatment of choice for symptomatic gallstones ***(Agabiti et al., 2013)***. Beneficial effects of LC have been demonstrated in studies showing the advantages from real-life settings using secondary databases ***(Giger et al. 2011)***.

Considering the significant intraoperative blood loss that accompanies portal hypertension, liver cirrhosis was classified as a contraindication to laparoscopic cholecystectomy (LC) in the early 1990s ***(Gupta 2011; Wang et al. 2014)***.

Cirrhotic patients are often treated with operative interventions when they suffer from concomitant late stage gallbladder disease, which had led to severe chronic cholecystitis. Consequently, in addition to the risks associated with liver cirrhosis itself, the woody and friable gallbladder tissue has represented a challenge to surgeons during LC. Bearing in mind that the periumbilical collaterals and the falciform ligament might be sources of bleeding in these patients, the trocar for laparoscopy is recommended to be placed in the lower umbilicus ***(MacHado 2012)***.

Beneficial effects of the laparoscopic approach versus traditional open surgery for the treatment of

gallstones come from various randomised controlled trials ***(Keus et al. 2010)***. They found significant shorter hospital stay and quicker convalescence associated with LC but no differences in mortality, complications and operative time between the two procedures ***(Agabiti et al. 2013)***.

The Child-Pugh score is used to evaluate and assess the condition of a patient with liver disease as well as predict mortality during surgery. Nowadays it is also used to establish the prognosis and the required treatment for the disease. Another recent assessment tool is the Model for End-Stage Liver Disease (MELD), a scoring system for assessing the severity of chronic liver disease. This system uses the patient's values for serum bilirubin, serum creatinine, and the international normalized ratio for prothrombin time (INR) to predict the patient's survival after surgery ***(Al-Mulhim 2011)***.

Cholecystectomy, both open and laparoscopic, has a high complication rate in patients with cirrhosis. Until recently, the Child-Pugh score has been used to predict the risk of death and complications for both hepatic and nonhepatic procedures in patients with cirrhosis. MELD score has been recently introduced and used: (1) to predict survival in cirrhotic patients receiving transjugular intrahepatic portosystemic shunt, (2) to determine priority on the waiting list for liver transplantation, and (3) to predict postoperative outcome of cirrhotic patients undergoing surgical procedures ***(Delis et al. 2010)***.

In cirrhotic patients with symptomatic cholelithiasis, the videolaparoscopy is an effective and safe procedure and can be indicated as the first

choice to attain clinical resolution ***(Bernardo and Aires 2011)***.

The advantages of laparoscopic cholecystectomy in cirrhotic patients are decreases in postoperative infections, haemorrhaging, transfusion rates, liver failure and mortality rates. Minimally-invasive surgery should be the preferred initial choice in compensated cirrhotic patients with cholelithiasis ***(Neri et al. 2013)***.

Aim of the work

The aim of this work is to compare the use of laparoscopic and open surgical technique cholecystectomy in cirrhotic patients.

Liver Cirrhosis

I. HISTORICAL REVIEW:

Aretaeus (2nd century AD) coined the term "skirros", because he thought that inflammation of the liver led to its hardening (skirros). In 1543, Vesal described the granulation of the liver surface as being responsible for the compression of the small hepatic vessels. Even at that time, he associated these changes, which were thought to accompany a shrinking of the liver, with alcohol consumption. When Posthius, (1590), described ascites, he said that the changed liver was "all granulated inside". A drawing by Brown, (1685), shows coarse nodular liver cirrhosis. Morgagni, (1761), also wrote a treatise on cirrhosis, in which he described the small vessels as being compressed due to a shrinking and hardened liver. Baillie, (1818), wrote an excellent description of the morphology of liver cirrhosis and, like Vesal, also postulated a causal connection with excessive alcohol consumption. The first accurate report on atrophic, portal cirrhosis was given by Laennec, (1819), as an incidental inclusion in his book «Traité d'auscultation». Because of the yellow color of the liver (kirros), he coined the term cirrhosis. The first microscopic examinations were carried out by Kiernan, (1833), Carswell, (1838) and Hallmann, (1839). Frerchis differentiated between two stages of the cirrhotic course: stage of inflammation and stage of shrinking with formation of nodes. In 1911 Mallory defined cirrhosis as a "chronic, destructive, progressive process" with regeneration, accompanied by scarring and shrinking of the connective tissue.

Ghon, (1928), recognized the transformational processes in the liver as being an essential feature of cirrhosis. In 1930 Rössle provided a morphological definition of cirrhosis by stating three criteria: ① destruction of liver parenchhhyma, ② connective tissue proliferation, and ③ nodular compensatory hyperplasia together with regeneration of liver parenchyma. In the following years, a 4th criterion was added: ④ disturbance of the intrahepatic vascular system with consecutive formation of arteriovenous and portovenous anastomoses (Thaler, 1952, 1957, 1968; Popper et al., 1958; Anthony et al., 1977; Rappaport, 1980) ***(Kuntz and Kuntz 2008)***.

II. DEFINITION:

Cirrhosis is a gradually developing, chronic disease of the liver which always involves the organ as a whole. It is the irreversible consequence and final stage of various chronicliver diseases of different etiology or the result of long-term exposure to various noxae. The extent of the morphological changes depends on the cause and stage of cirrhosis. Accordingly, there is a wide spectrum of morphological findings and clinical symptoms. The variations of this disease range from symptom-free conditions, non-characteristic complaints and different laboratory findings through to life-threatening complications ***(Kuntz & Kuntz 2008)***.

Since, in most cases, no clear dividing line can be drawn between cirrhosis and the preceding liver disease, it is difficult to determine the exact point at which the cirrhotic stage begins; the transition is fluent. Localized transformation