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Case Report

Safety of Laparoscopy in Patients with Advanced Liver Cirrhosis: Case Report and Literature Review

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Abstract

Liver cirrhosis was previously considered as an absolute contraindication to laparoscopic surgery because of its associated coagulation defects, portal hypertension, and nutritional disorders. Recently laparoscopy is being used increasingly in the diagnosis and treatment of patients with liver cirrhosis because of introducing low risks anesthetic agents and drugs, and less invasive surgical techniques. At present, it is well established that although the risk of laparoscopy in cirrhotic patients, is real, it is not significant enough to contraindicate the procedure. Laparoscopic surgery in patients with advanced liver cirrhosis is have been discouraged because of the high morbidity and mortality. We report a case of advanced cryptogenic decompensated liver cirrhosis who had laparoscopic retrieval of the intra-abdominal foreign body without postoperative complications or deterioration of his liver functions. We also review the literature for the safety of laparoscopy in patients with advanced liver cirrhosis.

Keywords: laparoscopy; liver cirrhosis; emergency surgery

Introduction

Since the first report of successful laparoscopic cholecystectomy in cirrhotic patients in 1993, the safety of laparoscopic surgery in patients with liver cirrhosis was intensively investigated. Although the safety of laparoscopic surgery in patients with Child's grade A and Child's grade B liver cirrhosis was well studied and reported, unfortunately, the safety of laparoscopic surgery in patients with Child's grade C is colored by the data from the era of open surgery and was not well studied with only few cases reported literature. The common consensus is that elective surgery is safe and permissible in patients with Child's class A and Child's class B cirrhosis, and almost formidable in patients with Child's class C cirrhosis except in life-saving situations. We report a case of 72 years old man with hepatic encephalopathy secondary to advanced cryptogenic decompensated liver cirrhosis with Ascites, low plasma albumin, and platelet count, elevated bilirubin, and deranged liver enzymes together with disturbed coagulation profile, who had a (dilator of a paracentesis set) inadvertently introduced in his abdomen during attempts of peritoneal tapping. Trials of ultrasound and fluoroscopic guidance retrieval were failed. The patient had laparoscopic exploration under general anesthesia with successful removal of the tube without postoperative complications.

Case Report

A 72-year-old man was admitted to the medical ward with hepatic encephalopathy secondary to advanced cryptogenic decompensated liver cirrhosis with Ascites. He was known as a case of hepatitis B and hypothyroidism on Levothyroxine 50 mcg daily, Spironolactone tablet 50 mg daily and furosemide tablet 20 mg daily. He had no other medical disease and no surgery before. On admission, he was dehydrated, confused but vitally stable. Abdominal examination revealed a distended abdomen with a reducible paraumbilical hernia and shifting fluid dullness. Laboratory investigation revealed low hemoglobin 9.2gram%, low plasma albumin (22gram/100ml), normal WBCC6.6X10^9/L, low platelet count(66x10^3/ml), elevated bilirubin and deranged liver enzymes (bilirubin T 64.4 mmol/L- creatinine kinase 243umol/L– LDH 288 and AST 39U/L) together with disturbed coagulation screen (Prothrombin time 6.9 seconds – INR 1.44 and PTT 41.5 seconds). Paracentesis was attempted at a peripheral hospital, with drainage of 3 liters of ascetic fluid. During the procedure, the dilator was much advanced over the guidewire and lost inside the abdomen. The patient was referred for further management. An immediate x-ray of the abdomen showed the tube within the abdomen (figure 1).

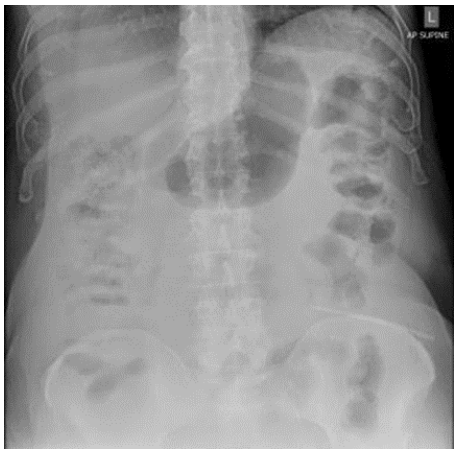

Figure 1: showing the tube within the abdomen lying just above the left iliac crest with its deeper part crossing and lying medial to the descending colon (the arrow).

Trials of ultrasound and fluoroscopic guidance retrieval were failed (figure 2&3). The patient had laparoscopic exploration under general anesthesia with successful removal of the tube. During laparoscopy, the insufflation pressure was kept as low as 8 mm of Hg and only two 5 mm trocars were used, one for 5 mm camera immediately above the umbilicus and another one in the right iliac fossa halfway between the umbilicus and anterior iliac spine. Postoperatively the patient made uneventful recovery without complications or deterioration of his liver functions.

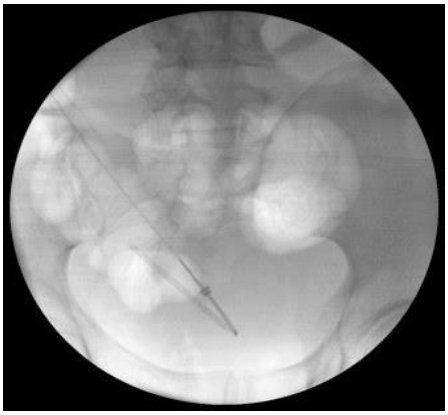

Figure 2&3: The attempts of fluoroscopic guided retrieval. The bowel was delineated by administration of oral contrast. The tube was successfully caught by the snare but was found fixed and difficult to be pulled out (the arrow).

Figure 3: lateral view showing the same findings of figure 2 (the arrow).

Discussions

Until recently, liver cirrhosis has been considered to be an absolute or relative contraindication of laparoscopy, however introducing low risks anesthetic agents and drugs, less invasive surgical techniques have made surgery possible for patients in extreme conditions [1].

The increased morbidity and mortality of surgery in patients with liver cirrhosis is well documented (2-4). The consensus is that elective surgery is permissible in patients with Child's class A, and Child's class B cirrhosis and contraindicated in patients with Child's class C cirrhosis [5, 6].

Traditionally elective surgical procedures in patients with advanced liver cirrhosis have been discouraged because of the high morbidity and mortality which includes thrombocytopenia, coagulopathy, ascites, portal hypertension, and renal failure, in addition to increased risk of postoperative liver decompensation and possible impairment of wound healing due to frequent bad nutritional state of the patients [7-9].

In the absence of liver diseases, the majority (70%) of the hepatic perfusion is provided by the portal vein, which contributes 50% of the organ's oxygen demand. The other 50% is provided by the hepatic artery, which makes up around 30% of total liver perfusion [10]. Hepatic arterial blood flow is autoregulated according to the organ metabolic demands, whereas the portal vein blood supply depends on the perfusion throughout the whole gastrointestinal tract and the spleen [10, 11].
Apart from the risk factors associated with advanced liver cirrhosis as coagulopathy and hypoalbuminemia, liver cirrhosis associated with a lack of maintenance of the reciprocal flow relation between the hepatic artery and the portal vein. (The ability of the hepatic artery to provide more oxygen supply by vasodilating during periods of reduced portal inflow described by Hanson and Johnson) [12, 13] together with the liver architecture disturbance by fibrosis and regenerative nodules which makes the cirrhotic liver more prone to ischemia [13]. The already disturbed pattern of liver blood flow in the cirrhotic liver usually gets worse by a sudden increase in the intra-abdominal pressure (IAP) which may occur with carbon dioxide insufflation in laparoscopic surgery.

Luca A et al [14] studied the effect of a sudden increase of the intraabdominal pressure by 10 mmHg for half an hour in 14 patients with portal hypertension they observed that such an increase in the (IAP) leads to a reduction in hepatic blood flow by 20%. Similarly, Al-Dorzi et al [15] observed the same findings of reduction of abdominal perfusion pressure with increased intra-abdominal pressure in cirrhotic patients.

Many authors [16-18] reported a decrease of hepatic arterial blood flow, portal venous blood flow and indocyanine green (ICG)-PDR clearance (quantitative assessment of hepatic function) during intra-abdominal hypertension.

The risks factors associated with surgery in patients with liver cirrhosis warrants special perioperative attention to many factors including the nutritional status of the patient, fluid and electrolyte balance, control of ascites, excluding preexisting infections, correction of coagulopathy and thrombocytopenia, and avoidance of nephrotoxic and hepatotoxic medications [19].

During the era of open surgery, before the introduction of laparoscopic surgery, some authors considered cholecystectomy in cirrhotic patients is a formidable operation due to high mortality related to complications of liver disease such as hepatic encephalopathy, ascites, sepsis and hemorrhage [2].

Franzetta M et al [20] in a retrospective analysis (from 1992 to 1999) of 40 patients with cirrhosis who underwent non- Hepatic surgical procedures observed that the presence of tense ascites, low albumin value, deranged prothrombin time and activated partial thromboplastin time, together with the emergency of the Operation, were significantly correlated with a mortality of 7.1% in Child's class A, of 23% in class B, and 84% in class C.

Garrison et al. [21] similarly noted that the post-operative mortality, both in elective and in urgent procedures in patients with liver cirrhosis, increased with the severity of the patient, stratified by Child's criteria (death of 10%, 31% and 76% in Child's class A, B, and C, respectively).

During the dissemination of laparoscopic cholecystectomy (LC) technique, concern about the safety of the procedure in cirrhosis was colored by such data from the era of open surgery [22], however introducing low risks anesthetic agents and drugs, less invasive surgical techniques have made surgery possible for patients in extreme conditions [23].

In the past, liver cirrhosis was considered to be an absolute or relative contraindication of LC. Subsequently, many papers were published investigating the safety of laparoscopy in patients with liver cirrhosis undergoing LC most probably because gallstones are the most common problem in patients with liver cirrhosis presents them for surgery. It was estimated that gallstones are twice as common in cirrhotic patients as in the general population with an increase in the prevalence in viral hepatitis and surgeons are more frequently encounter cirrhotic patients with symptomatic gallstones [24,25,26].
Surgery is performed in patients with liver cirrhosis more frequently now than in the past, in part because of the long-term survival of patients with cirrhosis [6].

Although LC has been proven safe and feasible for symptomatic gallstones, its role in cirrhotic patients remains controversial [27]. The first report of the safety of LC in cirrhosis was published by Yerdel et al [28] in 1993. He reported successful LC without complications in four cirrhotic patients with clinical portal hypertension in three of them and mild to the severe bleeding tendency in all of them.

Morino et al [1] reported that they performed thirty-three laparoscopic cholecystectomies in patients with cirrhosis between March 1990 and March 1997 without morbidity or mortality and with a conversion rate of 6% (2/33). They believe that their result favors the laparoscopic approach in comparison to open approach, together with the advantage laparoscopic approach in reducing the risk of viral contamination (hepatitis B virus, hepatitis C virus, or human immunodeficiency virus) of the surgical staff.

Sleeman D et al [29] reviewed retrospectively the records of 25 consecutive LC procedures performed on Child's Class A and Child's Class B cirrhotic patients from May 1992 to July 1996. All the procedures were completed laparoscopically without mortality with 32% morbidity in the form of wound hematomas, pneumonia, and ascites. They concluded that LC can be performed safely in cirrhotic patients with well-compensated liver function.

D'Albuquerque LA et al [23] also reported that they performed LC in 12 cirrhotic patients (eight Child's A and four Child's B) without mortality however postoperative complications occurred in four patients (25%), which include renal failure, diabetic impairment, hematoma with ascetic leakage through the wound, and wound abscess. They concluded that LC was safe and well-tolerated by selected cirrhotic patients (Child's class A and B) with a clear indication for surgery.

Poggio JL et al [30] retrospectively compared between LC and open cholecystectomy in patients with compensated cirrhosis in 50 patients who underwent cholecystectomy for symptomatic gallstones (24 patients underwent open cholecystectomy and 26 patients underwent LC) with conclusion that LC can be performed safely in patients with Child's Class A and B cirrhosis and with advantage of LC over open surgery in term of morbidity, operative time, and hospital stay.

Puggioni A et al [31] in their extensive search of the literature for LC in cirrhotic patients retrieved twenty-five publications with a total number of 400 patients with cirrhosis undergoing LC in the period from 1993 to 2001. They observed worse outcomes in terms of conversion rate, operative time, bleeding complications, and overall increased morbidity in cirrhotic patients compared with non-cirrhotic patients. In comparing the laparoscopic approach to the open surgical approach in cirrhotic patients, they observed that the laparoscopic approach offers advantages of less blood loss, shorter operative time, and shorter length of hospitalization in patients with cirrhosis

Similarly, Machado, et al [32] in their extensive Medline search of major articles in the English literature on LC in cirrhotic patients over 16 years from 1994 to 2011 identified a total number of 1310 cases. They reported an overall conversion rate of 4.58%, morbidity 17%, and mortality 0.45%. with most death occurred among Child's class C and concluded that LC in cirrhotic patients is associated with a higher complication rate than in no cirrhotic patients, however, improvements in operating skills, equipment, and accumulating experience in performing LC in difficult conditions over the years have made LC in cirrhotic patients a safe proposition when used judiciously.

Although many authors [33-36] reported the safety of LC in patients with Child's class A and B liver cirrhosis, unfortunately, the safety of laparoscopic surgery in patients with Child's grade C was not extensively investigated, most properly due to the fact that most surgeons prefer to treat those patients conservatively except in life-saving situations.

The mortality rates of surgery in patients with Child's class C cirrhosis vary from one series to another in the literature. Two of the most important studies (6, 21) with a considerable gap of time between them, reported nearly identical results of mortality rates 76–82% for surgery in patients with Child's class C cirrhosis [37]. Another two recent series reported mortality rate as high as 50% to 83% (31, 34), although a larger meta-analysis reported mortality of 17.1% in the same class of patients [32].

Wu CC et al [38] reported high mortality of emergency operation in patients with Child's class C in comparison with those with classes A and B therefore, recommending that definitive biliary surgery can selectively be carried out in cirrhotic patients in Child's class A and class B. However, a conservative approach is more suitable in Child's class C patients in emergency conditions and definitive procedures should be considered when their liver function improves.
Similarly, Curro et al [34] compared 38 Child-Pugh's class A and B patients to 4 Child-Pugh's class C patients who had LC. They found a morbidity rate of 26% in Child-Pugh's class A and B and 75% in class C patients. The authors advised that surgery in Child-Pugh's group C patients should be avoided as much as possible except in emergency situations.

Conclusion

The increased morbidity and mortality of surgery on patients with advanced liver disease are well documented. Until recently, cirrhosis has been considered to be an absolute or relative contraindication for laparoscopic cholecystectomy however many studies confirmed the safety of laparoscopy in patients with liver cirrhosis (Child's class A and B liver cirrhosis). Unfortunately, the risk of laparoscopic surgery in patients with advanced liver cirrhosis (Child's class C) was not well studied and colored by data from the era of open surgery. The few published papers and series suggest high morbidity and mortality and advocate avoidance of surgery in this group of patients unless it is lifesaving. We encourage reporting all cases of laparoscopic procedures in this group of patients to establish a database for future analysis and conclusions.

Conflict of Interest: None declared.

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