Laparoscopic cholecystectomy in cirrhotic patients with symptomatic cholelithiasis

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Background
Gallstones are twice as common in cirrhotic patients as in the general population. Although laparoscopic cholecystectomy (LC) has become the gold standard for symptomatic gallstones, cirrhosis has been considered an absolute or relative contraindication. Many authors have reported on the safety of LC in cirrhotic patients. We reviewed our patients retrospectively and assessed the safety of LC in cirrhotic patients at our unit of Zagazig University Hospital.
Patients and methods
From January 2014 to December 2016, a total of 200 patients underwent LC for symptomatic gallstone disease. All the cirrhotic patients with Child–Pugh class A and B cirrhosis undergoing LC were included in the study. Cirrhosis was diagnosed based on clinical, biochemical, ultrasonography, and intraoperative findings of the nodular liver and histopathological study.
Results
Of the 200 patients undergoing LC, 20 (10%) were cirrhotic. Of these 20, 12 (60%) were Child's group A and eight (40%) were group B; 65% had hepatitis C, 5% had hepatitis B, 20% had combined C and B hepatitis, and 10% were had hepatitis. Preoperative diagnosis of cirrhosis was possible in 90% of cases, and 10% were diagnosed during surgery. The morbidity rate was 20% and no mortality was seen. One patient had hemorrhage, one patient developed postoperative ascites, one patient showed wound infection, and another one had trocar site hematoma. The mean hospital stay was 2.9±0.1 days. Of the 20 cases, two (10%) were converted to open cholecystectomy. The mean operation time was 75.2±32.54 min.
Conclusion
LC is an effective and safe treatment for symptomatic gallstone disease in select patients with Child–Pugh A and B cirrhosis. The advantages over open cholecystectomy are the lower morbidity rate and reduced hospital stay.

Keywords:
cholycystectomy, cirrhotic, laparoscopic

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Introduction

Gallstones are most commonly seen in cirrhotic patient due to several factors, including reduced hepatic synthesis and transport of bile salts, high estrogen levels, and impaired gallbladder contraction [1,2]. Laparoscopic cholecystectomy (LC) is the gold standard therapeutic intervention for the treatment of symptomatic gallbladder stones [3].

Cholecystectomy in cirrhotic patients is associated with a high rate of morbidity and mortality, due to blood loss, postoperative liver failure, and sepsis. With the introduction of video laparoscopy in the treatment of cholelithiasis, the question as to whether cirrhotic patients will benefit from this technique is increasingly raised [4]. As surgeons gain experience and confidence in using the new equipment and techniques required by this procedure, [5–7] absolute and relative contraindications are gradually being eroded.

To date, in cirrhotic patients LC has found widespread use for the treatment of symptomatic gallstones with low mortality and morbidity rates. The aim of our study was to assess the safety of LC in cirrhotic patients and to evaluate its benefits compared with the benefits in noncirrhotic patients.

Patients and methods

From January 2014 to December 2016, a total of 200 patients underwent LC for symptomatic gallstone disease in our unit of Zagazig University Hospital. Of these 200 patients, 20 had liver cirrhosis. The study had been previously approved by the research ethics committee of the university. Informed consents were

obtained from all patients. All of these patients provided a medical history followed by physical examination, ultrasonography, liver function tests, prothrombin time, and viral hepatitis screening. The diagnosis of cirrhosis was made based on preoperative workup, intraoperative findings of a nodular liver, and histopathological study. All patients were evaluated preoperatively according to the American Society of Anesthesiologists scoring system. LC was performed with the standard four-port technique with the patient under general anesthesia. Pneumoperitoneum was created through the first port subumbilically by means of the open (Hasson) technique. A subhepatic drain was kept in place in all cases. The data were analyzed for patient demographics, and cause of cirrhosis, Child–Pugh class, operative time, conversion rate, procedure-related morbidity, mortality, and hospital stay.

The data were evaluated using SPSS version 16.0 (IBM Company). Fisher's exact test and Pearson's χ^2-test were applied for categorical parameters, and the independent *t*-test was used to compare the means (two-tailed) among continuous variables. The results were calculated on 95% confidence interval. *P* value up to 0.05 was considered significant.

Results

Twenty patients with cirrhosis, four men and 16 women, underwent LC. The mean age of the patients was 45.9±8.06, whereas the mean age of noncirrhotic patients (n=180) was 42.5±7.28. Of these 20 patients, cirrhosis was diagnosed as secondary to hepatitis C in 13 (65%), hepatitis B in one (5%), combined hepatitis C and B in four (20%), and cryptogenic hepatitis in two (10%) patients. Child–Pugh classification was used to assess the severity of liver cirrhosis; 12 (60%) patients were of class A, and eight (40%) were of class B. Two (10%) patients in the cirrhotic group and 12 (6.7%) in the noncirrhotic group had a history of previous abdominal surgery. Significant comorbidity was present in four (20%) of the cirrhotic patients and 15 (8.3%) of the noncirrhotic patients (Table 1**)**.

The mean operation time was 75.2±32.54 min in patients with cirrhosis, significantly longer compared with operative time for patients without cirrhosis. Conversion to an open procedure was required in two (10%) patients, one due to abdominal adhesion of previous operation and the other due to excessive fibrosis with difficult dissection of the Calot triangle. The mean length of hospital stay was 2.9±0.1 days, not much different from that for noncirrhotic patients (Table 2**)**. No operative mortalities occurred. Postoperative morbidity was observed in four (20%) patients with cirrhosis (Table 2**)**. Postoperative complications for each group are presented in Table 3. One patient had hemorrhage, one patient with Child–Pugh class B cirrhosis developed ascites after surgery; one patient had wound infection and another one showed trocar site hematoma. All patients were followed up for 12 months.

Discussion

Gallstone disease is a prevalent one which is more common in patients with liver cirrhosis. Its incidence is 29.4% for patients with cirrhosis compared with 12.8% for patients without cirrhosis [2,8]. Asymptomatic gallstones rarely lead to problems. Complications of gallstones may include biliary colic, choledocholithiasis, acute cholecystitis, and acute pancreatitis.

The infection which develops in about 20% of cases is the most important complication of acute cholecystitis. In addition, some of the cases with acute cholecystitis may require emergent surgery. During the course of cirrhosis, infections are highly associated with mortality. On the other hand, Mansour *et al.* [9], reported that the mortality rate in patients with cirrhosis after emergent abdominal surgery was 50%, compared with 18% for elective surgery. In the light of these results, surgeons may prefer elective surgery for gallstones in patients with cirrhosis especially in Child–Pugh A and B.

Several published reports have shown that cirrhosis of the liver has a major impact on morbidity and mortality after open cholecystectomy. Because of the high rates of mortality (83.3%) and morbidity, Aranha *et al.* [10] considered cholecystectomy in patients with cirrhosis as 'a formidable operation,' since the development of LC has become the first choice of treatment for symptomatic gallstone diseases in patients with cirrhosis.

LC has been proven safe and feasible for symptomatic gallstones, but its role in cirrhotic patients remains controversial. Yerdel *et al.* [7] reported the first study of LC in cirrhotic patients. Although a small number of patients were included in the study, no morbidity or mortality occurred. However, with surgeons' increase in laparoscopic experience, various recent studies have demonstrated that LC in cirrhosis is safer and better tolerated than open cholecystectomy.

Proper patient selection after estimating the risk is an essential requirement. The Child–Pugh

Table 1 Patient demographics (*n*=200)

	Cirrhotic (*n*=20) [*n* (%)]	Noncirrhotic (*n*=180) [*n* (%)]	*P*-value
Age (years)	45.9±8.06	42.5±7.28	NS
Sex			
Male	4 (20)	18 (10)	NS
Female	16 (80)	162 (90)	
Child–Pugh class			
A	12 (60)	–	<0.001*
B	8 (40)		
Hepatitis C	13 (65)	–	<0.001*
Hepatitis B	1 (5)	–	NS
Hepatitis B and C	4 (20)		
Cryptogenic hepatitis	2(10)	–	<0.001*
Previous abdominal operation	2 (10)	12 (6.7)	NS
Associated disease	4 (20)	15 (8.3)	NS

*P value <0.05 is significant.

Table 2 Surgical outcomes after laparoscopic cholecystectomy

	Cirrhotic (*n*=20)*	Noncirrhotic (*n*=180)*	*P*-value
Operation time (min)	75.2±32.54	58.9±4.56	<0.001*
Hospital stay (days)	2.9±1.19	2.8±1.18	NS
Conversion rate [*n* (%)]	2 (10.0)	10 (5.6)	NS
Blood transfusion [*n* (%)]	2(10)	0	<0.001*
Morbidity [*n* (%)]	4 (20.0)	18 (10)	NS
Mortality	0	0	0

**P* value <0.05 is significant.

Table 3 Causes of morbidity (*n*=200)

	Cirrhotic (*n*=20)	Noncirrhotic (*n*=180)
Wound infection [*n* (%)]	1 (5)	8 (4.4)
CBD injury	0	0
Residual CBD stone	0	0
Bile leak	0	2 (1.1)
Trocar site hematoma [*n* (%)]	1 (5)	4 (2.2)
Liver bed bleeding [*n* (%)]	1 (5)	4 (2.2)
Ascites [*n* (%)]	1 (5)	0

CBD, common bile duct.

classification is helpful in estimating the risk and provides an idea of the patient's liver reserve [11,12]. The need for blood transfusion and patient mortality and morbidity all correlate with the Child–Pugh classification. We performed LC on patients with Child–Pugh class A and B only with no mortality; however, Block *et al.* [13] reported a mortality of 27% among Child–Pugh C, 9% among Child–Pugh B, and no mortality among Child–Pugh A patients. Kogut *et al.* [14] also reported no mortality among Child–Pugh A patients, and Wu *et al.* [15] suggested that Child–Pugh A patients can even be regarded as 'noncirrhotic' in biliary surgery.

Hepatitis B and C are the most common causes of liver cirrhosis in developing countries. In western nations alcoholic liver cirrhosis is more common. In our study, viral hepatitis is responsible for 90%, cryptogenic causes 10%, and no alcoholic cases of cirrhosis. Intraoperative incidentally detected liver cirrhosis cases have been reported in the literature [16].

In our study, the average operation time was 75.2 ±32.54 min; this is lower than the previous reports. During LC, the conversion rate to open cholecystectomy has been reported in patients with liver cirrhosis ranged from 0 to 15.7% [7,17,18]. Our study revealed a conversion of two (10%) patients, one due to abdominal adhesion of previous operation and the other due to excessive fibrosis with difficult dissection of the Calot triangle. The mean hospital stay was 2.9 days, comparable to that in patients without cirrhosis. However, Puggioni and Wong [19] in their meta-analysis reported that operative time and length of hospital stay in cirrhotic patients were considerably reduced for LC compared with the open approach.The increased risk of bleeding in cirrhotic patients is related to reduced prothrombin time, thrombocytopenia, and portal hypertension. In our experience, we had global major blood product transfusions in the cirrhotic

group (10% vs. none) compared with noncirrhotics in the perioperative period; however Neri *et al.* [20] show (26.1% vs. Zero %). Chinnasamy *et al.* [21] reported that bleeding is quite common in the liver and gallbladder bed. In the literature the authors reported that intraoperative bleeding rate of LC was 9.8–12% [22]. This is generally venous bleeding; therefore, it can be easily controlled. In our study, hemorrhage was seen in one (5%) patient and was controlled with postoperative transfusion of fresh, frozen plasma and red blood cell and did not require reoperation.

Considerable postoperative complication in cirrhotics is the ascites [19,23]. Several causes are postulated such as leakage of lymphatic vessels, injured gallbladder bed lymphatic vessels. This morbidity was present in one case in our study that was treated conservatively by our internal medicine physician.

Conclusion

On the basis of our results as well as those of others, we conclude that LC in selected Child–Pugh A–B in patients with liver cirrhosis is a safe and effective treatment method. Today, with increasing experience and technological advances of LC in cirrhotic patients is no more contraindicated. LC in cirrhotic patients is a successful method with a shorter operation time and hospital stay compared with open cholecystectomy, low conversion rates, and acceptable morbidity rates.

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Conflicts of interest

There are no conflicts of interest.

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