ORIGINAL ARTICLE

OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY FOR GALL STONES DISEASE IN PATIENTS WITH LIVER CIRRHOSIS

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Background: Laparoscopic cholecystectomy (LC), a gold standard procedure for cholelithiasis, is associated with higher incidence of bile duct injuries and perioperative bleeding. These complications are of further concern when LC is carried out on patients with liver cirrhosis. Although LC is now increasingly being performed for cholelithiasis in cirrhotic patients, the safety of the procedure is debatable in this group of patients. **Methods:** We retrospectively analysed 82 LCs, performed between January 2002 and December 2011, in cirrhotic patients with gall stone disease for perioperative complications. Patients were sub-classified into Class A, B and C based on child-Pugh classification of severity of liver cirrhosis. Intergroup comparisons were carried out using ANOVA, and $p \leq 0.05$ was considered significant. **Results:** LC was successfully completed in all but 3 patients (3.7%). None of the cirrhotic patients had bile duct injury. Class C patients (n=27) had higher frequency of perioperative bleeding than Class B and A (p=0.03). Class C patients had comparatively longer stay (5.42 days; range 4–8 days) than Class B (3 days; range 2–6) and Class A (2.74 days; range 2–4), (p=0.01). There was no mortality in our series. **Conclusion:** The outcome in Child A and B cirrhosis is comparable to non-cirrhotic patients undergoing LC for gall stone disease. Conversion rate and perioperative bleeding in these groups of patients is acceptable in relevance to LC in non-cirrhotic patients. Child C patients however need careful assessment and determination of operative risk versus advantages.

Keywords: Laparoscopic cholecystectomy, Cirrhosis, Cholelithiasis, Chronic liver disease

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INTRODUCTION

Laparoscopic cholecystectomy (LC) is considered the gold standard approach to the management of gall stone disease.[1] Shorter hospital stay, lesser postoperative pain, early return to work and a single follow-up visit to outpatient clinic has increased patient compliance and trust on this procedure.[2–5] It is perhaps the most frequent laparoscopic procedure performed in general surgery.

Laparoscopic cholecystectomy however has been associated with higher incidence of bile duct injuries (0.4–0.5%) and perioperative bleeding due to vascular trauma.[6,7] These complications are of further concern when LC is carried out on patients who tend to have distorted anatomy of the biliary system and abnormal bleeding profiles.[6–8] In liver cirrhosis, extensive fibrosis and hepatic nodularity distorts anatomy of the Calot's triangle.[9]

Abnormal clotting mechanism predisposes to intra-operative bleeding that obscures the visibility and adds to the complexity of the situation.[10] Although previously considered as contra-indication, LC in patients with hepatic cirrhosis is now increasingly performed for the management of gall stones disease.[9–11]

We retrospectively analysed 82 LCs performed for gall stone disease, in patients with liver cirrhosis, for conversion to open cholecystectomy, perioperative (operative and postoperative) bleeding, bile duct injury, postoperative hospital stay and other major complications.

MATERIAL AND METHODS

Between January 2002 and December 2011 a total of 2200 laparoscopic cholecystectomies (LCs) were performed in one unit of surgical department at Shifa international hospital (SIH), Islamabad, Pakistan. Among them, 82 patients had liver cirrhosis. Patients were diagnosed having liver cirrhosis based on pre-operative sonographic reports, laparoscopic findings and or liver biopsy. Patients having obstructive jaundice due to choledocholithiasis were excluded. Data was retrieved retrospectively from patient's files on medical record (MR) coding and recorded on a standard Performa designed for this project. All cirrhotic patients were sub-classified into Class A, B and C based on child-Pugh classification of severity of liver cirrhosis. Demographic characteristics, duration of operation, intra-operative bleeding, postoperative bleeding, bile duct injury, post-operative stay, deterioration of liver function tests and major complications were recorded. Patients having incomplete data on their files were not included in the study.

Statistical analysis was performed using SPSS-13. Demographic characteristics were expressed in frequency and percentage. Statistical comparisons between groups were made with the student's t-test and ANOVA for continuous variables. Chi-square test was employed accordingly to analyse the categorical data statistically and $p<0.05$ was considered statistically significant.

RESULTS

A total of 2,200 Laparoscopic cholecystectomies (LCs) were performed in a single unit of surgical department of Shifa International Hospital (SIH), out of which 82 patients were cirrhotic. Among these cirrhotic patients 54 (66 %) were females and 28 (34 %) were males. The average age in this group of patients was 46.62±7.96 years (range: 34–67). Child-Pugh classification of these cirrhotic patients was as follow: Class A=46 (56%), Class B=24 (29 %), and Class C=12 (15%). (Table-1).

Hepatitis C was the cause of liver cirrhosis in 48 (58.6%) patients (32 females, 16 males); Hepatitis B accounted for 32 (39 %) patients (22 females, 10 males); while the remaining 2 patients (2.4%), both males, had alcoholic cirrhosis. (Table-1). Diagnosis of liver cirrhosis was established preoperatively in 65 (79%) patients. In the remaining 17 patients (21%) suspicion of liver cirrhosis arose during laparoscopic cholecystectomy. Hepatic biopsy performed during LC confirmed cirrhosis in these patients.

Acute cholecystitis was the main presentation in 22 (27 %) of patients while symptomatic gall stones was the indication of surgery in 60 (73 %) patients. However, in Child-Pugh class C patients, acute cholecystitis was the main presentation (67 %) while only 17% patients in Child- Pugh B class were diagnosed with acute cholecystitis. Patients with obstructive jaundice treated with ERCP followed by LC were not included in this study (See above).

The LC was successfully completed in all but 3 patients (2 males, 1 female) with liver cirrhosis. Two out of these three patients (66.7%) patients had distorted anatomy as the reason for conversion to open cholecystectomy (OC). The 3rd patient had excessive per operative bleeding interfering with clear visibility forcing conversion to OC. The Child-Pugh class did not affect the conversion rate. (Table-2).

The mean duration of surgery in all cirrhotic patients was 80±15 minutes, comparatively longer (90±10) in Child-Pugh C than Child-Pugh B (75±14) and Child-Pugh A (78±14) minutes. The difference was however not statistically significant (p=0.15). None of the cirrhotic patients had bile duct injury.

Perioperative bleeding requiring transfusion (more than 200 ml perioperative loss or postoperative drop in Hb to less than 8 gm % or persistent drain beyond 2nd postoperative day) with fresh frozen plasma (FFPs), Packed Red Blood Cells (PRBCs) occurred in 27 patients (12 Class C, 7 Class B and 8 Class A). The difference was statistically significant (p=0.03).

Child-Pugh class C patients had comparatively longer postoperative hospital stay (5.42 days; range 4–8 days) than class B (3 days; range: 2–6) and class A (2.74 days; range: 2–4). The difference was statistically significant at p=0.01. (Table-3).

When Child-Pugh class A patients were compared for duration of postoperative hospital stay with non-cirrhotic patients undergoing LC (2±1 day; unpublished data) there was no significant difference (p=0.13).

Table-1: Demographic characteristics of laparoscopic cholecystectomy in cirrhotic patients

	Child-Pugh Class			Total
	Child A	Child B	Child C	
Number (%)	46 (56%)	24 (29%)	12 (15%)	82
Gender (M/F)	11/35	11/13	6/6	28/54
Cause of Cirrhosis				
Alcohol	0	2	0	2 (2.4%)
Hep. B	17	10	5	32 (39%)
Hep. C	29	12	7	48 (56%)
Diagnosis of Cirrhosis				
Preoperative	29	24	12	65 (79%)
Peroperative	17	0	0	17 (21%)
Indication for LC				
Symptomatic GS	36 (78%)	20 (83%)	04 (33%)	60 (73%)
Acute Cholecystitis	10 (22%)	4 (17%)	08 (67%)	22 (27%)
Duration of Surgery (Mean)	78 min	75 min	90 min	80 min
Conversion to open	2	1	0	3 (3.7%)
Significant Bleeding	8 (17%)	7 (29%)	12 (100%)	27 (33%)
Postoperative Stay(Mean)	2.74	3.09	5.42	3.23
Major Complications				
Leak/persistent drain	0	0	9 (75%)	9 (11%)
Pleural effusion	0	0	2 (17 %)	2 (2.4%)
Pneumonia	0	0	1 (8%)	1 (1.2%)
Sepsis	0	0	2 (17%)	2 (2.4%)

Table-2: Conversion of laparoscopic cholecystectomy to open cholecystectomy vs Child-Pugh class (over all conversion rate=3.7%)

	Child-Pugh Class			Total
	Class A	Class B	Class C	
LC	44	23	12	79
Converted to OC	2	1	0	3
Total	46	24	12	82

The Child-Pugh class had no effect of the conversion of LC to OC in patients with liver cirrhosis. The difference was not statistically significant (p=0.14)

Table-3: Child-Pugh classification vs postoperative hospital stay

	N	Mean	Minimum	Maximum
Class A	46	2.74	2	6
Class B	23	3.09	2	6
Class C	12	5.42	4	8
Total	81	3.23	2	8

The Child-Pugh class (indicating the severity of the liver cirrhosis) affects the total postoperative in-hospital stay (ANOVA, p=0.001)

DISCUSSION

Compared to normal population cirrhotic patients are reported to have 2 times higher prevalence of gall bladder stones.[12] Surgical patients with cirrhosis are prone to excessive perioperative bleeding due to altered coagulopathy and thrombocytopenia secondary to hypersplenism.[7,9] Postoperative infection and sepsis due to depressed immunity is another common problem in

surgical patients with cirrhosis.[13] Cirrhotic nodularity of liver distorts anatomy in the Calot's triangle rendering dissection difficult.[7,9,13] Peroperative bleeding and difficult dissection had been associated with higher conversion rate in these patients.[14] Until recently cirrhosis was considered as contra indication to laparoscopic cholecystectomy.[11] On the other hand the proven advantages of the laparoscopic techniques such as decreased rate of infection, pain and early recovery are of particular interests in patients with cirrhosis in whom infection and delayed recovery associated with further deterioration in liver function are fearsome complications.[3,5,7,12,14] Previously clinical investigators have shown that in comparison to open cholecystectomy laparoscopic cholecystectomy has better outcome in cirrhotic patients with quick recovery, less pain, decreased chances of wound infection and early discharge from hospital.[9,10,13]

Previously studies have shown the safety of LC in Child A and B liver cirrhosis with reasonable outcome.[10,12,15] The safety of LC in Child C (decompensated liver cirrhosis) is yet to be established.[10,14,16] We in this study compared the outcome of laparoscopic choleycestectomy in cirrhotic patients with respect to Child-Pugh class. Hepatitis C was the most common cause of cirrhosis in our patients which seems to be consistent with prevalence of hepatitis C in this part of the world.[17] While most patients were previously diagnosed as having Cirrhosis, a significant proportion (21%) did not know about their liver disease. Preoperative ultrasound had detected gall stones but not hepatic changes. Since liver enzymes were normal in these patients the suspicions about these patients having cirrhosis arose only during laparoscopy. Biopsy taken per-operatively confirmed liver cirrhosis in these patients. This finding suggests that low threshold for preoperative screening should be kept to diagnose chronic active hepatitis (CAH) early in the course of the disease. This argument is supported by previous studies on the prevalence of hepatitis C and B in this part of the world.[17]

The conversion rate in our series was 3.7%. A metaanalysis conducted in 2003, involving 400 cirrhotic patients undergoing LC had shown a conversion rate of 7.06%.[18] A recently conducted randomized control trial (RCT) involving 33 Child A and B cirrhotic patients indicated a similar conversion rate of 6.7%. In contrast, the conversion rate in our series of patients is comparable to the conversion rate (3.6 %) of non-cirrhotic patients undergoing LC.[19] We compared this figure with our unpublished data of laparoscopic cholecystectomy (n=2108; Conversion rate=2.64%) and did not found the difference statistically significant (p=0.15). The low conversion rate in our patients could be due to multiple factors. Firstly, 21% of our patients were not diagnosed with liver disease until laparoscopy, suggesting a comparatively better compensation of their liver disease status. Secondly, patients in our study were all operated by the same surgeon while the previously reported metaanalysis incorporated studies from wide spectrum of centres with different experiences and time periods.[16,18,20] The Child-Pugh class had no effect on the conversion rate as all the 3 patients belonged to child A (n=1) and Child B (n=2), and none to child C. Previously some authors have shown that Child-Pugh classification does not predict the outcome of LC in cirrhotic patients.[10] These claims are however not substantiated by their small sample size especially in Child C class.

Child class was however important for predicting perioperative bleeding in our patients. Over all, 45% patients had perioperative bleeding requiring transfusion. Transfusion of blood products were required in Child A (15 %), Child B (79%) and Child C (92%). When compared, the inter Child class variation was statistically significant at p=0.04.

Previously Schiff J *et al*[10], have suggested that severity of liver disease based on INR (international normalisation ratio) and serum albumin values predicts the bleeding outcome better than Child-Pugh classification in cirrhotic patients undergoing LC. Other investigators however have shown that Child-Pugh classification is associated with perioperative bleeding in patients with cirrhosis undergoing LC.[16,21]

Child class also dictated postoperative hospital stay with longest stay for Child C followed by Class B and A respectively (p=0.01). A similar correlation have been found in previous studies.[20,21] Persistent drainage of ascetic fluid was the main reason for longer postoperative in-hospital stay followed by pulmonary complication (Pneumonia and plural effusion). These problems exclusively occurred in Child C patients. Most patients were successfully discharged without drain. A small group of patients were sent home with drain for about a week time and then drains were removed on the first follow up in surgical clinic.

CONCLUSION

Laparoscopic cholecystectomy is preferred choice in patients with symptomatic gall stones having liver cirrhosis. The outcome in Child A and B is comparable to non-cirrhotic patients undergoing LC for gall stone disease. Conversion rate and perioperative bleeding in these groups of patients is acceptable in relevance to LC in non-cirrhotic patients. Child C patients however need careful assessment and determination of operative risk versus advantages. Perioperative haemorrhage should be anticipated and dealt accordingly with perioperative transfusion of platelets, FFPs and Packed cells. Further studies in this group of patients are warranted before reaching a consensus.

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