SCIENTIFIC PAPER JSLS

Laparoscopic Cholecystectomy in Child-Pugh Class C Cirrhotic Patients

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ABSTRACT

Objectives: This study aimed to determine whether laparoscopic cholecystectomy is a safe and advisable procedure in Child-Pugh C cirrhotic patients with symptomatic cholelithiasis.

Methods: The records of 42 laparoscopic cholecystectomies performed between January 1995 and February 2004 in patients with Child-Pugh A, B, and C cirrhosis were retrospectively reviewed, focusing on the 4 patients with Child-Pugh C cirrhosis.

Results: Among the 38 Child-Pugh A and B patients, no deaths occurred. In this group, only 1 Child-Pugh B cirrhotic patient required blood transfusion, and postoperative morbidity occurred in 10 patients including hemorrhage, wound infection, intraabdominal collection, and cardiopulmonary complications (morbidity rate 26%). The mean postoperative stay was 5 days (range, 3 to 13). The indication for surgery in the 4 Child-Pugh C patients was acute cholecystitis. In this group, 2 deaths occurred for severe liver failure in 1 case and for sepsis in the other. One patient developed heavy gallbladder bed bleeding, and a second operation was necessary to control the hemorrhage. The morbidity rate was 75%. Only 1 patient had no complications. The mean postoperative stay was 10 days (range, 4 to 17).

Conclusions: Laparoscopic cholecystectomy is a safe procedure in well-selected Child-Pugh A and B cirrhotic patients indicated for surgery, but it is a very high-risk procedure in Child-Pugh C patients. Indications for surgery in Child-Pugh C patients should be evaluated very carefully and surgery should be avoided unless the patient needs an emergency cholecystectomy for acute cholecystitis. Child-Pugh C cirrhotic patients might better benefit from percutaneous drainage of the gallbladder.

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Key Words: Cholelithiasis, Cirrhosis, Laparoscopic cholecystectomy.

INTRODUCTION

The prevalence of cholelithiasis in cirrhotic patients seems to be twice that in noncirrhotic patients.[1] Laparoscopic cholecystectomy (LC) is the procedure of choice for cholelithiasis in the general population. Historically, the presence of cirrhosis was thought to be an absolute or relative contraindication to LC because of the potential risks of bleeding and liver failure.[2] Currently, increasing evidence indicates that patients with early cirrhosis may undergo LC with low morbidity and no mortality.[3] Nevertheless, few articles addressing the issue of LC in patients with advanced cirrhosis have been published, and in most studies the results support LC as a safe procedure only in Child-Pugh A and B cirrhosis.[4] Very little has been reported in the literature about LC in Child-Pugh C cirrhotic patients. We present our experience with 42 LC performed in patients with Child-Pugh A, B, and C cirrhosis, focusing on indications for surgery, morbidity, and mortality rates in these 3 different subsets of patients.

METHODS

The records of 42 laparoscopic cholecystectomies performed in patients with Child-Pugh A, B, and C cirrhosis from January 1995 to February 2004 were retrospectively reviewed focusing on the 4 patients with Child-Pugh C cirrhosis. The 42 patients included 17 men and 25 women with a mean age of 57 (range, 28 to 83). The diagnosis of cirrhosis was determined according to clinical history and laboratory data. A diagnosis of liver cirrhosis was known preoperatively for 34 patients and discovered during laparoscopy in 8 patients.

The cause of cirrhosis was hepatitis B in 9 patients, hepatitis C in 25 patients, alcohol abuse in 7 patients, and unknown in 1 patient. All the patients were classified according to the Child-Pugh Score: 22 Child-Pugh A (52%), 16 Child-Pugh B (38%), and 4 Child-Pugh C (10%) **(Table 1)**. Ascites was present in 10 patients, splenomeg-

Table 1.
Laparoscopic Cholecystectomy Patient Data Stratified According to Child-Pugh Score

Child-Pugh Score	n	Sex (M/F)	Cause of Cirrhosis*	Indications for Surgery	Complications	Mean Postop Stay (Days)	Mean Operative Time (Minutes)
A	22	9/13	6 HBV 13 HCV 3 alcohol	16 symptomatic cholelithiasis 8 cholecystitis	3 wound infection 1 pleural effusion	4 (3–10)	115 (55–150)
B	16	6/10	3 HBV 10 HCV 2 alcohol 1 unknown	6 symptomatic cholelithiasis 10 cholecystitis	2 wound infection 1 intraabdominal collection 2 hemorrhage 1 heart failure	5 (3–13)	125 (60–165)
C	4	2/2	2 HCV 2 alcohol	4 cholecystitis	2 death 1 hemorrhage	10 (4–17)	145 (100–185)

*HBV=Hepatitis B; HCV=Hepatitis C.

aly in 14, and esophageal varices in 11. The diagnosis of cholelithiasis was confirmed by ultrasonography. The indication for surgery was symptomatic cholelithiasis or cholecystitis in Child-Pugh A and B patients (12 cholecystitis and 26 symptomatic cholelithiasis), but exclusively acute cholecystitis in Child-Pugh C patients. In this last group, a conservative treatment was at first attempted, but worsening of general conditions and laboratory tests forced us to perform an emergency cholecystectomy. Coagulopathy was corrected with fresh frozen plasma in the perioperative period in patients with prothrombin time (PT) > 2.5 sec (n=3). In all cases, a standard laparoscopic procedure was performed with some modifications. The subxiphoid port has been placed more to the right of the midline to avoid injury to the falciform ligament, and the umbilical vein and transillumination of the abdominal wall by laparoscope has been used to identify major collaterals. Furthermore, the Harmonic scalpel has been used to dissect tissues and to provide radiofrequency energy to control bleeding from the gallbladder bed.

RESULTS

Two deaths occurred in the Child-Pugh C group. One patient died because of liver failure and one because of sepsis as a consequence of wound infection. Conversion to open was necessary in 3 cases because of adhesions in 2 Child-Pugh B patients with previous surgery and because of heavy gallbladder bed bleeding in 1 Child-Pugh C patient (conversion rate 4.76%). Five patients (all Child-Pugh C patients and 1 Child-Pugh B patient) required blood transfusions **(Table 2)**.

The mean operative time was 115 minutes (range, 55 to 150) and 125 minutes (range, 60 to 165) respectively, in Child-Pugh A and B patients, which was significantly shorter than that in Child-Pugh C patients (145 min; range, 100 to 185).

Postoperative morbidity occurred in 4 of 22 Child-Pugh A cirrhotic patients (18%), in 6 of 16 Child-Pugh B cirrhotic patients (37.5%) and in 3 of 4 Child-Pugh C cirrhotic patients (75%) **(Table 1).** No significant difference oc-

Table 2.
Laparoscopic Cholecystectomy in Patients With Cirrhosis: Intraoperative Blood Loss, Blood Transfusion, and Conversion to Open

Intraoperative blood loss	
<200 mL	20 (8 Child A and 12 Child B)
200–500 mL	5 (2 Child B and 3 Child C)
>500 mL	1 (1 Child C)
Blood transfusion	
5 (1 Child B and 4 Child C)	
Conversion to open	
3 (2 Child B and 1 Child C)	

curred in outcome between Child-Pugh A and B cirrhotic patients who underwent LC, but correlating Child-Pugh A and B (overall morbidity rate 26%) with Child-Pugh C cirrhotic patients, the outcome was significantly different ($P<0.05$). The length of postoperative stay was similar in Child-Pugh A (mean 4 days; range, 3 to 10) and B patients (mean 5 days; range, 3 to 13), but significantly longer in Child-Pugh C patients (mean 10 days; range, 4 to 17).

DISCUSSION

Cholelithiasis is a common disease in patients with cirrhosis.[5] Intravascular hemolysis and functional alterations of the gallbladder (reduction in motility and emptying) are some pathogenic factors leading to an increase in unconjugated bilirubin secretion and, thereafter, to the formation of stones.[6] Open cholecystectomy (OC) in cirrhotic patients is associated with high morbidity and mortality rates reported in different series to be as high as 17% to 27%.[7,8] Most deaths are related to excessive blood loss, postoperative liver failure, and sepsis. Selection of patients according to liver reserve is the key issue. The correlation between the Child-Pugh classification and the incidence of perioperative complications after open surgery has been clearly demonstrated.[9]

In early clinical experiences with LC, cirrhosis was thought to be an absolute or relative contraindication because of potential risks of bleeding and liver failure.[10,11] However, with the increase in experience with laparoscopic surgery, LC has been demonstrated as safe and well tolerated in select cirrhotic patients indicated for surgery. Several studies have examined the efficacy and safety of LC in cirrhotic patients, and the results have been encouraging **(Table 3)**. Including our study, more than 400 patients with Child-Pugh A and B cirrhosis who underwent LC have been described to date without mortality and with an overall morbidity rate of 20%.[4,12–15] The results of our study are similar. Among 38 Child-Pugh A and B patients who underwent LC, we observed an overall morbidity rate of 26% and no mortality. When LC is compared with OC in cirrhotic patients, the laparoscopic approach is associated with less operative blood loss, shorter operative time, and a decreased length of hospital stay.[16,17] These data seem to be associated with several causes. Magnification of the surgical field in laparoscopy permits meticulous care during hemostasis, and pneumoperitoneum seems to play a role in determining hemostasis (barohemostasis).[18] Laparoscopy avoids the subcostal incision that would increase hemorrhage, particularly in patients with coagulopathy. Furthermore, laparoscopic cholecystectomy reduces the risk of infections, dehiscences, postoperative hernias, and infiltration of ascites through the abdominal wound.[13] It is important to note that the studies on LC in cirrhotic patients reported in the

Table 3.
Laparoscopic Cholecystectomy in Patients With Cirrhosis: Review of the Literature

Author	Year	n	Child-Pugh			Morbidity	Mortality	Hospital Stay (Days)	Operative Time (Min)
			A	B	C				
Yerdel	1997	7	6	0	1	0	0	6	155
Angrisani	1997	31	20	11	0	8 (25%)	0	3	–
Jan	1997	21	18	3	0	1 (4.8%)	–	4.1	–
Sleeman	1998	25	25	0	0	8 (32%)	0	1.7	116
Poggio	2000	26	22	4	0	5 (19%)	0	2.3	116
Morino	2000	33	27	4	2	0	0	2.8	114
Fernandes	2000	48	38	10	0	6 (12.5%)	0	6.5	–
Eason	2001	19	19	0	0	0	0	3.5	64
Clark	2001	25	14	9	2	13 (52%)	1 (4%)	4	107
Tuech	2002	26	22	4	0	7 (27%)	0	5	126
Yeh	2002	226	193	33	0	15 (6.6%)	2 (0.88%)	4.7	
Cucinotta	2003	22	12	10	0	8 (36%)	0	5	115
Wu Ji	2004	38	19	15	4	7 (13.2%)	0		
Present study	2004	42	22	16	4	15 (35%)	2 (4.76%)	7.3	128

literature **(Table 3)** come from centers with considerable experience in laparoscopy and that some technical challenges are encountered when performing LC in cirrhotic patients. Hemorrhage is the most common and dreadful complication in these patients. Bleeding may result from abdominal varices or coagulopathy secondary to depressed clotting factor synthesis and thrombocytopenia from hypersplenism. It is advised to correct the coagulopathy in the perioperative period by platelet replacement and transfusion of fresh frozen plasma. Furthermore, technically, particular care is necessary when performing LC in cirrhotic patients, and some modifications should be used to avoid the risk of heavy bleeding. First, care must be taken to avoid bleeding from the periumbilical wall varices. Second, transillumination of the abdominal wall by laparoscope helps to identify major collaterals in the abdominal wall. Third, placement of the subxiphoid port more to the right of the midline is useful to avoid injury to the falciform ligament and the umbilical vein. Fourth, excessive traction is avoided to prevent avulsion of the gallbladder from liver bed and bleeding.

We used a Harmonic scalpel for tissue and gallbladder dissection and radiofrequency energy to control bleeding from the gallbladder bed.[19] Based on our results as well as on those of others, LC is a safe procedure and should be the treatment of choice for symptomatic cholelithiasis or cholecystitis in well-selected Child-Pugh A and B cirrhotic patients.

On the other hand, Child-Pugh C patients are very challenging. The indications for LC in these patients should be evaluated very carefully considering the degree of liver insufficiency. Because of the limited experience with LC in Child-Pugh C cirrhotic patients and the high mortality rate reported in these patients undergoing OC, we operated only on patients with acute cholecystitis not responding to conservative treatment. LC and OC in Child-Pugh C patients are very high-risk procedures because of the risk of heavy hemorrhage and liver failure leading to death. In our study, we observed a morbidity rate of 75% and 2 of 4 patients died after surgery as a consequence of complications. In the literature, very little is written about Child-Pugh C patients undergoing LC. A recent meta-analysis by Puggioni and Wong[4] evaluating LC in cirrhotic patients found only 6 Child-Pugh C cirrhotic patients who underwent LC in 4 different studies. No deaths or complications are reported by Morino et al[13] in 2 Child-Pugh C cirrhotic patients who underwent LC as well as in 1 case described by Yerdel et al[20] and in another one by Lacy et al,[21] but 1 death of 2 Child-Pugh C cirrhotic patients is reported by Clark et al.[14] Wu Ji et al[22] performed 38 LC in cirrhotic patients including 4 Child-Pugh C patients with an overall morbidity rate of 13.2% and no mortality. They did not correlate the outcome by Child-Pugh Score, so it is not possible to establish in their study the morbidity rate in Child-Pugh C cirrhotic patients **(Table 3)**.

However, this group of patients is clearly a high-risk subset but, based only on the currently available data, it is not possible to draw conclusions about the outcome in Child-Pugh C cirrhotic patients. In our opinion, cholecystectomy should be avoided in Child-Pugh C patients unless clearly indicated (acute cholecystitis not responding to conservative treatment). Some authors[23] have even suggested endoscopic stenting of the cystic duct to avoid cholecystectomy in this group of patients. The results seem to be good, and no complications are reported after the procedure.[23] Another therapeutic option suggested by other groups is the percutaneous drainage of the gallbladder, which has been proven to be safe and effective in critically ill patients with acute cholecystitis.[24–26] Recently, we also treated a Child-Pugh C cirrhotic patient with acute cholecystitis by ultrasound-guided percutaneous drainage of the gallbladder. Although it was not a resolving treatment of cholelithiasis, symptoms ceased after the procedure, and we did not observe complications.

CONCLUSIONS

We believe that LC should be the treatment of choice in patients with symptomatic cholelithiasis or cholecystitis and Child-Pugh A or B cirrhosis. Nevertheless, because of the high risk of liver failure and heavy hemorrhage in patients with Child-Pugh C cirrhosis, the indications for surgery in this subset of cirrhotic patients should be evaluated very carefully and surgery avoided unless clearly indicated. The percutaneous drainage of the gallbladder in Child-Pugh C cirrhotic patients might be a better treatment, particularly when the patient is awaiting a liver transplant. Further prospective comparative randomized trials are needed to establish the appropriateness of LC or other therapeutic options in patients with Child-Pugh C cirrhosis.

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