

## Gallstones in Cirrhotics Revisited by a Laparoscopic View

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### ABSTRACT

Surgical literature around 1980 has emphasized the technical challenge and the risks of cholecystectomy in cirrhotic patients reporting discouraging results. The aim of this study is the retrospective analysis of laparoscopic cholecystectomy in cirrhotics. The collected laparoscopic experience of 3 surgical groups for the last 5 years is reported. Cirrhotics were classified according to Child–Pugh criteria. Postoperative complications were classified using Clavien's rules. Forty patients were recruited; 31 received successful laparoscopic cholecystectomy. Liver cirrhosis was preoperatively diagnosed in all Child–Pugh B ( $n = 11$ ) and in 11/20 Child–Pugh A patients. Compared with 989 noncirrhotics undergoing laparoscopic cholecystectomy, cirrhotics were similar in terms of age ( $59.9 \pm 10.3$  vs.  $58.1 \pm 10.9$ ) and sex (male: 51.6% vs. 50.1%). Acute cholecystitis has a similar frequency in cirrhotics and noncirrhotics (3.2% vs. 4.1%, respectively). Bile duct stones and acute pancreatitis were significantly more frequent in cirrhotic patients (6.4% vs. 3.7%,  $p < 0.001$ ; and 6.4% vs. 0.3%,  $p < 0.001$ , respectively). Endoscopic papillotomy and stone extraction combined with laparoscopic cholecystectomy was performed in 2 patients. Intraoperatively, technical problems occurred in 5 (16.1%) patients: liver bed bleeding ( $n = 4$ ) was significantly more frequent in cirrhotics vs. noncirrhotics ( $p < 0.001$ ). Mean operative time was 90 min, range 50–180, and it was not significantly longer than in noncirrhotics (85 min, range 30–200). Conversion rate was also similar (3%). Seven patients presented 8 postoperative complications (Class II): right side lung effusion ( $n = 2$ ), ascites ( $n = 2$ ), temporary worsening of Child–Pugh status ( $n = 2$ ), hyperosmotic coma ( $n = 1$ ), and umbilical hernia ( $n = 1$ ). Mean hospital stay in noncomplicated cases was the same for noncirrhotics ( $3 \pm 1$ ).

The authors suggest a more liberal use of laparoscopic cholecystectomy for symptomatic gallstones in selected Child–Pugh A and B patients.

### INTRODUCTION

**G**ALLSTONES, DISCOVERED BY ROUTINE ULTRASONOGRAPHIC MONITORING, are a common condition in cirrhotic patients, the most being asymptomatic: they are generally considered of limited clinical rele-

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vance.<sup>1-3</sup> Clinicians concentrate on the main complications of cirrhosis: metabolic liver insufficiency, bleeding by portal hypertension, and hepatocellular cancer.<sup>4,5</sup> Nevertheless, a minority of cirrhotics harboring gallstones at some stage of their natural history, develop biliary cholics.<sup>6,7</sup> These are responsible for repeated hospital admissions, biliary complications, decompensation of the metabolic balance eventually followed by fatal outcome. Surgical literature around 1980 has emphasized the technical challenge and risks of biliary surgery in cirrhotic patients, reporting discouraging results.<sup>8-13</sup> Surgeons have been alerted and the attitude toward symptomatic gallstones in cirrhotic patients, at present, by both surgeon and gastroenterologist, remains conservative.<sup>14</sup>

The introduction of video-laparoscopy has revolutionized the world of surgery and cholecystectomy via the laparoscope has become a common procedure.<sup>14-17</sup> Recently, cholecystectomy literature has been almost completely rewritten in light of laparoscopy—old problems are being explored by different perspectives with modern techniques, but very little has been published on laparoscopic cholecystectomy in cirrhotic patients.<sup>17-25</sup> The aim of this study is a revisitation of the problem concerning symptomatic gallstones in cirrhotics, considering the results obtained with laparoscopic cholecystectomy within a geographic region at high epidemiological incidence for hepatitis virus B and C.

## PATIENTS AND METHODS

Cirrhotic patients with gallstones were retrospectively recruited by a series of three centers routinely involved with laparoscopic surgery during the last 5 years, independently working in Naples and its neighboring area. Pre-operative or intra-operative diagnosis of liver cirrhosis and/or portal hypertension was not considered a contraindication for gallbladder removal. Diagnosis was confirmed by laboratory tests and histological examination. Patients were classified following Child-Pugh criteria.<sup>26</sup> Nutritional status was evaluated according to body mass index (BMI). Diagnosis of portal hypertension was made by the presence of one or more of the following: esophageal varices (upper GI-endoscopy, barium meal), macroscopic appearance of gastric wall, falciform ligament, and omental varicosity (laparoscopy). Gallstones were symptomatic in all patients. The following parameters were collected: laboratory tests, ultrasound, cholangiographic findings, macroscopic gallbladder appearance, presence of adhesions, operative time, intraoperative and postoperative complications and their treatment, hospital stay, and outcome. Vitamin K was chronically administered in all Child-Pugh B patients. Preoperative somatostatin and/or fresh-frozen plasma and intraoperative vasopressin or somatostatin were not administered. Intraoperative surgical complication was considered only if dedicated maneuver was needed to control it. Postoperative complications were classified using Clavien's rules.<sup>27</sup> Operations were performed under general anesthesia. Data were expressed as mean  $\pm$  SD, and compared to those obtained in 989 noncirrhotic patients undergoing laparoscopic cholecystectomy within the last 5 years. Statistical analysis was performed by means of Fisher's exact test and Student *t* test. Statistical significance was defined as  $p < 0.05$ .

## RESULTS

Treatment allocation for cirrhotic patients included in this study is summarized in Table 1. Five patients were excluded from any surgical treatment. Age, sex, associated diseases, Child-Pugh, and portal hypertension status, causes of exclusion and follow-up are reported in Table 2. During the early stages of the laparoscopic experience, 3 patients received uncomplicated cholecystectomy by laparotomy. Two patients (aged 65 and 78, Child-Pugh A and B, respectively) were operated on electively. Emergency cholecystectomy was performed in the remaining one (77-year-old, Child-Pugh C) for acute cholecystitis. Mean postoperative hospital stay was  $13.6 \pm 9.4$ , range 10–16 days. Successful cholecystectomy (without mortality and/or conversion) was performed in 31 of 32 patients that underwent laparoscopic approach (Table 3). Only 1 patient in this group (67/M; with a single episode of acute cholecystitis 16 years before the operation, and gallbladder excluded at cholangiography) did not receive cholecystectomy. At laparoscopic exploration, he presented with macronodular cirrhosis (preoperatively unknown), scleroathrophic gallbladder

## LAPAROSCOPIC CHOLECYSTECTOMY AND CIRRHOSIS

TABLE 1. CIRRHOTIC PATIENTS REFERRED FOR LAPAROSCOPIC CHOLECYSTECTOMY (1991-1995)

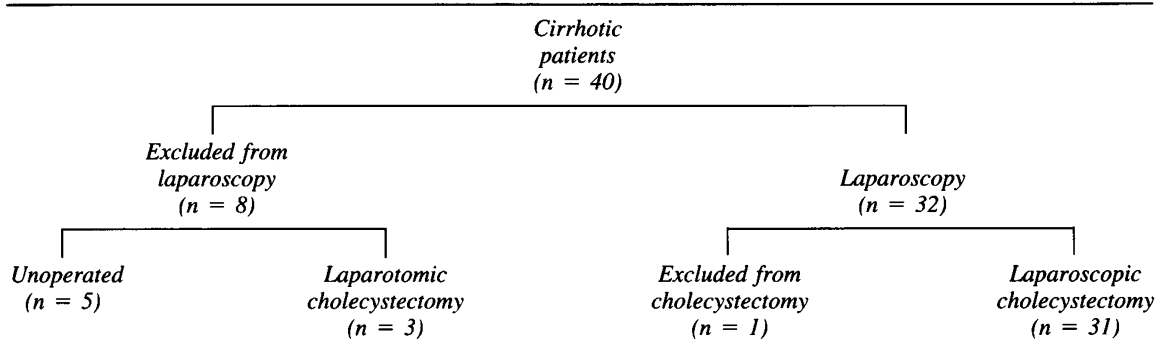


TABLE 2. PATIENTS EXCLUDED FROM SURGICAL TREATMENT

Age/ sex	Associate pathology	Child- Pugh Class	Portal hypertension	Reasons of exclusion	Follow-up
57/F	diabetes, duodenal ulcer, renal cysts	C	yes	Child C	1 year alive
60/F	atrial fibrillation mitral regurgitation decompensated	B	yes	ASA IV	lost
83/F	COPD, RBBB, Acute pancreatitis	A	no	multiorgan failure	dead (72 h)
55/M	HCC	C	yes	HCC	dead (1 year)
60/F	HCC	C	yes	HCC	dead (3 months) (brain stroke)

HCC, hepatocellular carcinoma; COPD, chronic obstructive pulmonar disease; RBBB, right bundle branch block.

TABLE 3. LAPAROSCOPIC CHOLECYSTECTOMY  
IN CIRRHOTIC PATIENTS

No of patients	31
Sex (m/f)	16/15
Mean age (yr ± SD)	59.9 ± 10.3
Child-Pugh class	
A (%)	20 (64.5)
B	11 (35.4)
C	— —
Cirrhosis etiology	
HBsAg	16 (51.6)
HCV	12 (38.7)
HBsAg + HCV	1 (3.2)
unknown	2 (6.4)
Other diseases	
diabetes	6 (19.3)
hypertension	5 (16.1)
renal cyst	1 (3.2)
Peptic ulcer	7 (22.5)
Portal hypertension	10 (32.2)

with massive omental adhesions, and macroscopic findings of portal hypertension. He received a liver biopsy and was postoperatively classified as Child–Pugh Class A. He had an uneventful postoperative course and is alive and stable at 5 years follow-up.

Liver cirrhosis was preoperatively diagnosed in all Child–Pugh B patients and in 11 (55%) Child–Pugh A patients. Mean duration of the biliary symptoms was 120 months, range 1 month to 16 years. Two patients presented recurrent episodes of jaundice and acute pancreatitis during the 2 months before the operation.

Statistical analysis revealed no difference in terms of age, sex, and nutritional status between nonoperated and the laparoscopically treated patient. Associated diseases and Child–Pugh C status were significantly higher ( $p < 0.001$ ) in unoperated patients. Cirrhotic patients were similar to noncirrhotics in terms of age ( $59.9 \pm 10.3$  vs.  $58.1 \pm 10.9$ ) and sex (male: 51.6% vs. 50.1%). Acute cholecystitis has a similar frequency in cirrhotics and noncirrhotics (3.2% vs. 4.1%, respectively). Bile duct lithiasis and acute pancreatitis were significantly more frequent in cirrhotics (6.4% vs. 3.7%,  $p < 0.001$ ; 6.4% vs. 0.3%,  $p < 0.001$ , respectively). Ultrasound preoperative diagnostic accuracy for gallstones was 100%. Intravenous cholangiography preoperatively performed in 8/32 cases showed an excluded gallbladder in 5 (62.5%) patients. Endoscopic papillotomy and stone extraction combined with laparoscopic cholecystectomy was performed in 2 patients with cholecysto-choledocholithiasis. One patient received this treatment under general anesthesia in a single session. In the other case, the laparoscopic cholecystectomy was performed 48 h after the endoscopic clearing of the bile duct. Intraoperative cholangiography was not performed.

Two patients presented at laparoscopic exploration with scleroatrophic gallbladder and severe inflammatory adhesions involving the Hartmann pouch and the bile duct. Intraoperative technical problems occurred in 5 (16.1%) patients: biliary spillage from gallbladder wall ( $n = 1$ ) and liver-bed bleeding ( $n = 4$ ). Liver-bed bleeding was significantly more frequent in cirrhotic patients versus noncirrhotics ( $p < 0.001$ ). In 8 patients, a drainage was positioned within the Winslow foramen. The gallbladder was extracted through the umbilical ( $n = 18$ ) or subxiphoid trocar ( $n = 13$ ) in patients operated on by French or left-side approach, respectively, and 2 patients required the extension of the trocar incision. Mean operative time was 90 min, range 50–180 (not statistically different from noncirrhotics). One patient required intraoperative blood (1 unit) and platelet-suspension transfusion. Postoperative transfusion was not required. Seven (22.6%) patients presented 8 postoperative complications (Class II according Clavien): right-side lung effusion ( $n = 2$ ), ascites ( $n = 2$ ), temporary worsening of Child–Pugh status ( $n = 2$ ), hyperosmotic coma ( $n = 1$ ), and umbilical hernia ( $n = 1$ ). Postoperative complications were significantly more frequent in Child B patients compared with those presented in Child A ( $p < 0.01$ ). None of these complications were present in noncirrhotic patients undergoing laparoscopic cholecystectomy. Mean hospital stay was  $3 \pm 1$  days ( $p = NS$  vs. noncirrhotics) in noncomplicated cases, with complete rehabilitation at discharge.

## DISCUSSION

The incidence of gallstones in cirrhotic patients is doubled compared to the population of noncirrhotics.<sup>28,29</sup> In the majority of cirrhotics, biliary stones are clinically silent.<sup>6,7,30</sup> This condition does not require cholecystectomy. A minority of cirrhotics present with clinical symptoms or complications with their gallstones, few of these die.<sup>6,7,30,33</sup> Recently, emergency treatment by peroral endoscopic papillotomy for septic cholangitis or cholecysto-choledocholithiasis in cirrhotics has reported a mortality rate between 7.1 and 22.2% of the operated cases (Table 4).<sup>33–36</sup> The indication for elective cholecystectomy and the role of laparoscopy for this group of symptomatic patients both pertain to a gray area of gastroenterology.

The negative attitude in indicating gallbladder removal in cirrhotics has to be explained by the initial discouraging results of the cholecystectomy literature in cirrhotic patients: it was reported as the operation with the highest mortality for benign biliary disease.<sup>8–13</sup> Alternative techniques such as cholecysto-lithotomy, cholecystostomy, and subtotal cholecystectomy have been proposed.<sup>37,38</sup>

In 1984, Garrison contributed to clarifying the problem of high mortality in laparotomy in cirrhotics operated on for various indications confirming the predictive value of Child classification.<sup>9</sup> He also identified septic status and emergency as the single preoperative conditions highly predictive of negative prognosis.

## LAPAROSCOPIC CHOLECYSTECTOMY AND CIRRHOSIS

TABLE 4. BILIARY LITHIASIS IN CIRRHOTIC PATIENTS: MORBILITY AND MORTALITY OF ENDOSCOPIC PAPILOTOMY—LITERATURE REVIEW

Author (ref)	Patients (n.)	Morbidity (%)	Mortality (%)
Sugiyama (33)	7	14.3	14.3
Wu (34)	14	7.1	7.1
Moreira (35)	18	13.3	16.6
Chijiwa (36)	9	22.2	22.2

In 1985, Block, retrospectively classifying cirrhotic patients undergoing cholecystectomy according Child criteria, reported a mortality of 23.5% in Child C versus 0 in Child A.<sup>13</sup> The most common cause of death was found to be liver-bed bleeding requiring transfusions, ultimately leading to hepatic failure and sepsis. A definitive correlation was made between intraoperative blood loss, postoperative mortality, and Child classification. Morbidity of 12.2% in this series was due to wound infection and dehiscence.

Following these fundamental studies, other publications have recently reported results of cholecystectomy in cirrhotics Child A or B similar to those obtained in noncirrhotics.<sup>33,34,40,41</sup> International literature data of those studies using Child classification to analyze results are summarized in Table 5.<sup>13,33,34,39,41,43</sup> Absolute contraindication to cholecystectomy in cirrhotics are high anesthesiological risk and hepatocellular carcinoma (HCC), although recently hepatic resection and cholecystectomy as a combined operation has been reported.<sup>4</sup> Child C status is a relative contraindication because some of these patients may regress to B status under intensive medical treatment, depending on their functional hepatic reserve. For those patients not improving their metabolic and clinical status, conservative treatment eventually followed by liver transplantation should be considered.

In the retrospective evaluation of the collected series reported in this study, the learning period with laparoscopic surgery has been considered by surgeons a technical limitation in 4 patients. Three patients, in fact, received straightforward laparotomic cholecystectomy. In the last, which was explored laparoscopi-

TABLE 5. BILIARY LITHIASIS: MORTALITY AND MORBILITY OF LAPAROTOMIC ACCESS

Author (ref)	Year	Tot. Pts.	Child Class*	Morbidity (%)	Mortality (%)
Bloch (13)	1985	49	A = 21 B = 11 C = 17	A = 19 B = 0 C = 11, 8	A = 0 B = 9 C = 23, 5
Nuzzo (41)	1986	42	A = 35 B = 2 C = 5	A = 20 B = 0 C = 80	A = 0 B = 0 C = 0
Calise (42)	1986	11	A = 4 B = 0 C = 7	A = NR B = 0 B = 100	A = 0 B = 0 C = 100
Wu (34)	1993	87	A = 39 B = 14 C = 34	A = 2, 5 B = 7, 1 C = 32, 4	A = 0 B = 0 C = 11, 8
Ishizaki (38)	1993	34	A + B = 19 C = 15	A + B = 10, 5 C = 60	A + B = 0 C = 26, 6
Isozaki (40)	1993	23	A = 4 B = 10 C = 9	A = 0 B = 70 C = 78	A = 0 B = 0 C = 33, 3
Sugiyama (33)	1993	9	A = 2 B = 2 C = 5	A + B + C = 66, 7	A = 0 B = 0 C = 80

\*Includes Child and Child-Pugh score.

cally without pre-operative diagnosis of cirrhosis, the endoscopic procedure was abandoned because of the risk of a difficult dissection for a scleroatrophic gallbladder with portal hypertension.

Child A patients with ( $n = 11$ ) or without ( $n = 9$ ) preoperative diagnosis of liver disease and Child B ( $n = 11$ ) patients, 35.4% of them with findings of portal hypertension, all received successful laparoscopic cholecystectomies. Technically, the only relevant problem has been liver-bed bleeding which, in 1 case, required intraoperative blood and platelet transfusion. Bleeding, in general, has been controlled with mono or bipolar coagulation.

In two cirrhotic patients with cholecysto-coledocholithiasis, laparoscopic cholecystectomy was successfully combined with endoscopic papillotomy and stone extraction. Although the numbers are small, results of this minimal invasive approach for complicated biliary lithiasis in cirrhotics should be compared with those obtained in patients by open cholecystectomy and bile duct exploration. This manouver is a well-known negative predictive factor of postoperative outcome aggravating morbidity and mortality, especially in high-risk patients.<sup>9,10,12,43</sup> During the early stage of laparoscopic cholecystectomy, cirrhosis was considered by some as an absolute contraindication for this procedure. As far as our knowledge, literature data currently available are reported in Table 6.

In conclusion, clinical monitoring of cirrhotic patients (prevention of bleeding from esophageal varices, early diagnosis, and treatment of HCC, etc.) prolongs survival and improves quality of life. Although symptomatic biliary lithiasis is a minor problem in the natural history of hepatic cirrhosis, it is responsible for morbidity and mortality in this group of patients.<sup>12,43</sup>

Technically, results of the present study suggest that laparoscopic cholecystectomy is feasible in cirrhotics without mortality and low morbidity. Portal hypertension with hypervascularization of the gallbladder pedicle and liver bed, coagulopathy associated with liver cirrhosis, do not represent a technical limitation for laparoscopic approach. It seems to offer the following advantages:

1. Reduces blood loss and wound complications.
2. Allows detailed exploration to evaluate the risk/benefit ratio considering the surgical anatomy and complexity of each case, leaving the option of nonoperative strategy without risks.
3. Confirms the quick postoperative rehabilitation and short hospital stay already demonstrated in noncirrhotic patients.
4. Clinically, we definitively suggest a more liberal use of laparoscopic cholecystectomy by surgeons routinely performing laparoscopic operations in Child A and Child B cirrhotic patients for symptomatic and complicated biliary stones.

TABLE 6. VIDEOLAPAROSCOPIC CHOLECYSTECTOMY IN CIRRHOTIC PATIENTS: INTERNATIONAL LITERATURE REVIEW

<i>Patients n.</i>	<i>Fugger</i> (20)	<i>Bickel</i> (21)	<i>Gentileschi</i> (22)	<i>Yerdel</i> (23)	<i>Beppu</i> (24)	<i>Lacy</i> (25)
	2	1	1	4	4	11
Cirrhosis etiology	NR	NR	alcoholic	Post-hepatitis	NR	NR
Child-Pugh class	NR	NR	B	3A/1C	NR	7A 3B 1C
Clinical appearance	BC	AC	BC	BC	AC	BC
Portal hypertension	NR	2/2	present	4/4	NR	NR
Intraoperative complications	NR	NO	NO	NO	NR	2/11
Postoperative complications	NR	NO	NO	NO	NR	NR
Hospital stay (days)	NR	2-4	6	7-15	NR	1-6

NR, not reported, BC, biliary cholics; AC, acute cholecystitis.

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### REFERENCES

1. Lucariello A, Francica G, Morante R, Cozzolino G, Morisco E, Romano V, Cacciatore L: Cholelithiasis and chronic liver disease. *Ital J Gastroenterol* 1989;21:59–63.
2. Acalovschi M, Badea R, Dumitrascu D, Varga C: Prevalence of gallstones in liver cirrhosis: A sonographic survey. *Am J Gastroenterol* 1988;9:954–956.
3. Lu SN, Chang WY, Wang LY, Hsieh MY, Chuang WL, Chen SC, Su WP, Tai TY, Wu MM, Chen CJ: Risk factors for gallstones among Chinese in Taiwan. A community sonographic survey. *J Clin Gastroenterol* 1990;12:542–546.
4. Nagasue N, Kohno H, Chang YC, Taniura H, Yamanoi A, Uchida M, Kimoto T, Takemoto Y, Nakamura T, Yukaya H: Liver resection for hepatocellular carcinoma. Results of 229 consecutive patients during 11 years. *Ann Surg* 1993;217:375–384.
5. Terblanche J, Burroughs AK, Hobbs KEF: Controversies in the management of bleeding esophageal varices. *N Engl J Med* 1989;320:1393–1398.
6. Fornari F, Civardi G, Buscarini E, Cavanna L, Imberti D, Rossi S, Sbolli G, Di Stasi M, Buscarini L: Cirrhosis of the liver. A risk factor for development of cholelithiasis in males. *Dig Dis Sci* 1990;35:1403–1408.
7. Conte D, Barisani D, Mandelli C, Bodini P, Borzio M, Pistoso S, Segala M, Aimo GP, Fraquelli M, Bianchi PA: Cholelithiasis in cirrhosis: Analysis of 500 cases. *Am J Gastroenterol* 1991;86:1629–1632.
8. Dobernek RC, Sterling WA Jr, Allison DC: Morbidity and mortality after operation in nonbleeding cirrhotic patients. *Am J Surg* 1983;146:306–309.
9. Garrison RN, Cryer HM, Howard DA, Polk HC Jr: Clarification of risk factors for abdominal operations in patients with hepatic cirrhosis. *Ann Surg* 1984;199:648–655.
10. Schwartz SI: Biliary tract surgery and cirrhosis: A critical combination. *Surgery* 1981;90:577–582.
11. Aranha GV, Sontag SJ, Greenlee HB: Cholecystectomy in cirrhotic patients: A formidable operation. *Am J Surg* 1982;143:55–60.
12. McSherry CK, Glenn F: The incidence and causes of death following surgery for non-malignant biliary tract disease. *Ann Surg* 1980;191:271–275.
13. Bloch RS, Allaben RD, Walt AJ: Cholecystectomy in patients with cirrhosis. A surgical challenge. *Arch Surg* 1985;120:669–672.
14. Talamini MA: Controversies in laparoscopic cholecystectomy: Contraindications, cholangiography, pregnancy and avoidance of complications. *Baillieres Clin Gastroenterol* 1993;7:881–896.
15. The Southern Surgeons Club (Meyers WC): A prospective analysis of 1518 laparoscopic cholecystectomies. *N Engl J Med* 1991;324:1073–1078.
16. Zucker KA, Bailey RW, Flowers J: Laparoscopic management of acute and chronic cholecystitis. *Surg Clin N Am* 1992;72:1045–1067.
17. Angrisani L, Lorenzo M, De Palma G, Sivero G, Catanzano C, Persico G, Tesauo B: Laparoscopic cholecystectomy in obese patients compared with nonobese. *Surg Laparosc Endosc* 1995;5:197–201.
18. Carrol BJ, Phillips EH, Daykhovsky L, Grundfest WS, Gershman A, Fallas M, Chandra M: Laparoscopic cholecystectomy: An effective approach to the common duct. *J Laparoendosc Surg* 1992;2:15–21.
19. Davenport M, Howard ER, Green DW: Minimally invasive surgery in sickle cell disease. *Br Med J* 1991;303(6796):249.
20. Fugger R, Klimann S, Gnant M, Herbst F, Schulz F, Fritsch A: Laparoskopische cholezystektomie. Auswertung einer prospektiven beobachtungsstudie. *Wien Klin Wochenschr* 1992;104:640–643.
21. Bickel A, Shtamler B: Laparoscopic subtotal cholecystectomy. *J Laparoendosc Surg* 1993;3:365–367.
22. Gentileschi P, Forlini A, Russo F, Rossi P: La colecistectomia laparoscopica nel paziente cirrotico: revisione della letteratura e presentazione di un caso clinico. *Chir Gen* 1993;XIV:487–490.

23. Yerdel MA, Tsuge H, Mimura H, Sakagami K, Mori M, Orita K: Laparoscopic cholecystectomy in cirrhotic patients: Expanding indications. *Surg Laparosc Endosc* 1993;3(3):180–183.
24. Beppu T, Futagawa S, Nakanishi R, Ourea S, Ohashi K: Laparoscopic cholecystectomy for gallstones in liver cirrhosis. *Surg Endosc* 1994;8:554A.
25. Lacy AM, Balaguer C, Andrade E, Garcia-Valdecasas JC, Grande L, Fuster J, Bosch J, Visa J: Laparoscopic cholecystectomy in cirrhotic patients. Indication or contraindication? *Surg Endosc* 1995;9:407–408.
26. Pugh RNH, Murray-Lyon IM, Dawson JL, Pietroni MC, Williams R: Transection of the esophagus for bleeding oesophageal varices. *Br J Surg* 1973;60:646–649.
27. Clavien PA, Sanabria JR, Strasberg SM: Proposed classification of complications of surgery with examples of utility in cholecystectomy. *Surgery* 1992;111:518–526.
28. Nicholas P, Rinaudo PA, Conn HO: Increased incidence of cholelithiasis in Laennec cirrhosis. A postmortem evaluation of pathogenesis. *Gastroenterol* 1972;63:112–121.
29. Bouchier IAD: Postmortem study of the frequency of gallstones in patients with cirrhosis of the liver. *Gut* 1969;10:705–710.
30. Gracie WA, Ransohoff DF: The natural history of silent gallstones. The innocent gallstone is not a myth. *N Engl J Med* 1982;307:798–800.
31. McSherry CK, Ferstenberg H, Calhoun WF, Lahman E, Virshup M: The natural history of diagnosed gallstone disease in symptomatic and asymptomatic patients. *Ann Surg* 1985;202:59–63.
32. Castaing D, Houssin D, Lemoine J, Bismuth H: Surgical management of gallstones in cirrhotic patients. *Am J Surg* 1983;146:310–313.
33. Sugiyama M, Atomi Y, Kuroda A, Muto T: Treatment of choledocholithiasis in patients with liver cirrhosis. Surgical treatment or endoscopic sphincterotomy? *Ann Surg* 1993;218:68–73.
34. Wu CC, Hwang CJ, Liu TJ: Definitive surgical treatment for cholelithiasis in selective patients with liver cirrhosis. *Int Surg* 1993;78:127–130.
35. Moreira VF, Arribas R, Sanroman AL, Merono E, Larena C, Garcia M, Torres G: Choledocolithiasis in cirrhotic patients: Is endoscopic sphincterotomy the safest choice? *Am J Gastroenterol* 1991;86:1006–1010.
36. Chijiwa K, Kozaki N, Naito T, Kameoka N, Tanaka M: Treatment of choice for choledocholithiasis in patients with acute obstructive suppurative cholangitis and liver cirrhosis. *Am J Surg* 1995;170:356–360.
37. Bornman PC, Terblanche J: Subtotal cholecystectomy for the difficult gallbladder in portal hypertension and cholecystitis. *Surgery* 1985;98:1–6.
38. Ishizaki Y, Bandai Y, Shimomura K, Shimada K, Hashimoto M, Sanjo K, Idezuki Y: Management of gallstones in cirrhotic patients. *Surg Today* 1993;23:36–39.
39. Hamid S, Siddiqui M, Jafri W, Shah H, Khan H, Ahmed M: Outcome of biliary tract surgery in unknown cirrhotics: A case control study. *Ann Royal Coll Surg Engl* 1993;75:434–436.
40. Isozaki H, Okajima K, Morita S, Ishibashi T, Tanimura M, Hara H, Takeda Y: Surgery for cholelithiasis in cirrhotic patients. *Surg Today* 1993;23:504–508.
41. Nuzzo G, Murazio M, Costamagna G, Magistrelli P, Coppola R, Maseti R, Puglionisi A: Chirurgia della litiasi biliare nel cirrotico: Analisi di 42 casi. *Chir Epatobil* 1986;5:73–78.
42. Calise F, Napoli V, Tricarico A, Sicoli F, Monti G: Urgenze chirurgiche nel paziente cirrotico non correlate all'epatopatia. Analisi di un'esperienza di 78 casi. *Urg Chir Comm* 1986;9:419–422.
43. Cucchiario G, Watters CR, Rossitch JC, Meyers WC: Deaths from gallstones. Incidence and associated clinical factors. *Ann Surg* 1989;209:149–151.

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