

Outcome of gallbladder preservation in surgical management of primary bile duct stones

Ming-Guo Tian, Wei-Jin Shi, Xin-Yuan Wen, Hai-Wen Yu, Jing-Shan Huo, Dong-Feng Zhou

Ming-Guo Tian, Xin-Yuan Wen, Hai-Wen Yu, Jing-Shan Huo, Dong-Feng Zhou, Department of Hepatobiliary Surgery, Affiliated Hospital of Jining Medical College, Jining 272129, Shandong Province, China

Wei-Jin Shi, Department of General Surgery, Ren Ji Hospital of Shanghai Second Medical University, Shanghai 200001, China

Correspondence to: Dr. Ming-Guo Tian, Department of Hepatobiliary Surgery, Affiliated Hospital of Jining Medical College, Jining City 272129, Shandong Province, China. tian88@hotmail.com

Telephone: +86-537-2903270 **Fax:** +86-537-2213030

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Abstract

AIM: To evaluate the methods and outcome of gallbladder preservation in surgical treatment of primary bile duct stones.

METHODS: Thirty-five patients with primary bile duct stones and intact gallbladders received stone extraction by two operative approaches, 23 done through the intrahepatic duct stump (RBD-IDS, the RBD-IDS group) after partial hepatectomy and 12 through the hepatic parenchyma by retrograde puncture (RBD-RP, the RBD-RP group). The gallbladders were preserved and the common bile duct (CBD) incisions were primarily closed. The patients were examined postoperatively by direct cholangiography and followed up by ultrasonography once every six months.

RESULTS: In the RBD-IDS group, residual bile duct stones were found in three patients, which were cleared by a combination of fibrocholedochoscopic extraction and lithotripsy through the drainage tracts. The tubes were removed on postoperative day 22 (range: 16-42 days). In the RBD-RP group, one patient developed hemobilia and was cured by conservative therapy. The tubes were removed on postoperative day 8 (range: 7-11 days). Postoperative cholangiography showed that all the gallbladders were well opacified, contractile and smooth. During 54 (range: 6-120 months) months of follow-up, six patients had mildly thickened cholecystic walls without related symptoms and further changes, two underwent laparotomies because of adhesive intestinal obstruction and gastric cancer respectively, three died of cardiopulmonary diseases. No stones were found in all the preserved gallbladders.

CONCLUSION: The intact gallbladders preserved after surgical extraction of primary bile duct stones will not develop gallstones. Retrograde biliary drainage is an optimal approach for gallbladder preservation.

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INTRODUCTION

The gallbladder is important for digestion. Cholecystectomy

can give rise to postoperative symptoms such as flatulent dyspepsia, abdominal pain, distention, heart burn, obstipation and diarrhea^[1-5], and may lead to increase of incidence of carcinoma of the proximal colon^[6]. Many patients with primary bile duct stones do not have stones in the gallbladders. However, as T-tube drainage after common bile duct (CBD) exploration may cause adhesion and subsequent cholecystitis and stone formation, these intact gallbladders are often concomitantly resected. Since 1991, we have adopted retrograde biliary drainage instead of T-tube drainage for primary bile duct stones. Thirty-five intact gallbladders have been thus preserved.

MATERIALS AND METHODS

Patients

Thirty-five patients with primary bile duct stones and intact gallbladders received retrograde biliary drainage (RBD) between December 1991 and December 2001. The age of the patients ranged from 29 to 70 (mean 44) years. Preoperative diagnosis was made by ultrasonography and in some cases by a combination with percutaneous transhepatic cholangiography (PTC). During the operation, the gallbladders were normal in appearance and no stones and lesions were found by intraoperative ultrasonography (IOUS). Stones extracted from the bile ducts had the typical features of pigment stones with brown color and soft quality. Stone distribution and the operation methods are shown in Table 1. Postoperatively, all the patients were routinely examined by direct cholangiography and followed up once every six months by ultrasonography. The follow-up duration ranged from 6 to 120 (mean 54 months) months.

Table 1 Stone distribution and operation methods

Stone distribution	Cases	Operation methods	Cases
Left hepatic	11	RBD-IDS&II, III segmentectomy	15
Extrahepatic	8	RBD-RP	12
Intra- and extrahepatic	8	RBD-IDS & left hepatectomy	6
Bilateral hepatic	7	RBD-IDS & III segmentectomy	1
Segment VII	1	RBD-IDS & VII segmentectomy	1
Total	35	Total	35

Notes: RBD-RP: retrograde biliary drainage by retrograde puncture, RBD-IDS: retrograde biliary drainage through intrahepatic duct stump.

Methods

RBD through intrahepatic duct stump (RBD-IDS) After partial hepatectomy for intrahepatic bile duct stones, biliary tract exploration was done by fibrocholedochoscopy through the intrahepatic bile duct stump. The CBD was incised in the patient with big concurrent extrahepatic bile duct stones which could not be extracted retrogradely. The RBD tube was placed through the hepatic duct stump and the CBD incision was closed primarily. In case of suspected residual stones, the RBD

tube was sheathed by a tube of larger bore from the abdominal wall to the lumen of the stump.

RBD by retrograde puncture (RBD-RP) After CBD exploration and stone clearance, a guide sheath was inserted into the right hepatic duct, with the tip as deep in the duct as possible. The direction was regulated with IOUS to avoid injury of large blood vessels. An 8Fr cannula fitting over a matching stylet was inserted through the guide sheath and pushed forward until the tip came out of the liver. From the other end, an 8Fr Silastic drainage tube was inserted over the guide wire which was introduced through the cannula. When the tip of the drainage tube emerged in the CBD incision, the guide wire, retrograde cannula and guide sheath were retracted together. The end of the drainage tube was brought out of the abdominal wall subcostally. The CBD incision was primarily closed. Intraoperative cholangiography was done to rule out residual stones in some suspected cases.

RESULTS

In the RBD-IDS group, postoperative drainage of bile was 340-780 ml/d (mean 440 ± 140 ml/d). The drainage tubes were removed on postoperative day 16-42 (mean 22 days). Residual stones were found in three cases. After four weeks, stone extraction started through the tracts with the help of fibrocholedochoscope and ultrasonic lithotripter. All patients had the stones cleared after 2-5 sessions of extraction. In the RBD-RP group, postoperative drainage of bile was 150-800 ml/d (mean 520 ± 210 ml/d). Bile drainage was interrupted intermittently in two patients owing to blockage of the tubes and it resumed to draining after flushing with normal saline. The drainage tubes were removed on postoperative day 7-11 (mean 8 days). Hemobilia occurred in one earlier treated patient. She recovered soon after conservative therapy. No tube dislocation or residual stones occurred in this series.

Postoperative cholangiography of both methods showed that the extrahepatic bile ducts had no stricture at the sites of CBD incisions. The preserved gallbladders were well opacified, contractile and smooth (Figure 1). During the follow-up, six patients were found to have rough and mildly thickened cholecystic walls at 12-36 months after operation. However, these patients had no related symptoms and no further changes afterwards. Two patients underwent laparotomies because of adhesive intestinal obstruction and gastric cancer, respectively. Three died of cardiopulmonary diseases. No stones occurred in the preserved gallbladders.



Figure 1 Direct cholangiogram showed that the preserved gallbladder was well opacified and contractile.

DISCUSSION

A high recurrent rate of gallbladder stone after successful extracorporeal shock wave lithotripsy and dissolution has been

documented by many reports^[7-11]. However, the gallbladders after endoscopic sphincterotomy for common bile duct calculi rarely formed stones^[12-14]. One explanation for the difference of the results is that sphincterotomy decreases fasting volume of the gallbladder and increases its contraction ability^[15, 16]. Another is that the primary bile duct pigment stone is different from the cholecystic cholesterol one in both epidemiology^[17-21] and pathogenesis^[22-26]. It is therefore generally considered that both kinds of stones are different diseases^[26]. The results of this study also showed that the gallbladders preserved during operation of the patients with primary bile duct stones had no tendency to form stones. As most gallbladders of the patients with primary intrahepatic bile duct stones are not affected, concomitant cholecystectomy during surgical extraction of stones or liver resection in these patients seems unjustified.

T-tube drainage after choledochostomy or after liver resection is a conventional method for primary bile duct stones. However, many reports in recent decades have demonstrated the problems it brought about^[27, 28]. The long tube-bearing not only results in inconvenience, but also causes pathological changes of the CBD^[29]. T-tube tract can also adhere to the gallbladder and impair its function. Therefore, intact gallbladder is often concomitantly resected during these operations. In recent years, several alternatives to T-tube drainage have been reported^[30-33]. However, preservation of the gallbladder during surgical management of primary bile duct stones and its long-term outcome have not been reported yet. After retrograde biliary drainage, the function of the gallbladder will not be impaired by tube stimulation or tube induced local adhesion because the gallbladder does not contact the drainage tube. This study also demonstrated that both methods had respective advantages over T-tube placement in residual stone management and the duration of tube-bearing.

Therefore, we conclude that retrograde biliary drainage is an optimal method for preservation of gallbladder during surgical management of primary bile duct stones.

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