A “One-Stage” Laparoscopic Procedure for Treating Choledocholithiasis

Sebastiano Lacitignola, MD, Martino Minardi, MD, Roberto Palmieri, MD, Achille Nigri, MD, Luigi Caliandro, MD, Anselmo Rosellini, MD

ABSTRACT

Objectives: A minimally invasive approach is considered the treatment of choice for gallbladder stones. We report our experience with the treatment of choledocholithiasis.

Methods: From January 1993 to December 2002, 3118 patients underwent minimally invasive surgery for symptomatic gallstones, 2681 for gallbladder stones and 437 (14%) for cholecysto-choledocholithiasis.

Results: We performed endoscopic retrograde cholangiopancreatography and endoscopic sphincterotomy in 71 patients (18.7%) with high operative risks, transcystic clearance and transcystic drainage in 96 cases (26.2%) and transcholedochal clearance with a T-tube in 270 cases (73.8%). In 2 patients, residual stones were removed with endoscopic retrograde cholangiopancreatography and endoscopic sphincterotomy. Postoperative stay ranged from 4 days to 12 days. No morbidity or mortality occurred.

Conclusion: In our experience, “one-stage” laparoscopic procedure for cholecystocholedocholithiasis is safe and effective in skilled hands.

Key Words: Choledocholithiasis, Transcystic clearance, Transcholedochal clearance.

INTRODUCTION

The “ideal treatment” for asymptomatic bile duct stones found during laparoscopic cholecystectomy has yet to be established. The introduction of laparoscopic cholecystectomy (LC) has not changed the basic rationale for the treatment of cholelithiasis, but it has for common bile duct stones (CBDS). The main options are1 laparoscopic bile duct exploration through the cystic duct or choledochotomy;1,2 conversion to open exploration;3 postoperative endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES);3,4 and4 observation alone.

Different surgeons deal with this according to their personal preferences and hospital protocols. At our institution, the tendency is to treat bile duct stones in one stage whether the choledocholithiasis is diagnosed preoperatively or found during the procedure.

METHODS

Between January 1993 and December 2002, 3118 patients with symptomatic gallstones underwent laparoscopic cholecystectomy. Intraoperative cholangiography (IOC) was attempted during every LC.

Preoperative evidence of choledocholithiasis was defined as a history of jaundice or pancreatitis, elevated total serum bilirubin (>1.0 mg/dL), alkaline phosphatase (>147 U/dL), or amylase (>115 U/dL), or preoperative imaging (ultrasound) demonstrating choledocholithiasis or common bile duct >7 mm in diameter. If none of these factors is present, IOC is considered routine. Choledocholithiasis was present in 437 patients (14%). ERCP was performed preoperatively in 82 of the 437 patients (18.7%) in whom the history, blood tests, and imaging studies strongly suggested bile duct stones. These patients were also compromised with respiratory problems or cardiac disease that increased the operating risk. ERCP with ES was successful in 71 patients. Therefore, 366 patients were operated on laparoscopically: transcystic clearance with transcystic drainage was performed in 96 patients, and transcholedochal clearance with T-tube placement was performed for 270 patients.
All patients had intraoperative cholangioscopy utilizing a flexible 7 F fiberscope through the cystic duct or via a choledochotomy to confirm clearance of the biliary system.

RESULTS

Bile duct stones were detected during the operation in all 366 patients. The mean age of patients was 61 years (range, 31 to 84); 138 were men and 228 were women. Preoperatively, 44 patients (12%) had clinical, laboratory, or imaging evidence of stones, and operative cholangiography in these patients showed the number of stones to be from 1 to 5 with a diameter of 3 mm to 7 mm.

A transcystic catheter was placed in 96 patients (26.2%) and removed after 2 weeks. A T-tube was placed in 270 patients (73.8%) and removed after 3 weeks. In all cases, radiologic survey was performed before drain removal. With transcystic and transcholedochal drainage in situ, no patients developed obstructive jaundice, acute cholangitis, or pancreatitis, and postoperative cholangiography in these patients showed the number of stones to be from 1 to 5 with a diameter of 3 mm to 7 mm.

A transcystic catheter was placed in 96 patients (26.2%) and removed after 2 weeks. A T-tube was placed in 270 patients (73.8%) and removed after 3 weeks. In all cases, radiologic survey was performed before drain removal.

DISCUSSION

Excluding acute cholecystitis, choledocholithiasis is the most common complication of gallstones and occurs in at least 10% to 15% of all patients who undergo cholecystectomy.5 This prevalence increases dramatically in elderly patients, reaching more than 48% in those who require cholecystectomy patients who are over age 70.6 Not only are biliary tract surgeons of today expected to perform laparoscopic cholecystectomy with the same low morbidity, mortality, and efficacy as in open surgery, but they also have an obligation to manage all stone-related biliary tract disease as efficiently, or more efficiently, than in the past.7,8 This responsibility includes surgical management of choledocholithiasis.

It is our opinion that the surgeon must manage even these complicated problems in the least invasive manner possible. Certainly, treatment in one session during laparoscopic cholecystectomy fulfills this requirement.

More than one third of all cases of choledocholithiasis identified during cholecystectomy are unsuspected because preoperative history, clinical signs, and laboratory data are equivocal or normal.9,10 In an early series of 500 consecutive cases (open cholecystectomy) with routine IOC, 5% of the patients were found to have unsuspected calculi.11 A multi-institutional evaluation of the laparoscopic treatment of common bile duct stones also confirmed a high prevalence of unsuspected intraductal calculi.12 In the present series, 44 patients had choledocholithiasis diagnosed inadvertently because of IOC. This strengthens our conviction supporting routine use of IOC. But the greatest value of routine cholangiography is the possibility of recognizing anomalies of the biliary system and detection/documentation of bile duct injuries during surgery. In our series we had only one injury (0.03%) of the hepatic duct that was repaired immediately.

Intraoperative choledochoscopy is an important part of the treatment of choledocholithiasis, to make sure that all stones are identified and removed.

We are convinced that it is important to drain the extrahepatic biliary tree in all patients with choledocholithiasis. In accordance with other authors,13 we decompress the extrahepatic biliary system after every common bile duct exploration because of the potential for obstruction, secondary to edema at the lower end of the bile duct secondary to surgical manipulation. No fistula or leaks occurred in our series. All patients had normal activity with the catheter in situ.

CONCLUSION

The management of choledocholithiasis has reached a point in its evolution where more options are available than some institutions can support. Open common bile duct exploration and stone extraction have enjoyed satisfactory results for decades. The advances over the last 10 years to 15 years in laparoscopic technology have created a seductive atmosphere in which laparoscopy is being considered for managing choledocholithiasis. However, we believe that, when it is possible, it is appropriate to resolve a patient’s pathologic condition in one stage, making use of any method the surgeon has available.

References:

1. Petelin J. Laparoscopic approach to common duct pathology. *Surg Lap Endosc.* 1991;1:33–41.
2. Martin J, Bailey IS, Rhodes M, O’Rourke N, Nathanson L, Fielding G. Towards T-tube free laparoscopic bile duct explora-
tion. A methodologic evolution during 300 consecutive procedures. Ann Surg. 1998;228:29–34.

3. Rhodes M, Sussman L, Cohen L, Lewis MP. Randomised trial of laparoscopic exploration of common bile duct versus postoperative endoscopic retrograde cholangiography for common bile duct stones. Lancet. 1998;351:159–161.

4. Liu CL, Lai ECS, Chu KM, Fan ST, Wong J. Combined laparoscopic approach in patients with cholelithiasis and choledocholithiasis. Surgery. 1996;119:534–537.

5. Fink A. Current dilemmas in management of common duct stones. Surg Endosc. 1993;7:285–291.

6. Hermann RE. The spectrum of biliary stone disease. Am J Surg. 1989;158:171–173.

7. Moossa A, Lavelle-Jones M, Scott M. Surgical complications. In: Sabiston D, ed. Textbook of Surgery. Philadelphia, PA: WB Saunders; 1986;331–345.

8. Meyers W. The Southern Surgeons Club: a prospective analysis of 1518 cholecystectomies. N Eng J Med. 1991;324:1073–1078.

9. Roush TS, Traverso LW. Management and long-term follow-up of patients with positive cholangiograms during laparoscopic cholecystectomy. Am J Surg. 1995;169:484–487.

10. Arregui M, Navarrete J, Davis CJ, Hammond JC, Barteau J. The evolving role of ERCP and laparoscopic common bile duct exploration in the era of laparoscopic cholecystectomy. Int Surg. 1994;79:188–194.

11. Berci G, Hamlin A. Postoperative removal of retained stones through the T-tube tract. In: Cushieri A, Berci G, eds. Common Duct Exploration. Boston, MA: Martinus Nijhoff; 1984;89.

12. Berci G, Morgenstern L. Laparoscopic management of common duct stones. A multi-institutional SAGES study. Surg Endosc. 1994;8:1168–1175.

13. Holdsworth RJ, Sadek SA, Ambikar S. Dynamic of bile flow through the human choledochal sphincter following exploration of the common bile duct. World J Surg. 1989;13:300–306.