

Management and outcome of residual bile duct stones following cholecystectomy at a tertiary referral centre in Sri Lanka

A S D Liyanage¹, B D Gamage² and W M M de Silva³

(Index words: ERCP, endoscopic sphincterotomy, open cholecystectomy, laparoscopic cholecystectomy)

Abstract

Background In spite of the advent of pre- and per-operative imaging techniques, the problem of residual bile duct stones following laparoscopic or open cholecystectomy still exists with a reported frequency of 2-10% [1]. Endoscopic stone extraction is a minimally invasive technique which is fast becoming popular in the management of residual ductal stones.

Objective To review the experience in our unit with regard to clinical presentation and the outcome following endoscopic management of residual bile duct stones.

Design Retrospective descriptive study

Setting Patients referred to a tertiary referral centre with suspected residual bile duct stones following open or laparoscopic cholecystectomy from 5 March 2002 to 31 December 2006

Patients and method 56 patients with suspected residual bile duct stones were reviewed with regard to clinical presentation, stone profile, success rate and outcome.

Results Mean age of the sample was 43.2 years. Female to male ratio was 34/22. 4 (73.3%). Main presenting symptom was epigastric or right hypochondrial pain (39.2%). Presence of residual stones or gravel noted in 91% (51) during ERCP. Complete stone extraction was achieved in 83.9% (47). All these patients became completely asymptomatic. Four patients had ERCP related morbidity. There were no deaths. Longest follow up was 38 months and the shortest 1.5 months.

Conclusions Endoscopic approach is a safe and effective method in the diagnosis and treatment of residual bile duct stones.

Introduction

Residual bile duct stones are reported in 5-15% [2] of patients after open cholecystectomy (OC) and in 0.5-2.3% following laparoscopic cholecystectomy (LC) [3,4]. They may be detected intra-operatively by cholangiography or post-operatively by T-tube cholangiography during the early post-operative period. Residual stones may be silent and present later with complications such as obstructive jaundice, cholangitis and gallstone pancreatitis, which are associated with a significant morbidity and mortality.

Open choledochotomy was the gold standard treatment of such stones in the era before minimally invasive surgery. The introduction of endoscopic sphincterotomy (ES) in 1974 started a new era of minimally invasive approach to this formidable problem [5]. This procedure was soon complemented with various stone extraction techniques. Endotherapy has revolutionised the management of residual bile duct stones over the past two decades.

Endoscopic stone clearance rates of 90% to 95% have been reported in centres with advanced technical facilities and expertise [6]. Our retrospective study reviews the experience in the management of residual bile duct stones at the University Surgical Unit, Teaching Hospital Colombo South, Kalubowila, Sri Lanka. ES with stone extraction by means of balloon catheters, Dormia baskets and mechanical lithotripter was the preferred technique for the extraction of residual bile duct stones.

Materials and methods

The study sample comprised 56 patients suspected of having retained bile duct stones, referred to the University unit from 5 March 2002 to 31 December 2006. The main variables recorded were demographic data, clinical presentation, therapeutic manipulations used, stone profile, procedure related morbidity and mortality, success rate and outcome.

Stone clearance was defined as the clearance status of the common bile duct demonstrated in the occlusion cholangiogram after each procedure. Morbidity was considered as systemic and biliary complications of the procedure. Mortality was defined as any death occurring within 30 days of the procedure.

All residual bile duct stone patients were offered ES and stone extraction. Prophylactic antibiotic coverage was employed in each case. Intravenous cefuroxime was the preferred first antibiotic choice, and ciprofloxacin and cefapime were considered second and third choices. The endotherapeutic procedures were performed by a single surgeon. 7 patients had to undergo ERCP more than once. In 9 patients, ERCP was unsuccessful in retrieving stones

¹Registrar, ²Lecturer, ³Professor and Head, Department of Surgery, Faculty of Medical Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

Correspondence: WMMdeS, e-mail <thathya@gmail.com>. Received 7 May and revised version accepted 15 August 2007. Conflicts of interest: none declared.

and open surgery was done. All patients were followed up clinically and biochemically.

Mean age of the sample was 43.2 years. Female to male ratio was 34/22 and their ages ranged from 25-83 years. Of these 34 (60.7%) patients were between 25 and 50 and 22 (39.2%) were above 60 years.

Patient details

41 (73.3%) patients had undergone OC, of whom 32 (57.1%) had CBD exploration either during the primary surgery or subsequently. 15 (26.7%) patients were after LC. None of the patients who had LC had operative cholangiograms or bile duct explorations. 21 patients presented with a T-tube in situ.

Clinical presentation

Main presenting symptom was epigastric or right hypochondrial pain (12). Seven patients were asymptomatic and suspected to have residual stones because of elevated liver enzymes or stones detected by magnetic resonance cholangiography (MRCP), computerised tomography (CT) or T-tube cholangiography. All 21 patients who presented with T-tubes in situ had stones in the T-tube cholangiogram. The other patients had obstructive jaundice, episodes of cholangitis or gallstone pancreatitis.

Investigations

All patients were assessed ultrasonographically and biochemically before ERCP. Elevated liver enzymes were noted in 27 patients, and elevated alkaline phosphatase (ALP) was a constant finding in patients who were clinically jaundiced. Dilated bile duct more than 7 mm was noted in 9 patients. Ultrasound imaging picked up bile duct stones in 14 patients; 18 (32.1%) patients had biochemical evidence of residual stones.

ERCP findings

Majority (33/56) had a single stone. Seven patients were found to have multiple stones. In 2 patients stones were found to be at a higher level, the hepatic confluence in one and the left hepatic duct system in the other. In these two instances stone retrieval was technically not possible with the available facilities. The other stones were in the bile duct. No ductal stones were visualised at ERCP in 2 patients, possibly due to spontaneous passage before the procedure. Biliary microlithiasis was evident in 5 patients. In 2 patients cannulation failed for technical difficulties. Juxta-ampullary diverticuli were noted in 4 patients, but cannulation failure arose only in one patient.

Stone extraction techniques and results

All patients had ES to gain access to the bile duct.

Dormia baskets and biliary balloons were used to retrieve stones. Mechanical lithotripter was used to crush the stone if larger than the sphincterotomy. Complete stone extraction was achieved in 83.9% (47) of patients. 12.5% (7) of patients had partial extraction of stones in the first attempt and stents were placed to facilitate drainage. Complete clearance of ducts was achieved in one or two attempts. Two patients, who had stones too large to be extracted endoscopically and in another seven patients, where stone extraction and cannulation failed for technical reasons, were taken up for open surgery.

Reasons for failure

In our series the failure rate was 16.1%. This is high comparing to the results from other specialised centres. Some patients with larger stones require ancillary procedures such as electrohydraulic lithotripsy or laser techniques to achieve complete stone clearance, facilities not available at our unit during the study period. In a patient with juxta-ampullary diverticulum cannulation of the ampulla becomes difficult. Stone extraction in patients with a T-tube in situ, where the stone is lodged above the tube is technically demanding. When the lower limb of the tube is longer, this difficulty will be compounded. Table 1 shows the problems encountered during endoscopic stone extraction.

There were 21 patients with residual stones and T-tubes in situ. 19 of them had stones in the lower bile duct. 2 patients referred with stones found lodged above the T-tube constituted a special problem. All patients with a T-tube in situ had successful stone extraction.

Table 1. Problems encountered at ERCP

<i>Problems</i>	<i>Patients</i>
Large stone	9 (16%)
Periampullary diverticulum	4 (7.1%)
Technical difficulty	2 (3.5%)
Long lower limb of T-tube	1 (1.7%)
Stone above the T-tube	2 (3.5%)

Complications

Procedure related morbidity was observed in 7.1% (4) of patients. 2 patients had pancreatitis and another 2 had clinically significant cholangitis. All were managed conservatively and recovered completely. No patients had bleeding following sphincterotomy. There was no procedure related mortality. Average hospital stay was 4 days.

Outcome

Six patients continued to have dyspeptic symptoms. No patients who had successful endoscopic stone extraction (47) had features suggestive of residual stones. 3 patients had persistently elevated alkaline phosphatase levels despite a normal serum bilirubin level.

Discussion

Ductal stones discovered after cholecystectomy may have been overlooked at the time of surgery or may reflect the formation of new primary stones. Longer the duration between cholecystectomy and detection of ductal stones, the latter becomes more likely. As 66 % (37) of patients presented within one month of surgery, it is likely that our cohort of patients would most likely have had residual stones that have been overlooked at the time of surgery.

Despite advancement of minimally invasive technology available to treat bile duct stones the problem of residual stones following cholecystectomy still poses a management challenge. Some studies claim that the minimal access approach has significant morbidity and frequent hospital visits [7]. However, if the gallbladder has been removed the endoscopic approach is the preferred technique [8].

Our study reports an overall success rate of 83.9% which is lower than the clearance rates from some specialised centres. Reasons for our failures have been mentioned.

Two problems were identified during the management of patients with residual stones referred to us with T-tubes in situ. One was the length of the lower limb of the tube which interfered with extraction. The other was stones positioned above the upper limb of the T-tube. Stone extraction was not attempted initially in the two patients who had the latter problem. First, a stent was placed in the bile duct after endoscopic sphincterotomy to establish a natural drainage pathway and T-tubes were removed. After natural healing of the bile duct defect, after one month,

both patients underwent successful endoscopic stone extractions. We recommend the placement of smallest possible T-tube (10F), and the length of the lower limb of the T-tube to be less than 3 cm.

Our results indicate that endoscopic sphincterotomy stone extraction techniques can achieve an acceptable success rate with a minimum morbidity in the management of residual bile duct stones in patients after cholecystectomy.

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