

Subtotal cholecystectomy

**D. J. Cottier, C. McKay
and J. R. Anderson**

University Department of Surgery,
Royal Infirmary, Glasgow
G31 2ER, UK

Correspondence to:
Mr J. R. Anderson

Subtotal cholecystectomy has been carried out on 11 patients during a 5-year period, constituting 3.8 per cent of cholecystectomies performed during this time. The indications were severe inflammation/fibrosis in six patients, portal hypertension in three and the Mirizzi syndrome in two patients. There were no deaths and only minor in-hospital morbidity. One patient developed a common bile duct stone 21 months after the operation. None of the remaining patients has to date developed postcholecystectomy sequelae (mean follow-up period 29 (range 1-62) months). Subtotal cholecystectomy is a safe, straightforward and definitive operation in patients for whom standard cholecystectomy could be dangerous, and is a more attractive proposition than cholecystostomy.

Cholecystectomy is a common surgical procedure. It is, however, a potentially difficult operation because of the variable anatomy and the wide spectrum of inflammatory reaction within the gallbladder and surrounding tissues. On occasion it can test even the most experienced surgeon.

The associated presence of portal hypertension (especially secondary to cirrhosis) further increases the difficulty and danger of the operation. Cholecystectomy in the patient with cirrhosis has been described as a 'formidable operation' with a reported mortality rate of 83 per cent in high-risk cases¹. It has therefore been suggested that the indications for elective cholecystectomy in patients with cirrhosis should be restricted² and that the operation should be performed only when there are life-threatening complications¹.

Subtotal cholecystectomy has been described as an easy, safe and definitive alternative to standard cholecystectomy for the difficult gallbladder and in the presence of portal hypertension³. More recently this procedure has been described as the operation of choice for patients with the Mirizzi syndrome type I⁴. This report reviews a series of patients who have undergone subtotal cholecystectomy over the past 5 years. The purpose of the study is to assess the results of the operation and to increase awareness of the procedure as an alternative to standard cholecystectomy or cholecystostomy.

Patients and methods

All patients who had a subtotal cholecystectomy carried out or supervised by the senior author (J.R.A.) over the 5-year period from 1986 to 1990 were included in the study. The procedure was limited to patients with severe inflammatory and/or fibrotic changes that made dissection of Calot's triangle difficult and therefore potentially dangerous, patients with portal hypertension and patients with the Mirizzi syndrome type I. All patients were followed up for a mean of 29 (range 1-62) months. Table 1 gives details of the patients.

It is our practice to select patients for operative cholangiography on the basis of history, abnormal liver function or ultrasonography indicating either stones within the biliary tree or showing duct dilatation. Operative cholangiography was also carried out if, at the time of surgery, there were small stones within the gallbladder, if the cystic duct was found to be wide, if the common bile duct appeared dilated or if there was any problem delineating the anatomy.

Operative technique

All operations were carried out through a right subcostal or transverse incision. After division of adhesions, the area of Calot's triangle was inspected and the decision taken to perform a subtotal, rather than total, cholecystectomy. The gallbladder was opened at a convenient site, usually the fundus, and the contents were evacuated, bile being sent for culture. The gallbladder was then excised using diathermy, leaving *in situ* the wall of the gallbladder directly in contact with the liver and Calot's triangle. No attempt was made to identify the structures within this triangle.

When the cystic duct was occluded, as is often found in the Mirizzi syndrome, and where there was extensive inflammation/fibrosis, operative cholangiography was not performed. Puncture of the common bile duct is potentially dangerous and should be avoided. Postoperative endoscopic retrograde cholangiography should be carried out if visualization of the biliary tree is considered necessary in these patients.

In those patients in whom the cystic duct is patent it may be possible to dissect the duct close to its junction with the gallbladder and to carry out operative cholangiography by passing the catheter into the duct from within Hartmann's pouch, held in place by a suture surrounding the cystic duct. If this is not possible, a purse-string suture can be inserted around the opening of the cystic duct within Hartmann's pouch. Where the cystic duct is patent, it can be oversewn from within the gallbladder remnant using continuous polyglactin 910 (2/0 Vicryl®, Ethicon Ltd., Edinburgh, UK).

The gallbladder area was drained using a suction drain. All patients were given a single perioperative dose of prophylactic antibiotic (1.5 g cefuroxime) with induction of anaesthesia.

Results

Eleven patients underwent subtotal cholecystectomy during the 5-year period. This represents 3.8 per cent of the 287 patients undergoing cholecystectomy under the care of the senior author over this period. The patients can be divided into three groups on the basis of the indications for performing subtotal cholecystectomy. Six patients had severe inflammation/fibrosis. Three of these underwent urgent cholecystectomy following admission with acute cholecystitis, two were admitted for elective cholecystectomy for chronic symptoms and the final patient was admitted with jaundice, which was settling. The second group consisted of three patients with portal hypertension, and the third group comprised two patients with the Mirizzi syndrome type I.

Within the first group of six patients (see Table 1, patient numbers 1 to 6), imaging of the common bile duct was considered unnecessary in two. In patient number 1, endoscopic retrograde cholangiography had been carried out 3 weeks before cholecystectomy because the patient had had a raised alkaline phosphatase level and slight dilatation of the common bile duct on ultrasonography. No stones were seen within the duct system. This patient had mitral stenosis with atrial fibrillation and a past history of a cerebrovascular accident. Patient number 2 was a severe asthmatic who underwent endoscopic retrograde cholangiography and endoscopic sphincterotomy for common bile duct stones. Twelve months later cholecystectomy was indicated because of continuing pain. He underwent check endoscopic retrograde cholangiography 3 weeks before cholecystectomy. Patient number 3 had previously undergone a Pólya gastrectomy for ulcer disease and presented with jaundice. A long afferent loop in this patient precluded endoscopic retrograde cholangiography. Percutan-

Table 1 Patient details

No.	Sex	Age (years)	Presentation	CBD imaging	Follow-up (months)
Severe inflammation					
1	F	61	Acute on chronic cholecystitis	Preoperative ERC	Uneventful (62)
2	M	58	Acute on chronic cholecystitis	Preoperative ERC	Died from gastric carcinoma (58)
3	M	47	Jaundice	Preoperative PTC (previous Pólya gastrectomy)	CBD stone removed surgically at 21 months. Well since (35)
4	F	75	Chronic cholecystitis	Not done	Died from myocardial infarction (21)
5	F	59	Chronic cholecystitis	Not done	Uneventful (8)
6	F	41	Acute on chronic cholecystitis	Operative cholangiography	Uneventful (1)
Portal hypertension					
7	M	38	Chronic cholecystitis (portal hypertension secondary to portal vein thrombosis)	Not done	Uneventful (54)
8	F	56	Acute on chronic cholecystitis (alcoholic cirrhotic with portal hypertension)	Operative cholangiography	Uneventful (45)
9	F	59	Chronic cholecystitis (chronic active hepatitis with cirrhosis + portal hypertension)	Preoperative ERC and sphincterotomy for CBD stones	Died from variceal haemorrhage (6)
Mirizzi syndrome					
10	F	48	Jaundice	Postoperative ERC	Uneventful (24)
11	F	65	Jaundice	Postoperative ERC	Uneventful (2)

CBD, common bile duct; ERC, endoscopic retrograde cholangiography; PTC, percutaneous transhepatic cholangiography

eous transhepatic cholangiography carried out before operation had shown minimal dilatation of the common bile duct, but no stones within it. By the time of operation, this patient's jaundice had resolved. Patient number 3 remained well for 21 months following cholecystectomy (liver function tests were normal) but then became jaundiced again. Repeat percutaneous transhepatic cholangiography indicated a small stone within the common bile duct, which was removed surgically. This may represent a retained stone missed by percutaneous transhepatic cholangiography.

In the second group of patients (those with portal hypertension), operative cholangiography was considered unnecessary in one patient (patient number 7) and was carried out in one of the remaining two (patient number 8) because of a large number of small stones within the gallbladder. The third patient within this group (patient number 9) underwent endoscopic retrograde cholangiography and endoscopic sphincterotomy for common bile stones, and 18 months later underwent cholecystectomy for continuing symptoms. Operative cholangiography in this case proved impossible because of technical difficulties. Check endoscopic retrograde cholangiography after the operation indicated a lack of stones within the common bile duct. Of the patients in the second group, one (patient number 7) was Child's grade A and the others were Child's grade B. During the early part of the 5-year period, three different patients with portal hypertension (all Child's grade B) underwent a standard cholecystectomy. Of these, two required 5 units of blood owing to haemorrhage from the liver bed. Following this experience, subtotal cholecystectomy was performed in patients with portal hypertension and the problem of haemorrhage was overcome.

The remaining two patients had the Mirizzi syndrome type I. Both were minimally jaundiced with high levels of alkaline phosphatase. Preoperative ultrasonography in these patients had indicated multiple stones within the gallbladder, but no evidence of duct dilatation, although in both cases this emerged as misleading. Diagnosis of the Mirizzi syndrome was made at operation. Frozen section examination of the gallbladder was not carried out in either case. Operative cholangiography in these patients was not possible as the cystic duct lumen was obliterated, direct puncture of the common hepatic duct being

considered dangerous because the anatomy was distorted. In retrospect, both patients should have undergone preoperative endoscopic retrograde cholangiography. Postoperative endoscopic retrograde cholangiography, however, confirmed the diagnosis in these patients.

Two of the 11 patients in this study developed complications following their operation, one developing a minor wound infection and the other (patient number 11) a small bile leak. This leak settled to allow removal of the suction drain on the fourth postoperative day. Neither complication delayed the patient's discharge from hospital. None of the patients required blood transfusion.

Discussion

We agree with Bornman and Terblanche that subtotal cholecystectomy is a straightforward, safe procedure in patients for whom standard cholecystectomy would have been extremely hazardous³. The region of Calot's triangle is the area that presents the greatest risk when carrying out a cholecystectomy, the common bile duct, common and right hepatic ducts and the right hepatic artery all being at risk of damage. Severe fibrosis associated with inflammation can also distort the anatomy in this region, increasing the risk of damage to these structures. In the Mirizzi syndrome type I, Hartmann's pouch with its contained stone is adherent to the common hepatic duct as a result of long-standing inflammation and fibrosis, and Calot's triangle is obliterated. In this case, dissection of the gallbladder from the common hepatic duct is extremely hazardous and significantly increases the risk of damage to the duct. Recently, Baer *et al.* have suggested that subtotal cholecystectomy is the treatment of choice for the Mirizzi syndrome type I⁴.

Within this group of patients, imaging of the biliary tree can be problematical, as the cystic duct lumen is often obliterated. When it is patent, operative cholangiography can be carried out as described. When the cystic duct is obliterated we have often found it impossible to define the common hepatic duct and believe that direct puncture of this duct is also hazardous. In this situation we would advocate postoperative endoscopic retrograde cholangiography. In those patients

who are jaundiced, preoperative imaging of the biliary tree should be carried out, either by endoscopic retrograde cholangiography or percutaneous transhepatic cholangiography depending upon the clinical circumstances and availability of the two techniques. In patients suspected before operation of having the Mirizzi syndrome, endoscopic retrograde cholangiography should be carried out.

Cholecystectomy in the presence of portal hypertension, especially secondary to cirrhosis, can be a formidable and bloody operation, increased vascularity in the region of the porta hepatis and in the free edge of the lesser omentum, limited hepatocellular function and a cirrhotic liver bed all contributing to the bleeding which can occur during this procedure. Even with correction of coagulopathy, bleeding may still be a major problem. In the present study the three patients with portal hypertension all underwent an uncomplicated operation with none requiring blood transfusion. We believe that subtotal cholecystectomy should be considered for all patients with portal hypertension. Within this group of patients, abnormalities of liver function, sometimes associated with jaundice, make it difficult to distinguish between common bile duct stones and hepatocellular disease. Although at the time of surgery it is frequently possible to cannulate the cystic duct via Hartmann's pouch, our experience argues for preoperative endoscopic retrograde cholangiography in all patients with portal hypertension and abnormal liver function with endoscopic sphincterotomy when indicated. This will overcome any difficulties which may be encountered in carrying out operative cholangiography (as occurred in one patient) and avoids the need for exploration of the common bile duct.

The time-honoured alternative to cholecystectomy in these difficult cases is generally considered to be cholecystostomy, the major disadvantages of which are well known. Welch and Malt reported retained stones in the gallbladder or common bile duct in 27 per cent of patients who survived cholecystostomy, with others reporting this condition in up

to 75 per cent of patients⁵. Winkler *et al.* have reported a mortality rate of 5 per cent with cholecystostomy, but 70 per cent of their surviving patients underwent cholecystectomy 6–8 weeks later⁶. In patients in whom calculi are completely cleared at cholecystostomy, the majority will go on to form further stones and develop symptoms necessitating a second definitive operation. Fifty per cent of the recurrences take place within 3 years of the original operation⁷. During the 5-year period under review we have not carried out a cholecystostomy.

Subtotal cholecystectomy is a definitive procedure and avoids the need for a second operation. It is both safe and straightforward and should be possible to perform in the majority of cases where previously cholecystostomy had been considered.

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