ENDOSCOPIC SPHINCTEROTOMY AND GALL STONE REMOVAL

by

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CALCULI in the common bile duct are extremely common. Although such stones are overlooked at operation in only about 5 per cent of cases, the frequency of gall stone surgery means that there are many patients with retained stones.[1] Stones may rarely form within the biliary system after cholecystectomy. Removal of retained or reformed stones is important because of their morbid potential—cholangitis, hepatic abscess, biliary cirrhosis or pancreatitis. Until recently surgical management has been the only successful method of treatment. Exploration of the common duct increases the morbidity and mortality associated with biliary surgery.[2] Moreover the risks increase with age and the presence of jaundice and indeed those patients requiring surgery for choledocholithiasis are frequently both old and jaundiced. Endoscopic retrograde cholangiopancreatography is helpful in the evaluation of such patients. Removal of gall stones from the common bile duct by endoscopy is being done with increasing frequency and studies to date have shown this to be a relatively safe and effective means of extracting retained stones from the common bile duct.[3] This paper reports our experience with endoscopic sphincterotomy for the extraction of such calculi and for the treatment of other causes of obstructive jaundice over the past two years.

PATIENTS AND METHODS

Patients

Endoscopic sphincterotomy was attempted in 96 patients, with an age range from 26 to 87 years, average 68. Seventy-two per cent were aged over 60 and 44 per cent over 70 years. Indications for endoscopic sphincterotomy were:- choledocholithiasis in 84, periampullary carcinoma in 9 and papillary stenosis in 3. Of the 84 with choledocholithiasis, 44 (52 per cent) had had a cholecystectomy, the interval ranging from two weeks to 30 years. Ten patients still had a T-tube in place. Forty patients (48 per cent) had not had cholecystectomy but 10 had cholecystectomy subsequently. The patients with intact gall bladders either were acutely ill with jaundice, cholangitis or septicaemia or had serious coincidental medical problems including cardiorespiratory insufficiency, advanced liver disease, gross obesity or advanced years. No patients were rejected as unfit for endoscopic treatment. Most patients were referred by consultant surgeons.

Methods

The sphincterotomy was performed in the Radiological Department under sedation with pethidine and diazepam. Standard instruments were used — side viewing duodenoscopes (Olympus JFB3 or JF1T, Japan), diathermy source (Martin, Germany) and sphincterotomy knives (Storz, Germany; Keymed Ltd., England). When retrograde cholangiography confirmed the need for sphincterotomy, the knife

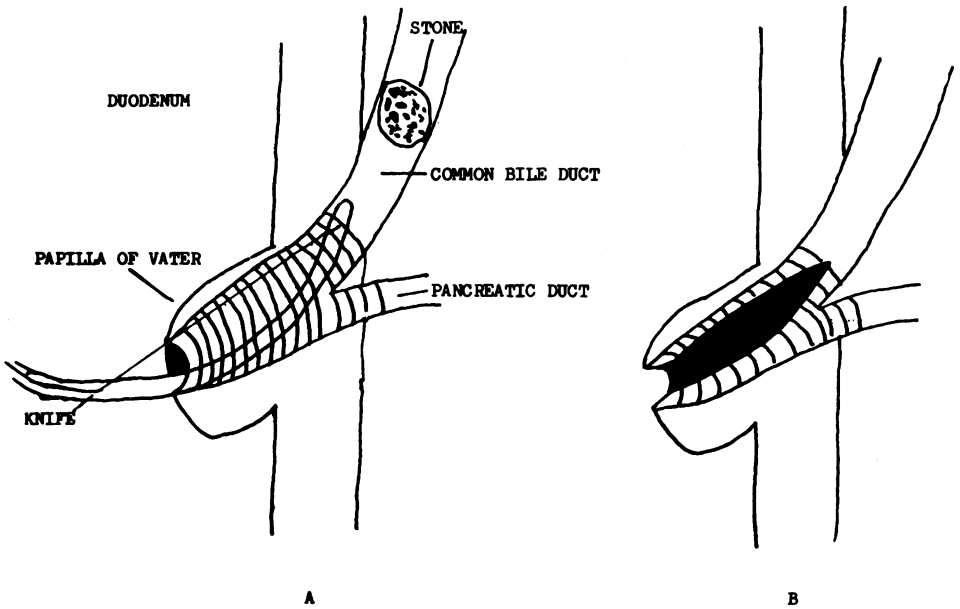

FIG.1A.
Illustration of sphincterotomy knife inserted selectively into the common bile duct in the cutting position.

FIG. 1B
Following electrosurgery the incision extends through the papilla and the muscles of the intramural portion of the distal common bile duct as it enters the duodenum.

was placed deep in the common bile duct. Radiographs were taken to check the position. The knife was then withdrawn until about 15 mm of wire were visible outside the papilla at about 12 o'clock (Fig. 1A and Fig. 2). The wire was tightened to produce a bow and diathermy current was applied in a controlled fashion to make it cut through the roof of the papilla and intramural common duct for a length of 1 to 2 cm (Fig. 1B). The length of cut was tailored to the size of the stones and the length of the intramural portion of the common bile duct as visualized endoscopically. The average time for the procedure was about 30 minutes but some took an hour or more. The presence of duodenal diverticula or altered anatomy from previous gastric or sphincter surgery sometimes made the procedure technically more difficult. The procedure for removal of duct stones after sphincterotomy was variable. In some patients, large or multiple stones were extracted immediately after the sphincterotomy using either basket forceps or a balloon catheter (Fig. 3). In others with smaller or single stones, these were allowed to pass spontaneously and only if they were still present at a check cholangiogram one to two weeks after the sphincterotomy, was any attempt made to extract them actively. In this group a long cannula was left in the bile duct after the endoscope has been withdrawn and this

FIG. 2

Radiographic appearances of sphincterotomy knife in cutting position in lower bile duct. The wire has been tightened to form a bow.

FIG. 3

Stone being removed from the bile duct by basket forceps.

facilitated repeated cholangiograms and drainage of the biliary system if a stone became impacted. This cannula also permitted flushing of the duct. Following sphincterotomy patients were allowed oral fluids within two hours and most were ambulant and eating normally on the following day.

RESULTS

Endoscopic sphincterotomy was successful in 89 of 96 patients (93 per cent). Nine patients required more than one attempt. In patients in whom the procedure failed, or in whom repeated attempts were necessary, it was impossible to place the diathermy wire deeply in the bile duct. Two of these patients had peri-ampullary diverticula, one had had a previous partial gastrectomy and three had peri-ampullary carcinoma. In the 84 patients with choledocholithiasis a successful sphincterotomy was made in 80 (95 per cent) and the bile duct was cleared of stones in 76 (86 per cent). The stones passed spontaneously in 41 and were extracted in 35. In 8 patients the stones could not be removed after sphincterotomy. In these cases the common bile duct was either packed tightly with many large faceted stones or the stones were

located above a stricture in the bile duct or were situated high in the intra-hepatic radicles. In one patient the snared stone and basket became impacted at the sphincterotomy site. In nine patients with peri-ampullary carcinoma, a successful sphincterotomy was made in five and jaundice was relieved, allowing definitive surgery to be undertaken under improved conditions. Three patients with papillary stenosis had improvement in symptoms after sphincterotomy.

COMPLICATIONS

Twelve patients developed complications. Two patients developed haemorrhage, in one patient significant bleeding occurred after 12 hours and despite transfusion required surgery to control the bleeding; in another bleeding occurred 48 hours after the sphincterotomy and was managed by transfusion, the bleeding stopping spontaneously. Eight patients developed cholangitis; in seven of these residual stones were present after the sphincterotomy. Intravenous antibiotics cured the infection within 48 hours in all but two patients; both of these had intact gall bladders. One had successful surgery but the other unfortunately died after her operation from septicaemia. One patient who did not have any retained stones after sphincterotomy developed pancreatitis. His symptoms settled with conservative therapy. In the patient with impaction of the basket forceps and snared stone at the sphincterotomy site the stone and forceps were successfully removed at operation.

FOLLOW-UP

All patients studied continue to be followed up either by myself or the referring consultant. To date there has been no evidence of sphincterotomy stenosis either symptomatically or endoscopically in those patients who have been subjected to a repeat endoscopic examination 6-18 months following the procedure. However, the overall period of follow-up is short — maximum 2½ years. Ten of the 40 patients with intact gall bladders had successful cholecystectomy after the acute illness had subsided. The remainder were elderly or had other serious medical problems and it was thought advisable to observe them without cholecystectomy. Three of these 30 patients have so far suffered attacks of cholecystitis.

DISCUSSION

Endoscopic sphincterotomy is an effective and remarkably safe method of removing stones from the common bile duct. In this series of 96 patients the success rate for achieving sphincterotomy was 93 per cent and for removing duct stones—86 per cent. Complications occurred in 12 and there was one death. These results are similar to those in other reports. In a recent large international survey the overall success rate for stone removal was 90.5 per cent with a mortality rate of 1.4 per cent.[3]

This endoscopic technique obviously has an important clinical role. The precise indications however can only be defined after careful comparison of its results and risks with those of alternative methods of treatment.

The overall mortality rate of cholecystectomy and choledocholithotomy is at least 3 per cent but the incidence of common duct stones and the mortality of their removal both increase with age.[2] Over 65 years the mortality rate increases to 5 per cent.[2] In older patients removal of stones from the duct by endoscopic sphincterotomy means that a simpler and safer cholecystectomy can be done later if necessary.

Between the age of 50 and 65 years the surgical mortality rate is about 1 per cent for cholecystectomy and common duct exploration, similar to endoscopic treatment.[2] The complication rate with choledocholithotomy however can be as high as 30 per cent,[4] much higher that that of endoscopic sphincterotomy. Furthermore it is not always possible to remove all stones from the bile duct and in about 5 per cent the post-operative T-tube cholangiogram shows a retained stone.[5] Consequently some surgeons recommend transduodenal exploration of the bile duct and sphincteroplasty to allow any retained stones to pass spontaneously.[6, 7] For similar reasons other surgeons recommend choledochoduodenostomy,[8] but this procedure is often associated with recurrent episodes of cholangitis due to stenosis at the anastamosis.[9]

In patients under 50 the mortality rate of conventional surgery is less than 1 per cent which is similar to or less than the mortality of endoscopic sphincterotomy.[2] Many symptoms in these patients come from the diseased gall bladder so it is clear that conventional surgery remains the treatment of choice in this age group where the gall bladder is intact. For similar reasons, the use of endoscopic sphincterotomy in the average young and fit patient with a retained stone remains controversial because long term results are not known. However, to date follow-up studies have shown no evidence of stenosis or cholangitis and it is increasingly difficult to convince young patients that they need a further abdominal operation when they know that stones can be removed by a simpler technique. The youngest patient in this series, a woman aged 26, refused to have further conventional surgery and insisted on having the endoscopic procedure performed.

In patients of any age with the gall bladder in situ endoscopic sphincterotomy is an effective emergency treatment for severe cholangitis, septicaemia or biliary pancreatitis. In the elderly or in those patients with severe complicating disease, cholecystectomy may be postponed indefinitely.

In those patients who present with common bile duct stones, months to years after cholecystectomy, secondary exploration of the bile duct may be incomplete in 20 per cent of cases and so a drainage procedure, either transduodenal sphincteroplasty or choledochoduodenostomy, is often added. This combined procedure has a higher morbidity and a mortality of 7 per cent.[7] Endoscopic sphincterotomy thus, has similar benefits to the combined procedure with reduced risks.

In the patient who still has a T-tube drain in situ after a cholecystectomy, other methods apart from surgery and endoscopic sphincterotomy are available including chemical perfusion i.e. saline perhaps with added heparin or sodium cholate and monoctanoin. The latter is probably the perfusate of choice and in a recent series this procedure was successful in 60 per cent.[10] Another method is that developed by Burhenne where a steerable instrument passed through the T-tube track is used to extract the stone. This procedure is remarkably safe and effective and does not damage the sphincter[11] but is only applicable when the T-tube used has been 16FG or larger. Perhaps endoscopic sphincterotomy should be reserved for those patients who have failed a Burhenne extraction or desolution therapy.

In this series nine patients with peri-ampullary carcinoma were subjected to endoscopic sphincterotomy. This relieved jaundice in all five cases in whom cannulation was achieved and so the conditions for the definitive surgical treatment

of the tumour were improved. Three patients with papillary stenosis, defined as biliary tract pain, biochemical evidence of cholestasis and radiologically verified stenosis of the ampullary common bile duct with delayed emptying of injected contrast material, were subjected to sphincterotomy with good relief of symptoms.

This study confirms the finding of earlier studies that endoscopic sphincterotomy is an effective and remarkably safe method of removing stones from the common bile duct and of relieving other causes of obstructive jaundice. However, further studies are required to clarify precise indications for the technique and its long term consequences.

SUMMARY

This study reports our experience of endoscopic sphincterotomy for common bile duct stones and other causes of obstructive jaundice. The procedure was attempted in 96 patients of average age 68 years. An effective sphincterotomy was achieved in 89 (93 per cent). Nine patients required more than one attempt. The bile duct was cleared of stones in 86 per cent. Immediate complications occurred in 12 patients, four requiring surgery and one patient died.

Endoscopic sphincterotomy is a valuable alternative to surgery and in the elderly or high risk patients is a therapeutic advance in the management of common bile duct stones and other causes of obstructive jaundice. The possibility of long term complications suggests the need for caution in using this procedure in young patients who are fit for operation, until the results of long term studies are available.

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