

Three Patients with Common Bile Duct Stones Treated with Endoscopic Sphincterotomy (ERS)

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The stones of common bile duct, especially if they present after cholecystectomy, have been a problem for surgeons and gastroenterologists. Endoscopic sphincterotomy is a therapeutic offshoot of endoscopic retrograde cholangio-pancreatography (ERCP), and is gaining popularity rapidly throughout the world[1]. This technique is also being used for ductal stones with intact gall bladder and to relieve jaundice due to benign strictures and tumours[2]. Here we are presenting three cases of common bile duct stones treated successfully by endoscopic sphincterotomy.

Case No. 1.

History

K.B, an 87 year old female presented in January, 1989 with complaints of fever with rigors, itching, jaundice and epigastric pain radiating to back, intermittently, for three weeks. She had gradual worsening of symptoms leading to drowsiness and subsequently, stopped verbalizing and became totally withdrawn. There was no history of malena vomiting or haematochesia. No history suggestive of bronchial asthma.

Physical Examination:

A well nourished elderly lady, drowsy, but responding appropriately to verbal commands. She was mildly pale and moderately jaundiced. Her blood pressure varied between 90-100 mm Hg systolic and 60-70 mm Hg diastolic and temp. between 96-100F with intermittent sweating and chills. Her pulse rate hovered around 100/min.

Abdominal examination showed tenderness at epigastrium and right upper quadrant. Liver was 14 cm in span at the midclavicular line. Spleen was not palpable, ascites and other clinical evidence of portal hypertension were absent.

Chest examination showed generalized wheeze but otherwise unremarkable.

Lab. Reports:

Hemoglobin 7.3 G%, WBC count of 11,700/cmm, ESR 85 mm with normal differential count, total bilirubin was 7.0 mg%, direct bilirubin 4.0 mg%, SGPT 30 u/l (normal upto 40 u/l) SGOT 129 u/l, Alkaline Phosphatase 285 u/l (normal 30-115 u/l), Prothrombin time was 10 seconds prolonged, BUN 48 mg%, and Creatinine 4.1 mg%.

Ultrasonography of the abdomen revealed markedly dilated common bile duct (CBD) and biliary radicles with a hyperechoic shadow in the distal common bile duct. This shadow of laminated appearance was also apparent on plain film of abdomen. She was treated initially with intravenous and oral fluids for rehydration, vit. K injection 10mg I.M. for three days, amoxicillin 500 mg i.v. 8 hourly, blood transfusion one unit and bronchodilators.

During her stay in the hospital her conscious level deteriorated further. On Jan. 24, 1989 she underwent endoscopic retrograde cholangiopancreatography (ERCP) which revealed a 20 x 22 mm impacted (radiopaque) stone in the distal CBD with gross dilatation of 25 mm proximally (Fig 1). At this stage a guide wire could not be introduced alongside the obstruction on account of the impacted stone, therefore, papillotomy and placement of a stent was not possible at this time.

Consultation with the surgeon and anaesthesiologist precluded surgery due to high surgical risk. She then underwent extracorporeal shockwave lithotripsy twice. On the second attempt, the CBD stone was disintegrated into multiple fragments. During the ensuing three days, her clinical status did not improve but her bilirubin level dropped to 3 mg% (T. bilirubin) and 1.8 mg% (D. bilirubin), indicating partial relief of obstruction.

Repeat ERCP was done on February 4, 1989 and numerous stone fragments of various sizes were visualized in the CBD (Fig 2). This time adequate papillotomy and stent placement was possible. A 10 F straight stent with side flaps was introduced across the

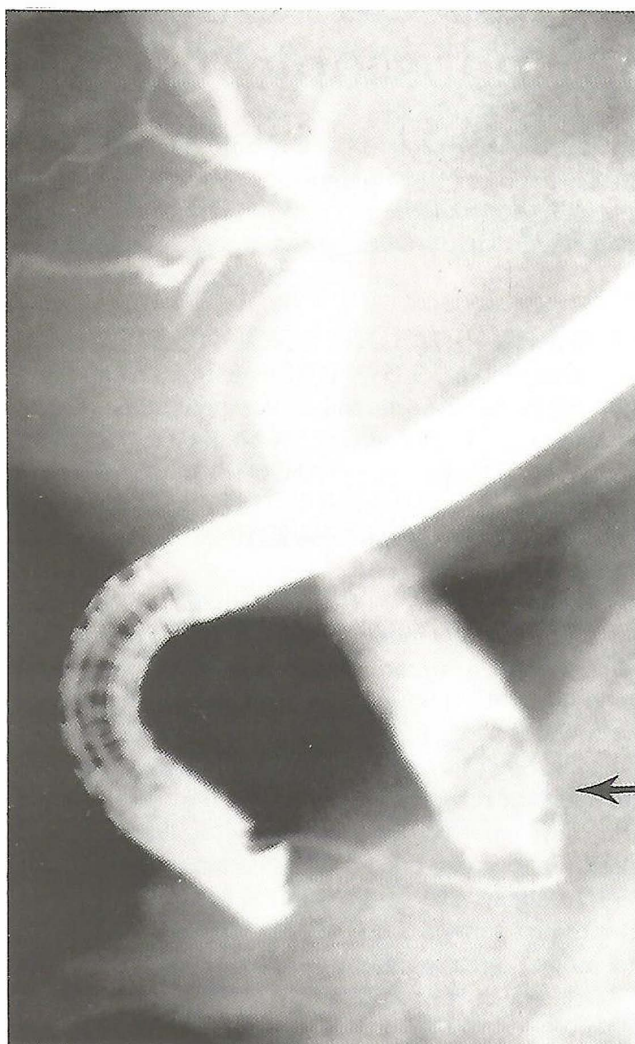


Fig. 1: ERS showing an impacted stone (arrow) in the common bile duct with proximal dilatation of the CBD and biliary radicles.

surgical risk, a definitive surgery with stone extraction and cholecystectomy will be offered.



Fig. 2: ERS showing fragmented, impacted stones in the common bile duct after lithotripsy. The open arrow showing the wire of curved sphincterotome in the common bile duct during papillotomy.

obstruction (fig 3), following which thick purulent bile was seen draining adequately into the duodenum. Papillotomy was done with the Olympus diathermy and papillotome. During the next two days she became fully alert and afebrile, communicated well and started eating better. Her total bilirubin lowered to 2.0 mg %. she was discharged from the hospital in good clinical status. On two week follow up visit she was ambulatory, without pain, fever or chills.

Future Plan: She is advised monthly follow up and if develops symptoms or it is felt that she is a good

Case No. 2.

History

K. B, a 60 year old female presented in the outpatient on 29.01.89 with complaints of recurrent episodes of right hypochondrial pain and jaundice of 3 weeks duration. She had long standing diabetes mellitus, controlled on dietary restriction and glibenclamide 5mg daily. she underwent cholecystectomy for gallstones 10 years prior to this presentation:



Fig. 3: A straight 10 french biliary stent (arrow) in the common bile duct after endoscopic retrograde sphincterotomy. The stent bypassed the obstruction.



Fig. 4: ERS showing dilated common bile duct (open arrow). Two stones are seen in the distal CBD.

Physical Examination

An elderly lady of average built, fully alert, moderately jaundiced and mildly pale. She was afebrile and had a cholecystectomy scar. Liver and spleen were not palpable and there was no evidence of ascites.

Lab. Reports:

Hemoglobin 10G%. CBC reported normal. PT, PTT, BUN and creatinine were also normal. Total bilirubin was 4.0 mg% direct bilirubin was 3.2 mg%, Alk. Phos. 470 u/l (normal upto 306u/l) SGPT 50 u/l (normal upto 40 u/l) and SGOT 60 u/l (normal upto 37 u/l)

Ultrasonogram of Hepatobiliary System:

It revealed slightly dilated common bile duct but no stone was seen. Patient underwent ERCP on February 01, 1989 as inpatient. This revealed moderately dilated CBD and hepatic ducts (CBD, 1.9 cm in diameter) with a 0.9 cm mobile stone in the CBD (fig 4). Adequate papillotomy (sphincterotomy) was done, with the Olympus sphincterotome and cautery system. She was discharged next day. Three days following the procedure, she experienced severe epigastric and right hypochondrial pain and an episode of vomiting which lasted for half an hour. ERCP was repeated on Feb. 6, 1989, which revealed no filling defect in the biliary tree even with the diluted contrast

(Fig. 5) CBD sizes was 1.5 cm in diameter. She was asymptomatic with normal liver function tests on follow up.

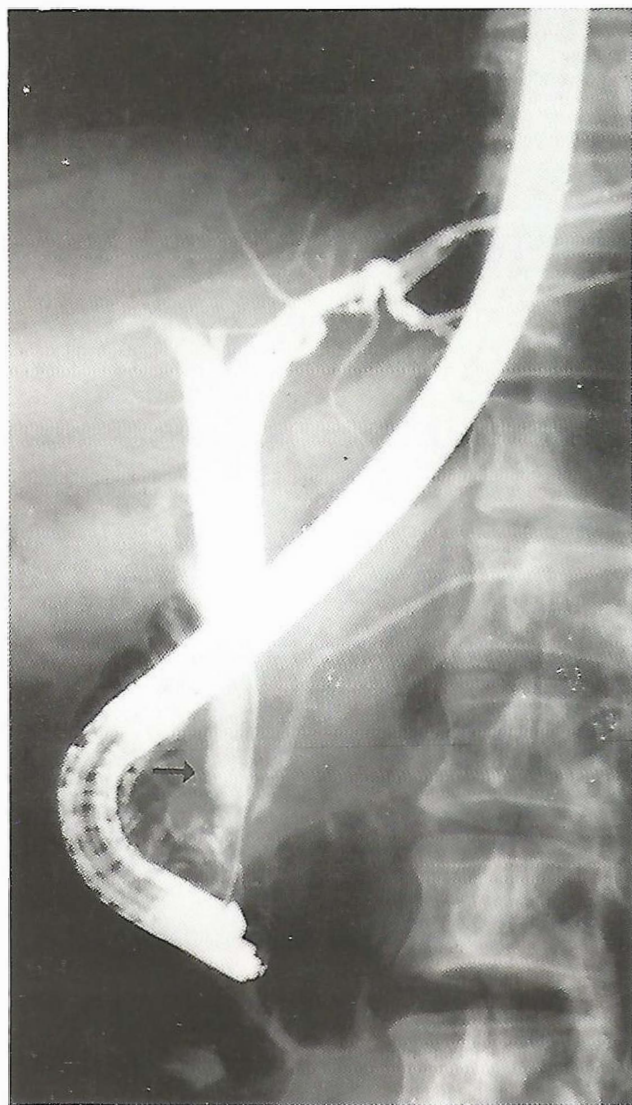


Fig. 5: Follow up ERCP after sphincterotomy showing slightly dilated common bile duct and normal pancreatic duct. No stones visible.

Case No. 3.

History

L. B a 56 year old lady presented in Nov.1987 with complaints of intermittent epigastric pain of 02 months duration. Reports of endoscopy and ultrasonography performed in an outside hospital showed mild gastritis. She had undergone cholecystectomy eight years ago for cholelithiasis.

Physical Examination:

Physical examination did not reveal any abnormal physical finding in the abdomen, cardiovascular or respiratory system.



Fig. 6: ERCP showing markedly dilated CBD and its radicles with a solitary stone in the common bile duct. The pancreatic duct is normal.

Lab Reports:

Lab reports showed normal Hb., CBC, serum amylase, lipase, PT and PTT. Total bilirubin was 1.0 mg%, SPGT and SGOT were also normal. Alkaline Phosphatase was one and a half times the normal. ERCP was done on 19.11.87 which revealed grossly dilated CBD (2.5cm) and CHD. Common bile duct had

a stone of 1.2 cm in diameter (Fig.6). Adequate sphincterotomy was done and a copious post-sphincterotomy bile drainage achieved. She was discharged next day and advised to follow after a week. The day after discharge she experienced an episode of severe epigastric pain, vomiting and consulted her surgeon. She was operated two weeks later no stone could be found upon exploration of the CBD. Choledochoduodenostomy was done. Patient showed uneventful recovery from the surgery. On follow up visit, she is asymptomatic and her liver functions are normal.

DISCUSSION

Endoscopic sphincterotomy, a therapeutic offshoot of ERCP, has gained popularity rapidly throughout the world[1]. Although, most popular for the management of ductal stones, presenting after cholecystectomy, the technique is now being employed additionally for ductal stones with intact gall bladder and to relieve jaundice due to benign strictures and tumors[2].

Endoscopic Retrograde Sphincterotomy (ERS) for ductal Stones.

The precise indications for ERS are still evolving. Relative contraindications include irreversible coagulation defects and very large stones.

Sphincterotomy

All patients require careful assessment before and after the procedure and few may require urgent surgical intervention because of complications or failure to clear the duct. Thus, ERS should be performed only on in-patient basis in a well equipped hospital[3]. Antibiotics are started before the procedure only in those patients who have cholangitis or cholecystitis and immediately after the procedure if adequate duct clearance has not been achieved[4].

Diagnostic ERCP is performed in the standard manner, presence of ductal stones and relevant indications are confirmed and diagnostic catheter is replaced by the one containing a diathermy wire (sphincterotome) (Fig.2). Radiographs are taken to confirm its correct position under fluoroscopic control. Position of the sphincterotome is adjusted so that only 10 mm of the wire remains within the papilla and the wire is pointing upward, away from the pancreas. Tension is exerted on the wire to produce a cutting bow and diathermy current is applied in short bursts to produce a controlled cut. The end point is destruction of the sphincter function, signalled by a sudden efflux of bile

and ability to pass the bowed sphincterotome freely in and out of the orifice[5].

Failure rate for ERS is less than 5% in expert hands and varies with experience and different anatomic considerations i.e. periampullary and juxtaampullary diverticulae, and after Billroth II gastrectomy.

Sphincterotomy and related extraction procedures are usually completed within 35 to 45 minutes. The patient is returned to room and is fed oral liquids after 4 hours, usually ambulatory and eating regular diet by the following morning. Most of the complications occur within 24 hours following the procedure. Careful observation, therefore, during this period is essential[6].

Stone Extraction:

Most of the stones, less than 1 cm in diameter in particular, pass spontaneously within a few days to weeks. The patient can, therefore, be discharged within 48 hours and brought back for a follow up ERCP one week later. There is a risk of stone impaction and occurrence of recurrent cholangitis or pancreatitis. Some centers, therefore, prefer to attempt extraction directly, immediately after sphincterotomy.

Extraction can be achieved with a balloon tipped catheter or baskets. Balloon catheters are rather fragile but are useful for removing small stones or biliary sludge as well as for sweeping the duct to prove that it is clear. Most experts use basket for active extraction, which is advanced beyond the stone, opened fully, stone trapped and withdrawn slowly under the fluoroscopic control.

If the patient has many stones or large stones that might become impacted with a basket, it is better to leave a biliary drain in place (prosthetic stent) (fig.3)[7]. Surgery may be performed at later date electively.

Nasobiliary Catheter:

A long single pigtail catheter can be used if the stones are left behind or if the situation is not clear. The pigtail end is placed in the CBD and the proximal end rerouted from the mouth to the nose. This system allows drainage, abolishing the risk of cholangitis after sphincterotomy, provides a route for follow up cholangiography, to monitor stone passage and provide potential means for flushing the duct and stone dissolution.

Problems with large stones:

Stones less than 15 mm in diameter are usually easily removed via the endoscope. Large stones are more commonly encountered in the elderly. Attempts to remove them are less likely to be successful and tend to

be complicated. When necessary, it is possible to remove stones upto 2.5 cm in diameter with suitable baskets and mechanical lithotripter[8]. Larger stones can obstruct the ileum if released into the duodenum. There is no absolute limit to the size of stones that can be managed endoscopically. The choice between endoscopic and the surgical removal depends upon relative risks, and those vary between patients and centers.

Attempts are being made to reduce the size of the stones in order to facilitate their extraction. Stones can be crushed with special baskets, fragmented with various devices (e.g. lithotripsy) or partially dissolved with chemicals infused into the duct via the transnasal biliary drain. Results with sodium cholate and mono-octanoin have been encouraging but not entirely satisfactory. More effective chemicals would change the situation dramatically since stones might, then be dissolved completely, without need of sphincterotomy at all. Methyl tert butyl ether (MTBE) has shown some promise as a solvent[9].

Success Rate and Complications:

Sphincterotomy is technically successful in over 90% of patients and duct clearance is achieved in a similar percentage. Sphincterotomy failure is due to inexperience or difficult access (anatomical variations). Stone extraction is more likely to fail when the stones are large.

Early Complications:

All centers report early complications in 5% to 10% of patients with a mortality rate of 0.5%[8]. Haemorrhage is the commonest and most alarming immediate complication. Slight, self-limited bleeding is common but major life threatening arterial bleeding is fortunately rare. This probably occurs more often with long incisions and second cuts.

Cholangitis occurs only when the technique fails to provide adequate drainage.

Clinical pancreatitis is very rare but transient asymptomatic rise in pancreatic enzymes is fairly common[5].

Impaction of stone at the sphincterotomy orifice either spontaneously or during attempts at basket extraction is uncommon and can usually be managed endoscopically. Occasionally surgery is required to remove the stone and the trapped basket[3].

Cholecystitis can occur if sphincterotomy is performed in the presence of gall bladder and when there is inability to drain the obstructed duct. It can be

prevented by the prophylactic use of antibiotics and proper drainage (Fig 3).

Surgical intervention is required urgently in about 2% of the patients undergoing ERS.

Late complications

Recurrent biliary problems appear in 5-10% of patients after several years of sphincterotomy.

Sphincter stenosis and new stones formation occurs occasionally and most of those can be managed endoscopically

Indications for E.R.S. in CBD Stones:

Postcholecystectomy patients without a T.tube in place : This is the most common and clear indication for endoscopic retrieval of stones from the CBD. Occasionally, during immediate postcholecystectomy period a stone detected by a T. tube cholangiogram can be retrieved by this means when extraction of stone is not possible through the T-tube track or has failed.

2. Patient with an intact gall bladder:

The procedure is being used as emergency management in patients actually ill with jaundice, cholangitis and pancreatitis due to ductal stones, as an alternative to emergency surgery or percutaneous biliary drainage. Under these circumstances ERS seems most logical as it provides immediate drainage by stone extraction or stent placement. Cholecystectomy may be performed with reduced risk, once the acute illness has subsided. ERS is also being used as primary treatment for gall stones extraction from the bile duct and proceeding with cholecystectomy only when indicated by recurrent symptoms.

3. Acute Gall Stone Pancreatitis:

Presence of gall stones in the CBD can cause pancreatitis. CBD. stones can safely be removed endoscopically without aggravating biliary pancreatitis. In addition, benign and malignant obstructive lesions can be relieved with ERS coupled with additional procedures respectively as enumerated below:

- i Papillary stenosis treated simply by ERS.
- ii. Postoperative biliary strictures treated by ERS and or angioplasty type balloon catheters.
- iii. Sclerosing cholangitis treated by ERS and placement of prosthesis.
- iv. Pancreatitis causing biliary obstruction treated by removal of pancreatic duct stones or placement of prosthesis in the CBD.

Papillary tumors treated by sphincterotomy allows effective drainage, leading to improvement of patients general condition during the detailed assessment phase before surgery. In patients who are elderly and with proven hepatic metastasis, ERS may itself provide long term palliation.

Tumors above the papilla are treated by ERS and railroading a prosthesis across the tumor may result in palliation.

Our three patients presented with benign disease of common bile duct stones. In the first one, surgery was not possible and severe cholangitis needed adequate drainage. When achieved, she showed dramatic improvement. Of the two cases with post cholecystectomy CBD stones, one could be saved from repeat surgery and had very low morbidity. The other was operated but stones had passed spontaneously after papillotomy.

ERS is therefore, a safe and effective method in the management of CBD stones in experienced hands.

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