

PRELIMINARY EXPERIENCE WITH TRANSDUODENAL SPHINCTEROPLASTY FOR BILIARY DRAINAGE

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SYNOPSIS

The most widely practised biliary drainage procedures in Singapore are choledocho-jejuno and choledochoduodenostomy. The transduodenal procedure has not been popular locally, despite encouraging reports from Ong in Hong Kong.

This paper is a report of the good results we have had with Sphincteroplasty over a 4 year period at the Dept of Surgery, Alexandra Hospital. The technique described by Austin Jones was used in all cases. In this series of 27 patients, transduodenal sphincteroplasty was done at primary ductal exploration when multiple calculi, mud or ampullary stenosis were encountered. It was also done for residual stones or when irremovable hepatic duct calculi were found.

Although one-third of the patients developed complications post-operatively, they were essentially those of wound and chest infection (5 cases), wound breakdown (2 cases) and renal failure (2 cases) and was therefore not related directly to the procedure. Only 1 case of recurrent cholangitis has been noted to date. Considering the magnitude of this operation done on relatively ill and old patients (mean age = 52.4 years) there was no mortality; thus underscoring the safety of the procedure.

INTRODUCTION

The most widely practised biliary drainage procedures in Singapore are choledocho-jejuno and choledocho-duodenostomy (1). The transduodenal procedure has not been popular locally, despite encouraging results from Ong in Hong Kong (2). This paper is a report of the good results we have had with Transduodenal Sphincteroplasty over a 4 year period at the Dept of Surgery, Alexandra Hospital, Singapore.

MATERIAL AND METHOD

Between June 1978 to June 1982 a total of 27 consecutive patients requiring a biliary drainage procedure, underwent transduodenal sphincteroplasty when indications for the operation (TABLE 1) were encountered at laparotomy.

Twenty-three of the patients were Chinese (85.2%), 2 were Malays (7.4%), while there were 2 Indians (7.4%). Although their ages ranged from 16 to 75 years, the mean age was 52.4 years. Females predominated (F:M ratio = 5:4).

Presentation: 10 patients presented with cholangitis, 8 with painful jaundice and 9 were admitted with the diagnosis of acute cholecystitis. The single unusual case was that of a 16 year old Indian male who swallowed a foreign body and, at the time of surgery for removal of the latter, the additional finding of oriental cholangiohepatitis was discovered. Seven patients (25.9%) had associated medical disease (TABLE 2).

Investigation: The serum bilirubin was noted to range between 1.5 to 18.5 mg% with a mean of 14 mg%. The serum alkaline phosphatase was likewise raised in all cases with values ranging between 214 to 1110 Units and a mean of 390 Units.

15 patients improved with conservative treatment and were discharged to be investigated electively. In 10 of these, the serum bilirubin fell to normal values to enable oral cholecystograms to be done. In 5 patients a persistently raised bilirubin level of 2 to 5 mg% made the alternative choice of intravenous cholangiography (3 cases) & ultrasound (2 cases) mandatory.

TABLE 1

INDICATIONS FOR TRANSDUODENAL SPHINCTEROPLASTY	
MULTIPLE COMMON DUCT STONES	
Alone	2
With gallbladder stones	2
With gallbladder stones & mud CBD	12
With ampullary stenosis	2
With ampullary stenosis & Gallbladder stones	1
With hepatic duct stones & mud CBD	2
With hepatic duct stones, ampullary stenosis & mud CBD	2
AMPULLARY STENOSIS ALONE	1
HEPATIC DUCT STONE ALONE	1
RESIDUAL COMMON BILE DUCT STONE	2

TABLE 2

ASSOCIATED DISEASE	
HYPERTENSION	2
DIABETES	3
THYROTOXICOSIS & ATRIAL FIB.	1
FOREIGN BODY IN STOMACH	1
PULMONARY TUBERCULOSIS	1

Eight patients improved with 3 to 5 days of antibiotics treatment but remained sufficiently jaundiced to make a Percutaneous Transhepatic Cholangiogram study necessary, as the investigation of choice prior to semi-emergent surgical intervention.

The remaining 5 patients did not have any special study to delineate the status of the biliary system as they obviously required immediate laparotomy when initially seen (3 cases had a board-like abdomen with obvious peritonitis while the last patient required laparotomy to remove a gastric foreign body).

Treatment: All elective cases were given only ampicillin. Semi-emergency or emergency cases were administered ampicillin and gentamycin or ampicillin, gentamycin and flayl, depending on the severity of the clinical situation. 25 patients underwent cholecystectomy, choledocholithotomy and transduodenal sphincteroplasty at the time of primary surgery using the method described by Jones et al (4). In 2 of the patients, a sphincteroplasty was not done at the initial operation. Because a residual Common Bile Duct stone was demonstrated by a post-operative T-tube cholangiogram, a second operation to remove the residual stone and perform transduodenal sphincteroplasty was carried out.

The technical principles of sphincteroplasty which need emphasis are: division of the sphincter and infundibular region of the common bile duct until the opening is equal to the maximum diameter of the duct. This usually means extending the incision up the common duct for a distance of 2 to 2.5 cm, completely through the wall of the duodenum. The orifice of the duct of Wirsung must be identified. The duodenal & common duct mucosa are carefully sutured along both sides of the incision, with particular attention to the angle at the apex where the incision may extend beyond the wall of the duodenum into the pancreas. Care must be taken in the placement of clamps & sutures not to occlude or compromise the pancreatic duct orifice. Finally, if the common duct has been opened, a short-limb T-tube is placed in the duct, and the duodenotomy is closed longitudinally in 2 layers, outer seromuscular layer with non-absorbable material. (Fig 1a and 1b).

At the end of the operation, an intraoperative cholangiogram was done in 3 cases. Two of these had multiple CBD stones, Hepatic duct stones, mud in the CBD and ampullary stenosis. The 3rd patient had multiple CBD stones, multiple gallbladder stones and associated ampullary stenosis. Post-operative T-tube cholangiography was also done for these 3 patients. In 22 other cases, only a post-operative T-tube cholangiogram was done as operative clearance of the biliary tree was felt adequate enough to obviate the intra-operative cholangiographic study. The remaining 2 cases had neither an intraoperative or postoperative cholangiogram as these patients had multiple CBD stones alone without any other abnormality in the biliary system. The 2 cases of residual stone were from the group of patients where only a postoperative T-tube cholangiogram was done.

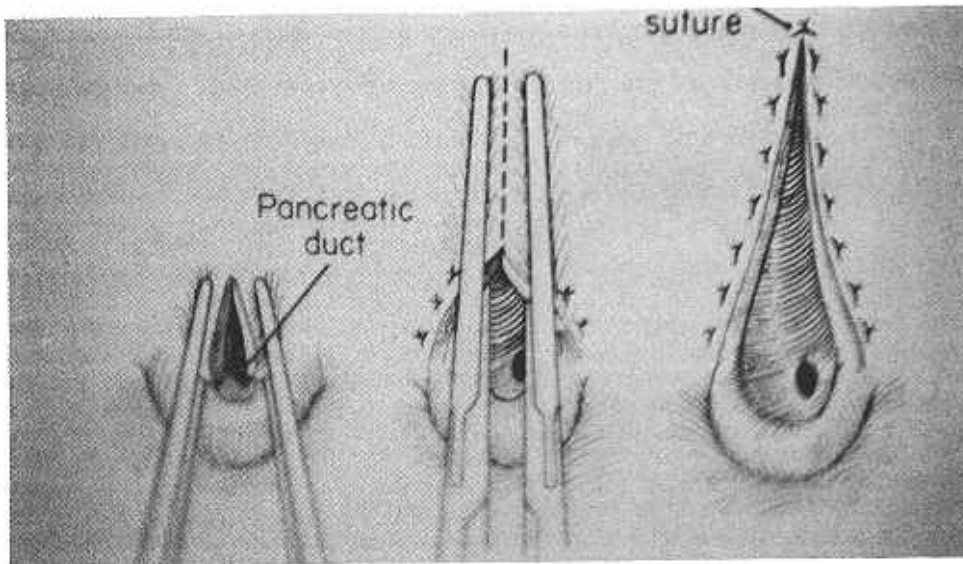


Fig 1a: TECHNIQUE OF TRANSDUODENAL SPHINCTEROPLASTY

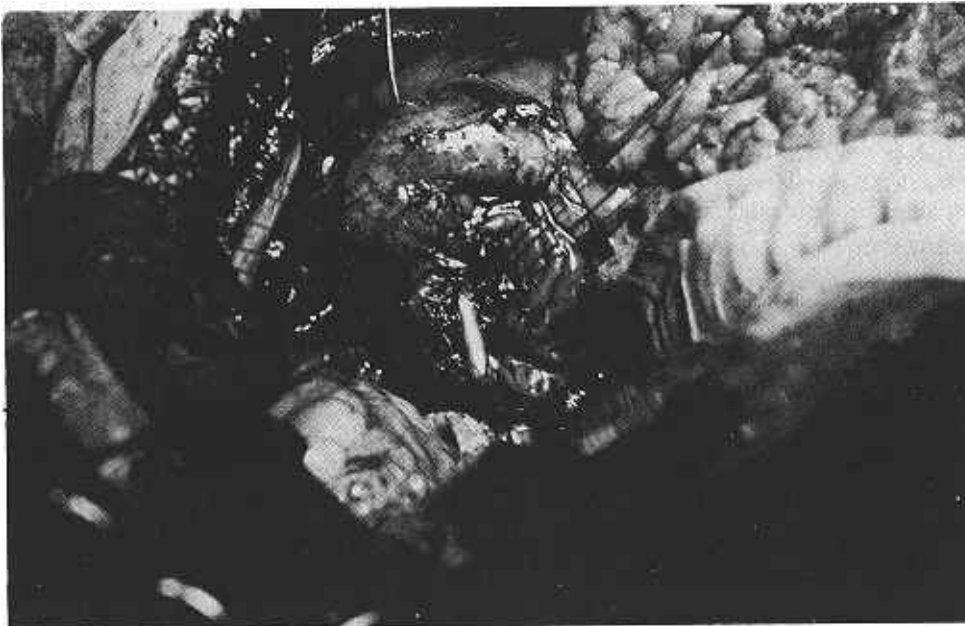


Fig 1b: THE OPERATION OF SPHINCTEROPLASTY

RESULTS

Operative Findings: The majority of the patients in whom transduodenal sphincteroplasty was carried out had multiple Common Bile Duct stones (23 patients). The latter occurred alone in 2 cases while the rest (21 cases) had associated gallbladder stones, hepatic duct stones, mud in the C B D, or ampullary stenosis — all or some of these in combination of a kind or other.

Hepatic duct stone was the only finding in 1 case, while there was a single case with ampullary stenosis alone. The remaining 2 cases in this series were cases of residual common bile duct stone/s discovered at postoperative cholangiography after an earlier cholecystectomy and common bile duct lithotomy.

A sample of the bile from the CBD was sent for pyogenic culture & sensitivity in all cases. 12 grew *Klebsiella* & *E.Coli* (44.4%), 9 samples grew *E.Coli* alone (33.3%), 2 grew *Aerobacter aerogenes* (7.4%), 1 grew *Proteus* species (3.7%),

1 grew *Pseudomonas aeruginosa* (3.7%), while no growth was found in 2 samples (7.4%).

Operative Mortality: There was none in this series.

Postoperative Morbidity: One patient developed a burst abdomen while another had a wound haematoma which caused wound breakdown. They were resutured & subsequently returned home. Two patients developed acute renal failure in the postoperative period & was successfully treated by the attending renal physician of the hospital. Of the 4 cases with wound infection, 3 were diabetes on insulin therapy. They were treated by pus evacuation & subsequent secondary suture of their wounds. One patient developed a basal pneumonia which responded to antibiotics & chest physiotherapy. There was only 1 patient with the late morbidity of recurrent cholangitis occurring 1 yr after sphincteroplasty. He improved after antibiotics & a subsequent PTC was reported as normal. No further episode of cholangitis has since occurred.

Hospitalization: The average period of hospitalization was 24 days with a range between 11 to 60 days. However if the 2 patients (1 with renal failure & the other with burst abdomen) who each required hospitalization of 60 & 50 days respectively, were eliminated from this series, the range of hospital stay would be 11 to 42 days. The average period of hospitalization would correspondingly be lower, namely, 19.7 days.

DISCUSSION

Sphincterotomy was first described by McBurney in 1891 (3) for the removal of stones in the retroduodenal portion of the CBD and has since been widely used as a biliary drainage procedure. Jones and Smith in 1952 (4) described the difference between a sphincterotomy and a sphincteroplasty. The latter destroys completely the sphincteric mechanism unlike the former which does not (Fig 2) completely ablate the sphincteric activity (5,6). Jones (7) defines sphincteroplasty as a transduodenal method of producing an end to side terminal choledochoduodenostomy with a stoma equal in size to the largest part of the Common Duct; such an opening being noncontractile & permanent and the entire sphincteric mechanism being completely ablated (Fig 3).

Like Ong in Hong Kong (2) we have used sphincteroplasty for our patients & have had good results with the technique over a 4 year period. Our indications for sphincteroplasty

parallel those of Jones (7) and Thorbjarnarson (8). Jones reported an overall morbidity rate of 5.8%. In contrast one third of our patients developed some complication in the early postoperative period. However these were essentially those of wound & chest infection (5 cases), wound breakdown (2 cases), and renal failure (2 cases) and was therefore not related directly to the procedure. Jones in fact had more serious complications like postoperative pancreatitis (3 cases), duodenal fistula (1 case) & excessive T-tube drainage (1 case) in their 293 sphincteroplasties (7). Ong (2) in a series of 342 patients with primary cholangitis who had a sphincteroplasty reported an equally wide range of complications. Jones & Ong reported mortalities of 1.4% (4/293), 4.7% (16/342) respectively. We do not have any. Our single case of recurrent cholangitis was the only case of delayed morbidity. Three of the 4 patients who developed wound infection were diabetics — infection therefore was not unexpected. The patients with wound breakdown & burst abdomen were aged 68 & 70 respectively and both had oriental cholangitis. One of the patients who developed postoperative renal failure was one of the 2 patients for whom the indication for sphincteroplasty at the re-operation was residual CBD stone. The 2 renal failure patients in fact were patients receiving high doses (80mg t.d.s.) of gentamycin for fulminating cholangitis. The patient who developed lobar pneumonia postoperatively was maintained on a respirator with a nasotracheal tube for 3 days following surgery. Thus the prolonged period of endotracheal tube usage probably predisposed to the chest infection. Finally, our patient who

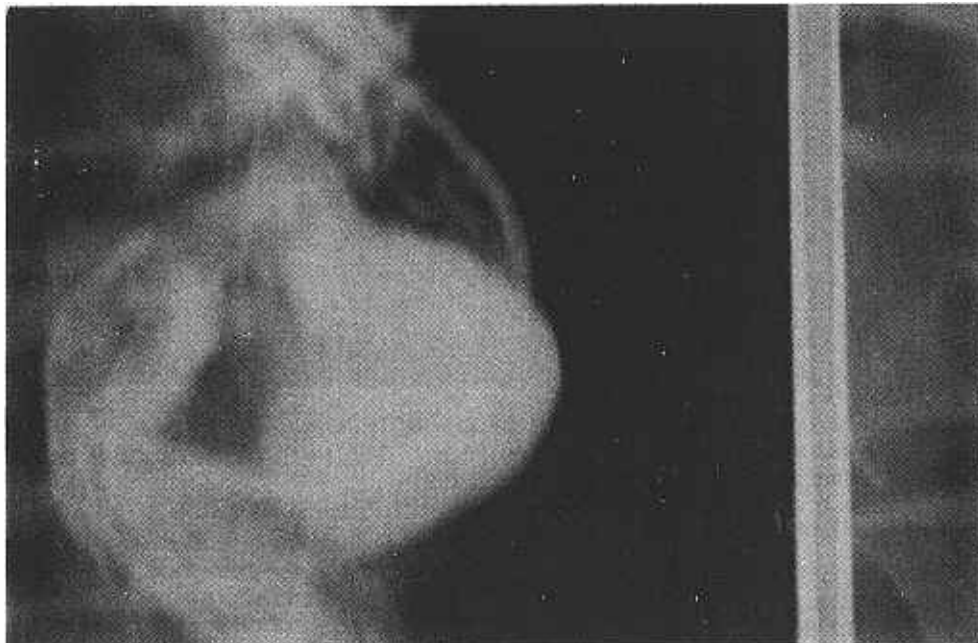


Fig 2: POST-SPHINCTEROTOMY T-Tube CHOLANGIOGRAM

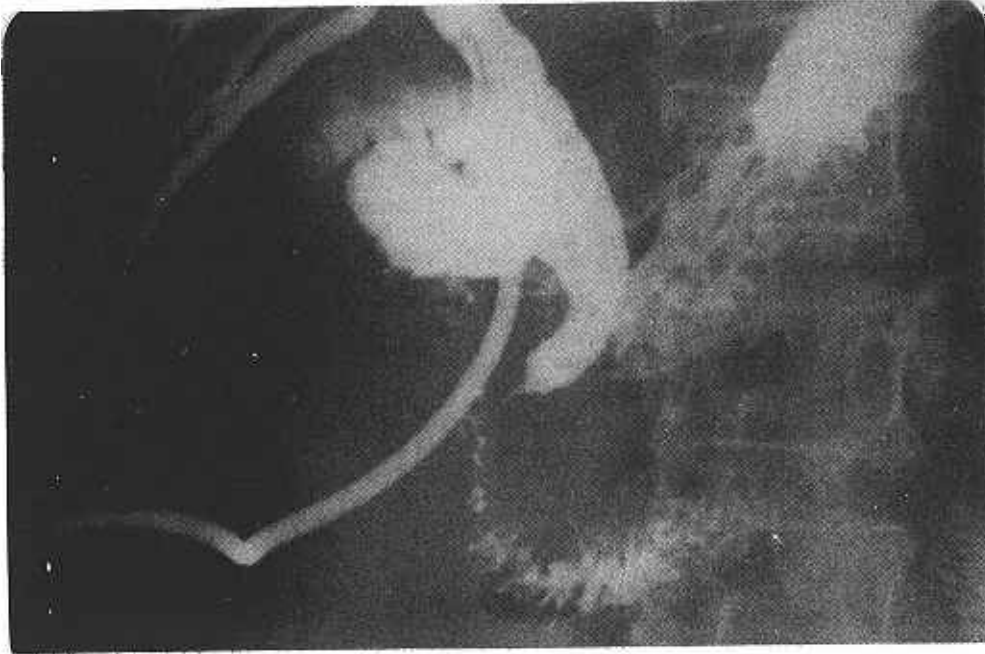


Fig 3: POST-SPHINCTEROPLASTY T-Tube
CHOLANGIOGRAM

had recurrent cholangitis 1 yr after sphincteroplasty had a multiplicity of problems at initial surgery, viz. multiple stones in the CBD, Right & Left hepatic duct stones and ampullary stenosis. He responded to antibiotics & has not since developed cholangitis after a further year of follow-up. Thus a satisfactory explanation can be found for nearly each & every complication in our series.

In the competent hands of Jones & associates (9) the mortality was 1.24% in 241 patients. Haff & Torma (10) reported 9 complications & no deaths in 23 patients. When used for primary cholangitis in Ong's series (2) the mortality was 4.7%. We did not experience any deaths. Considering therefore the magnitude of the operation done on relatively ill and old patients (mean age 52.4 years), it can be concluded that the procedure is comparatively safe.

We attribute our good results to a number of factors, not least of which is our conservative policy of attempting to get our patients out of a septicemic state before embarking on surgery. Hence only 4 patients were operated on the very day of admission, the rest receiving surgery either in a semielective (8 cases) or elective (15 cases) basis. By semielective we mean that the temperature is brought under control & surgery is carried out 3 to 5 days after admission and adequate investigations which usually include a PTC study.

The use of gentamycin in favour of the more commonly available ampicillin in the semiemergent and emergency cases probably has much to recommend this policy as ampicillin resistant strains of *E. Coli* are on the increase. Also, ampicillin is only effective against some strains of *E. Coli*. We have not done any cultures for anaerobic organisms & thus cannot as effectively demonstrate the rationale for the use of flagyl in some of our patients who are more ill than others.

The indications for the performance of transduodenal sphincteroplasty have been adequately stated. What of the contraindications to this procedure (TABLE 3). Jones (11) has advised against sphincteroplasty at primary or subsequent choledochotomy if the bile is clean, the calculi appear to be of gallbladder origin, only a few large calculi are present, the papilla is 3 mm in diameter or larger, choledoscopy is clear or the completion cholangiogram is normal. He has also

suggested avoiding the procedure when there is anatomic abnormality at the lower end of the duct eg. per-Vaterian diverticulum or when there is distal duct inflammatory disease including acute pancreatitis. Finally, it should not be done in the presence of long distal duct strictures.

The other biliary drainage procedures (12,13) have certain advantages and each method has its advocate (14). However, one has to be mindful that choledochojejunostomy requires considerable skill to perform, besides being a more major procedure. Choledochoduodenostomy may be simpler & quicker to perform but it carries the risk of the sump syndrome and its performance must have the prerequisite of an adequately dilated common bile duct.

TABLE 3

CONTRAINDICATIONS

- Clean Bile
- Calculi Gallbladder origin
- Papilla 3 m.m. in diameter or larger
- Choledoscopy clear
- Completion Cholangiogram normal
- Anatomic abnormality Lower End CBD
- Long distal Duct Strictures

CONCLUSION

Given the clinical circumstances in which biliary drainage is required to treat choledocholithiasis, cholangiohepatitis or residual stones, transduodenal sphincteroplasty appears to be a reasonable procedure of choice as it carries an acceptable morbidity when done by those trained in its execution.

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