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# Endoscopic sphincterotomy assisted by percutaneous transhepatic choledochal tube: a preliminary report\*

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## Abstract

We report a method of endoscopic retrograde sphincterotomy in patients in whom the optimal viewing of the papilla of Vater is hardly obtained. Percutaneous transhepatic cholangiodrainage (PTCD)-tube is placed under ultrasonographic guidance. PTCD-tube coming out of the papilla of Vater is observed by the endoscope and the guide wire inside the sphincterotome is inserted into the PTCD-tube. Sphincterotome is advanced into the common bile duct by the guidance of the guide wire and PTCD-tube. Sphincterotomy is performed in a usual fashion. Two patients with previous history of gastrectomy underwent this procedure with successful results. This method should be tried when usual method of EST is difficult and unsuccessful.

**KEYWORDS:** endoscopic sphincterotomy, percutaneous transhepatic cholangio-drainage, bile duct drainage

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*Brief Note***Endoscopic Sphincterotomy Assisted by Percutaneous Transhepatic Choledochal Tube: A Preliminary Report**

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We report a method of endoscopic retrograde sphincterotomy in patients in whom the optimal viewing of the papilla of Vater is hardly obtained. Percutaneous transhepatic cholangiodrainage (PTCD)-tube is placed under ultrasonographic guidance. PTCD-tube coming out of the papilla of Vater is observed by the endoscope and the guide wire inside the sphincterotome is inserted into the PTCD-tube. Sphincterotome is advanced into the common bile duct by the guidance of the guide wire and PTCD-tube. Sphincterotomy is performed in a usual fashion. Two patients with previous history of gastrectomy underwent this procedure with successful results. This method should be tried when usual method of EST is difficult and unsuccessful.

**Key words:** endoscopic sphincterotomy, percutaneous transhepatic cholangio-drainage, bile duct drainage

**E**ndoscopic sphincterotomy (EST) is a well-established technique developed in order to obtain efficient bile duct drainage without operative invasiveness inherent in surgical trans-duodenal sphincteroplasty (1, 2). Nowadays, laparoscopic cholecystectomy has become a standard procedure for biliary stones and EST is expected to play an important role in pre- and post-laparoscopic treatment of choledocholithiasis. However, there are several situations in which it is very difficult to perform EST (3), such as patients who underwent gastrectomy or patients with peri-papillary diverticula which are found frequently in elderly patients with stones. In such cases,

it is difficult to obtain proper visualization of the papilla of Vater because of anatomical alteration. Even cannulation of sphincterotome is sometimes very difficult because of anatomical condition. It may be even dangerous to attempt EST. We describe a safe and easy method to perform EST by the guidance of a tube inserted via a percutaneous transhepatic approach in such patients who have been regarded and shunned as difficult cases.

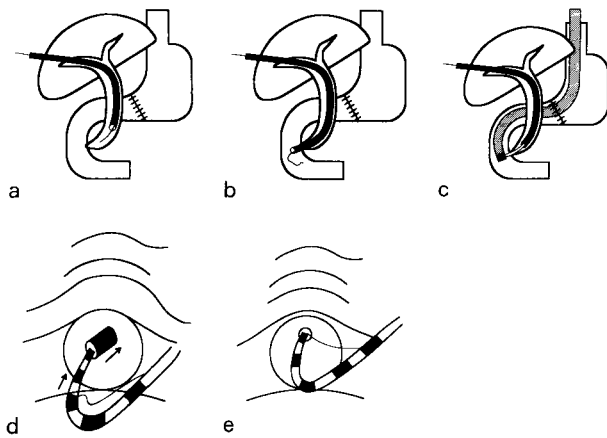
**Method**

A patient undergoes percutaneous transhepatic cholangio-drainage (PTCD) under ultrasonographic (USG) guidance. The intrahepatic bile duct is often dilated in those who require EST, and even if it is not dilated, it is very easy and safe to visualize the intrahepatic bile duct and to perform PTCD with USG. A straight tip guide wire is placed in the common bile duct (CBD), and by its guidance, an 8-French straight PTCD-tube is placed in the common bile duct (Fig. 1a). The CBD is visualized by X-ray with contrast medium and passage of the contrast medium to the duodenum is confirmed. The guide wire is then advanced through the papilla of Vater into the duodenum and is followed by the straight PTCD-tube (Fig. 1b). The guide wire is then removed. Care should be taken to secure the position of the PTCD-tube.

The patient then undergoes a routine endoscopic ERCP examination using Olympus JF-1T20 and the papilla of Vater, containing the PTCD-tube, is observed endoscopically. The PTCD-tube is retracted until about 5 mm of the tip of the PTCD-tube is exposed (Fig. 1c). We use sphincterotome which includes guide wire inside

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**Fig. 1** Schematic procedure of percutaneous transhepatic cholangio-drainage (PTCD)-tube-guided- endoscopic sphincterotomy (EST). **a:** Ultrasound guided PTCD is performed in the usual fashion and the tube and guide wire are placed in the common bile duct; **b:** The guide wire is advanced into the duodenum through the ampulla of Vater, followed by the PTCD; **c:** PTCD tube is placed through the ampulla of Vater; **d:** The tip of the sphincterotome is inserted into the PTCD-tube guided by the guide wire built into the sphincterotome; **e:** The sphincterotome is inserted into the common bile duct (CBD), and EST can be performed in the usual fashion.

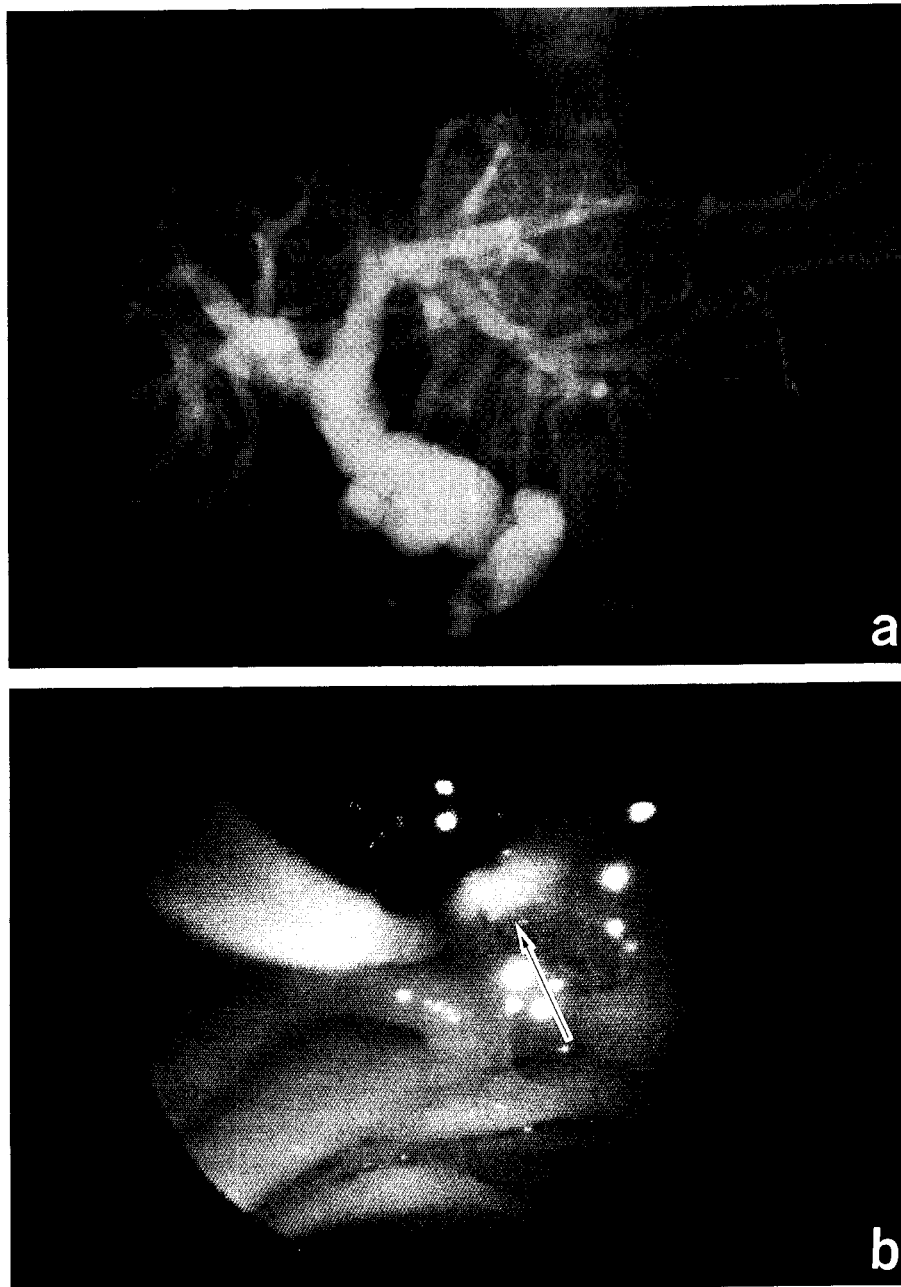
(Wilson-Cook). The guide wire inside the sphincterotome is inserted retrograde into the hole of the PTCD-tube. The guide wire is advanced through the PTCD-tube until it is held outside the PTCD-tube. The tip of the sphincterotome for EST is then advanced in retrograde fashion into the CBD (Fig. 1d) by the guidance of the guide wire. While the sphincterotome is advanced, the PTCD-tube is retracted with care so as not to lose contact with the sphincterotome. It is advisable to use a sphincterotome with a long tip because the long tip in the CBD guarantees the accurate positioning of the sphincterotome. Once the sphincterotome is placed in the CBD (Fig. 1e), EST procedure is performed in the usual fashion. Cranial direction of the sphincterotome can be adjusted by rotating PTCD-tube while maintaining the tight junction of the PTCD-tube and the sphincterotome. During the procedure of EST, the guide wire and the PTCD-tube stay at the position in case the sphincterotome comes out of the papilla of Vater.

Following completion of EST, the position of the PTCD-tube is maintained in the CBD for a day or two prior to removal.

### Cases

We have performed this method in two patients.

**Case 1.** A 76-year-old male with jaundice and fever was referred to our department with PTCD-tube drainage which had been done in the previous hospital. He underwent the mitral valve replacement at the age 70, gastrectomy with Billroth I gastrojejunostomy at the age 72, and cholecystectomy and T-tube drainage at the age 75. He was on anti-coagulative treatment due to the valve replacement and repetitive myocardial ischemic attack. Electrocardiogram showed the significant ST-T change on exercise. Roentgenographic examination through PTCD-tube revealed CBD stones and kinked CBD and the stenosis of the ampulla of Vater due to the previous operation (Fig. 2a). We decided to perform EST instead of open laparotomy due to the patient's wish and his clinical background. After the temporal discontinuance of the anti-coagulants consisted of Aspirin and Warfarin Potassium, endoscopic examination was performed and it revealed a severe clockwise rotation of the duodenum and the front view of the papilla of Vater was hardly obtained. Cannulation into the papilla Vater was managed to be performed but deep cannulation was not possible. In addition, the straight part of the kinked lower CBD was so short that the perforation of the CBD by insertion of the sphincterotome was strongly concerned. We therefore performed the PTCD-tube guided EST. The PTCD-tube was advanced into the duodenum under the guidance of the guide wire. Endoscopy was performed and the tip of the PTCD-tube was confirmed. The tip of the sphincterotome was connected to the tip of the PTCD-tube (Fig. 2b) by the assistance of the guide wire inside the sphincterotome, and the sphincterotome was advanced into the CBD. Despite the poor visibility of the opening of the papilla of Vater due to the anatomical alteration, the insertion of the cannula into the CBD was easily performed by the method described above. The tight connection of the PTCD-tube and the sphincterotome made it possible to perform easy insertion and right positioning of the sphincterotome. EST was successfully performed and the CBD stones were extracted and passage of the contrast medium was confirmed. The patient showed normal liver function test and smooth passage of the contrast medium into the duodenum one week after the treatment. The PTCD-tube was then removed. He was discharged two weeks after the treatment without any complications, and has no signs of recurrent stones one year after the procedure.



**Fig. 2** PTCD-tube-guided-EST in case #1. **a:** Roentgenographic examination through the PTCD-tube revealed dilated and kinked CBD and stones. The passage of the contrast medium into the duodenum was difficult to observe due to fibrotic stenosis of the ampulla of Vater; **b:** The sphincterotome was inserted into the tip of the PTCD-tube (arrow). PTCD, EST and CBD: See Fig. 1.

**Case 2.** An 82-year-old man was admitted to our department with pain and jaundice. He had undergone Bilroth I gastrectomy at the age of 75 and cholecystectomy with T-tube drainage at the age of 78. Echographic examination revealed dilated intrahepatic bile duct and

CBD stones. Endoscopic observation of the papilla of Vater revealed no papillary swelling, suggesting no impaction of the stone. Endoscopic retrograde cholangiography was not successful because of the severe rotation of the duodenum and the existence of the big peri-papillary

diverticulum. Shortly after the normalization of the liver function by palliative treatment, USG-guided PTCD drainage was performed and the successive EST was performed by the method described above. CBD stones were removed by balloon extraction. No complications were observed, and shortly after the removal of CBD stones, the patient was discharged. Follow up ERC revealed no recurrence of the CBD stones 8 months after the treatment.

### Discussion

Endoscopic retrograde sphincterotomy (EST) is a widely accepted technique for performing common bile duct drainage with little operative stress (3). EST is preferred when a patient should have less invasive procedure than operation due to age or clinical condition. In addition, laparoscopic cholecystectomy has become a standard procedure in most patients with biliary stones, so EST is expected to play a more and more important role as a tool to treat choledocholithiasis in combination with laparoscopic cholecystectomy. In order to perform safe EST, it is most important to get an optimal front view of the papilla of Vater and to place a sphincterotome in accurate position. A cutting wire of the sphincterotome should be situated in a cranial direction. However, it is often the case that those who would benefit from EST are the most difficult patients in whom to perform the procedure. For example, it is very hard to obtain an optimal view of the papilla of Vater in a patient who has previously undergone gastrectomy (4). Peri-papillary diverticulum is found frequently in elderly patients who are the good candidate to be performed EST. Even a cannulation of sphincterotome needs an exquisite technique in such patients. Endoscopic sphincterotomy in such patients are difficult and quite dangerous if performed in an usual fashion. We admit that the success rate of EST is deeply dependent on the experience of the endoscopist. However, it is important to develop a method by which every endoscopist can perform a safe EST with ease. By using the method described above, the insertion and the accurate positioning of the sphincterotome is easily performed and EST can be safely performed regardless of the previous operation. The PTCD-tube is used to reveal the position and the direction of the CBD for the insertion of the sphincterotome. The guide wire included in the sphincterotome secures the contact between the PTCD-tube and sphincterotome. In addition, the direction of the

cutting wire can be adjusted to the optimal cranial position by rotating the PTCD-tube, which may prevent complications such as pancreatitis.

To treat complexed choledocholithiasis, laparoscopic antegrade sphincterotomy is reported by DePaulo (5) and others. They perform laparoscopic cholecystectomy and simultaneous treatment of choledocholithiasis. The reported results are very satisfactory. However, enough experiences in laparoscopic surgery to perform this technique are required. And in recurrent cases who have already cholecystectomized, they should undergo general anesthesia and laparoscopic procedure in this method. In addition, the laparoscopic procedure does not necessarily guarantee a favorable outcome: there is a possibility for open procedure if laparoscopic procedure fails. We therefore prefer preoperative EST if choledocholithiasis is found or suspected preoperatively. Even after failure of the firstline preoperative EST, laparoscopic antegrade EST can be performed. That is the reason we perform preoperative EST and the following laparoscopic cholecystectomy to treat choledocholithiasis in our institute.

Judging from the patients we experienced, though little in the number, the method described is very useful and safe especially in those who have been abandoned as difficult cases or contraindications for EST in the institute where PTCD procedure under USG observation is fully established. The preliminary results indicate that this method is useful and worth consideration in hard cases.

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