

Insertion of a Large-Caliber Biliary Endoprosthesis via the T-Tube Tract (Technical Note)

John K. Sammon,¹ Steven K. Teplick, and Pamela H. Haskin

Percutaneous placement of biliary endoprotheses via the transhepatic route in patients with malignant ductal obstruction has been advocated as an alternative to internal-external drainage catheters [1]. We recently encountered three patients in whom malignant obstruction of the distal common bile duct was discovered at the time of T-tube cholangiography after cholecystectomy. We have previously described our technique for insertion of a large caliber endoprosthesis through the liver [2]. We present a modification of this technique for use through a T-tube tract when there is distal common-bile-duct obstruction.

Technique

Figure 1 depicts the components of the prosthesis insertion system, which is commercially available (TBEP-14S, Wilson-Cook Medical, Winston-Salem, NC). The procedure is performed with celiac plexus nerve block, supplemented by either epidural anesthesia or local anesthesia at the T-tube entry site. Figure 2A shows a malignant stricture of the common bile duct discovered on a routine postoperative T-tube cholangiogram. After the T-tube tract has matured for 4–6 weeks, the T-tube is removed and a guidewire is manipulated through the stricture into the duodenum. The stricture is then dilated to 16 French with progressively larger Teflon dilators or a balloon-dilatation catheter, and the 9-French guiding catheter is advanced well into the duodenum (Fig. 2B). (Dilatation of the tract and stricture may require an additional session, especially if the T-tube is a small one). The 14-French mushroom-tipped polyethylene biliary endoprosthesis is trimmed to an appropriate length, and the duodenal end is gently curved over a steam kettle. It is important to cut the stent long enough to prevent migration of its lower end upward into the bile duct. One strand of suture material is looped through a side hole at the duodenal end of the stent, and another strand is looped through the mushroom on the proximal (ductal) end. The stent is then loaded into the 16-French Teflon sheath, which keeps the mushroom collapsed until the stent is ready to be released. The entire apparatus is then advanced over the guiding catheter through the T-tube tract and biliary stricture (Fig. 2C). The proximal end of the endo-

prosthesis is positioned completely within the bile duct above the obstruction, and the distal end in the duodenum. The ends of both strands of suture material are held loosely outside the patient. The stent is pushed out of the sheath with the 14-French "pusher," allowing the mushroom to expand. The guidewire, guiding catheter, and sheath are then removed, using the pusher to hold the stent in place (Fig. 2D).

Traction on the suture through the duodenal end of the stent will pull the endoprosthesis into the common or intrahepatic duct above the T-tube tract. A combination of alternately pulling on the two sutures and pushing with the pusher will help direct the proximal end of the stent cephalad. Finally, both loops of suture material are removed while the pusher is temporarily held against the midportion of the stent to prevent any possible displacement. Contrast material may be injected through the pusher to verify the final position of the endoprosthesis (Fig. 2E).

Discussion

Percutaneous reinsertion of T-tubes through a T-tube tract has been described previously [3]. Conceivably, small-bore (8-French) endoprotheses could be inserted in the same way

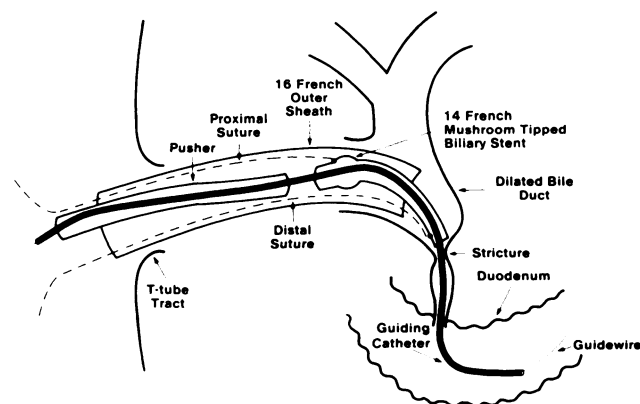
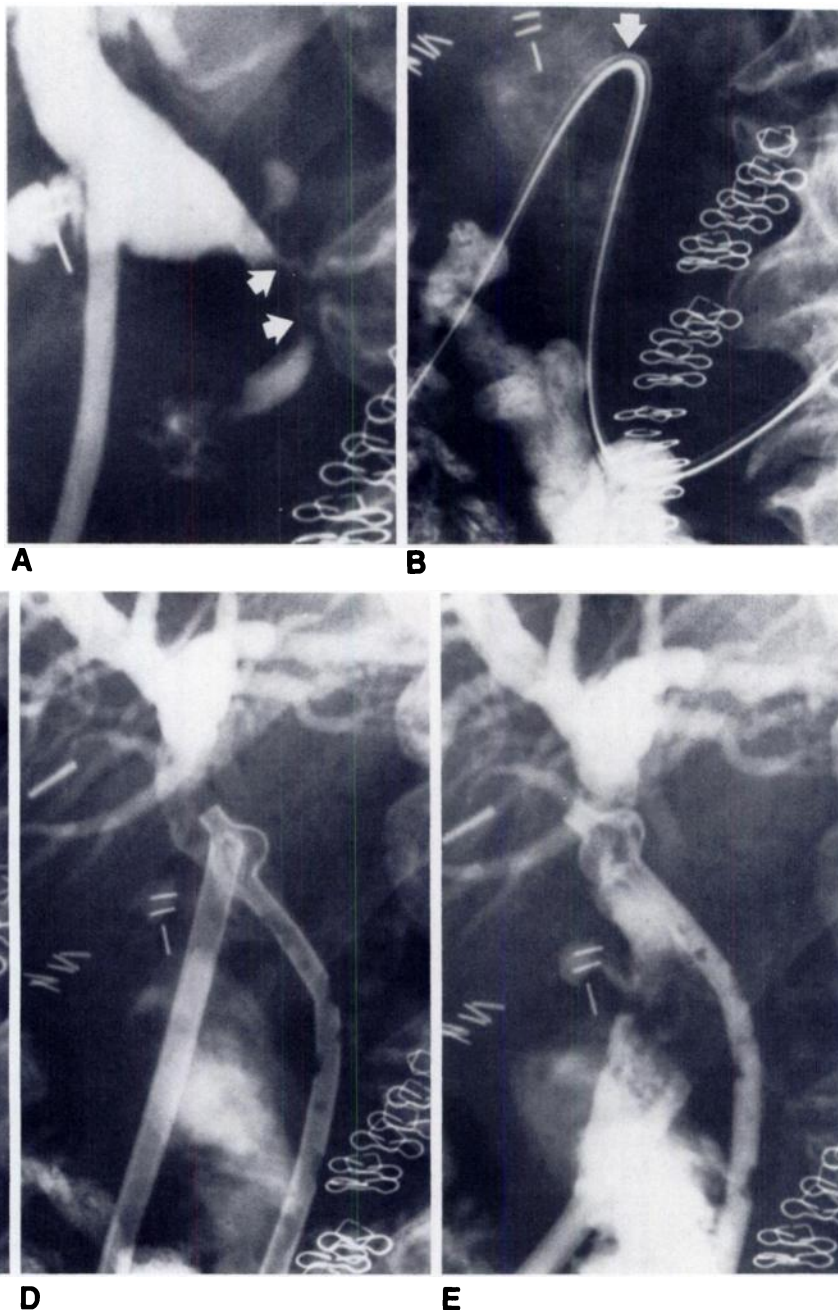


Fig. 1.—Diagram (not drawn to scale) showing components of biliary stent placement system as used through a T-tube tract.

Received January 6, 1986; accepted after revision March 12, 1986.

¹ All authors: Department of Diagnostic Radiology, Hahnemann University, Broad and Vine Streets, Philadelphia, PA 19102. Address reprint requests to S. K. Teplick.

Fig. 2.—A, T-tube cholangiogram after cholecystectomy demonstrates distal common-bile-duct stricture (arrows). B, Tract and stricture have been dilated to 16 French, and 9-French guiding catheter has been inserted over a guidewire. Note the acute angle (arrow) between T-tube tract and distal portion of common bile duct. C, Biliary stent is being advanced into common bile duct. Mushroom (arrow) at proximal end of stent is well within outer sheath. (Pusher has been temporarily pulled back from field of view.) In this patient, guidewire and guiding catheter passed into descending part of duodenum (at lower left of figure). D, Stent has now been pushed out of sheath, allowing mushroom to expand. Sheath and guiding catheter have been removed. Pusher and sutures (not radiopaque) are now used to manipulate proximal end of stent into proximal bile duct above T-tube tract. E, Final stent position. Distal end of stent (not shown) extends several centimeters into duodenum.



since these catheters can be bent or folded upon themselves. However, in our experience large-bore stents remain patent for longer periods of time than smaller ones and should be inserted if possible. In addition, the problem of migration is eliminated with the mushroom-tipped catheter as long as the distal end of the stent is well into the duodenum. We believe that placing a strand of suture material through each end of the stent provides maximal control during the positioning procedure; however, placing a single suture through side holes in the midportion of the stent could be tried as a simpler alternative. The angle between the T-tube and the distal common bile duct may be acute, and consequently insertion of a larger endoprosthesis, especially one with a flange or mushroom at one end, may be more difficult than it would be

with a standard transhepatic approach. However, this potential difficulty is usually outweighed by the advantages of using an established percutaneous tract. There were no significant complications in our three patients, and patient discomfort was mild when regional anesthesia was used.

REFERENCES

1. Coons HG, Carey PH. Biliary endoprosthesis: yes or no? (editorial). *AJR* 1985;145:429-430
2. Teplick SK, Haskin PH, Goldstein RC, et al. A new biliary endoprosthesis. *AJR* 1983;141:799-801
3. Crummy AB, Turnipseed WD. Percutaneous replacement of a biliary T-tube. *AJR* 1977;128:869-870