

ROUND TABLE

Therapeutic Endoscopic Ultrasonography in Pancreatic Malignancy. Is the ERCP Passè?

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Introduction

Endoscopic biliary stenting is the most common method of treating obstructive jaundice. But, in about 3-12% of cases, selective cannulation of the major papilla fails and surgery or percutaneous biliary drainage is required. But, percutaneous drainage requires dilated intrahepatic biliary ducts, and the rate of complications reaches 20%, including cases of peritoneal bleeding. A new technique of biliary drainage using EUS and EUS guided puncture of the bile duct (common bile duct or left hepatic duct) is now possible.

Using EUS guidance and specific accessories it is now possible to create bilio-digestive anastomosis.

The aim of this paper is:

1. to describe the material needed for such procedures;
2. to describe the technique of choledoco-duodenal anastomosis guided by EUS;
3. to describe the technique of left hepaticogastrostomy under EUS guidance;
4. the place of these techniques today in comparison with ERCP.

Material

Interventional Echoendoscopes

About 1990, the Pentax Corporation (Tokyo, Japan) developed an electronic convex curved linear array echoendoscope (FG 32UA) with

an imaging plane in the long axis of the device which overlaps with the instrumentation plane. This echoendoscope, equipped with a 2.0 mm working channel, permits fine-needle biopsy under EUS guidance. However, the relatively small working channel of the FG 32UA was a drawback for pseudocyst drainage since it necessitated the exchange of the echoendoscope for a therapeutic duodenoscope in order to insert either a stent or nasocystic drain. To enable stent placement using an echoendoscope, EUS interventional echoendoscopes (FG 38X and EG 38UT) were developed by Hitachi Medical Corporation (Kashiwa Japan). The FG 38X has a working channel of 3.2 mm, which allows the insertion of a 8.5 F stent or nasocystic drain, and the EG 38UT has a larger working channel of 3.8 mm with an elevator allowing the placement of a 10 F stent (Figure 1).

The Olympus Corporation (Tokyo, Japan) has also developed convex array echoendoscopes. The GF UC 30P has a biopsy channel of 2.8 mm, which enables the placement of a 7 F stent or nasocystic catheter, and the instrument is equipped with an elevator. A new prototype, the GF UCT 30, has a larger working-channel of 3.7 mm allowing the placement of a 10 F stent. The main drawback of convex linear array echoendoscopes is the more limited imaging field (120° using the Pentax and 180° using the Olympus) produced by an electronic transducer. These



Figure 1. Interventional echoendoscope EG 38 UT (Pentax-Hitachi).

instruments are coupled with the Aloca (Tokyo, Japan) processor or with a smaller processor (Suzie, Olympus Co., Tokyo, Japan).

Needles and Accessories for Drainage

Some authors have used needle knife catheters, but the needle can be difficult to visualize endosonographically. The “Zimmon” needle-knife (Wilson-Cook Co., Winston Salem, North Carolina, USA) has a large gauge needle which is easier to visualize. Diathermy is usually required to penetrate the cyst.

A standard endosonography fine needle aspiration (FNA) needle is well visualized sonographically and can be used for pseudocyst puncture. The drawback of this needle is the small caliber (22 or 23 G) which will only accept a 0.018 inch guide wire. Using a 19G FNA needle (Wilson-Cook Co., Winston Salem, North Carolina, USA), a 0.0035 inch guide wire can be inserted through the needle into the dilated bile duct. The Wilson Cook Corporation has recently developed a “one step device”: the Giovannini Needle-Wire. This instrument is composed of 3 parts: a needle-wire, a dilator catheter of 6.5 F and a stent of 8.5 or 10 F.

Technique of Bilio-Duodenal Anastomosis Guided by EUS (Figure 2)

Using a therapeutic EUS scope, the common bile duct (CBD) is punctured with a 5 F needle-knife under EUS guidance and a cholangiography is obtained. It is preferable to puncture the dilated CBD through the second part of the duodenum to prevent peritoneal bile leakage even if it is necessary to pass through the pancreatic tumor.

But sometimes, the dilated CBD is only clearly visible through the first part of the duodenum and, in this position, the risk of peritoneal bile leakage is very high. In this case, it is better to use a covered metallic stent to prevent this leakage.

The metallic part of the needle-knife is removed and a 0.035 inch guide wire is introduced in the CBD. On the guide wire, a 6.5 F Sohendra dilator (Wilson-Cook Co., Winston Salem, North Carolina, USA) is placed in the CBD and allows the placement of a 10 F plastic stent or a covered metallic expandable stent through the duodenum.

Another trick to prevent bile leakage is to leave a naso-biliary drain in aspiration in the metallic stent for 48 hours.

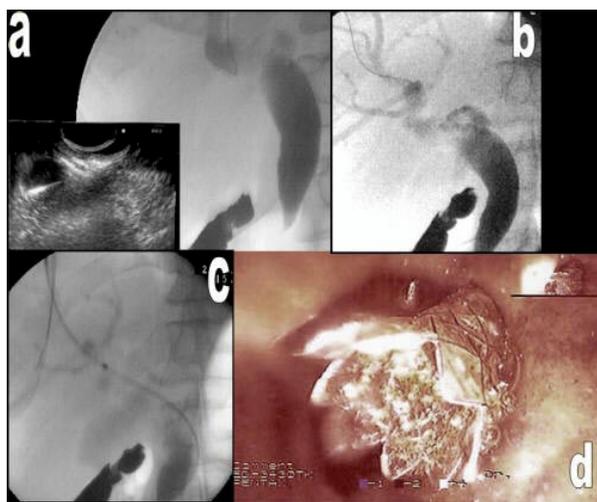


Figure 2. Technique of common bile duct drainage under EUS guidance. **a.** EUS puncture of the common bile duct. **b.** 0.035 guide wire is inserted in the common bile duct. **c.** Insertion of the metallic stent. **d.** Endoscopic aspect of the covered metallic stent through the duodenum.

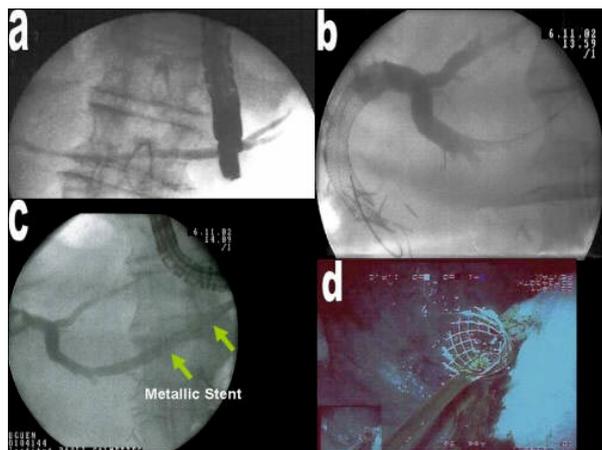


Figure 3. Technique of hepaticogastrostomy guided by EUS. **a.** EUS guided puncture of the left hepatic duct using a 19 G Wilson-Cook EUS needle. **b.** Insertion of a 0.035 inch guidewire. **c.** Deployment of a covered expandable metallic stent (Boston Scientific Co., Natick, MA, USA) through the stomach. **d.** Endoscopic view of the stent creating a hepaticogastrostomy.

Technique of Left Hepatico-Gastrostomy under EUS Guidance (HGE) (Figure 3)

By using an interventional echoendoscope, the dilated left hepatic duct (segment III) was clearly visualized. HGE was then performed under combined fluoroscopic and ultrasound guidance, with the tip of the echoendoscope positioned so that the inflated balloon was in the middle part of the small curvature of the stomach. A needle (19 G, Echotip Ultrasound Needle, EUSN-19-T, Cook Ireland Ltd., Limerick, Ireland) was inserted transgastrically into the distal part of the left hepatic duct, and contrast medium was injected. Opacification showed a dilated left biliary duct to the tumor obstruction. The needle was exchanged through a guidewire (0.02 inch diameter, Terumo Europe, Leuven, Belgium) for a 6.5 F diathermic sheath (prototype Cysto-Gastro set, EndoFlex, Voerde, Germany), which was then used to enlarge the channel between the stomach and the left hepatic duct. The sheath was introduced by using cutting current. After exchange through a guidewire (TFE-coated 0.035 inch diameter, Cook Europe, Bjaeverskov, Denmark), a 8.5 F, 8-cm-long hepatico-gastric stent or a covered metallic

expandable stent (8-cm length, Boston-Scientific Co., Natick, MA, USA) was positioned. As observed by fluoroscopy, contrast medium emptied from the stent into the stomach.

To prevent bile leakage you can leave a 6 or 7 F naso-biliary drain in aspiration in the metallic stent for 48 hours.

Site of Bilio-Digestive Anastomosis Guided by EUS in Comparison with ERCP

Today, ERCP is still the gold standard technique for the drainage of obstructive jaundice due to pancreatic cancer. The success rate of biliary stenting using ERCP is about 80-85% but sometimes ERCP fails to selectively cannulate the papilla or fails to reach the papilla as in the case of duodenal obstruction.

These new techniques of biliary drainage using EUS guidance could be an alternative to percutaneous procedures or to surgery.

The problem with the percutaneous techniques of biliary drainage is the high rate of complications (bleeding, peritoneal bile leakage), involving about 12 to 20% of cases, and the morbidity and the mortality rates in surgery for such palliative procedures are 35-50% and 10-15%, respectively.

Probably, these new techniques of biliary drainage will be an alternative to surgery and percutaneous biliary drainage in the future.

Regarding the data in the literature, we have found two studies concerning hepaticogastrostomy guided by EUS. The first was published by Burmeister *et al.* involving 4 cases [1]. Four cases of successful EUS-guided-cholangio-drainage are presented in which the major papilla could not be cannulated at ERCP. For puncture of the intrahepatic or extrahepatic bile duct, a modification of the one-step technique for the drainage of pancreatic pseudocysts was used. Stent insertion was successful in 3 of the 4 patients. In these 3 patients the cholestasis resolved promptly. The second was our study involving 2 patients with the use of plastic stents in the first case and an expandable covered metallic stent in the second case [2].

There are also 2 studies regarding the common bile duct drainage. The first was published in 2001 about one case of biliary stenting using an echoendoscope [3]. The second is more recent, using a therapeutic echoendoscope to perform EUS-guided "rendez-vous" technique. EUS-guided transgastric or transduodenal needle puncture and guidewire placement through obstructed pancreatic (n=4) or bile (n=2) ducts was attempted in 6 patients [4]. Efforts were made to advance the guidewire antegrade across the papilla or surgical anastomosis. If the guidewire passage was successful, rendezvous ERCP with stent placement was performed immediately afterward. EUS-guided duct access and intraductal guidewire placement was accomplished in 5 of the 6 cases, with a successful removal of the obstruction, and rendez-vous ERCP with stent placement in 3 of the 6 cases (two biliary, one pancreatic). The procedure was clinically effective in all successful cases (two patients with malignant obstructive jaundice and one with relapsing pancreatitis after pancreaticoduodenectomy). There was one minor complication (transient fever) but no pancreatitis or duct leaks after successful or unsuccessful procedures. EUS is a feasible technique for allowing rendez-vous drainage of obstructed biliary or pancreatic ducts through native papillae or anastomoses after initially unsuccessful ERCP.

Conclusion

ERCP is still the gold standard technique for the drainage of obstructive jaundice due to pancreatic cancer. But ERCP fails in about 10-15% of cases and EUS-assisted or -guided biliary drainage will be the alternative to

surgery or percutaneous procedures in the near future.

Keywords Drainage, Sanitary; Endoscopy; Endosonography; Surgical Procedures, Minimally Invasive

Abbreviations CBD: common bile duct; HGE: hepatico-gastrostomy under EUS guidance

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