

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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## EUS-assisted Biliary Decompression for Malignant Jaundice

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**G&H** Is endoscopic ultrasound usually used as a diagnostic procedure?

**JB** Until recently, endoscopic ultrasound (EUS) was used to confirm the presence of a mass causing malignant obstructive jaundice, to obtain tissue from the mass via EUS-guided fine needle aspiration for cytology, and to stage the tumor based on vascular and lymph node involvement. However, in the last 12–18 months, papers have been appearing in the endoscopic literature describing EUS-guided puncture of dilated bile ducts for access in stenting in cases of failed endoscopic retrograde cholangiopancreatography (ERCP).

**G&H** What is causing the failure to access bile ducts at ERCP?

**JB** A head of pancreatic cancer may distort the anatomy of the distal bile duct sufficiently to make cannulation impossible, even using a guide wire or after needle-knife papillotomy. A large tumor may also cause obstruction of the descending duodenum, making endoscopic access for cannulation of the duodenal papilla impossible. In addition, malignant tumors of the ampulla of Vater may defy cannulation.

**G&H** Before the use of therapeutic EUS, how were these problems addressed?

**JB** Typically, the patient underwent the radiologic procedure of percutaneous transhepatic cholangiography,

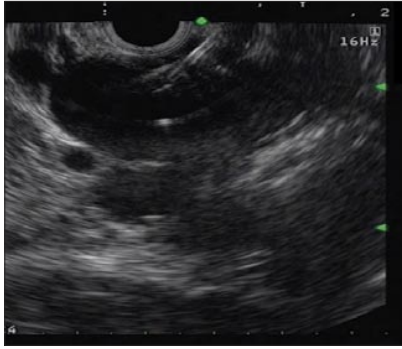
during which a radiologist punctured the liver through the right chest wall to access a dilated bile duct. Depending on the experience of the radiologist and the difficulty of the anatomy, multiple passes with a so-called Chiba needle were sometimes required to successfully locate and puncture a bile duct. After obtaining a contrasted image of the biliary tree with a cholangiogram, a thin catheter was usually left either through or above the obstruction to achieve bile drainage. These biliary catheters were typically left in place for weeks or months, to allow a “track” to mature. Through such tracks, further manipulation could be performed, including the placement of expandable metal mesh biliary stents, if needed, for palliation.

**G&H** Why was another endoscopic approach needed?

**JB** Unfortunately, percutaneous drains are frequently uncomfortable for the patient. The liver moves on respiration, but the chest wall does not. Any patient with a percutaneous biliary drain will tell you that taking a deep breath can be excruciatingly painful. Percutaneous drains also require frequent flushing to maintain their patency, which can be onerous for elderly patients and their caregivers. Percutaneous procedures are occasionally complicated by immediate or delayed bleeding related to vascular injury. In the event of bleeding from a hepatic artery pseudoaneurysm, this hemorrhage can be life-threatening. Many endoscopists who have managed patients with percutaneous biliary drains over the years have longed for a simple, nonexternal drainage alternative to ERCP in malignant jaundice.

**G&H** Why do these patients need biliary drainage?

**JB** Jaundice in itself is not inherently dangerous, but patients do not like the attention that yellow skin attracts in public and do not like being labeled as having a liver disease. Also, many patients with mechanical obstruction



**Figure 1.** Using endoscopic ultrasound, the dilated bile duct is targeted and punctured with a cytology needle.



**Figure 2.** After bile is aspirated to confirm the location, contrast is injected to perform a cholangiograph.

of the biliary tree have severe pruritus, which is related to the backflow of bile acids into the systemic circulation and their binding to proteins in the skin. The itching of malignant jaundice is intense and often intractable and has driven more than a few patients to commit suicide. Although some drugs, including antihistamines and naloxone, can ameliorate the itching of biliary obstruction, only permanent relief can cure this distressing symptom. Patients who are about to undergo attempted resection for pancreatic cancer such as a Whipple procedure may be best served by not having their biliary tree drained, as endoscopic and percutaneous drainage increase the likelihood of postoperative biliary sepsis and wound infection. However, jaundiced patients who are undergoing weeks or months of preoperative chemotherapy with or without irradiation will benefit psychologically and physically (in terms of itching) from biliary decompression.

**G&H** Can you describe how EUS-guided biliary drainage is performed?

**JB** First and foremost, I should state that I hand these cases over to colleagues with training and expertise in EUS. The biliary access can be a combined EUS-ERCP “rendezvous” procedure, or the EUS endoscopist can do the entire procedure unassisted. Obviously, for the former situation, skill in both ERCP and EUS is needed. At present, two physicians are typically needed, although in future we hope that EUS and ERCP training will be offered jointly and concurrently.

I will not go into the technicalities of linear versus radial EUS endoscopes. Suffice it to say that the dilated bile duct above the obstruction is usually identified from the first part of the duodenum, the duodenal bulb. (Intrahepatic bile duct punctures are possible through the stomach wall, but these are beyond the scope of

this discussion.) Passing a large needle, such as a 19-Fr gauge, through the working channel of the EUS scope, the endoscopist punctures the bile duct. Bile is aspirated with a syringe to confirm positioning, and then a cholangiogram is obtained. This alone is very helpful in defining the local anatomy. A biliary guide wire is then passed through the needle and advanced through the stricture if possible. This wire can be grasped with a snare or basket catheter and pulled up in the instrument channel of an ERCP endoscope. Provided that it is long enough (eg, 450 cm), it can then be used to pass standard ERCP accessories, including papillotomes and catheters, to assist stent placement (Figures 1–6).

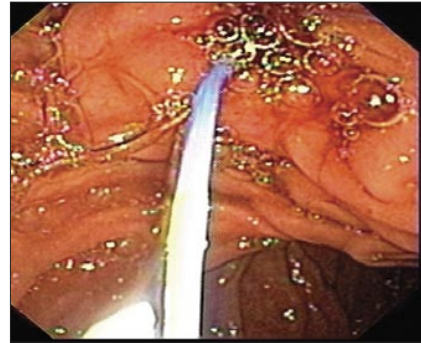
In situations in which a rendezvous procedure is logistically impossible, such as in a duodenal obstruction by tumor, plastic and metal mesh stents can be left across the fistula created between the duodenal bulb and bile duct, although better delivery systems are needed to make this a comfortable procedure for EUS endoscopists.

**G&H** What are the risks of EUS-guided biliary puncture and stenting?

**JB** Theoretically, bleeding and perforation are risks, but in practice they occur rarely. We have seen some retroperitoneal air after EUS-guided biliary puncture, but no significant clinical syndrome resulted and the air was resorbed spontaneously. The ability of the EUS endoscopist to see and avoid large blood vessels including varices when making the puncture greatly adds to the safety of the EUS approach. Thus far, most of these procedures have been described as single cases or small case series in the endoscopic literature. Far more procedures need to be done and reported for us to evaluate the true potential of these techniques, although the initial experience looks very promising.



**Figure 3.** A guide wire is advanced through the needle and negotiated through the distal bile duct stricture.



**Figure 4.** An endoscopic view, showing the guide wire exiting the duodenal papilla into the second part of duodenum.



**Figure 5.** Using a snare or basket catheter, the guide wire is grasped and pulled through the instrument channel of the duodenoscope to facilitate the positioning of a stent-placement system.



**Figure 6.** A Wallstent™ (Boston Scientific) is deployed across the biliary stricture, with the tip open to the duodenum. Bile is seen flowing freely.

**G&H** How do you perceive the role of EUS endoscopists versus that of interventional radiologists in terms of managing malignant obstructive jaundice?

**JB** As you might predict, some interventional radiologists are unhappy about endoscopists treading on their turf, but in my opinion anything that can be done to avoid percutaneous biliary drainage as a palliative procedure should be encouraged. I support minimizing the use of interventional radiology in this setting.

I view my relationship with EUS endoscopists as a partnership. I am delighted to find that they can help me do my job better and offer a less-invasive way to deal with a very difficult management problem, namely failed ERCP for biliary drainage.

*The author thanks Dr. Girish Mishra for his expertise in EUS and for sharing his images of the combined EUS-ERCP procedure.*

### Recommended Reading

Bories E, Pesenti C, Cailloi F, et al. Transgastric endoscopic-guided biliary drainage: results of a pilot study. *Endoscopy*. 2007;39:287-291.

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