EUS-Guided Hepaticogastrostomy

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Abstract

In patients with jaundice and unsuccessful biliary drainage with endoscopic retrograde cholangiopancreatography because of a situation after operation (gastrectomy, Roux-y hepaticogastrostomy (HG), Billroth-II operation), endoscopic ultrasound (EUS)-guided biliary drainage has been introduced as an alternative to percutaneous transhepatic cholangial drainage. Here is demonstrated an EUS-guided HG in a patient 1 year after Whipple operation with relapse of pancreatic cancer and with peritonal and hepatic metastases and intrahepatic cholestases. This article is part of an expert video encyclopedia.

Keywords

Endoscopic ultrasound; EUS-guided biliary drainage; EUS-guided hepaticogastrostomy; Standard endoscopy; Video.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70210-3

Techniques

Endosonography, fluoroscopy, cholangiography.

Materials

- Endosonography: EG 3870UTK; Hitachi Medical system, Japan.
- Puncture: 19-gauge needle; Boston Scientific Corporation, Natick, MS, USA.
- Probing: 0.0035″ guidewire; Boston Scientific Corporation, Natick, MS, USA.
- Choledochostomy:
  - Ring knife ‘Dr. Will’; MTW-Endoskopie, Wesel, Germany.
  - Max force balloon; Boston Scientific Corporation, Natick, MA, USA.
- Stenting: Partially covered metal stent 6 cm; Boston Scientific Corporation, Natick, USA.

Background and Endoscopic Procedure

A 43-year-old man was admitted for cholestasis and fever. The medical history exhibited a Whipple procedure for pancreatic cancer 1 year before admission. The percutaneous ultrasound revealed dilated intrahepatic bile ducts in both hepatic lobes and, in addition, multiple hepatic and peritoneal metastases. Biliiodigestive anastomosis could not be reached with a balloon enteroscope. A percutaneous transhepatic cholangial drainage (PTCD) for external bile drainage was declined by the patient.

When endoscopic retrograde cholangiopancreatography (ERCP) is unsuccessful, the usual alternative is percutaneous transhepatic biliary drainage. However, PTCD may be associated with complications such as bleeding and bile leakage. If subsequent internal drainage cannot be achieved, the patient would have to accept long-term external biliary drainage, which can be uncomfortable and is nonphysiological, with significant impairment of quality of life.

In cases where internal biliary access with ERCP cannot be achieved, interventional EUS-guided cholangiodrainage has become an alternative to percutaneous transhepatic cholangiodrainage.1–4

In this patient, EUS-guided biliary drainage was performed under conscious sedation using a combination of intravenous midazolam and disopivran. Prophylactic antibiotics were administered before the procedure (ceftriaxone is preferred). The transgastric EUS of the left hepatic lobe shows the dilated intrahepatic bile ducts with undisturbed communication. Using color Doppler mode, many pronounced vessels near the bile ducts can be detected. The fundamental issue for planning of the EUS-guided hepaticogastrostomy (HG) is first searching for the best and safest site for an interventional approach to get access to the biliary system.

The puncture site was chosen after careful endosonographic assessment of the biliary tree and the anatomy of the perigastric region, especially the neighboring vessels. In patients with dilated right and left intrahepatic bile ducts with undisturbed communication, the optimal puncture site from the stomach is through segment 2 of the liver to the main left bile duct near the bifurcation. The advantage of this puncture is missing the occlusion of side branches of the bile duct after stent opening, because the puncture is through hepatic parenchyma entering the bile duct from outside at a angle of nearly 90°.

Once a puncture with a 19-gauge needle was made, confirmation of biliary access was achieved by bile aspiration through the needle and contrast instillation under fluoroscopy. Subsequently, a 0.0035-inch guidewire was inserted through the
EUS-Guided Hepaticogastrostomy

Key Learning Points/Tips and Tricks

- EUS-guided HG is a possible technique for internal drainage in patients with malignant jaundice for palliative care to prevent an external drainage via PTCD if an ERC is unsuccessful.
- The retrograde transhepatic drainage with EUS-guided HG still requires a good puncture position to the dilated bile duct in the left liver lobe. Patients with massive ascites and a long way from stomach to the left liver lobe are inappropriate candidates for this intervention.
- Puncture using a 19-gauge needle is the first step, followed by creation of a fistula with ring knife or balloon to insert a plastic or a covered metal stent (SEM).
- The use of a ring knife may be technically easier than graded dilation, because the ring knife burns itself through the liver parenchyma and makes the subsequent passage of the stent delivery system easier.
- The advantage of covered SEM is sealing the dilation tract, which prevents biliary and gastric leakage; also, the large diameter is preferred for a long-term patency and easy reintervention if the stent is obstructed.
- The serious risk of early stent dislocation by foreshortening of the SEM and subsequent bile peritonitis should be prevented with careful attention under EUS and fluoroscopic control.
- To prevent late stent dislocation, the stent should be fixed with hemoclips at the intragastric mucosal site in cases with SEM.

Scripted Voiceover

- EUS-guided hepaticogastrostomy is considered an advanced technique of interventional endoscopy for internal drainage of bile in patients with malignant jaundice and impossible ERCP.
- In a patient with jaundice after former Whipple procedure, ultrasound reveals dilated intrahepatic bile ducts in both hepatic lobes and, in addition, multiple hepatic and peritoneal metastases. Biliodigestive anastomosis could not be reached with duodenoscope or enteroscope. An alternative PTCD for external bile drainage was declined by the patient.
- The transgastric endoscopic ultrasonography of the left hepatic lobe shows the dilated intrahepatic bile ducts with undisturbed communication. Using color Doppler mode, many pronounced vessels near the bile ducts can be detected. The fundamental issue for planning of the EUS-guided hepaticogastrostomy is at first searching for the best and safest site of an interventional approach to get access to the biliary system.
- The transgastric puncture of the left hepatic duct is performed with a 19-Gauge needle.
- Using contrast media, control fluoroscopy confirms the dilated intrahepatic bile ducts and the absent bile drainage through the anastomosis into the jejunum. Under EUS guidance a 0.035-inch guide wire is inserted through the needle into a bile duct.
- This maneuver can be observed with fluoroscopy real-time. The guide wire should be introduced as fare as possible to achieve a stable position for the next steps.
- Over the guide wire, a high-frequency ring knife is push forward up to the gastric wall.
Under changing EUS and fluoroscopy control, the motion of the ring knife during high-frequency cauterization is being followed. Hereafter, approval of hepatic consistency is essential. The ring knife can be moved forward through the hepatic tissue faster or slower. Favoring rather the slow motion, cauterization should be repeated two or three times to avoid unfavorable dilatation of the former puncture channel before stent insertion.

The stent delivery system armed with a fully covered metal stent is pushed over the guide wire to be watched closely with EUS and fluoroscopy.

At the beginning of stent release, we can see - under EUS guidance - the expanding distal end of the stent within the dilated bile duct. At this moment it is essential to hold a close position to the gastric wall, in particular, if the releasing stent reaches the space between gastric wall and liver surface to prevent stent dislocation into the abdominal cavity. It is necessary to draw back the delivery system from time to time watching the distal stent end to be held the correct position of the stent, in particular, the intrahepatic stent end already placed within the bile duct.

The last part of stent delivery comprises gastroscopic control and checking correct position of the stent using fluoroscopy. The favorable position of the intragastric or proximal end of the stent should be nearly 1.5 to 2 cm above the mucosa of the gastric wall within the gastric cavity.

After complete stent delivery, the effusion of bile or, in this case with cholangitis, of pus demonstrates and provides evidence for the correct position of the stent. To prevent stent dislocation, the stent can be fixed with hemoclips at the intragastric mucosal site.

Further control fluoroscopy shows the correct stent position and the effusion of contrast media into the stomach can be seen.

On the 1st postinterventional day, stent position is controlled using transabdominal ultrasound. The intrahepatic bile ducts show normal caliber with aerobilia. The stent itself crossing segment II and stent opening are complete.

The intervention was performed with perinterventional prophylaxis using the antibiotic ceftriaxone.

Worth mentioning, reintervention via the stent is possible but infrequently necessary since in patients with malignant jaundice, there is a poor prognosis with limited life expectancy.

<table>
<thead>
<tr>
<th>Time (min:sec)</th>
<th>Voiceover text</th>
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<tbody>
<tr>
<td>00:00–00:29</td>
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The intervention was performed with periinterventional prophylaxis using the antibiotic ceftriaxone.

Worth mentioning, is that reintervention via the stent is possible but infrequently necessary since in patients with malignant jaundice, there is a poor prognosis with limited life expectancy.

References


