

EUS-guided biliary drainage

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Endoscopic ultrasound guided biliary drainage (EUSBD) is a complex second-line procedure selected for cases in which ERCP fails. When the bile duct cannot be accessed retrogradely through the papilla during ERCP, the duodenoscope is exchanged for a linear-array echoendoscope. EUS needles are used to puncture the bile duct under ultrasound view, just like it is done during EUS-guided fine-needle aspiration (EUS-FNA) for tissue sampling. A vacuum syringe is used to aspirate bile and thus confirm that the needle is inside the duct. Contrast is then injected through the needle to obtain a cholangiogram, just like it is done during ERCP. A guidewire is passed through the needle and advanced into the bile duct under fluoroscopy.

If the guidewire reaches the duodenum through the papilla, the echoendoscope can be exchanged again for a duodenoscope and a stent can be placed into the bile duct using the wire that is coming out of the papilla. This EUSBD procedure is called rendezvous. Rendezvous can fail because: a) the guidewire goes in the direction opposite to the papilla (upwards instead of downwards); b) even if it goes downwards, cannot cross the tumor stricture or the papilla; c) even if the guidewire reaches the duodenum, it may slip out of the bile-duct during endoscope exchange; or d) the guidewire cannot be retrieved through the working channel of the echoendoscope because of too much friction. Rendezvous is successful in around 70% of attempts.

If the guidewire lies inside the bile duct away from the papilla, the puncture tract can be dilated with a thin caliber cystotome, needle-knife or 4 mm biliary balloon catheter. After dilatation, a stent can be placed over the wire into the bile duct across the wall of the gastrointestinal tract. This EUSBD procedure is called transluminal or transmural biliary drainage. When the intrahepatic duct is punctured from the proximal stomach the resulting type of transmural EUSBD is hepatico-gastrostomy. When the extrahepatic bile duct is punctured from the duodenal bulb the resulting type of transmural EUSBD is choledocho-duodenostomy.

When a dilated bile duct is punctured with a needle, leakage may occur along the puncture tract. Manipulation of the guidewire through the needle is challenging. Significant resistance may be encountered during dilatation prior to transmural EUSBD. To minimize the chances of failed drainage and bile leakage: a) all operators must be experienced in therapeutic ERCP and EUS-FNA; b) patients need to be carefully selected and deeply sedated; c) all team members must understand the procedural steps involved and be familiar with the devices (needles, guidewires, dilators, stents) and equipment (duodenoscope, echoendoscope, fluoroscopy) used; and d) thorough preparation of devices prior to puncture, full attention and exquisite coordination during the actual steps of EUSBD (puncture, wire-manipulation, dilatation and/or scope exchange, stent placement). EUSBD requires



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the combined skills of ERCP and EUS-FNA, but it is more challenging than just the sum of the above. However, with refined technique, most patients not amenable to ERCP can be successfully treated by EUSBD.