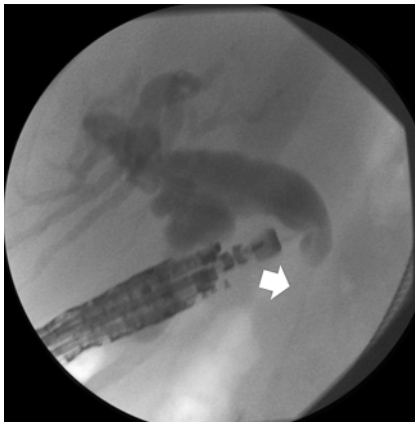


## Rendezvous ERCP via endoscopic ultrasound-guided gallbladder drainage to salvage a dislodged lumen-apposing metal stent during choledochoduodenostomy

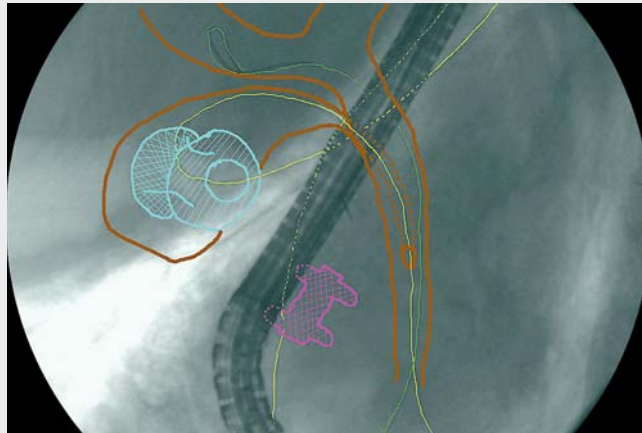


► **Fig. 1** Transduodenal endoscopic ultrasound (EUS)-guided cholangiography showing a dilated common bile duct and patent cystic duct above a malignant distal biliary stricture (white solid arrow).

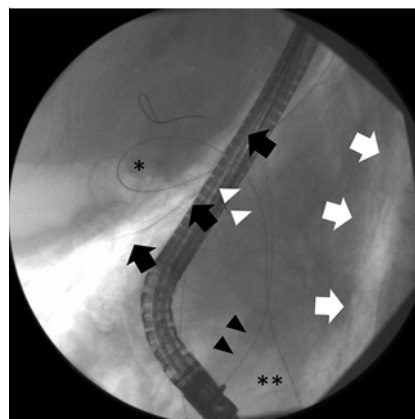
A patient with metastatic pancreatic adenocarcinoma underwent combined endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) and endoscopic biliary drainage. Tumor involvement of a creased papilla precluded endoscopic retrograde cholangiopancreatography (ERCP). EUS-cholangiography revealed a dilated common bile duct (CBD) and a patent cystic duct above a distal stricture (► **Fig. 1**).

EUS-choledochoduodenostomy was performed with an 8×8-mm lumen-apposing metal stent (LAMS). Bile and contrast outflow into the duodenum confirmed satisfactory placement of the LAMS (► **Video 1**). The LAMS was balloon dilated prior to the intended insertion of an axis-orienting double-pigtail stent. However, during dilation, the distal flange of the LAMS dislodged from the CBD and guidewire access was lost. Duct decompression and aerobilia prevented repeat EUS-guided CBD puncture being performed.

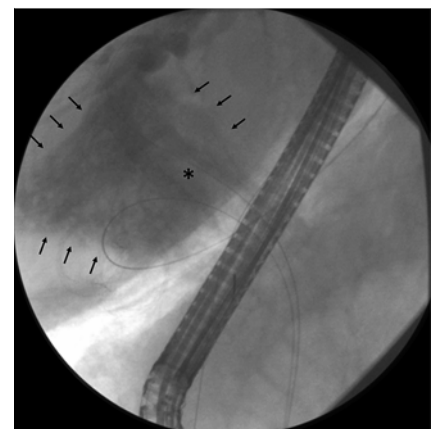
The gallbladder was imaged from the antrum and drained under EUS guidance with a cautery-enhanced 15×10-mm



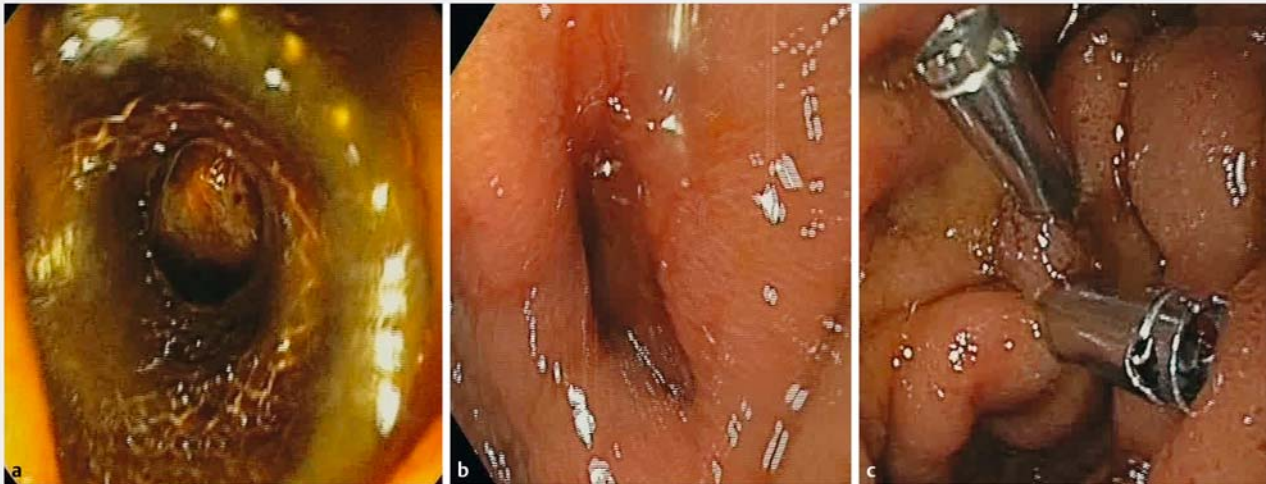
► **Video 1** Endoscopic ultrasound (EUS)-guided choledochoduodenostomy is performed, but dislodgement of the lumen-apposing metal stent occurs, resulting in a choledochal perforation. A salvage procedure consisting of EUS-guided gallbladder drainage as a portal for antegrade transcystic guidewire passage, followed by rendezvous endoscopic retrograde cholangiopancreatography is then performed, with eventual placement of a biliary metal stent and clips to seal the perforation.



► **Fig. 2** Fluoroscopic view of biliary cannulation with an incoming guidewire (black arrowheads) parallel to the guidewire entering the gallbladder through the cholecystogastric stent (\*) from the patient's mouth and passing in antegrade fashion through the cystic duct (white arrowheads) into the duodenum (\*\*). Note the retro-capnoperitoneum below the liver (black solid arrows) and next to the spine (white solid arrows), which was absent on the baseline cholangiogram.



► **Fig. 3** Contrast injection into the proximal bile duct results in gross retroperitoneal extravasation (arrows) producing a double-contrast fluoroscopic image of the common bile duct (\*). This confirms the presence of an active perforation, suggesting gallbladder drainage alone might be insufficient to control it.



► **Fig. 4** Endoscopic views showing the duodenal perforation resulting from distal flange dislodgment: **a** with the dislodged lumen-apposing metal stent (LAMS) still positioned across the duodenal wall; **b** after LAMS removal with forceps traction; **c** following double clip closure.

LAMS. A gastroscope was passed through the cholecystogastric LAMS after successful balloon dilation. The cystic-duct orifice was identified using cholecystoscopy. A guidewire was advanced in an antegrade fashion through the cystic duct until it was coiled in the duodenum. The gastroscope was removed over the wire. A duodenoscope was advanced to the papilla alongside the wire. A parallel guidewire was placed into the CBD (► **Fig. 2**) through a homemade monorail sphincterotome, as previously described [1]. A covered biliary metal stent was placed over the second guidewire across the malignant stricture and the choledochal perforation that had resulted from the dislodgement of the LAMS (► **Fig. 3**). The dislodged LAMS was retrieved, with clip closure of the duodenal perforation being performed (► **Fig. 4**). The patient was given intravenous antibiotics and analgesia, and recovered within 48 hours. Acute LAMS dislodgment from nonadherent organs results in a double perforation. LAMS are increasingly used for EUS-choledochoduodenostomy, with 10% unplanned procedural events reported [2]. Standard salvage strategies include a





bridging stent if the guidewire is in place or repeat EUS-guided CBD puncture to create a new tract. Unfortunately, neither of these was possible in this case. In malignant biliary obstruction, EUS-guided gallbladder drainage allows symptomatic decompression when the cystic duct is involved [3] and rescue biliary drainage when it is patent [4]. Two-stage transluminal cholecystoscopy for biliary rendezvous was reported after failed cannulation in a poor operative candidate with acute cholecystitis and choledocholithiasis [5]. We similarly used transluminal-transcystic rendezvous to perform a single-session ERCP with biliary stenting to seal the CBD perforation that had resulted from the dislodgement of the LAMS.

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#### Competing interests

Dr. Manuel Perez-Miranda is a consultant for Boston Scientific, Olympus, Medtronic, and M.I.Tech.

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