# 59 Endoscopic Salvage of a Mis-Deployed Choledochoduodenostomy Stent

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## 59.1 Background

Endoscopic biliary drainage is a well-established technique for providing biliary decompression in patients with obstructive jaundice. Endoscopic transpapillary biliary stenting is the most common procedure for biliary drainage in patients with obstructive jaundice. However, failure to achieve bile duct access still occurs in some patients due to failed biliary cannulation, inaccessible papilla because of severe duodenal stenosis caused by tumor invasion, other anatomical issues. In these cases, percutaneous transhepatic biliary drainage (PTBD) or surgical intervention is required. However, both methods have been associated with significant morbidity and mortality rates. Endoscopic ultrasound (EUS)-guided biliary drainage (EUS-BD) has emerged as an alternative in cases of endoscopic retrograde cholangiopancreatography (ERCP) failure. EUS-BD includes a rendezvous technique and a direct access technique. The direct access technique includes two major methodologies: EUS-guided choledochoduodenostomy (EUS-CDS) and EUS-guided hepatogastrostomy [1].

## 59.2 Case History

An 85-year-old woman with multiple comorbidities admitted to the intensive care unit with septic shock. Physical examination showed right upper quadrant pain. Blood culture showed multi-drug-resistant *Escherichia coli*. Computed tomography showed a persistently dilated common bile duct status post cholecystectomy, with a focal cutoff at the level of a lesion within the distal common bile duct (Fig. 59.1). The features are compatible with septic shock secondary to choledocholithiasis (Fig. 59.2). EUS-CDS was offered to the patient due to failed ERCP.

## 59.3 Procedural Plan

EUS-BD includes a rendezvous technique and a direct access technique. A rendezvous technique may be considered whereby a wire is placed into an intrahepatic or extrahepatic bile duct, passed through the papilla, and retrieved by a duodenoscope for transpapillary interventions. The direct

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**Fig. 59.1** Computed tomography demonstrating choledocholithiasis


**Fig. 59.2** Choledocholithiasis as noted on EUS

access technique includes two major methodologies: EUS-guided choledochoduodenostomy (EUS-CDS) and EUS-guided hepatogastrostomy. Both are performed without accessing the papilla. Recent studies have shown that both approaches are effective and safe for the treatment of distal biliary obstruction after failed ERCP [2, 3]. A recent meta-analysis demonstrated equal efficacy and safety, with very high technical and clinical success rates [4]. Some studies have shown that metallic stents should be placed whenever feasible, and non-coaxial electrocautery should be avoided when possible as plastic stenting and non-coaxial electrocautery were independently associated with adverse events [5].

## 59.4 Description of the Procedure

EUS-CDS was performed initially with a cautery-enhanced fully covered self-expandable metal stent (SEMS) via the transduodenal approach using a linear echoendoscope. Endoscopic observation was initially performed to confirm the absence of any lesions in the duodenal bulb. The extrahepatic bile duct was visualized along the long axis from the duodenal bulb. The location of the echoendoscope was adjusted so that the puncture needle faced toward the hepatic hilum. Color and power Doppler mode was used to confirm lack of blood vessels between the transducer and the extrahepatic bile duct. The duodenal wall and the common bile duct were punctured under endosonographic guidance with the 19-guage needle (Fig. 59.3). Bile was aspirated. Contrast was injected to perform a cholangiogram. Initially, a 0.025 inch straight standard wire was inserted into the extrahepatic bile duct under fluoroscopic guidance to attempt a rendezvous approach; however, the wire could not be passed into the duodenum across the papilla in an antegrade fashion. Therefore, it was decided to perform a direct access approach with a choledochoduodenostomy. Freehand access was attempted using a 10 mm × 10 mm electrocautery-enhanced lumen apposing metal stent (ECE-LAMS, Axios, Boston Scientific, Marlborough,


**Fig. 59.3** Dilated common bile duct punctured with a 19-gauge needle

MA). The catheter was introduced through the working channel and advanced to the duodenal mucosa under EUS guidance. Current was applied to the cautery tip, and the catheter was advanced into the bile duct. The first flange of the LAMS was then deployed within the lumen of the bile duct, and the catheter was withdrawn slightly to appose the wall of the bile duct and the duodenum. There was some concern that the flange itself may have been exiting the bile duct wall; however, deployment was continued with the release of the second flange within the duodenal lumen, confirmed on endoscopic view. Given the concern for potential misdeployment, a wire was passed through the introducer into the bile duct prior to removal of the LAMS system. A balloon catheter was inserted and contrast injected, which demonstrated a cholangiogram with bile entirely with the biliary tree, however, with only the tip of the LAMS remaining within the duct lumen while the flange itself was between the wall of the duodenum and the bile duct. The wire access was lost at that time. In anticipation of complete stent migration out of the duct and resulting perforation, a salvage technique was planned. The linear echoendoscope was exchanged for a duodenoscope, which allowed for visualization of the SEMS (Fig. 59.4). A small hole was visualized through the LAMS and felt to be the defect in the bile duct wall. A wire was passed through the LAMS and advanced into the intrahepatic duct. A 10 mm × 60 mm FCSEMS was placed over the wire, through the SEMS under fluoroscopic guidance. A final balloon occlusion cholangiogram was performed within the stents to ensure appropriate filling of the biliary tree. There was adequate filling of the entire biliary tree and no extravasation of contrast on the final cholangiogram.

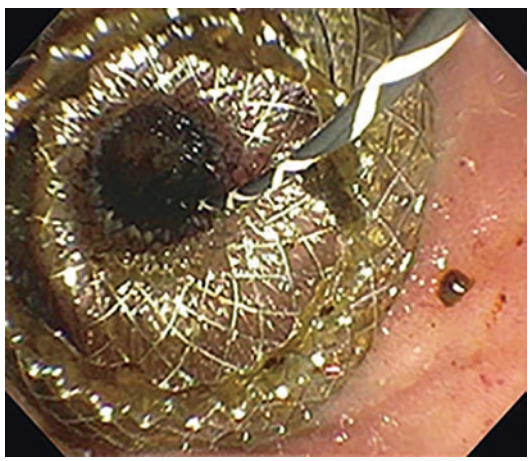

**Fig. 59.4** Proximal flange of LAMS deployed in the duodenal bulb

## 59.5 Post-procedure Management

Patients should be closely monitored for adverse events related to the procedure. Follow-up imaging is reasonable if patients do not improve clinically and continue to demonstrate signs of infection. If the patient develops signs of peritonitis or abscess formation, interventional radiological or surgical intervention may be indicated.

## 59.6 Potential Pitfalls

The potential adverse events related to EUS-CDS include infection (peritonitis, cholangitis), pneumoperitoneum, bile leak, biloma, bleeding, abdominal pain, perforation, stent migration, and stent misdeployment [6]. In the case of stent misdeployment, management depends on which flange has been misdeployed and whether a guidewire is present. Early recognition and placement of a wire into the intended target lumen is critical to further salvage techniques, although NOTES-type procedures can also be deployed. A bridging covered metal stent of either similar or larger diameter can be placed to bridge the two lumens (Fig. 59.5).

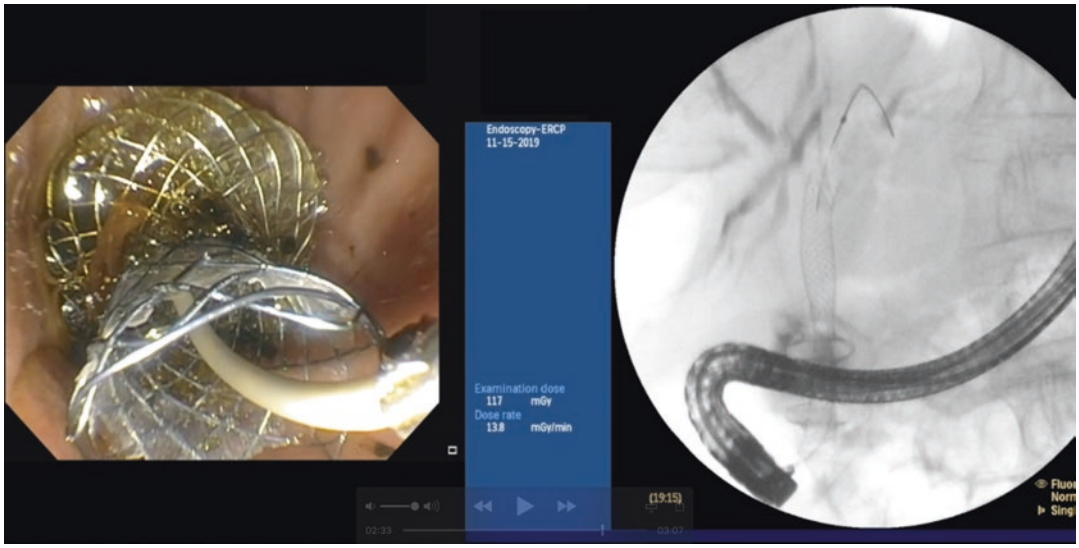


**Fig. 59.5** FCSEMS deployed through lumen of LAMS

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