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CASE REPORT | ENDOSCOPY

Endoscopic Ultrasound-Guided Choledochoduodenostomy Using a Lumen-Apposing Metal Stent in Pancreatic Head Neoplasm-Associated Biliary Obstruction

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ABSTRACT

Endoscopic ultrasound (EUS)-guided transluminal drainage of obstructed bile duct with conventional metal and plastic stents has been in practice for several years, but this modality carries its own potential complications and obstacles. Nevertheless, the novel Hot AXIOS stent (Boston Scientific Corp., Marlborough, MA) has been shown to overcome some of those factors, which justifies its application in a variety of clinical indications, such as EUS-guided choledochoduodenostomy (EUS-CDS) for biliary drainage after failed endoscopic retrograde cholangiopancreatography. We present a case of EUS-CDS with an electrocautery enhanced lumen-apposing stent for biliary drainage.

INTRODUCTION

Since 1979, when the first endoscopic biliary stent was placed, a multitude of stents have been accepted for use in therapeutic endoscopy.[1] The evolution of endoscopic ultrasound (EUS)-guided interventions has driven a constant upgrade in endoscopic interventional accessories, including numerous revolutionary designs. The Hot AXIOS lumen-apposing stent and electrocautery-enhanced delivery system (Boston Scientific Corp., Marlborough, MA) is designed for use in EUS-guided transluminal therapeutic interventions and is indicated for transduodenal endoscopic drainage of the biliary duct.

CASE REPORT

A 61-year-old woman with a past medical history of hypertension, hyperlipidemia, and hypothyroidism was diagnosed with distal pancreatic adenocarcinoma (3.54 × 1.82 cm, T3N0M0) in 2015, during work-up for recurrent idiopathic acute pancreatitis and weight loss. Distal pancreatectomy, splenectomy, cholecystectomy, and splenic hilum lymphadenectomy were performed, but the pancreatic and peripancreatic tissue margins were positive for invasive ductal adenocarcinoma, which required adjuvant chemotherapy and radiation. Follow-up surveillance imaging had showed no recurrence or metastatic disease until recently, when CA 19-9 levels increased. Combined positron-emission tomography and computed tomography (CT) showed prominent, ill-defined, heterogeneous hypodensity within the pancreatic head (4.3 × 2.1 cm), consistent with recurrent adenocarcinoma. Endoscopic retrograde cholangiopancreatography (ERCP) with a biliary stent was planned due to evidence of intra- and extrahepatic biliary dilation and profound jaundice with total bilirubin 10.0 mg/dL (Figure 1). During ERCP, massive tumor infiltration into the common bile duct (CBD) and major papilla caused partial obstruction of the duodenal lumen and prevented major papilla cannulation (Figure 2). Follow-up CT showed interval progression

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Figure 1. Computed tomography showing dilated extrahepatic and intrahepatic biliary system.

of the disease involving multiple vessels. Biliary drainage with EUS-guided choledochoduodenostomy (EUS-CDS) with a lumen-apposing stent was planned with palliative intent.

EUS examination confirmed the infiltration of pancreatic head neoplasm into the ampullary tissue, causing severe upstream CBD dilation (22 mm). A 0.035-in guidewire was preloaded into a biflanged, lumen-apposing, fully covered, metal stent (15 × 10 mm) mounted on an electrocautery-enhanced delivery system (Hot AXIOS), but it was retained under the stent delivery system's catheter tip. Under EUS guidance, using the

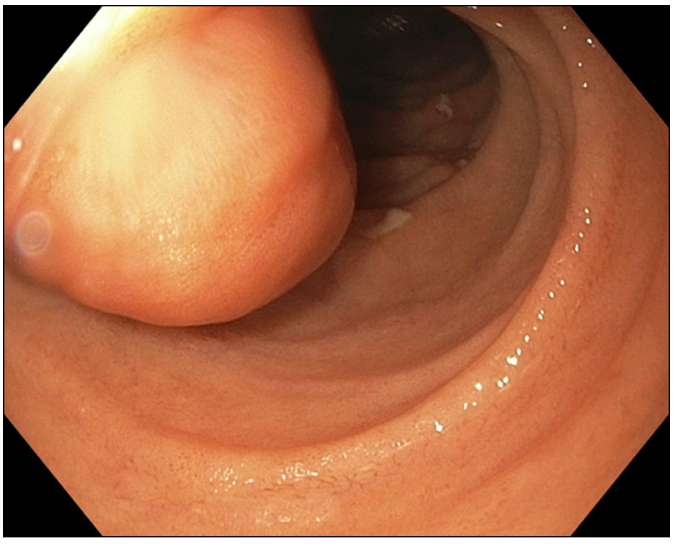

Figure 2. Massive tumor infiltration into the common bile duct and major papilla, causing partial obstruction of the duodenal lumen.

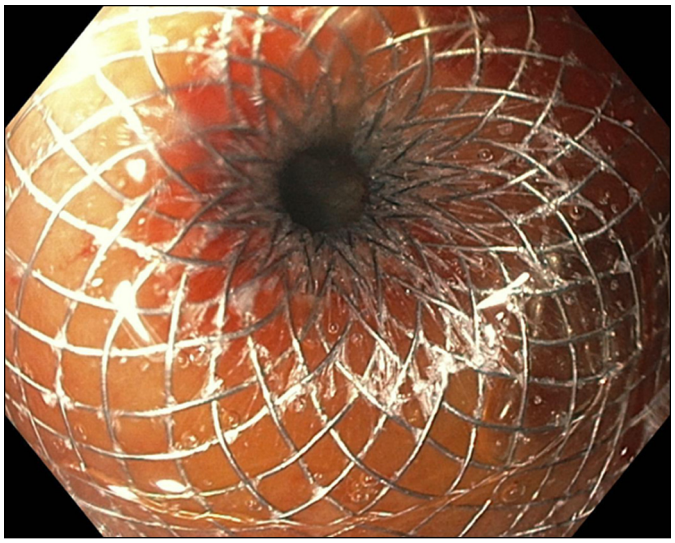

Figure 3. Deployment of a 15 × 10 mm lumen-apposing stent.

cautery-enabled access catheter, the lumen-apposing catheter was advanced through the duodenal bulb wall into the CBD. The catheter sheath was retracted, and the first flange (proximal) of the lumen-apposing stent was deployed (Figure 3). The guidewire was advanced into the CBD immediately after deploying the first flange (distal) to facilitate accurate stent deployment. To prevent tissue plane separation of the duodenum and the CBD, the stent delivery system was pulled toward the duodenal wall before the second flange was deployed. A controlled radial expansion balloon catheter (Boston Scientific Corp., Marlborough, MA) was then advanced over the guide wire, and the lumen-apposing stent was dilated to 8 mm. When the controlled radial expansion balloon catheter and guidewire were retracted, bile exuded into the duodenal lumen via the stent. Bile leakage outside the fistula was ruled out with contrast injection (Figure 4).

At 3-week and 3-month follow-up with gastroenterology and oncology, respectively, the patient appeared to be clinically stable with resolution of jaundice (total bilirubin <1). She had no stent-related complications and no need for re-intervention. With the resolution of hyperbilirubinemia, a new regimen of chemotherapy was initiated.

DISCUSSION

ERCP is widely used for biliary drainage, however at times, it may not be feasible in the event of upper gastrointestinal tract obstruction, surgically altered anatomy, periampullary diverticulum, or periampullary tumor infiltration. Percutaneous transhepatic biliary drainage or surgical intervention are alternative options, but both have high associated morbidity and mortality.[2-4] Multiple approaches for EUS-guided biliary drainage have been explored and accepted, such as the EUS-guided rendezvous approach, EUS-guided anterograde

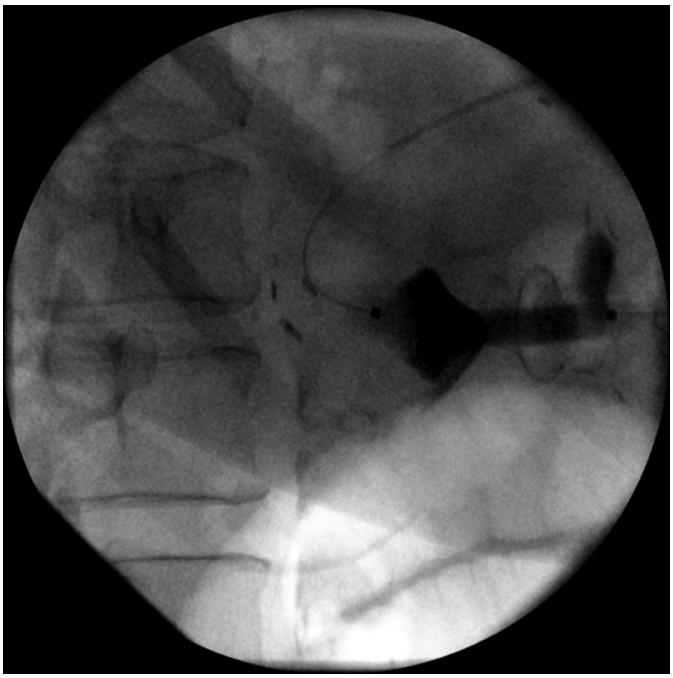

Figure 4. Bile leakage outside the fistula was ruled out by contrast injection.

transpapillary biliary stent placement, and EUS-guided transluminal stenting.[5-7] The transluminal approach has traditionally utilized self-expandable, fully covered, metal stents (SEMS) to perform choledochoduodenostomy or hepatogastrostomy for biliary drainage. This procedure demands a number of accessories, such as a fine-needle aspiration needle, a needle knife, bougie dilators, dilation balloons, and a stent retriever, which creates additional potential risk for complications. SEMS used for transluminal stenting also pose a modest risk of lumen-to-lumen anchorage due to its tubular shape, bile leakage due to the potential separation of tissue planes, tissue injury and bleeding when the end of the stent adjoins the lumen wall, and stent migration.[8,9]

In our case, an EUS-CDS with placement of a double pigtail plastic biliary stent for biliary drainage was an alternate option. Plastic stents have an increased rate of occlusion after 3 months due to their size, which results in an increased rate of interventions and hospital stay.[10] The lumen-apposing self-expandable metallic stent (LASEMS) used in our case had a post-expansion diameter of 15 mm and was deemed to be the better option for higher patency and overcoming other such limitations.

The use of LASEMS for a transluminal approach was first reported in 2011.[11] It was initially tested and later practiced along with 19-gauge EUS-guided fine-needle aspiration to puncture the 2 luminal surfaces for the guidewire placement, followed by dilation of the tract with a biliary balloon and stent deployment. The new LASEMS has the advantage of having electrocautery on the tip, which allows puncture and release of the stent in a single-step procedure, decreasing the number of accessories to be exchanged and reducing the time of procedure and potential complications. The use of LASEMS has shown high efficacy in the drainage of pancreatic fluid collection.[12] Among adverse events, stent migrations have been reported with LASEMS when used to drain pancreatic fluid collection.[13] EUS-CDS with a LASEMS stent that has an electrocautery-enhanced delivery system appears to be safe and efficacious when performed by experienced clinicians. There is a need for a large study analyzing these measures for this indication. EUS-CDS with an electrocautery-enhanced LASEMS stent is still in the budding stages, and it will be interesting to see long-term outcome data.

Electrocautery-enhanced LASEMS stent for transluminal drainage have recently been applied in clinical practice and are being acknowledged for shorter, safer, and compelling procedures. Patient selection, endoscopist skills and experience, and the type of facility providing the service are still critical factors to be considered to attain high technical and clinical success rates. Our case reinforces the use of this novel stent system in relevant clinical scenarios.

DISCLOSURES

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Informed consent was obtained for this case report.

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