Diagnostic and Interventional Endoscopy

Case Report

Fluoroscopic "Candy Sign" of the Metallic Stent in Endoscopic Ultrasound-Guided Transmural Drainage

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Abstract

Endoscopic ultrasound-guided intervention is the emerging procedure for many pancreatico-biliary disorders. It is considered now as the standard line of drainage of pancreatic and peri-pancreatic fluid collections. It is also considered the first option for biliary decompression in patients with distal malignant biliary obstruction as a salvage method for failed or unsuitable Endoscopic Retrograde Cholangio-pancreatography (ERCP). Here, we present two cases: the first is a case of endoscopic ultrasound (EUS)-guided cystogastrostomy and the second is an EUS-guided choledochoduodenostomy (CDS), both showed a unique sign called the Candy signs, which has several explanations.

Keywords: Candy sign, cystogastrostomy, endoscopic ultrasound (EUS), EUS-choledochoduodenostomy (EUS-CDS)

INTRODUCTION

Endoscopic ultrasound (EUS)-guided interventions are rapidly expanding in the last decade. The wide channel of linear echoendoscopes allows the use of various tools and devices for transmural interventions.[1] Endoscopic ultrasound-guided transmural drainage techniques emerged as the first-line option for symptomatic pancreatic fluid collection (PFC) and malignant biliary obstruction with failed ERCP. We present 2 cases: an EUS-guided cystogastrostomy and an EUS-CDS with a candy-shaped stent, a rare fluoroscopic unintentional event.

CASE PRESENTATIONS

CASE 1

A 65-year-old male had a previous history of severe acute pancreatitis 8 months ago. He presented with large symptomatic (epigastric pain, dyspepsia, and sometimes vomiting) pancreatic pseudocyst about 22 × 20 cm. Initial assessment by EUS revealed unilocular large pancreatic pseudocyst with little amount of necrosis, and aspiration of the dark brown fluid was done. Biochemical analysis revealed high amount of the fluid amylase (>25 000 IU/mL) and low amount of the fluid replyCarcino-Embryonic Antigen (CEA) (10 ng/mL). After discussion of the drainage options with the patient, we decided to do EUS-cystogastrostomy using biflanged fully covered self-expandable metallic stent (BFCMS). After applying color flow Doppler, with good endoscopic position and short distance between the stomach and the cavity wall (<5 mm), we puncture the cyst using 19 G needle (Echotip ultra needle, Wilson-Cook Medical, Inc., Winston-Salem, NC, USA); aspiration of the little amount of the fluid was done and then we introduce a 0.035 guidewire (Jagwire; Boston-Scientific, Natick, MA, USA) making more than 1 coil in the cyst. Then, we made the tract using 6 Fr cystotome (Cysto Gastro Set; Endo-flex, GmbH, Voerde, Germany) followed by dilatation of the tract using 6 : 9 Fr Soehendra dilator (Wilson-Cook Medical, Inc.). And finally, we introduce and deploy the stent (BFCMS) under fluoroscopic, EUS, and lastly endoscopic view. Some resistance occurred during insertion of the stent delivery system through the fistulous tract, but with pushing and shortening the scope the stent pass within short time.

After stent deployment, an image with 2 waists of the stent appear on fluoroscopy (Figures 1-3). We put a double pigtail stent (10 Fr × 7 cm) through the BFCMS (Figures 4 and 5). The patient was admitted for 1 day under observation and discharged with no symptoms in the second day. After a 1 week follow-up, we noticed a marked reduction of the cyst size by Abd US and marked improvement of the symptoms. Disappearance of the stent waists was visible under fluoroscopy (Figure 6).

Three weeks later, there was complete resolution of the cyst by imaging studies with no symptoms. We removed the stent, and there was no recurrence with follow-up after 6 months.

Figure 1. Endoscopic ultrasound view of the opening of inner flange of the plumber stent.

We assumed that 2 waists may be due to the separation of the cyst wall from the gastric wall during insertion of the stent as there was some resistance during introduction (the delivery system of plumber stent is 10.5 Fr, and we dilate using Soehendra 6 : 9 Fr).

CASE 2

A 52-year-old male was diagnosed advanced pancreatic adenocarcinoma 3 months before. The patient started chemotherapy, but he developed deep jaundice within 1 month. MRCP revealed dilated Intra-Hepatic Biliary Radicles (IHBRs), CBD (about 18 mm) down to large pancreatic head mass with dilated main pancreatic duct. The patient underwent ERCP but unfortunately cannulation of the CBD failed. The patient was referred to us for further management. We did another ERCP trial, but cannulation was unsuccessful even with precut so we attempted EUS-CDS in the same session using a curved linear echo-endoscope. Linear EUS showed markedly dilated CBD (20 mm) and IHBRs. CBD was targeted from the duodenal bulb by a 19 G needle, Dark bile was aspirated and contrast injected and showed markedly dilated CBD and IHBRs. Negotiation was done with a 0.035-inch guidewire toward IHBRs. Exchange of the needle was done with

MAIN POINTS

- Candy sign is the presence of 2 waists with transmural metallic stents with different explanation; to prevent it, we recommend:
- In endoscopic ultrasound (EUS)-guided cystogastrostomy, we should choose the shortest distance between the 2 walls and dilate the fistula with a small-caliber balloon (4-6 mm) for passing an assembly of biflanged Self Expandable Metallic stent (SEMS) better than mechanical dilatation.
- In EUS-choledochoduodenostomy, we should be sure that there is no double-wall penetration by the identification of a single muscle layer and the distance between the Common Bile Duct (CBD) and duodenal wall should be kept the shortest.
- The guidewire should not be removed after deployment of the metallic stent until we are satisfied with the stent position.
- In candy sign, it is better to put a pigtail plastic stent inside the metallic stent.

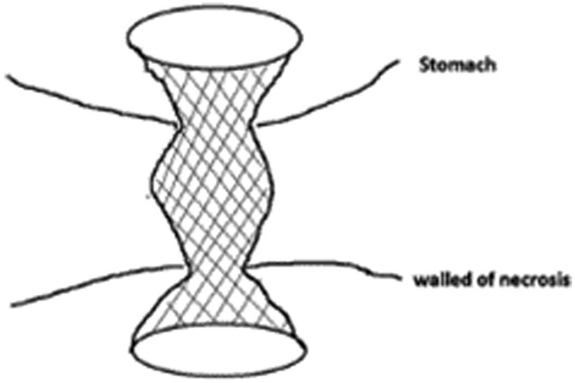

Figure 2. Line diagram depicting separation of wall of walled-off necrosis and stomach during insertion of metal stent. Quoted from Jain et al.[7]

6 Fr cystotome over the guidewire. There was deployment of partially covered SEMS (6 cm) under fluoroscopic guidance and direct visualization. The EUS-CDS procedure was performed quickly; however, the fluoroscopic view revealed a candy-like appearance of the stent (Figure 7). At first, we thought this appearance was caused by malposition of the stent and the wide distance between the duodenum and CBD. However, no dislocation was observed. Eventually, we concluded that this appearance resulted from the double penetration of the duodenal wall. Fortunately, no additional interventions were required. On follow-up, the patient had no abdominal pain or distension. Abdominal erect x-ray showed no air under diaphragm. The patient started oral feeding on the following day normally. Serum bilirubin dropped from 15 mg/dL before EUS-CDS to 1 mg/dL over 2 weeks.

The patient was referred back to the oncology center and resumed his chemotherapy sessions. On follow-up 6 months later, the patient is doing well with no reported complications.

DISCUSSION

Endoscopic ultrasound-guided interventions are rapidly growing and expanding. The curvilinear echoendoscopes allow the use of various tools and devices for transmural interventions and stenting. One of the

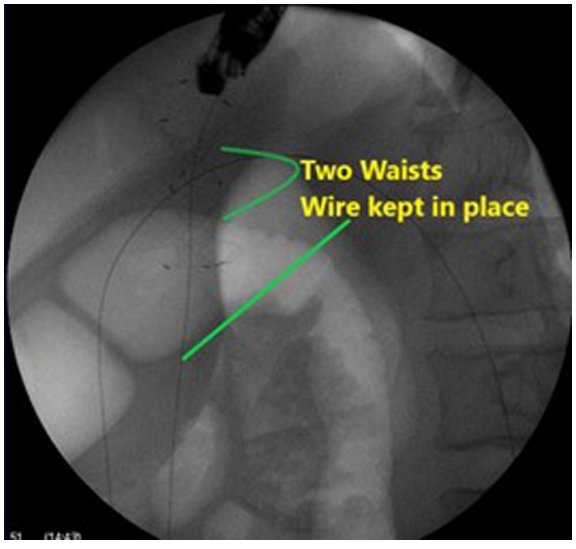

Figure 3. Fluoroscopic image of candy signs—2 waists within the stent after complete deployment.

Figure 4. Insertion of a double pigtail plastic stent within the metallic stent.

important and common EUS-guided intervention is EUS-guided drainage techniques in biliary and pancreatic diseases. The development of lumen-apposing stents has enabled the option to create a new anastomosis between GI lumen and biliary system or PFC aiming for shortening the procedure and lowering the adverse events.[1,2]

Currently, the EUS-guided transmural drainage was considered the standard of care for patients with PFCs as it is minimally invasive and highly technical with clinical success and much less complications.[3] Also, EUS-BD emerged as the first line for distal biliary decompression for patients with malignant distal obstruction by using transmural fully or partially covered SEMS with higher technical and clinical success and fewer complications compared to PTBD in cases of failed ERCP failed or unreachable papilla.[4]

Although rare, moderate-to-severe complications related to EUS-guided transmural drainage complications like bleeding, peritonitis, leakage, perforation, and stent migration may occur. Many procedure-related

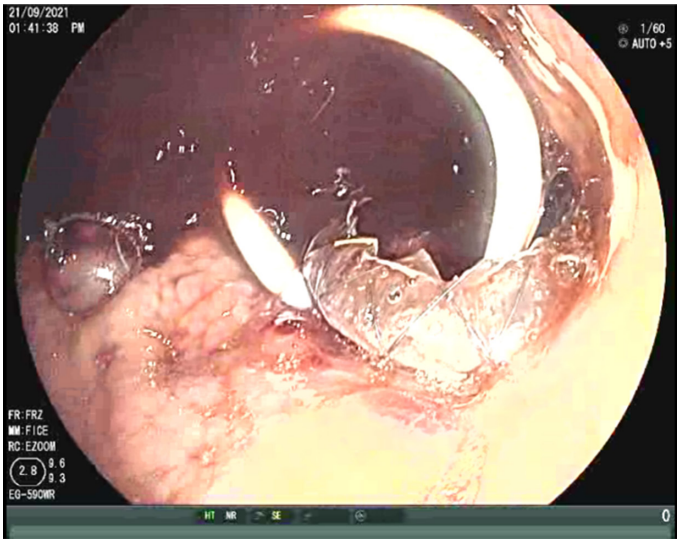

Figure 5. Insertion of a double pigtail plastic stent within the metallic stent.

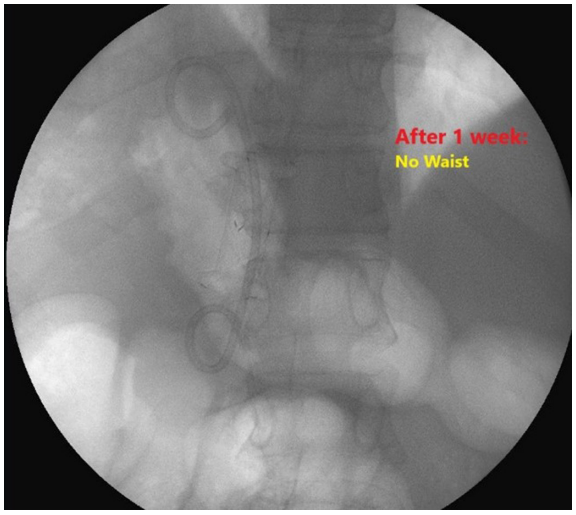

Figure 6. Disappearance of the waists after 1 week.

technical tips and development of new innovations in used instrument stent help to protect against these complications.[5,6]

Candy signs describe the shape of the stent under fluoroscopic image. Normally, there is 1 waist at the junction of the cavity or CBD wall and the mural wall. This indicates that the two walls are very close to one another. If two waists appear on the fluoroscopic view, this is referred to as a "candy sign" and denotes that there is a space between two separate walls (Figure 7).

In EUS-guided cystogastrostomy, use of Biflanged Fully Covered Self Expandable Metallic stent (BFCSEMS) is easier and faster to deploy with many folds larger diameter that gives the chance for necrosectomy if needed than when using plastic stents. In our case, the procedure was completed quickly (10-12 minutes) using biflanged FCSEMS (4 cm, plumber stent from MI Tech, Seoul, Korea). Some resistance encountered while inserting the delivery system through the dilated fistulous tract was the only minor issue. We assumed that insufficient mechanical dilatation or recoil of the fibrous wall after dilatation makes some difficulty for the delivery system to pass through, and with pushing of

Figure 7. Fluoroscopic view showing a candy-like appearance during endoscopic ultrasound-guided choledochoduodenostomy.

the delivery system, the cyst wall become away from the gastric wall. So, there are 2 separate walls and space in between, and this gives the image of a candy. Jain et al[7] describe the same sign and managed it in the same way. They dilated the tract with 4 mm balloon, but there was significant resistance to the stent insertion and so the resistance may not relate to the method of dilatation.

Candy signs in EUS-CDS may occur if the duodenal wall is away from the CBD, which is the same idea as in EUS cystogastrostomy. But also, double-wall penetration was documented to show the same signs.[8] Actually, it is usually a double mucosal puncture rather than complete double-wall puncture, but it may lead to bleeding or perforation.

This unintended double penetration of duodenal mucosa should be avoided. Before puncturing the CBD, we advise identifying the single muscle layer, intraluminal instillation of water, and, using a forward-view echoendoscope, if available.

Informed Consent: Consent was waved due to retrospective nature of these case reports but routine pre-endoscopic consent was taken from both patients.

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