VIDEO CASE REPORT

Switching the switch: endoscopic reversal of a biliopancreatic diversion

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BACKGROUND

Biliopancreatic diversion (also known as duodenal switch) is a complex bariatric surgery that includes a sleeve gastrectomy and long Roux-en-Y intestinal bypass. The entero-enteric anastomosis is very distal, resulting in bypass of two-thirds or more of the intestine. Patients lose weight not only because nutrients bypass most of the intestine, thereby reducing the absorption area, but also because nutrients join the biliopancreatic secretions and enzymes distally, leading to reduced digestion and absorption.[1] This is very effective for weight loss, but it can be complicated by severe malnutrition. In such cases, surgical reversal of the duodenal switch is done by creating a proximal anastomosis between the alimentary and biliopancreatic limbs.[2] To our knowledge, endoscopic reversal of the duodenal switch has not been previously reported.

The recent advent of lumen-apposing metal stents (LAMSs) and the possibility of their deployment under direct endoscopic ultrasound (EUS) guidance has introduced the possibility of creating new communication between anatomically separate organs, leading to interventions such as EUS-guided gastroenterostomy,[3] EUS-directed transgastric ERCP,[4] and EUS-directed transenteric ERCP,[5] among others.[6] Here we report the first case of the use of LAMSs for endoscopic reversal of the duodenal switch anatomy, by creation of a communication between the alimentary and biliopancreatic limbs.

CASE REPORT

A 43-year-old woman with a history of biliopancreatic diversion for obesity 9 years prior was hospitalized for diarrhea, malnourishment (albumin 2.1 g/dL), significant weight loss (42 pounds), and failure to thrive. Numerous evaluations for neoplasia were negative. The patient's malnourishment and weight loss were deemed to be due to her altered anatomy. Thus, considering her general condition, an EUS-guided duodenal switch reversal with LAMSs was proposed. The aim was to re-create the communication between the biliopancreatic and alimentary limbs and thus improve the digestion and absorption of nutrients (Fig. 1).

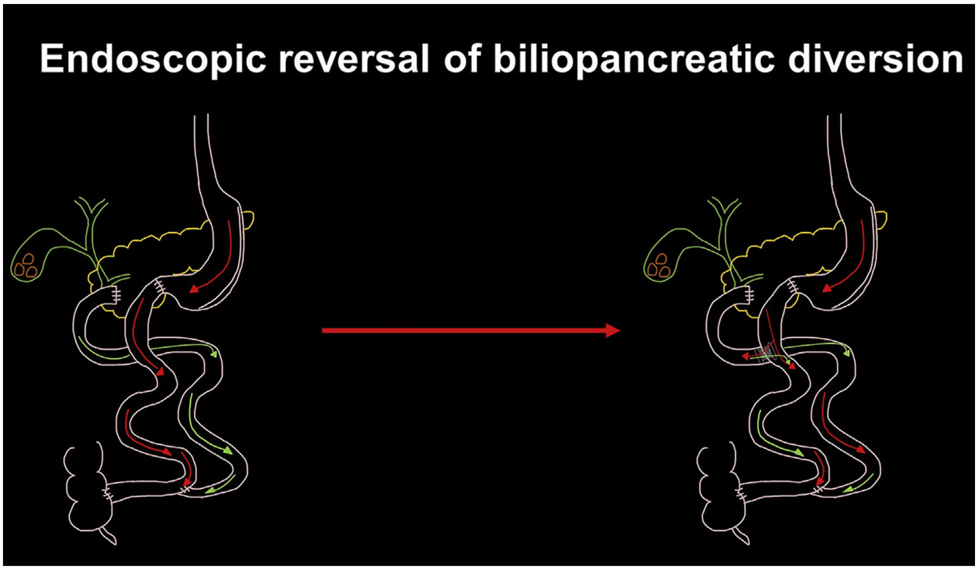

Figure 1. Schematic representation of the endoscopic duodenal switch reversal.

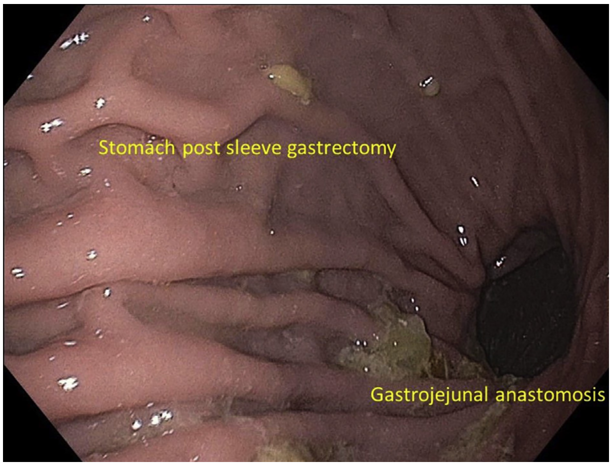

Figure 2. Gastric anatomy after sleeve gastrectomy.

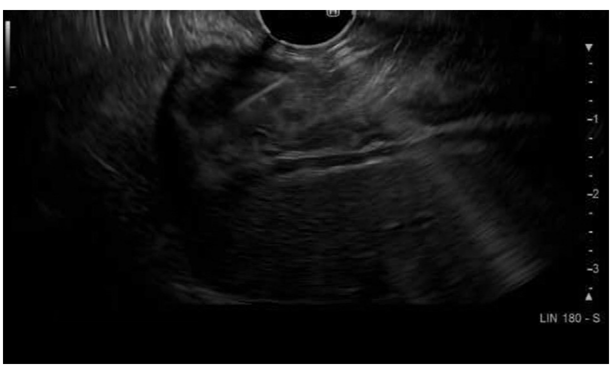

Figure 3. The biliopancreatic limb is identified with endoscopic ultrasound in the right upper quadrant and accessed with a 19-gauge FNA needle.

THE PROCEDURE

The procedure was performed in an endoscopy unit with the patient under general anesthesia (Video 1, available online at www.giejournal.org). The patient received intravenous antibiotics immediately before the procedure.

First, the patient's altered anatomy was explored endoscopically with a standard EGD scope (Fig. 2). The echoendoscope then was directed under fluoroscopic guidance toward the expected location of the duodenal stump and biliopancreatic limb in the right upper quadrant. The duodenal lumen was identified with EUS, and a 19-gauge FNA needle was used to access it (Fig. 3). The location was confirmed with fluoroscopic imaging by contrast injection (Fig. 4).

By connecting a pump to the FNA needle, about 500 mL of contrast and saline solution was injected to clearly define the anatomy and distend the biliopancreatic limb. We used saline solution to avoid hyponatremia. Intravenous glucagon was given to slow the peristalsis of the biliopancreatic limb and aid in fluid retention.

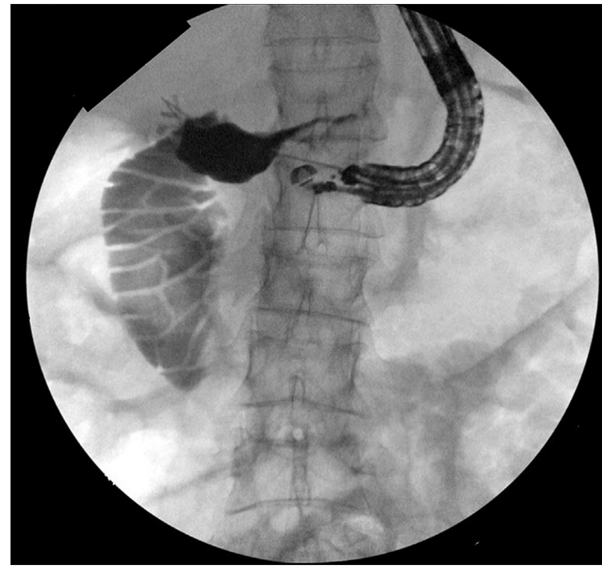

Figure 4. Contrast injection through the FNA needle confirms the location of the biliopancreatic limb.

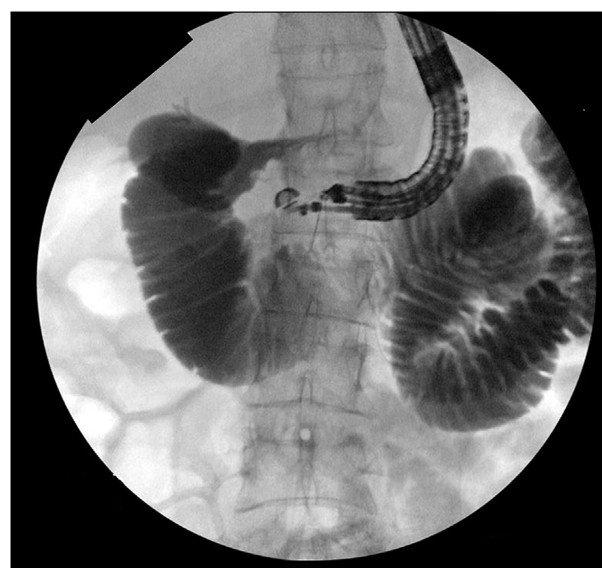

Figure 5. Infusion of large quantities of saline solution and contrast to distend the biliopancreatic limb.

Once the biliopancreatic limb was clearly defined and distended (Fig. 5), a jejunoduodenostomy was created under EUS guidance with the freehand technique using a 20-mm × 10-mm cautery-assisted LAMS (Figs. 6-8). We prefer the freehand technique over the wire-assisted technique because we believe that the latter may have an increased risk of misdeployment from pushing the small bowel away with a wire. In addition, a percutaneous endoscopic jejunostomy was placed to aid in improving nutrition (Video 1, available online at www.giejournal.org).

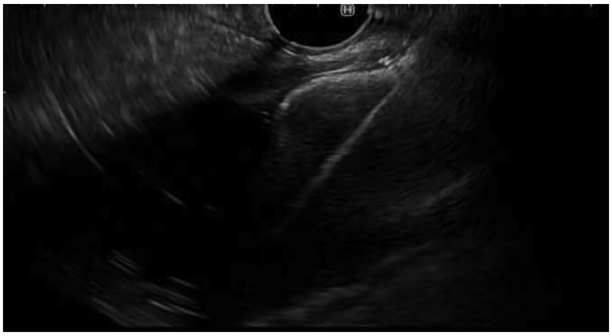

Figure 6. Release of the distal flange of the lumen-apposing metal stent under endoscopic ultrasound guidance.

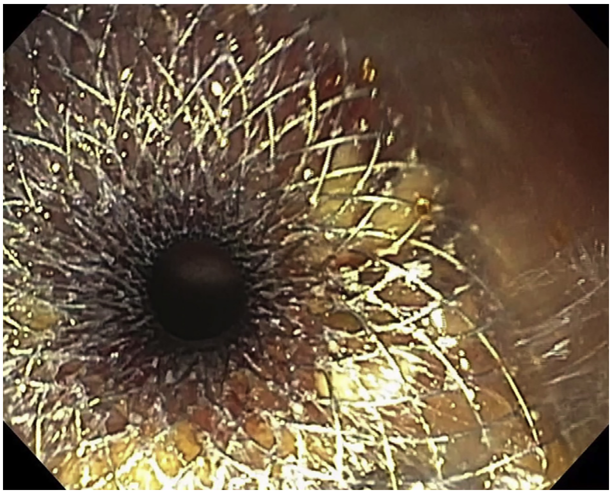

Figure 7. Release of the proximal flange of the lumen-apposing metal stent under endoscopic visualization.

OUTCOME

No follow-up upper GI series was performed after stent placement because the patient was doing clinically well. Because the patient tolerated oral feeding well and gained significant weight, the percutaneous endoscopic jejunostomy was removed after 2 months. The last endoscopic procedure was performed about 8 months after the initial procedure. The patient had gained over 50 pounds. In compliance with the desires of the patient, we removed the LAMS, thus re-establishing the duodenal switch anatomy (Fig. 9).

Argon plasma coagulation of the jejunoduodenostomy fistula margins was performed after stent removal to aid in fistula closure. We had suggested an upper GI series about 8 weeks after stent removal, to exclude fistula persistence. Unfortunately, the patient did not undergo this. At last evaluation, about 3 months after stent removal, the patient's weight had been stable.

In conclusion, endoscopic reversal of biliopancreatic diversion by means of LAMSs is feasible. Long-term outcomes of this procedure should be explored in large studies, and this procedure should be compared with surgical duodenal switch reversal.

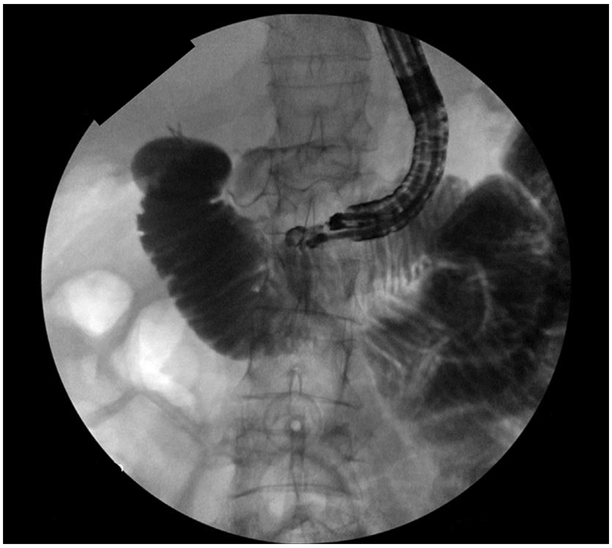

Figure 8. Confirmation of the communication between the biliopancreatic and alimentary limb through the lumen-apposing metal stent.

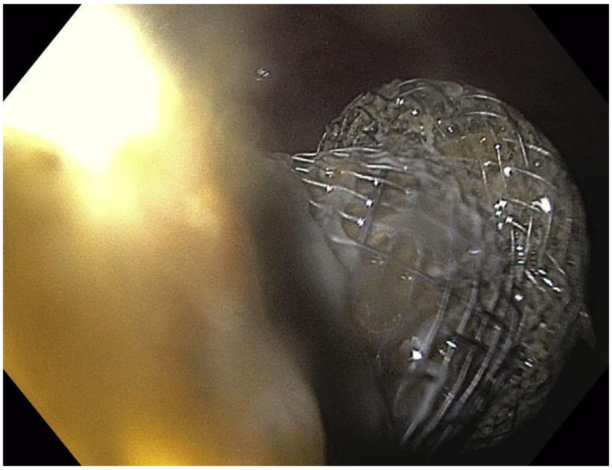

Figure 9. Removal of the lumen-apposing metal stent and re-establishment of the duodenal switch anatomy.

DISCLOSURE

Dr Khashab is a consultant for Medtronic, Boston Scientific, Olympus America, and GI Supply; is on the advisory board for Boston Scientific and Olympus America; and receives royalties from UpToDate and Elsevier. All other authors disclosed no financial relationships.

Abbreviations: EUS, endoscopic ultrasound; LAMS, lumen-apposing metal stent.

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