



Luminal and extraluminal bleeding during EUS-guided double-balloon–occluded gastrojejunostomy bypass in benign gastric outlet obstruction with portal hypertension

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A 45-year-old man with longstanding idiopathic chronic pancreatitis and splenic venous thrombosis presented with postprandial vomiting and abdominal fullness 10 months earlier. He received a diagnosis of duodenal narrowing (D1-D2 junction) (Fig. 1) and underwent several sessions of endoscopic balloon dilation, with an ill-sustained response. Surgery was attempted elsewhere; however, gastrojejunostomy was not done because of extensive perigastric collaterals. His laboratory evaluation showed moderate anemia (hemoglobin 10 gm/dL), platelets 1.2 lakhs/mm³, prothrombin time 17 seconds (international normalized ratio 1.28) and normal liver function test results, serum amylase levels, and lipase levels. Contrast-enhanced CT of the abdomen showed features of chronic pancreatitis and multiple perigastric, hilar, and peripancreatic collaterals. After due consideration, EUS-guided gastrojejunostomy (EUS-GJ) was chosen because of the persistent duodenal outlet obstruction. EUS-guided balloon-occluded gastroenterostomy bypass (EPASS) was performed with a double-enteric balloon (Tokyo Medical University type, Create Medic Co Ltd,

Yokohama, Japan) tube as described earlier (Fig. 2; Video 1, available online at www.VideoGIE.org).¹ The enclosed enteral loop between 2 inflated balloons was filled with normal saline solution mixed with contrast material and indigo carmine (Fig. 3). Under EUS guidance, the closed jejunal loop between the 2 balloons was punctured with an electrocautery-enhanced lumen-apposing metal stent (LAMS) (Hot Axios stent; Boston Scientific Corporation Inc, Marlborough, Mass, USA). At placement, the distal flange of the LAMS was maldeployed in the gastric wall, with no apparent leak of contrast material; therefore, the LAMS was removed. The procedure was attempted again with another LAMS (20-mm diameter) with precise puncture into the fluid-filled distended enteral loop and accurate enterogastric deployment (Fig 4). However, after complete deployment of the LAMS, dark brown fluid was seen draining through the gastric end of the LAMS instead of the expected blue fluid (Fig. 5). An endoscopic view of the echoendoscope confirmed substantial blood in the gastric lumen. Further inspection by gastroscope

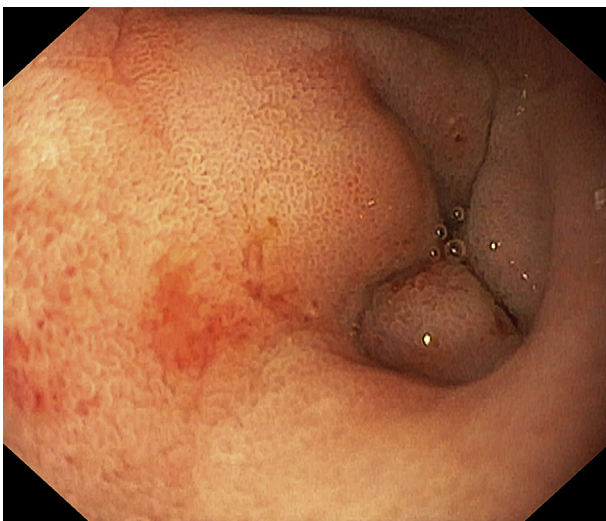


Figure 1. Endoscopic view showing duodenal bulb narrowing.

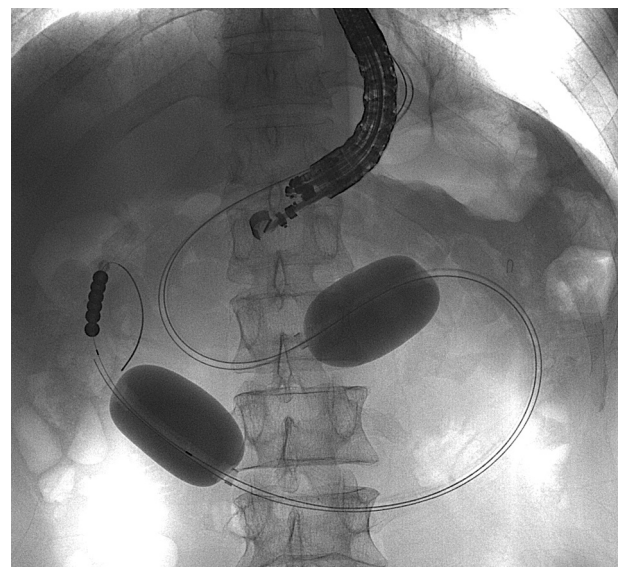


Figure 2. Fluoroscopic image showing double enteric balloon inflated with contrast material.

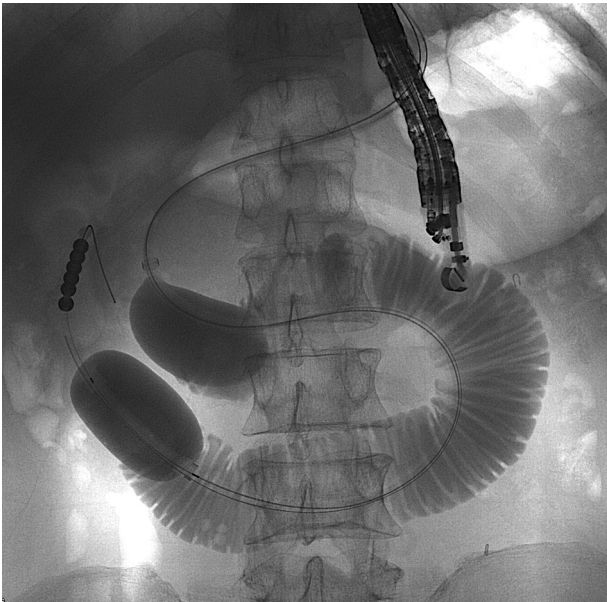


Figure 3. Fluoroscopic image showing inflated jejunal loops between 2 inflated balloons,

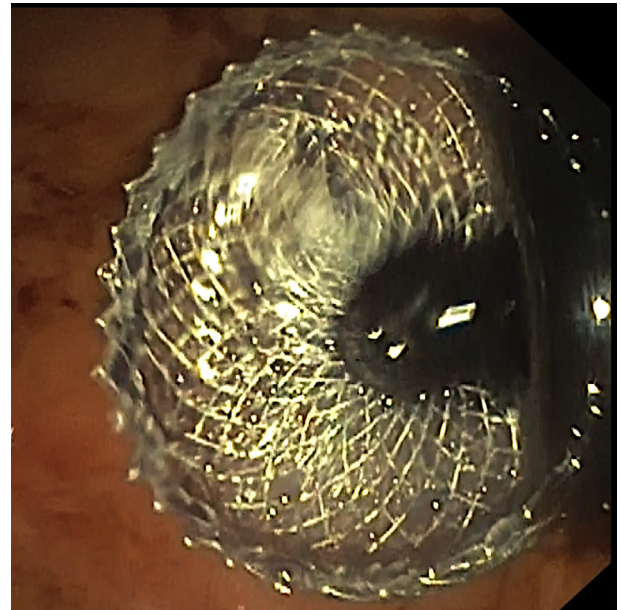


Figure 5. Endoscopic view showing lumen-apposing metal stent in situ with brown fluid draining through it.

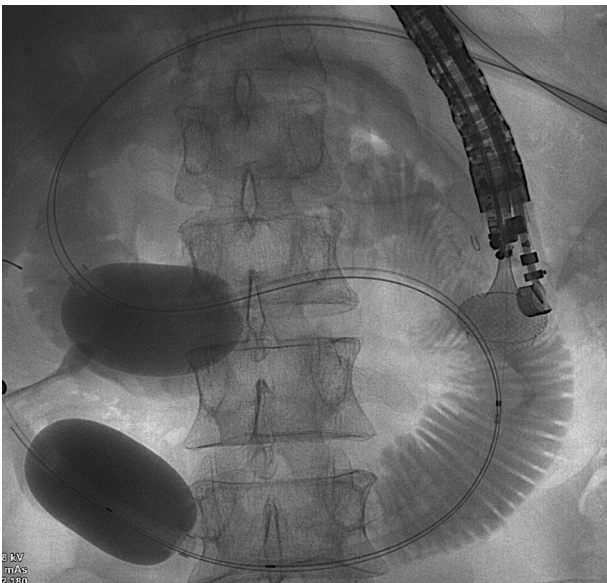


Figure 4. Fluoroscopic image showing deployment of distal flange of lumen-apposing metal stent.

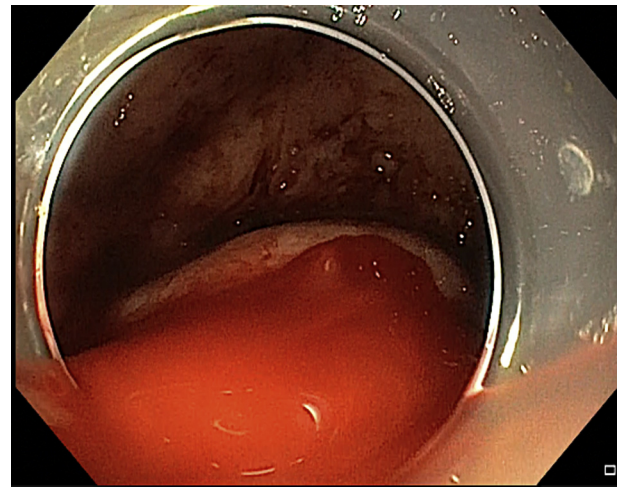


Figure 6. Endoscopic view showing active oozing from gastric puncture site.

with a transparent hood showed a blood clot at the first puncture site, adjacent to the LAMS. Clot dislodgement showed active oozing (Fig. 6), which was controlled by hemoclips. To evaluate the bleeding from the luminal aspect (jejunal) side, a gastroscope (9 mm) was passed through the LAMS after dilation with a balloon up to 15 mm. Both of the limbs (afferent and efferent) were inspected. A small adherent clot was seen in the jejunal efferent loop (Fig. 7). Two hemoclips were applied at the clot site. After the procedure, the patient had abdominal

pain. Contrast-enhanced CT of the abdomen showed hemoperitoneum with hematoma near the proximal jejunum (Fig. 8). There was a significant drop in the hemoglobin (from 10 gm/dL to 7 gm/dL), for which the patient received 1 unit of packed cell transfusion. He was treated conservatively in the intensive care unit with antibiotic agents, nothing by mouth, intravenous fluids, and analgesic agents. Gradually his abdominal pain subsided, and on the third day he was given a liquid diet. He was discharged on the fifth day in stable condition. He has completed 2 months of follow-up care, with the stent in situ and with no vomiting.

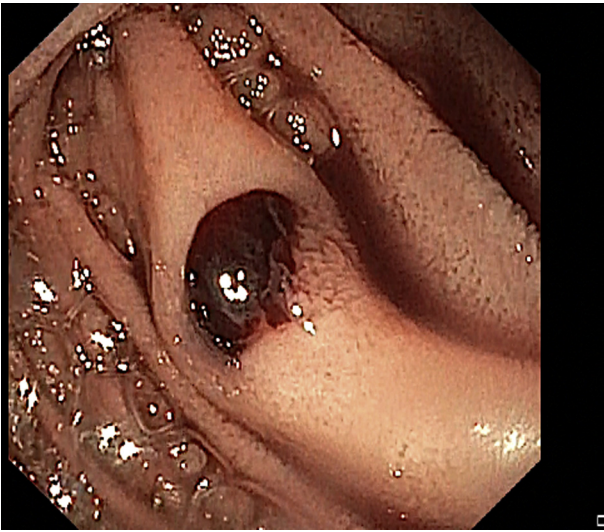


Figure 7. Endoscopic view showing small clot at jejunal puncture site.

EUS-GJ can be performed by various techniques: water immersion, water-inflated balloon technique, endoscopic EUS-guided double-balloon-occluded GJ bypass (EPASS), and the free-hand technique.² In the water immersion technique, the small bowel is distended either directly through the working channel of the endoscope, with placement of a nasobiliary drain, or after puncturing with a 22-gauge needle. In the water-inflated balloon technique, a balloon (biliary retrieval or dilating balloon catheter) is passed into the proximal jejunum and is then inflated with contrast material mixed with saline solution. This inflated balloon is pulled to bring it close to the gastric wall, where it is localized and punctured under EUS guidance. In EPASS, the saline solution mixed with contrast material in the duodenojejunal loop is retained between 2 anchoring balloons. This allows adequate distension and stabilization of duodenojejunal loop. The advantage of EPASS is that even after needle puncture, if the jejunal loop collapses, additional fluid can be easily administered to distend the loop. However, EPASS requires a special double-balloon enteric tube, which is not widely available. The free-hand technique is based on the principle of natural orifice transluminal endoscopic surgery.

EUS-GJ is usually done for malignant obstruction; however, a few case series have reported its utility in benign conditions.³ Procedure-related adverse events are common and include postprocedural pain, maldeployment of the stent, bleeding, and perforation. In a multicenter study, adverse events occurred in 3 patients (11%); 1 required surgery for pneumoperitoneum, another experienced peritonitis resulting from distal flange misplacement (despite LAMS removal and closure of the gastric opening with an over-the-scope clip), and the last patient had postprocedural bleeding that required blood transfusion.⁴ In a series of 57 patients who underwent direct



Figure 8. CT showing hyperdense fluid around liver and abdomen suggestive of hemoperitoneum and jejunal site hematoma.

EUS gastroenterostomy, adverse events occurred in 2 patients (1 leakage, 1 hemoperitoneum).⁵ Accurate LAMS deployment is crucial in EUS-GJ. Maldeployment of LAMSs is reported in 4% to 6% of patients and may be avoided by proper techniques like intrachannel release under complete EUS guidance. Half of the adverse events during EUS-GJ can be managed without surgical intervention.

In this patient, we observed adverse events that were managed nonsurgically.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviations: EPASS, EUS-guided balloon-occluded gastroenterostomy bypass; EUS-GJ, EUS-guided gastrojejunostomy; LAMS, lumen-apposing metal stent.

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