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Endoscopic pyloric exclusion—EUS-guided gastrojejunostomy combined with endoscopic suturing and closure of the pylorus: a novel approach to failed surgical repair of a perforated duodenal ulcer

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CASE PRESENTATION

An 82-year-old woman with metastatic breast cancer was admitted with an acute abdomen. She was found to have a duodenal bulb perforation, for which she underwent emergent surgical repair using an omental patch. Postoperatively, the patient developed a large-volume enteric output from the Jackson-Pratt drains, and she was found to have a persistent duodenal leak on a CT scan. She was referred to our center in her third postoperative week.

PROCEDURE DETAILS

On endoscopy, a deep ulcer with friable margins measuring 20 mm was visualized at the apex of the duodenum. The defect was not amiable to closure using an over-the-scope clip or endoscopic suturing given its size and friable margins. Placement of a fully covered self-expandable metal stent was also not possible because of the sharp angulation of the duodenum and presence of a large antral ulcer. Water-soluble contrast was subsequently injected into the duodenal bulb, and large-volume extraluminal leakage was visualized on fluoroscopy (Fig. 1). In addition, transient spillage of a small amount of contrast into the free peritoneal space was suspected. It was hence decided to divert the gastric stream away from the duodenal bulb. This was accomplished via a 2-step procedure (Figs. 2 and 3). A soft-tip guidewire and 20-mm extraction balloon were carefully advanced into the proximal small bowel under fluoroscopy. The gastroscope was withdrawn, leaving the balloon catheter and guidewire in place. The jejunum was insufflated with a mixture of water-soluble radio contrast and blue dye. A curvilinear echoendoscope was advanced into the stomach alongside

Abbreviation: LAMS, lumen-apposing metal stent.

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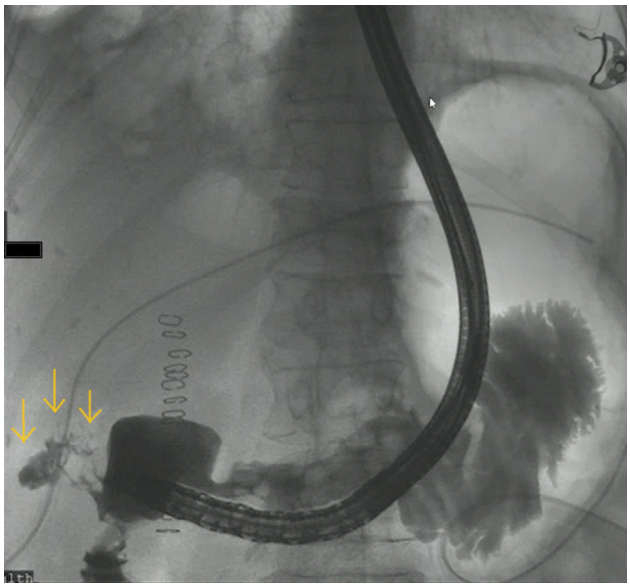

Figure 1. Fluoroscopic image after injection of radio contrast, demonstrating extraluminal leakage at the duodenal bulb (*yellow arrows*).

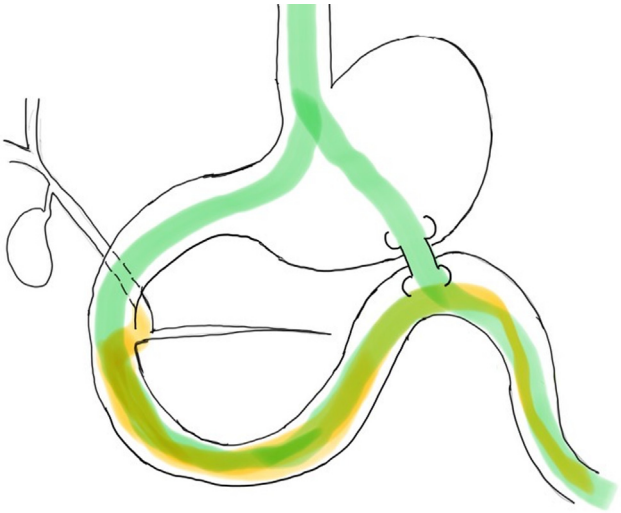

Figure 2. Step 1: EUS-guided gastrojejunostomy resulting in partial diversion of the gastric stream away from the duodenal bulb.

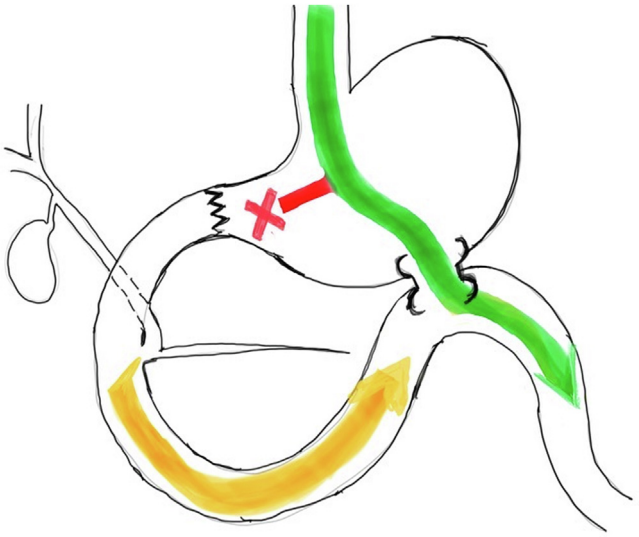

Figure 3. Step 2: Closure of the pylorus using the overstitch device, resulting in complete diversion of the anterograde gastric stream away from the duodenal bulb.

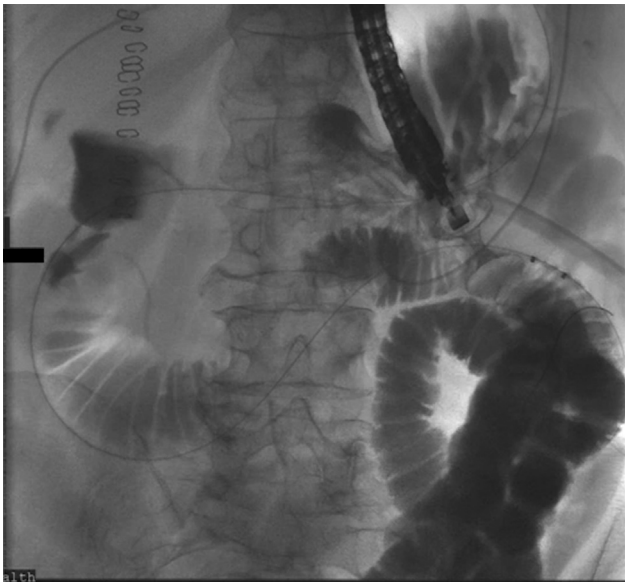

Figure 4. Fluoroscopic image after EUS-guided gastrojejunostomy, demonstrating partial diversion of the anterograde gastric stream into the small bowel.

the balloon catheter, and a suitable window for small-bowel access was identified. A 15- × 10-mm cautery-enhanced lumen-apposing metal stent (LAMS) was advanced freehand into the jejunum and deployed using standard technique (Fig. 4). The echoendoscope and all accessories were withdrawn. An endoscopic suturing device was then used to

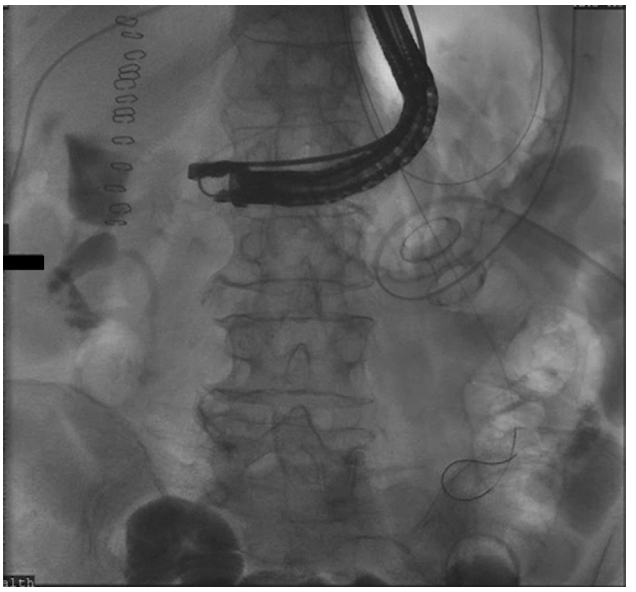

Figure 5. Fluoroscopic image demonstrating a short position of the therapeutic gastroscope during suturing of the pylorus.

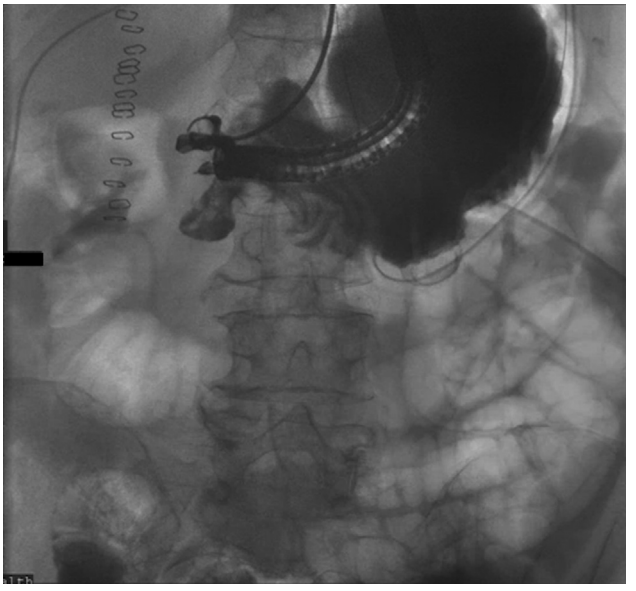

Figure 6. Fluoroscopic image after endoscopic suturing of the pylorus and injection of radio contrast. This demonstrates complete closure of the pylorus and absence of contrast flow into the duodenal bulb.

accomplish the second step of the procedure (Fig. 5). A 2.0 polypropylene suture was used to close the pylorus in a continuous fashion. Complete closure of the pylorus was ensured on fluoroscopy and endoscopy (Fig. 6), and a cinch was deployed. The stomach was subsequently injected with contrast to ensure complete diversion of the anterograde gastric steam into the proximal jejunum and away from the duodenal bulb (Fig. 7).

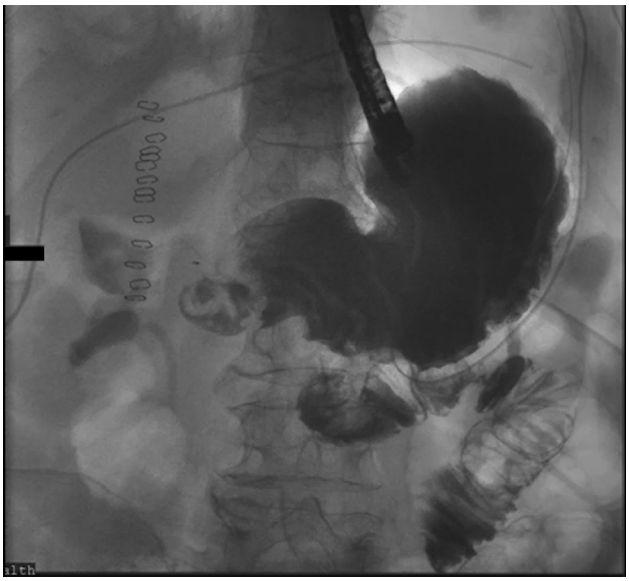

Figure 7. Fluoroscopic image after EUS-guided gastrojejunostomy and endoscopic suturing of the pylorus, demonstrating complete diversion of the anterograde gastric stream away from the duodenal bulb.

DISCUSSION

Surgical pyloric exclusion is frequently added to the primary repair of a duodenal perforation in patients who are at high risk for postoperative duodenal leak.[1,2] This involves surgically suturing the pylorus closed and diverting the gastric stream away from the perforated duodenum via a gastrojejunostomy.[3-5] Patients who have not undergone pyloric exclusion as part of the primary operation, and who subsequently develop a leak, have limited organ-sparing surgical options.[6,7] Considering the poor surgical candidacy of our patient, we aimed for endoscopically replicating a surgical pyloric exclusion and were able to successfully accomplish this via the described same-session 2-step procedure. The procedure is potentially reversable once the leak has improved, via endoscopic removal of the LAMS and cutting of the pyloric sutures. The outcome in our patient was favorable. The patient clinically improved, was started on an oral diet 3 days after the procedure, and was discharged to a rehabilitation facility. She died of unrelated causes 5 months later.

CONCLUSION

We were able to demonstrate that endoscopic pyloric exclusion is a technically feasible and potentially reversible novel procedure (Video 1, available online at www.giejournal.org). It may provide an alternative to surgical re-exploration in patients who develop a duodenal leak after undergoing primary surgical repair of duodenal perforations. Further studies are needed to evaluate the procedure's efficacy, reproducibility, and clinical use.

DISCLOSURE

Dr Yang is a consultant for MicroTech, Medtronic, Olympus, Fujifilm, and Apollo Endosurgery. Dr Arain is a consultant for Cook Medical, Merit, Boston Scientific, and Olympus. Dr Hasan is a consultant for Boston Scientific and Olympus. All other authors disclosed no financial relationships.

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