Endoscopic removal of migrated Nissen fundoplication mesh

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We describe an 89-year-old woman who underwent laparoscopic Nissen fundoplication reinforced with a polytetrafluoroethylene dual mesh 4 years before presentation at our institution. She presented 2 years after fundoplication with dysphagia due to a benign gastroesophageal stricture in relation to external compression by the surgical mesh. The stricture could be traversed with difficulty using a standard adult upper endoscope (GIF-Q180; Olympus, Center Valley, Pa, USA). Clinical improvement was seen during a 6-month period after 3 sessions of through-the-scope endoscopic balloon dilation (Boston Scientific, Marlborough, Mass, USA). However, 1 month after the last dilation, the patient presented with severe dysphagia.

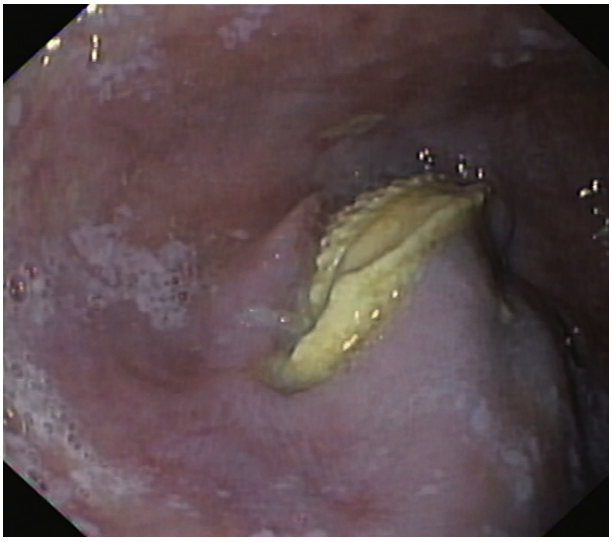

Figure 1. Endoscopic image revealing an esophageal mucosal discontinuity upstream of the esophagogastric stenosis, with surgical mesh apparent through the defect.

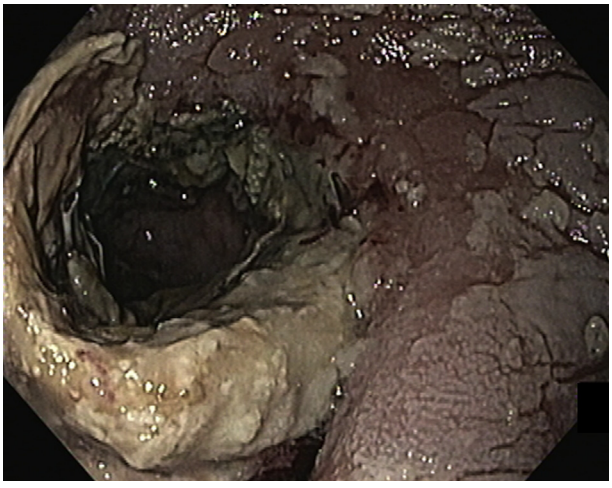

Figure 2. Endoscopic image of the surgical mesh migrated farther into the esophageal lumen but still embedded in the esophagus wall.

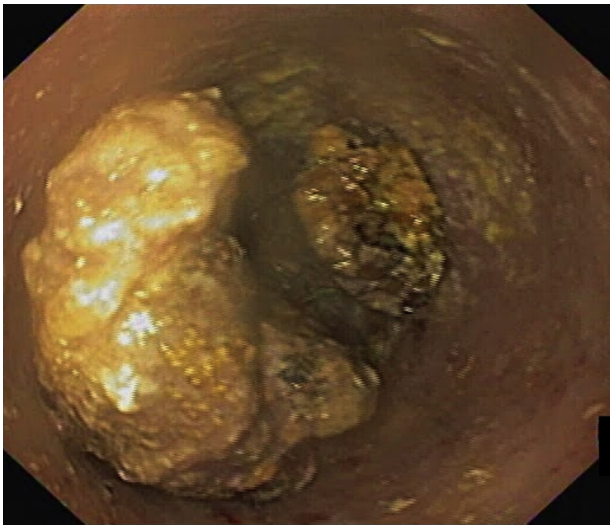

Figure 3. Endoscopic image revealing a mobile foreign body corresponding to the migrated surgical mesh (more proximally) and the diabolo-shaped stent (more distally).

Figure 4. Endoscopic image of the removed surgical mesh.

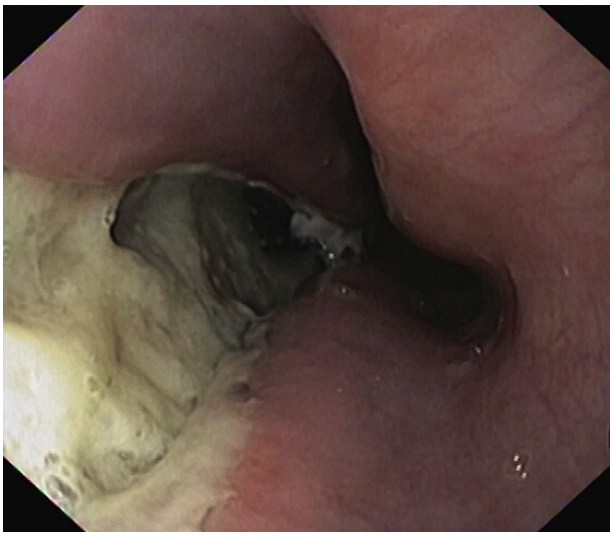

Figure 5. Endoscopic image of the 5-cm long, deep tear at the cervical esophagus caused by the overtube.

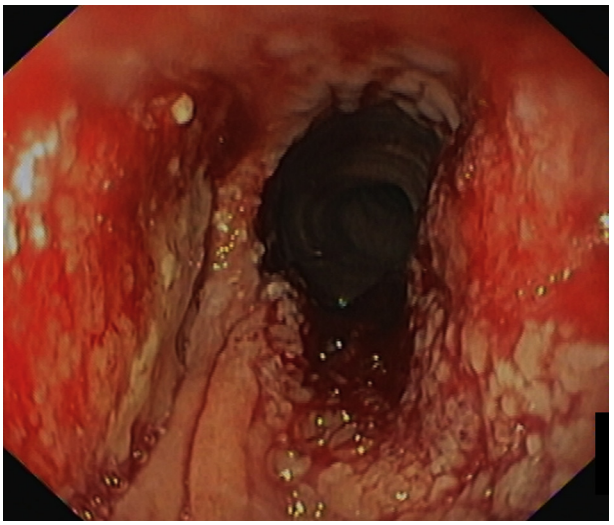

Figure 7. Endoscopic image of the cervical esophagus tear during treatment with vacuum therapy.

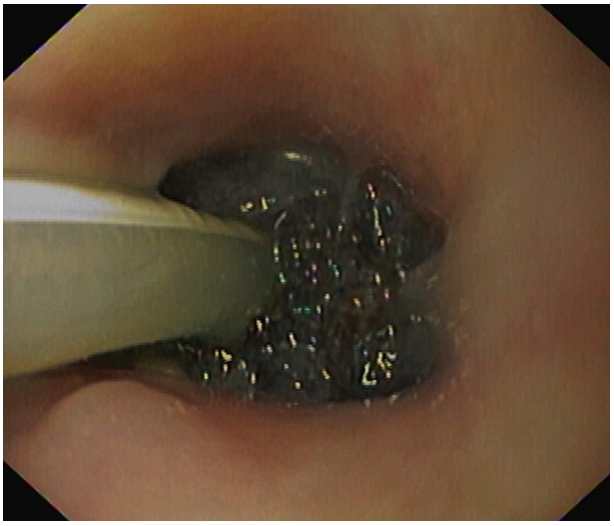

Figure 6. Endoscopic image of the vacuum therapy foam sponge placed intraluminally at the cervical esophagus.

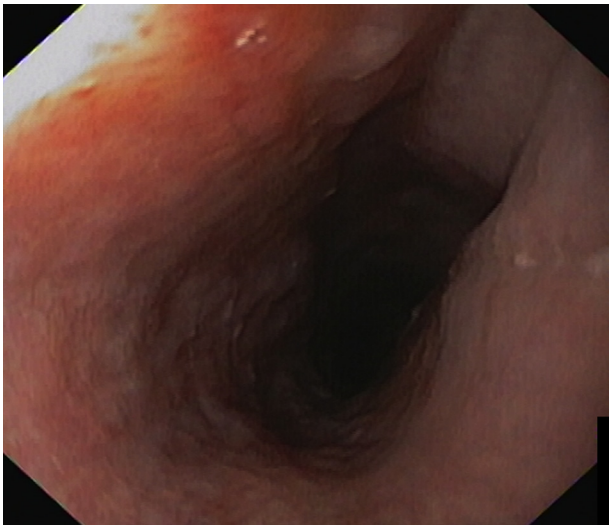

Figure 8. Endoscopic image of the cervical esophagus at the end of treatment with vacuum therapy.

Endoscopy revealed an esophageal mucosal discontinuity upstream of the stenosis, with the surgical mesh being apparent through the defect (Fig. 1 and Video 1, available online at http://www.giejournal.org). An 80- × 20-mm fully covered self-expandable metal stent (Hanarostent M.I.Tech Co, Inc, Seoul, South Korea) was placed for 6 weeks to induce additional migration of the surgical mesh. After stent removal, despite further migration, the mesh remained embedded in the esophagus (Fig. 2). Because the patient did not want to undergo further therapies and dysphagia worsened, a fully covered 40- × 26/16/26-mm diablo-shaped stent (Hanarostent) was placed without intention of removal. However, 2 years later, the patient presented again with dysphagia. Endoscopy revealed stent dysfunction, apparently due to food obstruction, which resolved after passage of the endoscope through the stent. The diablo stent was noted to have migrated proximally, with a mobile second foreign body corresponding to the surgical mesh being identified in the esophagus (Fig. 3). Despite the mesh being mobile, resistance was found when trying to pass it across the cervical esophagus; endoscopic removal with a snare was only achieved after overtube assistance (Fig. 4). However, after removal, a 5-cm long, deep tear caused by the overtube was found in the cervical esophagus (Fig. 5). Despite no contrast extravasation, the patient started systemic inflammatory response syndrome the day after the procedure, with extraluminal air in the anterior mediastinum. Intraluminal endoscopic vacuum therapy (EVT) with ENDO-SPONGE (B. Braun Medical B.V., Melsungen, Germany) (Fig. 6) was performed with systemic inflammatory response syndrome resolution after 4 sponge changes every 4 days (Figs. 7 and 8). The patient was discharged home and was eating normally (Fig. 9).

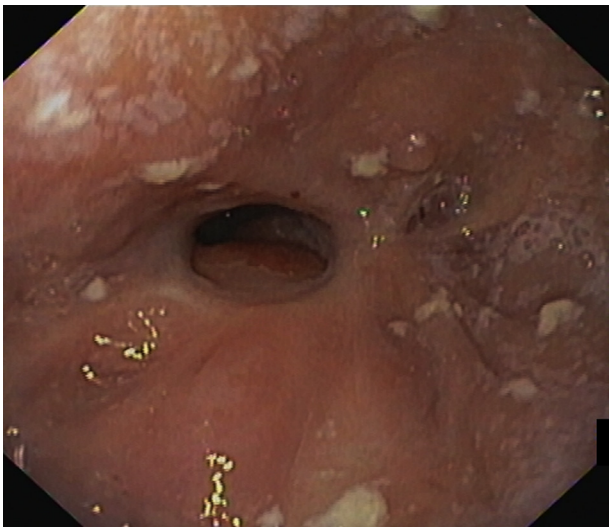

Figure 9. Endoscopic image of the distal esophagus after surgical mesh and diabolo-shaped stent removal, revealing an esophagogastric stricture transposable with a conventional gastroscope without resistance.

Mesh reinforcement in antireflux surgery may be complicated by mesh migration and need for recurrent surgery.[1-3] Endoscopic removal of a completely transmural migrated mesh has been described[4]; however, in this case, we believe migration was accelerated by placement of stents. Considering the physiological high-pressure zone at the lower esophageal sphincter after fundoplication, the placement of a metal stent may induce pressure necrosis of the esophageal wall, similar to stent-induced erosion in gastric bands.[5] The esophagus wall heals via fibrosis behind the migrating mesh, without perforation occurring. We believe that at the time the surgical mesh was removed, it was completely free in the esophagus, without any attachments to the serosal and mucosal wall; inspection of the fundus by retroflexion no longer showed the "Nissen-nipple."

Overtubes are typically used to enhance patient safety in gastrointestinal endoscopy; however, adverse events have been reported. Esophageal perforation was first reported in 1992 by Goldschmiedt et al,[6] and at least 7 subsequent cases were reported up to 2008.[7] No predictive factors for this adverse event have been described. Options for the treatment of acute perforations in the esophagus include placement of self-expandable metal stents, endoscopic sutures, clips, and EVT. The cervical location of the tear precluded placement of a stent or suture.

EVT is a promising approach for the treatment of perforations and leaks.[8] The basic principle of continuous or intermittent negative pressure is that it leads to a decrease in bacterial contamination, secretion, and local edema and promotion of perfusion and granulation. Despite the need for multiple procedures, it may result in complete closure, avoiding the need for surgery. Different EVT systems, either handmade (done by connecting a polyurethane foam sponge to a silicon 16F or 18F nasogastric tube) or already available on the market (ENDO-SPONGE and ESO-SPONGE), can be used. The use of an overtube is recommended to ensure easy passage of the sponge into the upper esophageal sphincter up to the location of interest. Lower defects may be harder to reach. An additional suture loop placed at the tip of the sponge (backpack technique) may be used to facilitate placement.[9] Depending on the size of the defect, the sponge should be driven either to the defect site (if smaller than 10 mm) or through the defect into the cavity (if larger than 10 mm). With diminishing defect size, sponge placement could be changed from its initial intracavitary position to an intraluminal position. The sponge should be changed every 3 to 5 days until complete healing of the esophageal defect is achieved. Sponges must be changed in this time frame because they are porous and will become clogged over time; if left too long, they will become increasingly difficult to remove and no longer provide effective treatment.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviations: EVT, endoscopic vacuum therapy.

REFERENCES

1. Acin-Gandara D, Miliani-Molina C, Carneros-Martin J, et al. Transmural gastric migration of dual-sided PTFE/ePTFEE mesh after laparoscopic surgery for a recurrent hiatal hernia with dysphagia: case report. Chirurgia (Bucur) 2014;109:538-41.
2. Carpelan-Holmström M, Kruuna O, Salo J, et al. Late mesh migration through the stomach wall after laparoscopic refundoplication using a dual-sided PTFE/ePTFE mesh. Hernia 2011;15:217-20.
3. Hergueta-Delgado P, Marin-Moreno M, Morales-Conde S, et al. Transmural migration of a prosthetic mesh after surgery of a paraesophageal hiatal hernia. Gastrointest Endosc 2006;64:120-1.
4. Leitão C, Ribeiro H, Caldeira A, et al. Late transmural mesh migration into the esophagus after Nissen fundoplication. Endoscopy 2016;48(Suppl 1 UCTN):E166-7.
5. Dugan J, Bajwa K, Singhal S. Endoscopic removal of gastric band by use of a stent-induced erosion technique. Gastrointest Endosc 2016;83:654-5.
6. Goldschmiedt M, Haber G, Kandel G, et al. A safety maneuver for placing overtubes during esophageal variceal ligation. Gastrointest Endosc 1992;38:399-400.
7. Wells CD, Fleischer DE. Overtubes in gastrointestinal endoscopy. Am J Gastroenterol 2008;103:745-52.
8. de Moura DTH, de Moura BFBH, Manfredi MA, et al. Role of endoscopic vacuum therapy in the management of gastrointestinal transmural defects. World J Gastrointest Endosc 2019;11:329-44.
9. Rodrigues-Pinto E, Morais R, Macedo G, et al. Choosing the appropriate endoscopic armamentarium for treatment of anastomotic leaks. Am J Gastroenterol 2019;114:367-71.

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