Endoscopic closure of a refractory enterocutaneous fistula by use of a fistula plug with fixation and mucosal oversewing

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Enterocutaneous fistulas (ECFs) are associated with considerable morbidity and mortality. Most ECFs occur after surgery, but other causes include infection, perforated peptic ulcer, inflammatory bowel disease, and even abdominal injury or trauma. The management of an ECF is often protracted and complex. When initial medical management fails, nonsurgical interventions are limited and have disappointing outcomes. Fistula plugs have been used with some success in anorectal fistulas. Although there is limited experience with fistula plugs for ECF closure, recapitulation techniques used in anorectal fistula closure with plug fixation and mucosal oversewing may be an option for patients in whom other therapies have failed.

A 67-year-old woman with a history of a perforated gastric ulcer repaired by partial gastrectomy in 1992 underwent Roux-en-Y reconstruction in 2004 and was doing well until 2014, when she experienced unexplained abdominal pain. An upper-GI series demonstrated a fistula between the gastric remnant and her abdominal wall. Endoscopic closure was performed with the Overstitch device (Apollo Endosurgery, Austin, Tex, USA), and a repeated upper-GI series 48 hours after the procedure demonstrated no extravasation of contrast material, confirming closure of the fistula. In August 2017, she experienced several months of worsening abdominal discomfort, for which she underwent a laparotomy with extensive lysis of adhesions. After the procedure, an abdominal wall abscess developed that required incision and drainage. During the workup, it was noted that her gastrocutaneous fistula had recurred. After multiple attempts at closure, which included placement of an Ovesco over-the-scope clip (OTSC; Ovesco Endoscopy AG, Tübingen, Germany) and internal drainage with a double-pigtail plastic stent, the fistula persisted. The drain output averaged 60 mL of fluid per day, and she was kept on nothing by mouth and was given tube feedings for 4 months. Endoscopic closure was then attempted with a novel approach using a fistula plug with fixation and oversewing as described below (Video 1, available online at www.VideoGIE.org).

A standard gastroscope was passed into the esophagus and advanced to the gastrojejunal anastomosis.
A 7-mm gastrocutaneous fistula was identified proximal to the anastomosis (Fig. 1). A cytology brush was passed into the fistula tract to agitate the mucosa and encourage granulation tissue formation. Contrast material was injected through a Glo-tip II catheter (Cook Medical, Bloomington, Ind, USA) to confirm that the fistulous tract extended to the percutaneous drain catheter (Fig. 2). Once this was confirmed, a 0.025-inch guidewire was passed through the gastric fistula extending across the tract, following the drainage catheter external to the patient. A 5F snare was used to grasp the guidewire, and the guidewire and snare were pulled through the fistulous tract out of the mouth in tandem with the endoscope. The snare was opened, and the guidewire was released. A Cook 7-mm × 5.1-cm fistula plug (Cook Medical) was soaked in sterile saline solution for 20 seconds and then grasped by the snare. The snare was slowly withdrawn through the fistula tract until the fistula plug was pulled into the fistula with the wide cap lying flush at the fistula opening. The snare remained closed around the tail of the fistula plug. The Overstitch suturing device (Apollo Endosurgery) was used to secure the fistula plug in place. One interrupted suture was placed through the jejunum/plug and gastric body/plug and was cinched (Fig. 3). Two additional interrupted sutures were used to oversew and approximate the gastric and jejunal mucosa and to bury the fistula plug underneath (Fig. 4). After the suturing was completed, the snare was opened, releasing the tail of the fistula plug.

An upper-GI series 48 hours after the procedure confirmed closure of the fistula tract (Fig. 5). The drain output was closely monitored; over the next 5 days the average output was less than 5 mL per day. One month after the procedure, the drain output was less than 1 mL daily, thus confirming continued closure of the gastric fistula.

In summary, this case demonstrates the successful closure of a gastrocutaneous fistula with a fistula plug, a novel technique of plug fixation and mucosal oversewing. Proceduralists should be aware that this technique may be an option for patients who have a refractory enterocutaneous fistula and who are poor

Figure 3. Endoscopic appearance of fistula plug after fixation with sutures.

Figure 4. Approximation of the gastric and jejunal mucosa over the fistula plug (right) using endoscopic sutures.

Figure 5. Upper-GI series demonstrating absence of the gastrocutaneous fistula after fistula plug placement of mucosal oversewing.
surgical candidates or would like to avoid surgical interventions.

DISCLOSURE

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Abbreviation: ECF, enterocutaneous fistula.