Closure of a persistent esophagopleural fistula assisted by a novel endoscopic suturing system

Gastrointestinal fistulas may be successfully managed endoscopically [1]. Novel endoscopic techniques for full thickness tissue approximation may serve as adjuvants for assisting fistula closure [2, 3]; an example is a flexible endoscopic suturing system [4]. We describe a case of a chronic esophageal fistula, treated previously with endoscopic clipping and esophageal stenting, which was successfully managed using a novel endoscopic suturing system [5].

A 66-year-old woman presented with a 3-month history of a chronic esophagopleural fistula secondary to Boerhaave syndrome. The fistula was initially drained by thoracostomy and subsequently treated with endoscopic clipping followed by placement of a partially covered self-expandable metal stent. Following removal of the stent 9 weeks later, a contrast esophagram revealed extravasation through a persistent esopha-gopleural fistulous opening 2 cm above the esophagogastric junction (Fig. 1). The fistula was 10 mm in diameter, with free flow of contrast through a long fistulous tract. Endoscopic closure of the fistula was performed using a novel endoscopic suturing device (Overstitch; Apollo Endosurgery, Austin, Texas, USA) (Fig. 2, Video 1) inserted through an esophageal overtube. A double-channel endoscope (Olympus GIF 2T160; Olympus, Center Valley, Pennsylvania, USA) fitted with the suturing device was advanced to the distal esophagus. Placement of a three-stitch running 3.0 polypropylene suture was successful at closing the fistula, and initial contrast instillation demonstrated no leak. Additionally, a partially covered stent was placed to cover the sutured defect. The stent was removed 4 weeks later, and a follow-up esophagogram showed a contrast leak, although the fistula was smaller (5 mm), and the flow less extensive. A second suturing procedure was planned to seal the remaining fistula opening (Fig. 3), starting with Argon plasma coagulation of the orifice of the fistula, followed by 10 mL human fibrin glue injection (Tisseel; Baxter, Westlake Village, California, USA). The fistula was closed again with three interrupted polypropylene 2.0 sutures using the suturing device in the same fashion as described in the literature.
previously. There was no contrast extravasation post suturing, and it was elected not to place a stent. The total procedure time was 90 minutes (20 minutes for the actual suturing procedure). Follow-up endoscopy and contrast examination of the esophagus after the second suturing procedure showed complete fistula closure (Fig. 4 and Fig. 5).

**Video 1**
The technique for endoluminal esophago-pleural fistula closure using a novel endoscopic suturing system.

**Competing interests:** Dr. Gostout is a member of the Apollo group which conceptualized the suturing system. Dr. Gostout is an advisor to Apollo Endosurgery. Both he and the Mayo Clinic hold equity in this company. Drs. Louis Wong Kee Song, Juliane Bingener and Eduardo A. Bonin have nothing to disclose. Zachary Gostout was a former employee of Apollo Endosurgery, Inc., developer of the Over-Stitch device.

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