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DISEASES OF THE ESOPHAGUS

Case report

The use of self-expandable plastic stents for non-malignant esophago-pleural fistulas

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SUMMARY. **Anastomotic leaks and fistulas are unfortunate complications of esophageal-gastric surgery and esophageal dilations. Traditional management options have included surgery or a more conservative approach. There have been few reports describing the use of self-expandable plastic stents for the treatment of esophageal perforations and tracheoesophageal fistulas from benign diseases. We are reporting the use of self-expandable plastic stents for the treatment of non-malignant esophago-pleural fistulas occurring after esophagectomy in one case and esophageal perforation post dilation in the other.**

KEY WORDS: **esophago-pleural fistulas, postoperative esophageal anastomotic leak, self-expandable plastic stents.**

CASE NO 1

A 72-year-old male patient known to have Barrett's esophagus without dysplasia for 10 years presented with adenocarcinoma *in situ* at a recent follow up. Endoscopic ultrasound revealed T1 N1 tumor stage. He was treated with neoadjuvant therapy including chemotherapy (Carboplatin, 5-Fluorouracil and Taxol) and radiation for 3 months, which he tolerated with no complications. He subsequently underwent a transthoracic esophagectomy. His postoperative course was complicated by an anastomotic leak seen on gastrografin studies, leading to right empyema. He was initially managed conservatively with antibiotics, chest tube insertion and total parenteral nutrition but the leak failed to close after 21 days of therapy. Upper endoscopy confirmed a large fistulous tract with an opening of approximately 1.5–2 cm at the surgical anastomosis (Fig. 1). A gastrografin study showed extravasation into the pleural cavity. A 9-cm length, 18 mm diameter Polyflex stent (Boston Scientific, Natick, MA) was deployed under fluoroscopic and direct visual guidance, covering the fistulous tract completely and without complications (Fig. 2). Chest tube drainage decreased to zero within 2 days of stent placement and the tube was removed. The patient was discharged from the hospital to a rehabilitation facility 6 days after stent placement, tolerating a mechanical soft diet.

Three months after stent placement, the patient had regained his presurgery weight with no symptoms of dysphagia or reflux. A repeat barium swallow demonstrated no extravasation. The Polyflex stent was removed at that time utilizing a standard snare; the top of the stent was grasped and pulled out with the assistance of an overtube. The underlying mucosa looked normal with no defects (Fig. 3). Upon subsequent follow up 3 and 6 months after stent removal, the patient has remained asymptomatic.

CASE NO 2

A 78-year-old male patient had symptoms of progressive solid food dysphagia for several months prior to presentation. He underwent an upper endoscopy with Maloney dilation at another medical center, which was complicated by esophageal perforation. A surgical closure of the perforation was attempted, but continued leakage into the right pleural cavity was noted at repeated radiographic swallow exams over a period of 14 days. The patient was transferred to our hospital for further management.

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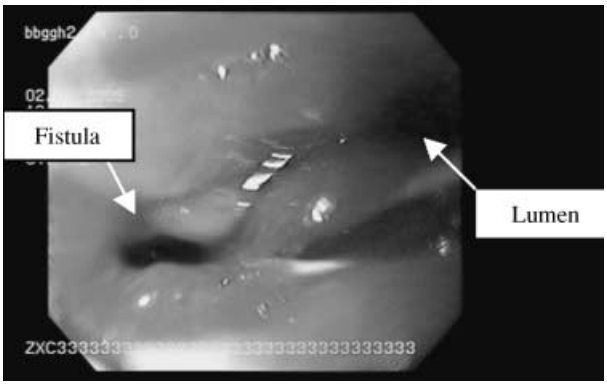

Fig. 1 Fistulous tract in the esophagus at the surgical anastomosis.

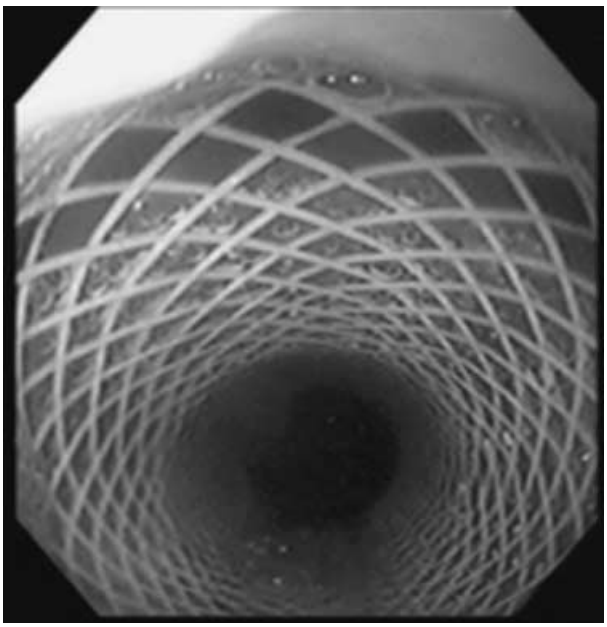

Fig. 2 Self-expandable plastic stents deployed in the esophagus.

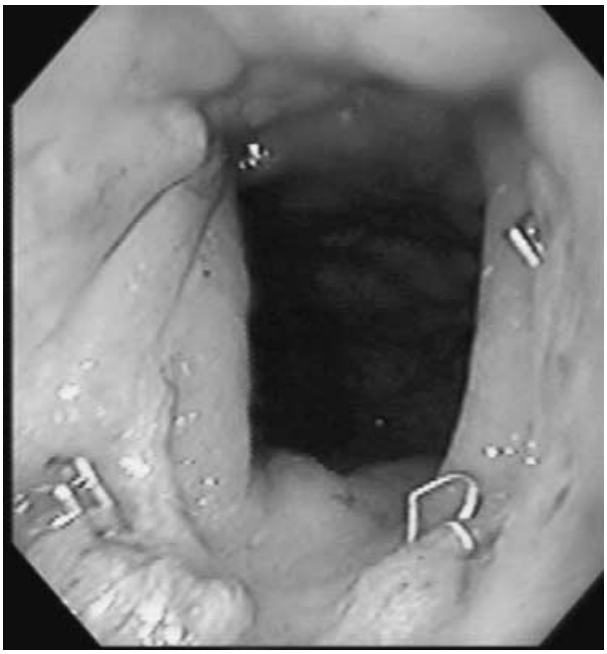

Fig. 3 Total obliteration of fistulous tract after stent removal.

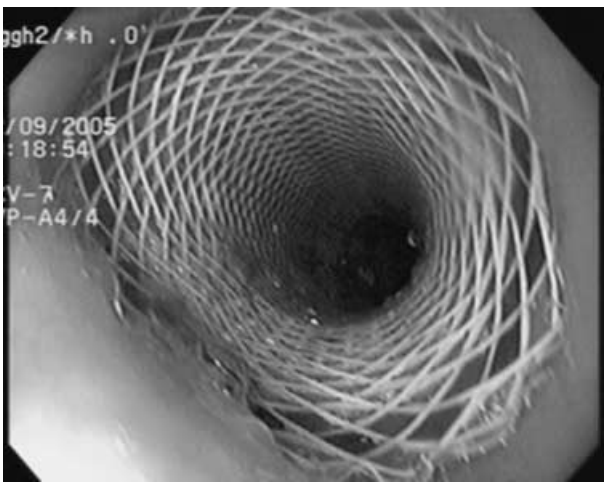

Fig. 4 Self-expandable plastic stent overlying the fistula (case 2).

An upper endoscopy revealed two lumens in his distal esophagus. The smaller lumen, measuring 1.5 cm, communicated with the pleural cavity (confirmed by guidewire introduction to the pleural space in a trial to identify the proper lumen). A 12 cm long, 18 mm diameter Polyflex plastic stent was placed under fluoroscopic and direct visual guidance in the distal esophagus overlying the fistulous tract with complete closure of the fistula (Fig. 4). A barium esophagram revealed no evidence of a leak.

During the first month after the stent placement, the patient resumed a regular diet with careful chewing and gained 7 kg. He had mild reflux symptoms that were controlled on proton pump inhibitor therapy. The gastrostomy tube previously inserted was removed. The stent was left *in situ* for 6 months, given the large size and complicated nature of the fistula. At 6 months the patient underwent esophagogastroduodenoscopy during which the stent was removed using a rat tooth forceps and an overtube (Fig. 5). The site of the previous perforation was noted to have closed with granulation tissue (Fig. 6). There were mild changes underneath the stent, suggestive of Candida esophagitis. Repeat barium swallow performed immediately after stent removal revealed the complete closure of the fistula. The patient was discharged home and remained on a liquid diet that was advanced successfully to regular diet within 48 h. He was seen in follow up over the course of 3 months with no symptoms.

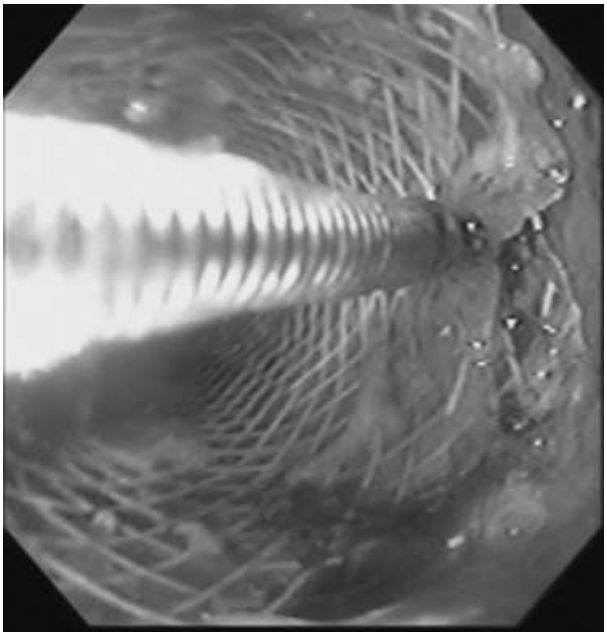

Fig. 5 Stent removal using rat tooth forceps.

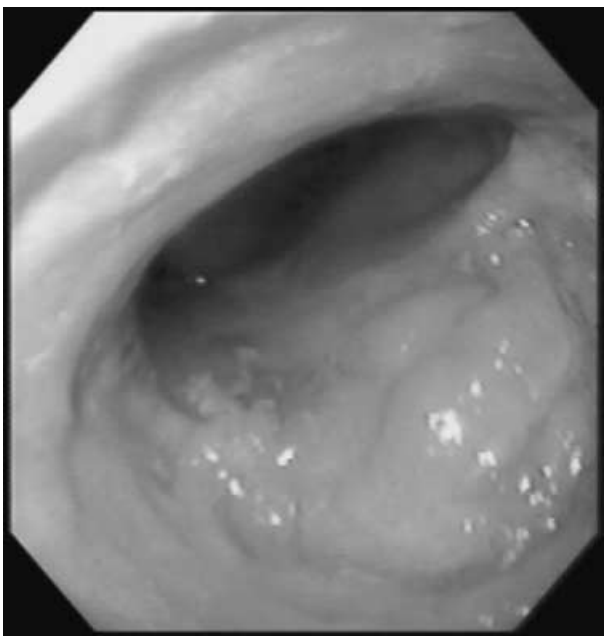

Fig. 6 Healthy granulation tissue at the site of previous fistula.

DISCUSSION

Anastomotic leaks and fistulas are unfortunate complications of esophageal–gastric surgery and esophageal dilation that can occur in up to 4% of dilations[1] and 10–30% of such surgeries.[2–4]

Self-expanding metal stents (SEMS) have been available for decades and have proved to be safe and effective treatment for malignant dysphagia in inoperable patients. Tumor growth into the lumen, however, significantly shortens the life of the stent.[5–7] These stents have also been utilized for closure of malignant esophageal fistulas with success.[8,9] SEMS have been primarily used to palliate malignant strictures but are less commonly used in non-malignant strictures of fistulas due to concern about their non-removability. Sandha *et al.* reviewed SEMS usage for benign esophageal strictures and found significant morbidity with an unacceptably high complication rate.[10] Thus, the use of these stents for benign strictures had been discouraged. Membrane-covered metallic stents have been used to allow malignant tracheoesophageal fistulas to heal but their removal remains problematic and results in damaging the esophageal mucosa.[11,12]

A relatively new type of self-expanding stent (Polyflex, Boston Scientific, Natick, MA) is a polyester weave that is completely covered with silicone. It can be deployed under fluoroscopic or direct endoscopic guidance. The silicone covering prevents the in-growth of neoplastic or hyperplastic tissue through the mesh. Dormann *et al.* reviewed the use of 33 self-expanding plastic stents for palliation of unresectable esophageal cancers.[13] Stent occlusion rate was 12% resulting from tumor overgrowth (no in-growth), with migration occurring in 6%. Since then, several other useful applications have been recognized for self-expandable plastic stents in benign esophageal disease:

1 Treatment of tracheoesophageal fistulas. This type of fistula usually results from malignant disease but can sometimes result from benign conditions. Due to the difficulty removing SEMS, they have limited use in benign disease. A recent report documented the successful use of a plastic Polyflex stent to treat tracheoesophageal fistulas resulting from polypectomy in the mid-esophagus.[14]

2 Treatment of post-surgical esophago-mediastinal fistula. Recipi *et al.* reported the successful healing of a fistula resulting from esophagectomy and total gastrectomy for adenocarcinoma of the cardia by placing a plastic stent across the esophago-jejunal anastomosis for 18 days.[15,16]

3 Treatment of esophageal perforations. Gelbmann *et al.* reported the use of Polyflex stents in nine patients (five with post-surgical anastomotic leaks and four with esophageal perforations). Complete mucosal healing was achieved in six patients. The three failures were related to underlying sepsis in two and progression of malignant disease in one.[17]

We report the use of this type of stent for the treatment of a non-malignant esophago-pleural fistula secondary to esophagectomy in one patient and iatrogenic in the other. Leakage to the pleural cavity was documented in both cases and the complete healing of the fistulous tracts was documented endoscopically and radiographically. The stent was

left in for a relatively longer duration of time (3 and 6 months, respectively) due to the size of the fistula. Stent removal was uncomplicated and there was no symptom of recurrence upon follow up. Based on these cases, as well as on others previously reported, it appears that self-expendable plastic stents are effective and safe for the treatment of esophageal-pleural fistulas. This approach can be particularly helpful in patients who are considered poor surgical candidates.

References

1 Hernandez L V, Jacobson J W, Harris M S. Comparison among the perforation rates of Maloney, balloon, and savary dilation of esophageal strictures. Gastrointest Endosc 2000; 51: 460–2.
2 Urschel J D. Esophagogastrostomy anastomotic leaks complicating esophagectomy: a review. Am J Surg 1995; 169: 634–40.
3 Baulieux J, Adham M, de la Roche E, Meziat-Burdin A, Poupart M, Ducerf C. Carcinoma of the oesophagus. Anastomotic leaks after manual sutures – incidence and treatment. Int Surg 1998; 83: 277–9.
4 Honkoop P, Siersema P D, Tilanus H W, Stassen L P, Hop W C, van Blankenstein M. Benign anastomotic strictures after transhiatal esophagectomy and cervical esophagogastrostomy: risk factors and management. J Thorac Cardiovasc Surg 1996; 111: 1141–6; discussion 7–8.
5 Toikkanen V J, Nemlander A T, Ramo O J *et al.* Expandable metallic stents in the management of malignant oesophageal obstruction. Ann Chir Gynaecol 2000; 89: 20–3.
6 Shimi S M. Self-expanding metallic stents in the management of advanced esophageal cancer: a review. Semin Laparosc Surg 2000; 7: 9–21.
7 Ahmad N R, Goosenberg E B, Frucht H, Coia L R. Palliative treatment of esophageal cancer. Semin Radiat Oncol 1994; 4: 202–14.
8 Nelson D B, Axelrad A M, Fleischer D E *et al*. Silicone-covered Wallstent prototypes for palliation of malignant esophageal obstruction and digestive-respiratory fistulas. Gastrointest Endosc 1997; 45: 31–7.
9 Raijman I. Endoscopic management of esophagorespiratory fistulas: expanding our options with expandable stents. Am J Gastroenterol 1998; 93: 496–9.
10 Sandha G S, Marcon N E. Expandable metal stents for benign esophageal obstruction. Gastrointest Endosc Clin N Am 1999; 9: 437–46.
11 Song H Y, Park S I, Jung H Y *et al*. Benign and malignant esophageal strictures: treatment with a polyurethane-covered retrievable expandable metallic stent. Radiology 1997; 203: 747–52.
12 Tsunoda S, Shimada Y, Watanabe G, Nakau M, Imamura M. Covered metallic stent treatment of a patient with spontaneous rupture of the esophagus. Dis Esophagus 2001; 14: 254–7.
13 Dormann A J, Eisendrath P, Wigginghaus B, Huchzermeyer H, Deviere J. Palliation of esophageal carcinoma with a new self-expanding plastic stent. Endoscopy 2003; 35: 207–11.
14 Adler D G, Pleskow D K. Closure of a benign tracheoesophageal fistula by using a coated, self-expanding plastic stent in a patient with a history of esophageal atresia. Gastrointest Endosc 2005; 61: 765–8.
15 Repici A, Conio M, De Angelis C *et al.* Temporary placement of an expandable polyester silicone-covered stent for treatment of refractory benign esophageal strictures. Gastrointest Endosc 2004; 60: 513–19.
16 Repici A, Romagnoli R, Reggio D *et al*. Successful closure of a postsurgical benign esophagomediastinal fistula by temporary placement of a polyester, expandable stent: case report and review. Gastrointest Endosc 2002; 56: 747–50.
17 Gelbmann C M, Ratiu N L, Rath H C *et al*. Use of self-expandable plastic stents for the treatment of esophageal perforations and symptomatic anastomotic leaks. Endoscopy 2004; 36: 695–9.