Aortoesophageal fistula treated with staged aortic stent graft and subsequent homograft interposition

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ABSTRACT

Aortoesophageal fistula (AEF) is a rare complication of esophageal interventions. We present a 49-year-old woman who underwent Roux-en-Y gastric bypass with a recurrent gastrojejunal anastomotic leak requiring covered esophageal stent placement. She presented 1 month later with abdominal pain, leukocytosis, and hematemesis. A computed tomography scan demonstrated migration of the esophageal stent with aortic erosion concerning for AEF. She underwent emergent endovascular exclusion of an AEF to the descending thoracic aorta with subsequent esophageal resection and diversion and aortic endograft explant, resection, and homograft repair on postoperative day 6 allowing for staged removal of prosthetic material and maintenance of inline flow. (J Vasc Surg Cases and Innovative Techniques 2020;6:313-6.)

Keywords: Aortoesophageal fistula; Esophageal stent; TEVAR; Homograft

CASE DESCRIPTION

The patient is a 49-year-old woman with rheumatoid arthritis, hypothyroidism, and morbid obesity who underwent Roux-en-Y gastric bypass surgery in 2003. Owing to subsequent weight gain, a revision of the gastric bypass was performed in 2015. This procedure was complicated by a contained leak. She had numerous percutaneous drainage and endoscopic procedures to palliate her leak. Ultimately, laparoscopic repair of a persistent gastrojejunal anastomotic leak was attempted, and aborted secondary to extensive intra-abdominal adhesions. She was then transferred to our institution for further care.

A covered esophageal stent (Wallflex, Boston Scientific, Marlborough, Mass) was placed traversing the gastrojejunal anastomosis with concomitant percutaneous drainage of a large abscess in the left upper quadrant (Fig 1). The stent was secured proximally with Prolene sutures. An upper gastrointestinal series revealed appropriate placement of the esophageal stent, and exclusion of the enteric leak (Fig 2). At this time, the patient was fed by mouth and the esophageal stent was planned to temporarily fix her enteral leak. However, 1 month later during the same admission, the patient developed abdominal pain, leukocytosis, syncope, and massive pulsatile hematemesis. She underwent emergent aortography, and was treated with a GORE TAG thoracic aortic stent for presumed aortoesophageal fistula (AEF; Fig 3, *A*; arrow pointing to the thoracoabdominal endovascular aneurysm repair [TEVAR] graft). Subsequent upper endoscopy visualized the esophageal stent protruding through the esophageal wall with visible aortic graft material (Fig 3, *B*). The etiology of the stent migration was determined to be likely secondary to bowel motility.

A computed tomography scan was obtained for operative planning that demonstrated communication of the esophagus with the aorta (Fig 4).

Owing to a large abscess with fistulous communication to her aortic stent graft, she underwent a thoracotomy, and laparotomy with distal esophagectomy, fistula resection, total gastrectomy, jejunal Roux-en-Y limb resection, left lower lung lobe wedge resection, splenectomy, cervical esophagostomy, feeding jejunostomy, left hemidiaphragm resection, partial colectomy with end colostomy, takedown of the splenic flexure, partial omentectomy, explant of infected aortic stent graft, and thoracic aortic interposition graft using cryopreserved thoracic aorta (Fig 5).

Her postoperative course was uncomplicated and she was discharged on postoperative day 12. She was left in gastrointestinal discontinuity for several months, and was taken back to the operating room 6 months after her initial resection for definitive gastrointestinal repair. The patient about which the case report describes has consented to this publication. Institutional review board approval has been waived by the University of California at Los Angeles.

DISCUSSION

AEF is a type of aortoenteric fistula defined as an abnormal communication between the esophagus and the aorta.[1] Fistula formation may result from multiple etiologies, including benign or malignant esophageal disease, foreign body (eg, fishbone) ingestion, esophageal surgery or intervention, thoracoabdominal aortic surgery, or mycotic thoracoabdominal aortic aneurysm.[2] In the 1991 review from Hollander and Quick,[3] the most common cause of AEF was an expanding thoracic aortic aneurysm;

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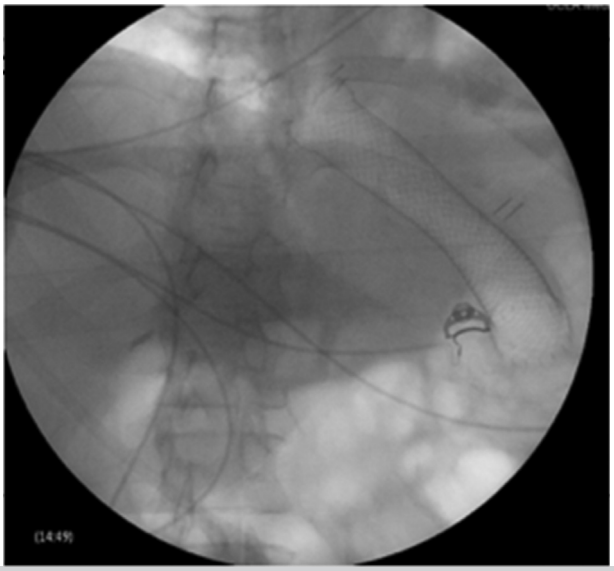

Fig 1. Fluoroscopic imaging of gastrojejunal stent placement.

Fig 2. Radiograph of the upper gastrointestinal tract (kidney, ureter, and bladder) showing no contrast extravasation and successful coverage of the gastrojejunal leak.

however, a more recent review from Canaud et al[2] in 2014 states that thoracic aortic surgery and TEVAR are the most common causes. This change is likely due to treatment of thoracic aortic aneurysms at an earlier stage secondary to increased surveillance and widespread use of the TEVAR endografts.

The initial diagnosis can be challenging because complication is rare and can lead to rapid hemodynamic instability. The typical presentation includes chest pain, sentinel arterial bleeding, and exsanguination after a symptom-free period also known as Chiari's triad.[4] Special attention to the color and volume of hematemesis is crucial for the differentiation of AEF from other types of upper gastrointestinal hemorrhage. AEF bleeding may be differentiated from other types of upper gastrointestinal bleeding by volume and quality of hemorrhage. Variceal bleeding, which may be a large volume hemorrhage, is typically darker in color owing to venous bleeding, whereas gastric bleeding is typically lighter in color owing to arterial bleeding and is smaller in volume. Large-volume, pulsatile, arterial hematemesis is a unique presentation seen only with an AEF.[3]

Owing to the significant morbidity and mortality associated with AEF, many patients do not survive their initial presentation. In the age of endovascular therapy, TEVAR has emerged as an expeditious treatment option to control exsanguination at presentation. With AEF, the aorta communicates with an enteric field exposing the aorta and the newly placed graft to bacterial infection. Therefore, subsequent open surgical intervention should be performed to repair the fistula and remove all prosthetic material. Options for primary aortic repair include rifampin-soaked Dacron versus cryopreserved cadaver aortic homograft. Esophageal repair depends on the extent and etiology of esophageal damage, which may be repaired primarily or require staged resection, exclusion, and reconstruction.

Increased mortality is associated with TEVAR alone if used as definitive treatment rather than a temporizing measure.[2] We present and discuss our treatment strategy for repair of an esophageal stent associated AEF in the setting of an infected surgical field owing to an enteric anastomotic leak.

AEF can occur as a complication of aortic or esophageal intervention secondary to the proximity of these organs to one another. As discussed, esophageal stent placement in an infected field can increase the risk for esophageal erosion into the aorta. Temporizing rapid hemorrhage with TEVAR at the initial presentation allows for hemodynamic stabilization, and staged planning for open surgical repair with homograft conduit.

A single-stage repair with TEVAR is not recommended because patients typically succumb to overwhelming sepsis secondary to graft infection.[5] Additionally, TEVAR does not allow for concomitant esophageal resection or repair, which has been reported to improve long-term outcomes.[5]

Boerlage et al[6] reported their experience with AEF after esophageal stent erosion which had been placed for complications of bariatric surgery. They used a Sengstaken-Blakemore tube in addition to TEVAR when the patient presented with severe hematemesis, and did not complete an open staged aortic repair.

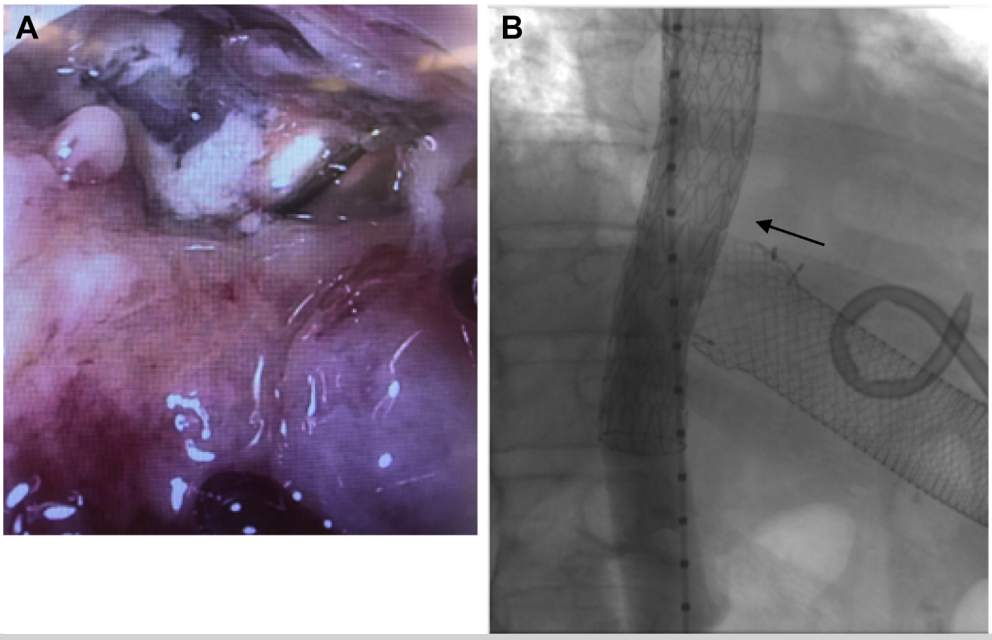

Fig 3. A, Flouroscopic view of aortic stent graft communication with esophagus. **B,** Endoscopic imaging of successful thoracoabdominal endovascular aneurysm repair (TEVAR) for temporary hemorrhage control.

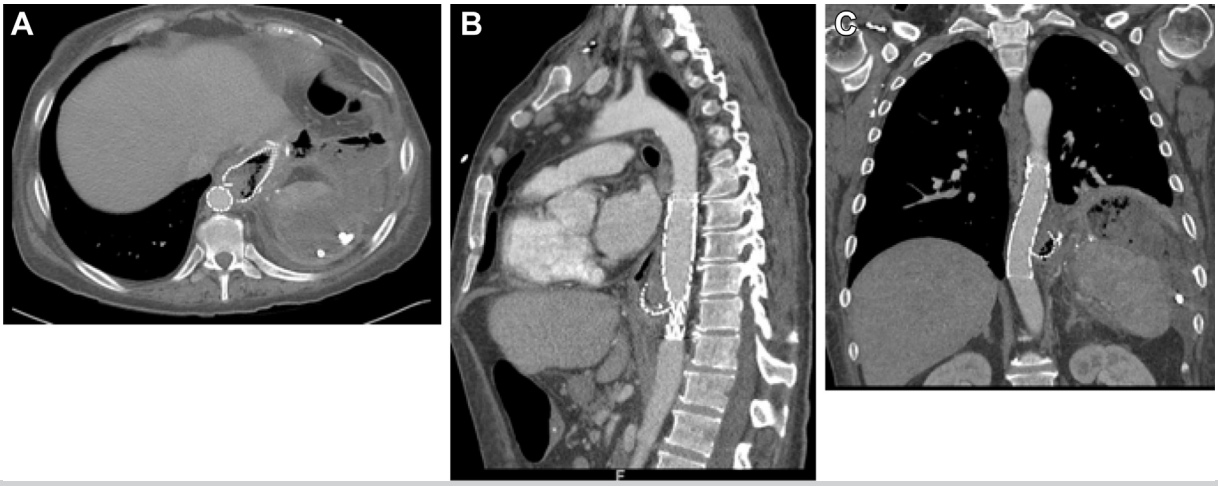

Fig 4. A, Axial, **(B)** sagittal, and **(C)** coronal views of thoracoabdominal endovascular aneurysm repair (TEVAR) successfully disrupting aortoesophageal communication.

Our case differs because TEVAR was used as a bridge to open repair, which according to current literature, appears to be the favored approach. There are several different etiologies and repair techniques noted as well as a systematic review[2] regarding this condition. However, there are few studies regarding esophageal stent erosion and the issue of subsequent versus concomitant gastrointestinal repair has yet to come to a consensus.

At 6 months postoperatively, our patient was doing well and was brought back for esophagostomy reversal and esophageal reconstruction. Several staged repairs were suggested when determining the best long-term outcome and quality of life. Using a multistage repair with initial TEVAR, subsequent esophagectomy, graft explant, and aortic homograft interposition repair proved beneficial. She ultimately gained gastrointestinal continuity, while mitigating the risk of her initial life-threatening hemorrhage.

CONCLUSIONS

In an appropriate-risk patient, treatment of an AEF secondary to esophageal stent erosion with initial TEVAR, and subsequent graft explant with interposition homograft repair may be performed successfully. Definitive treatment requires complete excision of all prosthetic material, and adequate infectious source control.

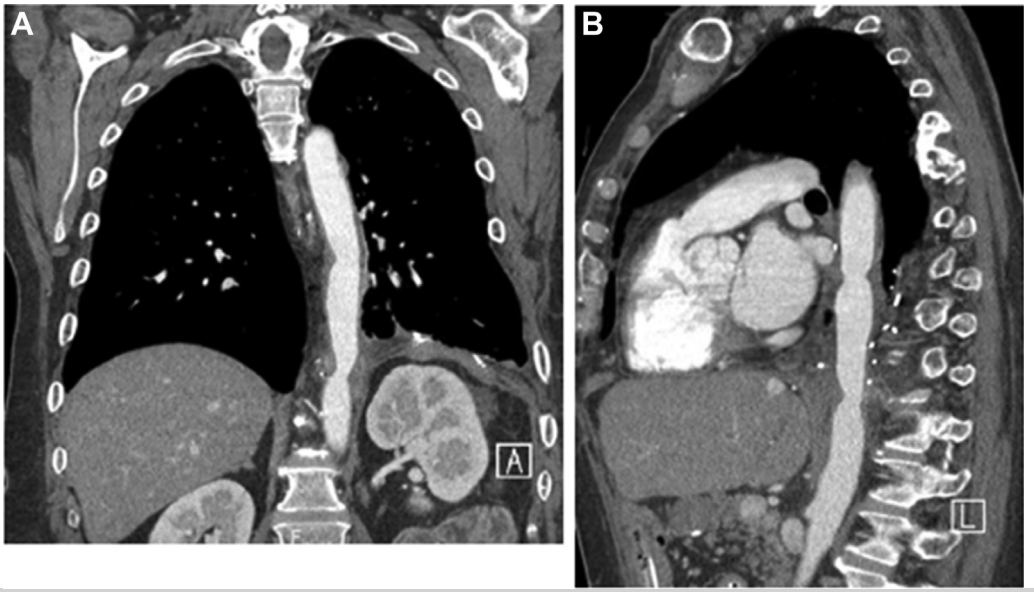

Fig 5. Postoperative computed tomography scan of the chest at 6 months postoperative. **A,** Coronal and **(B)** sagittal views.

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