

One-stage operation for aorto-esophageal fistula



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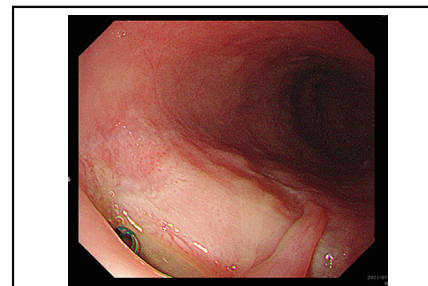
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Endoscopy demonstrated esophageal perforation, through which the stent-graft was visible.

CENTRAL MESSAGE

A one-stage operation can be safely performed for aorto-esophageal fistula, including esophagectomy, aortic repair, omental wrapping, and esophageal reconstruction, but long-term follow-up is required.

▶ Video clip is available online.

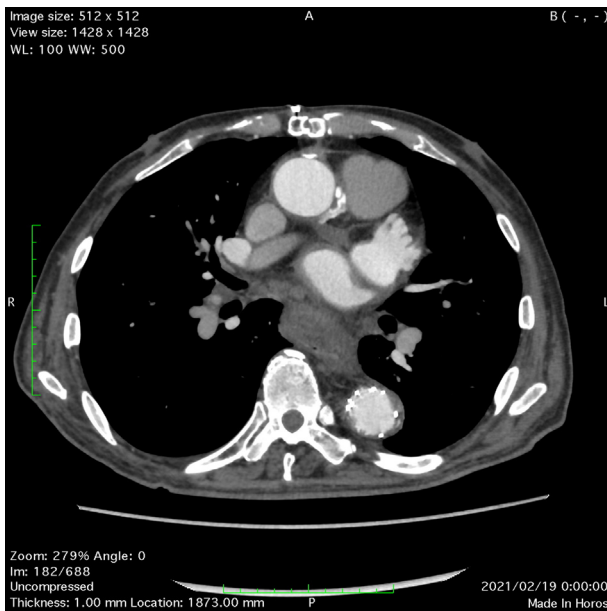
Aorto-esophageal fistula (AEF) is a life-threatening condition with a poor prognosis.¹ Even with surgery, the survival rate is approximately 50% at 2 years.^{2,3} A few reports have shown good results with staged AEF repair.^{3,4} However, there are no reports on one-stage operations. Herein, we report our experience with one-stage radical operations in 2 cases. This study was approved by the institutional review board at the Saitama Medical University (No. 2021-199, December 1, 2021). Informed consent was obtained.

CASE 1

A 71-year-old man underwent thoracic endovascular aneurysm repair (TEVAR) with axilloaxillary artery bypass for a distal aortic aneurysm 6 years previously. As the aneurysm had enlarged, 2 additional TEVAR procedures were performed as well as open total arch replacement with the frozen elephant trunk technique. The patient presented with fever and hematemesis and was transferred to our hospital with a diagnosis of AEF. Contrast-enhanced computed tomography revealed an enlarged aneurysm measuring 10 cm in diameter, an endoleak, and air in the aneurysm (Video 1). Endoscopy revealed perforation and a bulging lesion in the midesophagus (Figure 1).

An emergency operation was performed. With the patient in the supine position, a left oblique supraclavicular incision was made and upper median laparotomy was performed.

The cervical esophagus was encircled with tape, and blunt finger dissection was performed around the esophagus as far into the chest as possible. The abdominal esophagus was transected, a gastric tube was created, and the omentum was mobilized. Only the skin incisions were closed, and the patient was moved to the right lateral position. Lateral thoracotomy was performed at the fourth intercostal space; a partial cardiopulmonary bypass was established with cannulation of the left femoral artery and drainage via the left femoral vein. After the distal descending aorta was clamped, the aorta was opened. The aneurysm enlargement and AEF had occurred owing to a type II endoleak of the intercostal artery. The esophagus was separated and removed through the supraclavicular incision, and the aortic wall around the AEF was removed. After irrigation of the intrapleural space, the aorta was replaced with a rifampicin-soaked graft. The gastric tube was pulled up into the intrapleural space, the omentum was wrapped around the prosthetic graft, and the chest was closed. Finally, the patient was moved to the supine position for anastomosis of the esophagus and gastric tube. The postoperative course was unremarkable. He was discharged 38 days after antibiotic therapy and remained well at 16 months postoperatively.



VIDEO 1. Contrast-enhanced computed tomography revealed an enlarged aneurysm measuring 10 cm in diameter, endoleak, and air in the aneurysm. Video available at: [https://www.jtcvs.org/article/S2666-2507\(22\)00463-1/fulltext](https://www.jtcvs.org/article/S2666-2507(22)00463-1/fulltext).

CASE 2

A 72-year-old woman with fever and hematemesis was diagnosed with AEF for which she underwent TEVAR 2 months previously. The fever had not resolved postoperatively; therefore, she was transferred to our hospital. Endoscopy revealed an esophageal perforation through which the stent-graft was visible (Figure 2, A). Computed tomography revealed air around the stent-graft (Figure 2, B). An emergency one-stage operation was performed similar to that in case 1 (Video 2). After surgery, anastomotic leakage was observed at the esophagus and gastric tube anastomosis

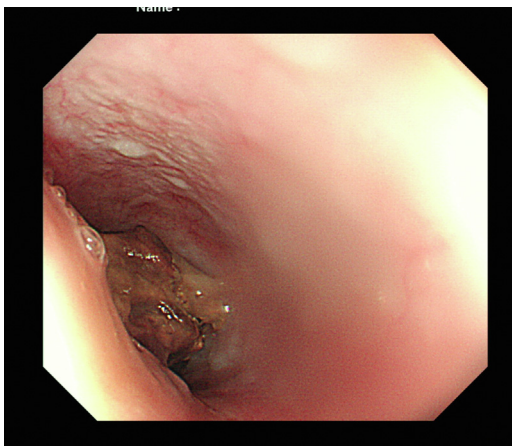
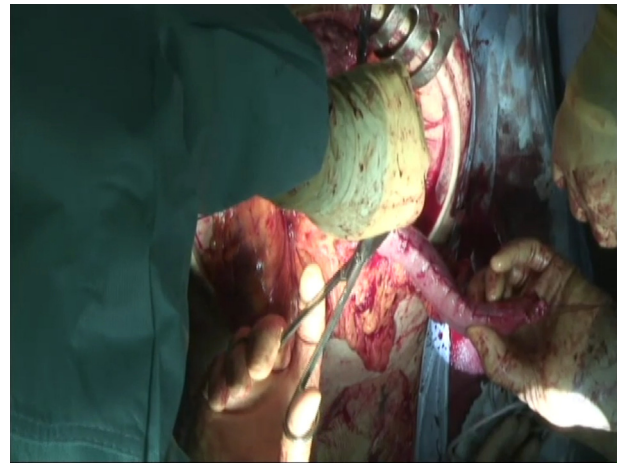


FIGURE 1. Endoscopic examination demonstrated perforation and a swollen lesion in the midesophagus.



VIDEO 2. One-stage operation, including esophagectomy, descending aorta replacement, omental wrapping, and esophageal reconstruction, was performed. Video available at: [https://www.jtcvs.org/article/S2666-2507\(22\)00463-1/fulltext](https://www.jtcvs.org/article/S2666-2507(22)00463-1/fulltext).

site. However, the leaked fluid was drained completely via a drainage tube placed during the operation and no mediastinitis occurred. The leakage was managed conservatively, the patient was discharged, and she remained well at 11 months postoperatively.

DISCUSSION

There are many strategies to treat AEF. Analysis of mid-term outcomes showed that the main cause of mortality is infection-related. To prevent posterior mediastinal abscess formation, we theorized that the important thing is not to leave dead space at the posterior mediastinum. Moreover, Akashi and colleagues⁵ showed the effectiveness of greater omental wrapping. In staged repair, omentum can be used for wrapping the graft to separate it from the stomach; however, gastric tube cannot be used in this setting. Therefore, we employed gastric tube with omentum for esophageal reconstruction, the tube was passed through the posterior mediastinum, the omentum was used to wrap the rifampicin-soaked graft, and the operation was performed in one stage. During surgery, complete resection and debridement of the infectious tissue, including the aorta and esophagus, should be performed. At the time of aortic crossclamping, we simultaneously removed the aorta and esophagus from the thoracic cavity.

A one-stage operation, including thoracotomy, laparotomy, and supraclavicular incision, is a substantial, invasive operation. Therefore, this approach should be considered only in patients who are not frail. In patients we deemed would not tolerate this invasive operation, we performed a staged operation, with aortic replacement and removal of the esophagus as the first stage and esophageal reconstruction as the second stage.

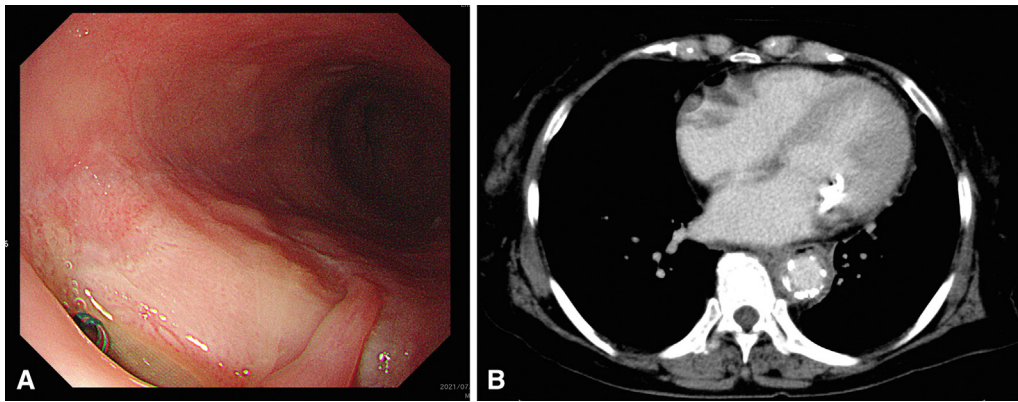


FIGURE 2. A, Endoscopic examination demonstrated an esophageal perforation through which the stent-graft was visible. B, Contrast-enhanced computed tomography revealed air around the stent-graft.

We consider TEVAR only a bridge to open surgery, and if the patient with AEF can physically tolerate open surgery, a one-stage aggressive procedure, including removal of the esophagus and aorta, aortic repair, and esophageal reconstruction, may be an effective treatment.

References

1. Takeno S, Ishii H, Nanashima A, Nakamura K. Aorto-esophageal fistula: review of trends in the last decade. *Surg Today*. 2020;50:1551-9.
2. Mosquera VX, Marini M, Pombo-Felipe F, Gomez-Martinez P, Velasco C, Herrera-Norena JM, et al. Predictors of outcome and different management of aorto-bronchial and aorto-esophageal fistulas. *J Thorac Cardiovasc Surg*. 2014;148:3020-6.
3. Okita Y, Yamanaka K, Okada K, Matsumori M, Inoue T, Fukase K, et al. Strategies for the treatment of aorto-oesophageal fistula. *Eur J Cardiothorac Surg*. 2014;46:894-900.
4. Yamanaka K, Nonaka M, Iwakura A, Asao Y. Repair of aorto-esophageal fistula after total aortic arch grafting. *Interact Cardiovasc Thorac Surg*. 2011;12:655-6.
5. Akashi H, Kawamoto S, Saiki Y, Sakamoto T, Sawa Y, Tsukube T, et al. Therapeutic strategy for treating aorto-esophageal fistulas. *Gen Thorac Cardiovasc Surg*. 2014;62:573-80.