Is it Possible to Treat Aorto-Esophageal Fistula with Endovascular Management?

Wei-Liang Lai, MD, Ping-Chun Li, MD, and Ming-Li Li, MD

Division of Cardiovascular surgery, Department of Surgery, China Medical University Hospital, and China Medical University, Taichung, Taiwan

Received: November 8, 2011; Accepted: January 17, 2012

Corresponding author: Wei-Liang Lai, MD. Division of Cardiovascular Surgery, Department of Surgery, China Medical University Hospital, No.2, Yu-Der road, Taichung, 404, Taiwan, R.O.C.

Email: s831012kimo@yahoo.com.tw

©2012 The Editorial Committee of Annals of Thoracic and Cardiovascular Surgery. All rights reserved.

Management of aorto-esophageal fistula has no consensus, currently. Aorto-esophageal fistula remains a life-threatening condition and has high mortality and morbidity rates. Endovascular therapy is a favorable choice for thoracic aortic disease, in recent years. We present our experience initially managed with endovascular therapy, but there was a re-hemorrhage event with suboptimal results. Aortic bypass surgery and plastic surgery of the esophagus have been performed, subsequently. The aorto-esophageal fistula was finally resolved by surgical management. We conclude that endovascular therapy is a reasonable method for aorto-esophageal fistula in the acute hemorrhagic phase, but early treatment of an erosive esophagus is suggested to avoid further morbidity.

Keywords: aorta, esophagus, fistula, endovascular therapy, aorta bypass surgery

Introduction

Aorto-esophageal fistula (AEF) is an uncommon disease that enables communications between the aorta and esophagus. Always, it is fatal due to massive hemorrhaging from the aorta to the esophagus, before diagnosis of the disease. If the diagnosis were delayed, massive hemorrhaging might cause hypovolemic shock and a high mortality rate. Successful endovascular therapy for aorto-esophageal fistula has been reported.1,2) We present one case in which the diagnosis was AEF, and in which endovascular therapy for the diseased thoracic aorta was performed successfully. However, since unfavorable management of the diseased esophagus results in high morbidity, we needed subsequent aortic bypass surgery to exclude the infected thoracic aorta and repair the esophagus later.

Case Report

One 44-year-old male had a history of acute type B aortic dissection with malperfusion syndrome, 8 years ago. Left thoracotomy for thoracic aortic replacement had been performed. During the follow-up period, an enlarged thoracic aorta, just proximal to the replaced artificial graft, had been noticed by CT scan. The patient did not want to receive any surgery because he did not feel any discomfort. This time, there was hematemesis, and he was brought to the local hospital. Upper gastrointestinal endoscopy (UGI endoscopy) was arranged, which demonstrated external compression of the middle third of the esophagus, and the scope had difficulty passing through it. Meanwhile, the CT scan of the chest showed a massive thoracic aneurysm compressing the esophagus. Under the impression of AEF, he was referred to our emergency room.

Review of the CT scan of the chest revealed a thoracic aneurysm, 6.8 cm in diameter, with esophageal compression (Fig. 1). The hemodynamic condition turned to stable status after fluid resuscitation. AEF with hypovolemic shock was impressed. Emergent surgical intervention for the massive thoracic aneurysm with an AEF and hypovolemic shock was considered.

Endovascular therapy was performed, and the stent
graft (32*32*150, Valiant, Medtronic Cardiovascular, Santa Rosa, CA, USA) was deployed proximally at the area between the orifices of left common carotid artery and left subclavian artery (zone 2) under fluoroscopy in the operation room. Then bypass surgery was performed with an 8-mm Polytetrafluoroethene (pTFE) artificial graft (Goretex vascular graft) from left common carotid artery to the left subclavian artery, and the proximal ligation of the left subclavian artery. Then the patient was sent to the intensive care unit for postoperative care.

Unfortunately, hematemesis happened again one month later. Emergent UGI endoscopy revealed active hemorrhaging from the middle of the esophagus with necrotic tissue and insertion of a Sengstaken-Blakemore tube (SB tube) for local compression in the middle of the esophagus. A gastroenteral specialist performed an esophageal stent, for the local compression of esophageal bleeders.

The esophageal stent has sludged to stomach in 3 months, and the stent was pulled out by endoscopic method. Occasional hematemesis was found, but the CT scan of chest still did not shown any contrast extravagated in aneurysm sac, and the aneurysm sac has become smaller.

6 months later, hematemesis happened again, and CT scan of the chest showed contrast extravasation in the middle of the stent graft with air bubble formation in the aneurysm sac, and abscess formation was impressed (Fig. 2). We decided to perform debranching the aortic arch vessel, extra-anatomic bypass, and exclusion of the thoracic aorta by a suture ligation method, with the patient under deep hypothermia and circulatory arrest with retrograde cerebral perfusion (Fig. 3). The ascending aorta was replaced with a 22-mm width and 10-cm length Dacron graft (Marquet, Wayne, NJ, USA) from the sino-tubular junction to the aortic arch, between the native innominate artery and left common carotid artery. Debranching the aortic arch vessel with a 20-10-cm Y Dacron graft from proximal ascending graft to innominate artery and left common carotid artery and then suture ligation for bilateral sides of the thoracic aorta. Postoperative UGI endoscopy revealed an esophageal ulcer with blood clots, but no active bleeders.
After surgery, the patient was fed through a nasogastric (NG) tube. However, fever developed within one month after the extra-anatomic bypass surgery. The chest CT scan revealed abscess formation at the mediastinum, and mediastinitis was suspected. Meanwhile, UGI endoscopy revealed stent-graft exposure in the middle of the esophagus (Fig. 4). A re-exploratory, left thoracotomy for removal of the thoracic stent graft repaired the esophagus by the chest surgeon, who debrided the mediastinum (Fig. 5).

Infection at left thoracotomy wound developed in two weeks. A right deltopectoralis flap, for reconstruction of the conduit of pharyngostomy, and a local rotation flap, from the impression of the unhealed esophagus, debrided the thoracotomy wound. Finally, the patient was secured, and the wounds became stable. Surgery for reconstruction of the esophagus as a right colon interposition and implanted subcutaneously at the right anterior chest wall was scheduled one year later.

Fig. 3 Extra-anatomic bypass surgery to exclude blood flow into thoracic aorta and avoid further hematemeses.

Fig. 4

(a) Abscess formation with mediastinitis, r/o saliva leak from erosive esophagus. (black arrow).
(b) UGI endoscopy revealed stentgraft exposure and esophageal erosion at the middle part of esophagus (dash arrow).
Thoracic aortic aneurysm accounts for about two-thirds of all AEFs. There are three issues concerning AEF. First, in the early stage, an aortic lesion should be corrected to control a fatal hemorrhage. Second, an esophageal lesion needs to be treated to avoid saliva-leak induced mediastinitis, sepsis or result in a delay, in death. Third, the surrounding tissue should be adequately debrided. AEF has been treated successfully by surgery or endovascular therapy. Endovascular therapy for thoracic aortic aneurysm is our first choice, due to a previous history of thoracotomy surgery. We were concerned about the adhesive tissue during re-exploratory thoracotomy and high risks from the enlarged thoracic aorta while re-approaching the left pleural space.

In this case, endovascular therapy was successfully treated, initially, but occasional hematemesis developed by a type II endoleak. In our concern, mediastinitis meant that adequate debridement was necessary, combined with the removal of a foreign body (stent-graft) and repair of an erosive esophagus. Further endovascular therapy for a type II endoleak is not suitable due to the complex condition with mediastinitis and the erosive esophagus. Aortic bypass surgery, including ascending aorta replacement, debranched aortic arch vessels, extra-anatomic aorto-abdominal aortic bypass surgery, suture ligation of proximal and distal ends of the thoracic aorta was performed to exclude blood flow in the thoracic aorta to avoid hemorrhage.

An esophageal stent was used in a narrowed esophagus and malignant esophageal dysphagia. In our case, the esophagus stent was not optimal because it could be sludged. The efficacy of the esophagus stent was deployed in an erosive esophagus and to compress the bleeding site from the thoracic aorta shortly. Finally, adequate management for an erosive esophagus is considered.

Antibiotic treatments were vancomycin and piperacillin + tazobactam (Tazocin) in intravenous form for 6 weeks and third generation cephalosporin in oral form, prescribed by the out-patient department. However, clinically, the sepsis was not overcome. The following CT scan revealed progression of abscess formation at the thoracic aneurysm. We assumed that saliva has been swallowed and passed through the erosive esophagus. The patient was fed a liquid diet through an NG tube after the extra-anatomic bypass surgery, but the saliva still has a chance to pass through the erosive esophagus.

After endovascular therapy for the enlarged thoracic aorta, the patient was fed through an NG tube. The event of aorto-esophageal fistula with bleeding happened again and the esophageal stent was inserted, followed with NG tube insertion and then feeding. Next the patient was treated with a feeding jejunostomy and aortic bypass surgery (ascending aorta to the abdominal aorta bypass and occlusion of the thoracic aorta). In our view, the establishment of early nutrition would be helpful for the recovery of the patient.

Although we have successfully treated the fatal hemorrhagic thoracic aneurysm by endovascular treatment, the
erosive and ongoing infected esophagus is still not managed properly.

We did not insist on staged surgery, at first, when the extra-anatomic bypass surgery and mediastinitis had developed. In this case, we learned that endovascular therapy for AEF with hypovolemic shock is the “bridge” to open surgical repair, especially in severe sepsis or uncontrolled infection. Prompt debridement of surrounding tissue and appropriate management of an erosive esophagus should be done as soon as possible.

Conclusions

We conclude that the best treatment for AEF is aortic bypass surgery to exclude the blood flow in the thoracic aorta, adequate debridement and appropriate management for an erosive esophagus in staged surgery. Endovascular therapy is the bridge choice for an adhesive thoracotomy wound, in patients with low-infection and high surgical risk. However, early management of the esophagus and adequate debridement of surrounding tissues should be arranged earlier.

References