

Hematemesis as a Late Complication after Tevar in a Stanford Type-B Chronic Aortic Dissection

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ABSTRACT

Aorto Esophageal Fistula (AEF) is a rare but catastrophic complication in thoracic aortic aneurysms with no consensus about the best treatment option. We present a case of AEF as a late complication of TEVAR implantation in a Stanford type-B chronic dissection treated with hybrid aortic surgical approach and percutaneous esophageal stent.

Keywords: Computed tomography; Aorta; Dissection; Vascular disease

LEARNING OBJECTIVES

- To recognize cardiovascular complications in chronic aortic diseases.
- To learn the role of multimodality imaging in challenging aortic disease cases.
- To evaluate and discuss percutaneous options in major complications in aortic diseases.

ABBREVIATIONS

AEF: Aorto Esophageal Fistula; CT: Computed Tomography; ECG: Electrocardiogram; TEVAR: Thoracic Endovascular Aortic Repair

INTRODUCTION

History of presentation

A 64-year-old male presented to the emergency department for the onset of nausea and hypotension. He also reported episodes of melaena in the last 3 days. Blood pressure was 95/60 mmHg, heart rate 60 bpm, body temperature 36°C, and respiration rate 24

bpm. Cardiac and thoracic auscultations were unremarkable, and all peripheral pulses were present.

CASE REPORT

Past medical history

His past medical history included arterial hypertension, dyslipidemia, and a Type-B Stanford aortic dissection in 2000. Due to the progressive aortic dilation, in 2013, a TEVAR was implanted in zone 1 of the aortic arch associated to total debranching of supra-aortic trunks and ligation of the left subclavian artery. Subsequently, due to progressive aortic dilatation and the suspicion of a type 2 endoleak, the left subclavian artery was embolized through the false lumen in 2017. Since then, the patient underwent annual follow-up at our aortic disease unit with stabilization of the proximal thoracic aortic aneurysm diameter, however, there was aortic arch dilation in the proximal sealing zone with proximal TEVAR migration without evidence of a type I endoleak (Figure 1). The patient was waiting for an elective open thoracoabdominal aneurysm repair.

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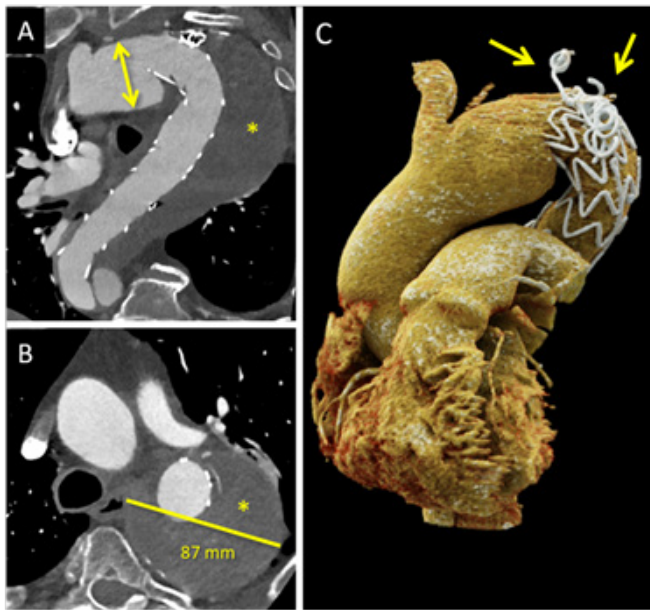


Figure 1: ECG-gated CT angiography, last follow-up study before hospital admission. (A): oblique sagittal plane showing the aortic arch and descending thoracic aorta with the implanted TEVAR and exclusion of the residual false lumen (asterisk). Double-sided arrow shows the aortic arch dilation and signals the displacement point of the TEVAR. (B): Transverse plane of the aorta showing the maximum diameter of the descending aorta aneurysm (87 mm). (C): Volume rendering cinematic reconstruction showing aortic arch dilation proximal to the TEVAR and subclavian artery embolization coils (arrows).

Differential diagnosis

Given the patient's clinical presentation with gastrointestinal bleeding, the differential diagnosis included primary digestive bleeding secondary to peptic ulcer disease, cancer, reflux esophagitis, or bleeding esophageal varices. However, because of the patient's history of chronic aortic dissection, the presence of an aortic-esophageal fistula or aortic rupture was also considered in the differential diagnosis.

Investigations

The laboratory workup revealed anemia (Hemoglobin of 10.7 g/dL, hematocrit of 33%), D-dimer elevation (2408 ng/mL), leukocyte elevation ($12.57 \times 10^9/L$) with neutrophilia (82.8%), C-reactive protein 1.89 mg/dL, creatinine 1.18 mg/dL; remaining parameters were unremarkable. The Electrocardiogram (ECG) showed no repolarization abnormalities. A transthoracic 2D echocardiogram (TTE) showed a non-dilated left ventricle with normal systolic function and mild dilation of the ascending aorta.

The patient underwent an ECG-gated CT study showing a significant detachment of the proximal portion of the TEVAR (Type I endoleak), proximal descending aorta aneurysm growth with a maximum diameter of 87 mm (including the false lumen peri-TEVAR), and the presence of small air bubbles in the mediastinum between the false lumen and the esophagus (Figure 2).

The esophageal-gastro-duodenoscopy confirmed the suspicion of Aorto Esophageal Fistula (AEF) for the presence of small clots in the esophageal wall and a clear wall continuity solution.

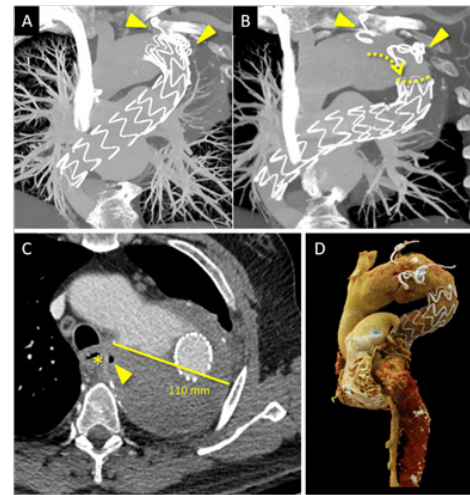


Figure 2: ECG-gated CT angiography. Oblique coronal plane of the TEVAR before (A) and after the current admission (B) showing caudal displacement of the proximal anchorage (dotted lines and dotted arrow). Arrowheads signal the subclavian embolization coils. (C): Increased dilation of the descending thoracic aorta (from 87 mm to 110 mm); intra-aneurysm air bubble (arrowhead), and adjacent esophagus (asterisk). (D): Volume rendering cinematic reconstruction of the thoracic aorta.

Management

The patient was hospitalized in the Acute Cardiac Care Unit and owing to recurrent hematemesis, progressive fall in hematocrit, possible mediastinal infection (fistulization with the esophagus), and the increased mortality risk associated with combined aortic surgery (open aortic arch and descending thoracic aortic repair) and esophagectomy, the aortic team decided on a hybrid surgical repair. High-dose antisecretory therapy, parenteral nutrition, and antibiotic prophylaxis with amoxicillin-clavulanic acid were started. Firstly, the patient underwent esophageal stent implantation to seal the fistula. Three days later, an aortic repair with a Thoraflex hybrid prosthesis implantation was performed with brachiocephalic trunk implantation on the distal ascending aorta. In the same procedure, a new TEVAR was implanted from the distal part of the Thoraflex to the distal thoracic descending aorta (Figure 3). Thus, the aortic arch and the thoracic descending aorta were repaired and isolated from the esophageal fistula.

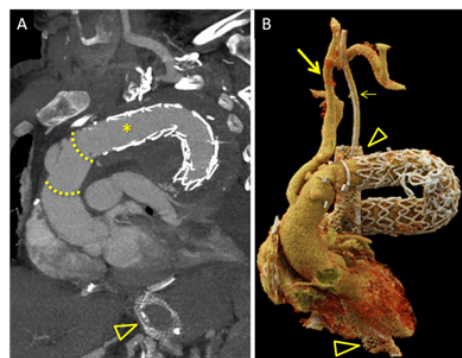


Figure 3: ECG-gated CT angiography after surgery. (A): ThoraflexTM hybrid aortic graft (between the dashed lines) followed by the overlapping TEVAR (asterisk). The distal esophageal stent is also seen (arrowhead). (B): Volume rendering cinematic reconstruction showing the ThoraflexTM and TEVAR as well as the esophageal stent (arrowheads) with the nasogastric tube within it (small arrow). The carotid-carotid bypass (large arrow) is also seen.

Follow-up

After surgery, the patient was followed by serial Gated-ECG CT studies with no reported endoleaks or other complications related to the aortic surgical procedure. Twenty days after surgery, the patient presented a new episode of non-hemodynamically significant hematemesis. A proximal detachment of the esophageal stent was shown by CT with no new aortic abnormalities. The endoscopic study again revealed the presence of an esophageal fistula (Figure 4) being treated with endoscopic relocation of the esophageal stent with no further complications. The patient was discharged in stable clinical conditions after 90 days of hospitalization and under treatment with broad-spectrum antibiotic therapy. However, 20 days later, the patient died due to the development of fever and posterior mediastinitis.



Figure 4: CT angiography volume rendering cinematic reconstruction, a posterior view showing the relationship between the TEVAR and the esophageal stent with the nasogastric tube within it.

DISCUSSION

AEF is a life-threatening condition with a high rate of morbidity and mortality. It is usually related to an aortic or esophageal disease such as esophageal cancer or aortic aneurysms [1,2]. It has been described as a rare and fatal complication after TEVAR with an incidence of <2% [3,4] associated with TEVAR infection in the early postoperative period [5,6] or direct erosion of the stent-graft through the aorta into the esophagus [3-7].

The AEF treatment of choice is under debate since these are high-risk patients. Classically, conservative management has been performed which was associated with a 100% mortality. Also, an esophageal stent (17% post-operatively survival rate) or isolated esophagectomy (19% survival rate) have been reported. The highest survival has been described in cases with aortic replacement/repair plus surgical esophagectomy with a 1-year survival rate of 46% [8,9]. We reported the first successful case in which non-invasive management of the esophageal pathology (stent) and a hybrid aortic approach (aortic arch surgery and TEVAR) has been described to initially stabilize the hemodynamic situation of the patient and, also, to reduce the morbidity and mortality of a combined esophageal and complete open aortic surgery. Although the procedure was technically successful and the patient could be discharged, the fatal final few weeks later suggests that this approach must be carefully individualized and highlights the importance of

esophageal repair after the initial stabilization given the high risk of infection and mediastinitis.

The present case shows that complications after TEVAR implantation are diverse and they can occur at any time, so close follow-up with different imaging techniques (mainly CT) must be performed at least annually [10].

CONCLUSION

There is no clear consensus about the treatment of choice in AEF which is associated with a high mortality rate. The best treatment approach is not known, and a bedside multidisciplinary decision by an aortic team seems to be the best option. In this case, a hybrid surgical aortic approach with a non-invasive esophageal intervention (stent) was chosen with a satisfactory in-hospital clinical stabilization of the patient. However, it underlines the relevance of complete esophageal repair and infection control to improve the negative prognosis of these patients.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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DISCLOSURES

The authors have reported that they have no conflicts of interest to disclose.

REFERENCES

1. Takeno S, Ishii H, Nanashima A, Nakamura K. Aortoesophageal fistula: Review of trends in the last decade. *Surg Today*. 2020; 50: 1551-1559.
2. Amin S, Luketich J, Wald A. Aortoesophageal fistula: Case report and review of the literature. *Dig Dis Sci*. 1998; 43: 1665-1671.
3. Eggebrecht H, Mehta RH, Dechene A, Tsagakakis K, Kühl H, Huptas S, et al. Aortoesophageal fistula after thoracic aortic stent-graft placement: A rare but catastrophic complication of a novel emerging technique. *JACC Cardiovasc Interv*. 2009; 2: 570-576.
4. Chiesa R, Melissano G, Marone EM, Marrocco-Trischitta MM, Kahlberg A. Aorto-oesophageal and aortobronchial fistulae following thoracic endovascular aortic repair: A national survey. *Eur J Vasc Endovasc Surg*. 2010; 39: 273-279.
5. Isasti G, Gómez-Doblas JJ, Olalla E. Aortoesophageal fistula: An uncommon complication after stent-graft repair of an aortic thoracic aneurysm. *Interact Cardiovasc Thorac Surg*. 2009; 9: 683-684.
6. Rawala MS, Badami V, Rizvi SB, Nanjundappa A. Aortoesophageal fistula: A fatal complication of thoracic endovascular aortic stent-graft placement. *Am J Case Rep*. 2018; 19: 1258-1261.
7. Hance KA, Hsu J, Eskew T, Hermreck AS. Secondary aortoesophageal fistula after endoluminal exclusion because of thoracic aortic transaction. *J Vasc Surg*. 2003; 37: 886-888.
8. Czerny M, Eggebrecht H, Sodeck G, Weigang E, Livi U, Verzini F, et al. New insights regarding the incidence, presentation and treatment options of aorto-oesophageal fistulation after thoracic endovascular aortic repair: The European Registry of Endovascular Aortic Repair Complications. *Eur J Cardiothorac Surg*. 2014; 45: 452-457.

9. Flores J, Shiiya N, Kuniyara T, Yoshimoto K, Yasuda K. Aortoesophageal fistula: Alternatives of treatment case report and literature review. *Ann Thorac Cardiovasc Surg.* 2004; 10: 241-246.
10. Erbel R, Aboyans V, Boileau C, Bossone E, Bartolomeo RD, Eggebrecht H, et al. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). *European Heart Journal.* 2014; 35: 2873-2926.