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Case Report

Emergent endovascular stent grafting for saccular arch aneurysm complicated by aorto-esophageal fistula



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ABSTRACT

Aneurysms of aortic arch are rare but amenable to endovascular therapy. Arch aneurysm presenting with aorto-esophageal fistula and hematemesis is a feared, but relatively rare complication. The extrapolation of the safety and rapidity of emergent endovascular repair for bleeding arch aneurysms has been infrequently reported. A bovine arch anatomy confers distinct advantages for endovascular therapy often avoiding a preceding debranching surgery. However, its endovascular treatment might be complicated by the nonhealing of fistula and potential risk for mediastinitis. Here, we report a case of a bovine aortic arch cystic aneurysm complicated by bleeding aorto-esophageal fistula, which warranted an emergent endovascular therapy. The prevertebral part of LSCA was plugged to interrupt the retrograde filling and a future endoleak. A nonhealing aorto-mediastinal fistula at follow-up was successfully treated by covered esophageal stenting. This report reiterates the importance of multidisciplinary approach with multispecialty collaboration to such complex spectrum of diseases.

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1. Introduction

Transverse aneurysms of the aortic arch are rare with a reported incidence of 11% in the literature. Their most common location is the isthmus region of aorta just distal to the origin of left subclavian artery on the lesser curvature.¹

There have been reports of association of bovine arch with the incidence of aortic aneurysms.² The incidence of aorto-esophageal fistula is also rare with reported incidence of 6.2%.³ Here, we describe a rare case of saccular aneurysm of the distal arch with bovine anatomy complicated by an aorto-esophageal fistula and hematemesis, successfully treated by emergent endovascular stenting.

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2. Case presentation

A 71-year-old hypertensive male with chronic kidney disease presented with history of hoarseness of voice for 1 month. Upon evaluation, he was found to have left vocal cord palsy. He had history of hematemesis 6 weeks ago and had been evaluated with an upper gastrointestinal endoscopy elsewhere. A diagnosis of multiple gastric erosions was made and treated accordingly. A plain computerized tomography (CT) chest to evaluate hoarseness of voice showed mass lesion in mediastinum. Due to the high index of suspicion of an aortic pathology, a magnetic resonance (MR) angiogram of thorax (in view of the medical renal disease, contrast CT angiogram was avoided) was done, which revealed a saccular aneurysm at the isthmus region on the lesser curvature (arch diameter 3.5 cm) of size 2.7 cm × 2.3 cm with a wide mouth of 1.7 cm just distal to the left subclavian artery take-off. There were clots around the aneurysm wall with areas of weakness noted. The aneurysm was abutting the lateral wall of esophagus [Fig. 1(a)]. Also, a bovine arch configuration with a common origin of right and left common carotid arteries and right subclavian artery was noted with an arch size of 2.5 cm [Fig. 1(b)].

The patient developed another episode of massive hematemesis during hospital stay with hemodynamic compromise and was resuscitated. Upon urgent bedside UGIE, pulsating aneurysm wall with a clot covering the esophageal opening was noted at 26 cm from incisors [Fig. 1(c)]. Considering the comorbidities and the urgency of intervention, he was taken up for an emergent endovascular stenting.

Under GA and endotracheal intubation, right femoral was exposed surgically. A 28 cm × 100 cm [3 size larger stent] covered endovascular stent graft (Valiant Captivia, Medtronic, Minneapolis, MN) was deployed via the right femoral route. A wide-zone 2 cm proximal landing zone was available and the stent graft was deployed covering the LSCA origin and the mouth of aneurysm, thus isolating it [Fig. 2(a)]. Retrograde flow was noted in the LSCA following the procedure with potential for endoleak [Fig. 2(b)]. An occluder device of size 14 (Cocoon, Vascular Concepts, India) was deployed through a left brachial cut down into the prevertebral part of LSCA to interrupt the retrograde flow into aorta [Fig. 2(c)]. He was weaned off ventilator and made an uneventful recovery with no further episodes of hematemesis or signs of left arm ischemia. Check MR aortogram revealed completely excluded aneurysm from aortic lumen with accurate stent deployment covering the

LSCA origin [Fig. 3(a)]. No retrograde flow was noted through the LSCA and there was no endoleak. Patient was maintained on nasogastric feeds to allow the healing of aorto-esophageal fistula. However, a check CT with contrast swallow revealed contrast pooling in the mediastinum through the esophageal end of the fistula at 1-month follow-up [Fig. 3(b)]. This was successfully treated subsequently with a self-expanding covered esophageal stent, which is planned to be retrieved by 8 weeks, and the healing of esophageal fistula has to be reassessed.

3. Discussion

Emergent thoracic endovascular stent grafting is an attractive and safer option for patients who are poor surgical candidates due to compromised physiology. The utility of this technique in an emergent scenario as described has not been previously reported. The present case with the comorbidities and poor clinical status precluded surgical intervention. The bovine arch anatomy worked to the advantage of the patient conferring an adequate zone 2 for proximal landing of the stent graft and thus avoiding a debranching procedure on a bleeding patient. The neurological deficits could be thus avoided with this approach.

The incidence of left arm ischemia after endovascular stent grafting has been quoted to be up to 25% in some studies although the symptoms are minor.⁴ Surgical debranching of the LSCA by left carotid to LSCA shunt is the recommended approach to avoid left arm ischemia or spinal cord complications. The documentation of collateral flow by transcranial Doppler or angiography allows the feasibility of occlusion of the LSCA with no complications. In our patient, the retrograde flow noted had to be interrupted with a plug to avoid the possibility of an endoleak in the future. The use of a plug to occlude the subclavian flow has been successfully documented in the literature.⁵ We believe that the endovascular treatment thus is a safer and efficient means to successfully manage complicated arch aneurysms. However, the long-term follow-up is mandatory to draw the final conclusions on this.

Nonhealing of the esophageal end of an aorto-esophageal fistula has infrequently been reported in the literature.⁶ In the present case, the risk of developing mediastinitis upon resuming oral feeds was significant. The age and compromised physiology precluded surgical options like cervical esophagostomy and feeding gastrostomy. Esophageal stapling to

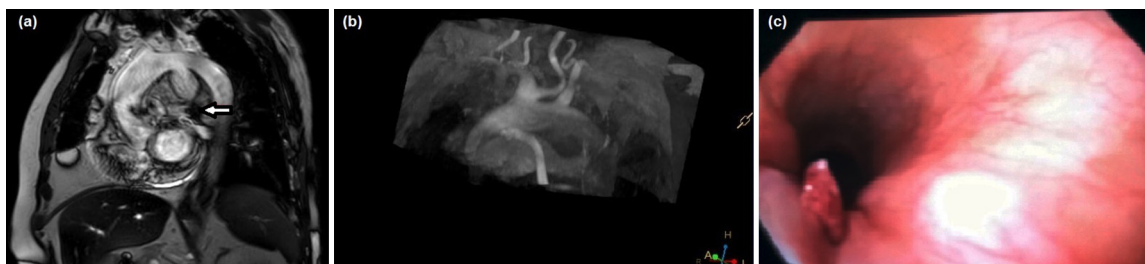


Fig. 1 – (a) Saccular aneurysm of the arch abutting the esophageal wall (arrow). (b) Bovine arch configuration with bilateral carotid take-off from a single trunk. (c) Upper gastrointestinal endoscopic image of clot at the mouth of esophageal end of the aorto-esophageal fistula.

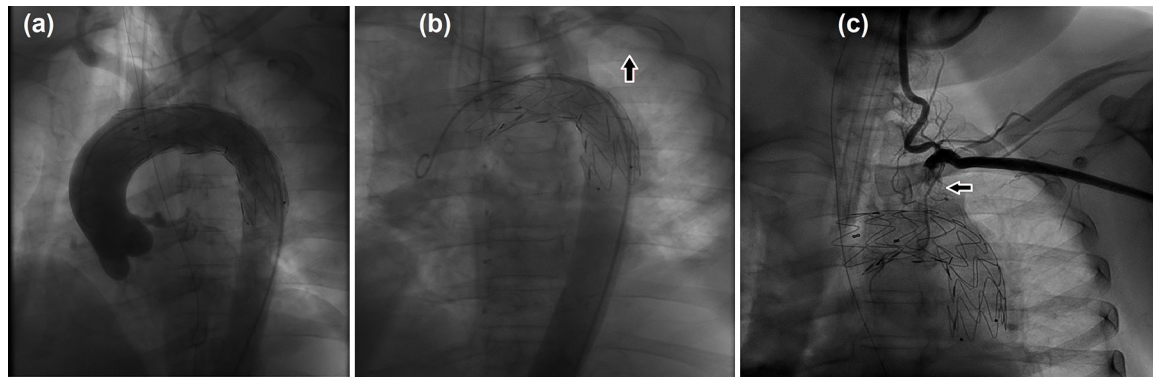


Fig. 2 – (a) Arch stent deployed and in position. (b) Retrograde flow (arrow) noted in the left subclavian artery. (c) Occluder device deployed interrupting the retrograde flow (arrow).

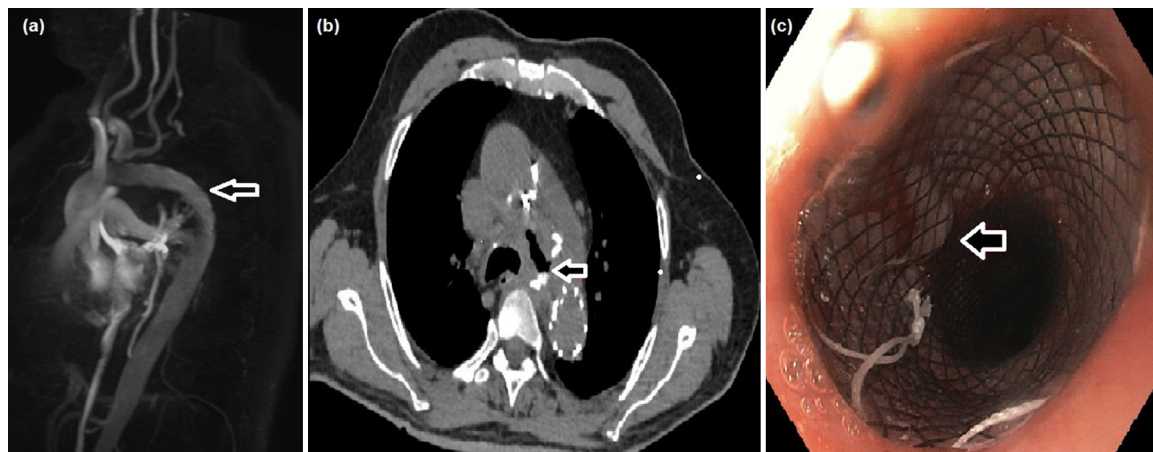


Fig. 3 – (a) Check MR aortogram revealing completely excluded aneurysm lumen (arrow – stent positioned into the descending aorta). (b) Computerized tomography of thorax revealing oral contrast leak into the mediastinum. (c) Esophageal stent deployed (arrow – marking the position of the esophageal opening of the fistula).

approximate the fistula mouth was also considered, but abandoned considering the unhealthy margins and higher risk of failure. Covered esophageal stents are routinely used in the treatment of malignant strictures and fistulae usually at the lower end of esophagus.⁷ In the present case, this treatment modality was chosen considering the above-mentioned factors albeit at a higher risk of future stent migration.

4. Conclusions

Emergent endovascular stent grafting is a safe and rapid technique for bleeding thoracic aneurysms. The occlusion of LSCA by endovascular stenting does not produce arm ischemia in the majority of cases; however, potential risk of this complication does exist. In an emergency situation, the concerns of left arm ischemia should not preclude emergent stent grafting. Nonhealing esophageal fistula and mediastinitis may complicate the course of recovery and should be closely followed up.

Conflicts of interest

The authors have none to declare.

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