

## Late dissecting aneurysm as a complication of postcoarctation repair in a patient with bovine arch anomaly

Bovine ark anomalisi olan bir hastada koarktasyon sonrası onarım komplikasyonu olarak geç dönem dissekan anevrizma

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### ABSTRACT

Coarctation of the thoracic aorta is a frequently seen condition and may cause late anastomotic complications after surgical repair, which often necessitates urgent treatment. Endovascular treatment methods in this group seem to be life-saving due to high mortality and morbidity rates of conventional open surgical repair. Postcoarctation repair and bovine arch anomaly are also complicating factors and may cause additional morbidity.

**Keywords:** Bovine arcus aorta; coarctation of aorta; endovascular treatment.

### ÖZ

Torasik aort koarktasyonu sık görülen ve geç dönemde anastomoz komplikasyonlarına yol açan, acil tedavi gerektiren bir durumdur. Bu grupta endovasküler tedavi yöntemlerinin konvansiyonel açık cerrahi onarımın yüksek mortalite ve morbidite oranları nedeniyle hayat kurtarıcı olduğu görülmektedir. Postkoarktasyon onarımı ve bovine ark anomalisi olması da, komplikasyona ve ilave morbiditeye yol açabilen faktörlerdir.

**Anahar sözcükler:** Bovine arkus aort; aort koarktasyonu; endovasküler tedavi.

Coarctation of the thoracic aorta is common and constitutes 5 to 8% of all congenital heart diseases and has late anastomotic complications after surgical repair which usually necessitates urgent treatment.<sup>[1]</sup>

### CASE REPORT

A 55-year-old man with aortic coarctation was initially treated at the age of 13 years through a left thoracotomy with end-to-end anastomosis of the ascending and descending thoracic aorta. At the age of 30 years, he was reevaluated due to fatigue and headaches, at which time an aortogram revealed hypoplasia of the thoracic aorta together with bovine arch anomaly and underwent reoperation

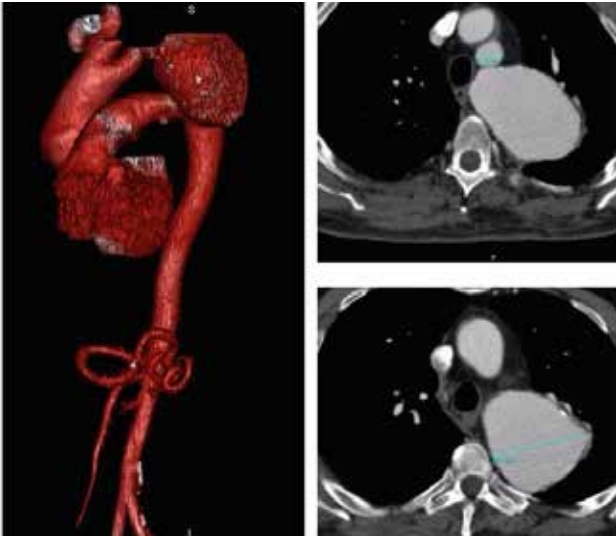
and was repaired by the same technique without using a graft or patchplasty via median sternotomy. The patient later presented with severe uncontrolled hypertension despite the use of three antihypertensive medications and severe hemoptysis and applied to our emergency service. A thoracic and abdominal computed tomography (CT) with multiple detectors revealed a 8 cm wide saccular aneurysm with an acute dissection just distal to the left subclavian artery origin. With the diagnosis of dissection and aneurysmal sac, the patient underwent an urgent intervention after the placement of external lumbar drainage catheter. Cerebrospinal fluid drainage catheter had stayed for 24 hours and mean pressure was 8 to 10 mmHg. Under strict sterile technique, with general anesthesia, right

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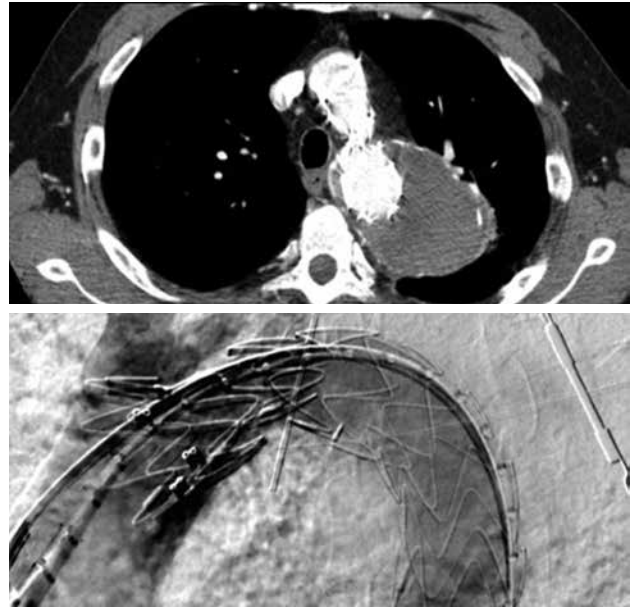
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**Figure 1.** Computed tomographic image of an 8-cm wide saccular aneurysm.



**Figure 2.** An image after implanting thoracic stent graft.

femoral cut-downs were performed. After systemic heparinization (80 to 100 U/kg) for an activated clotting time >300 sec, a 28 mm to 150 mm thoracic stent graft (Valiant Thoracic Stent Graft System, Medtronic, Minnesota, ABD) was introduced over an extra-stiff wire via the right femoral artery and deployed just distal to the origin of the patient's bovine type left subclavian artery. The proximal and distal landing zones and attachment sites were gently dilated with balloon. Completion angiography revealed that he did not develop an endoleak necessitating any additional intervention. Control studies showed a decrease and stabilization of the size of the aneurysm sac and disappearance of the intimal flap. There was no technical failure. The patient tolerated the procedure well. The length of intensive care unit follow up was 24 hours and hospital stay was four days. In the immediate postoperative period, the patient had no complaints and clinical signs of any complications. Follow-up CT angiography obtained three months after the procedure revealed no evidence of migration, stenosis, kink, or endoleak. His prior severe hypertension was under control with a single agent (a small single dose of oral beta blocker daily), and he had no hemoptysis after the intervention.

## DISCUSSION

Open surgical repair has been considered the gold standard treatment modality of aortic coarctation due

to its poor natural history. Patients treated at a young age with homografts or prosthetic grafts are at risk of late anastomotic complications, including aneurysms, pseudoaneurysms, recurrent coarctation, and valve dysfunction.<sup>[2]</sup> Furthermore, those patients treated with patch angioplasty has tendency to develop a high rate of pseudoaneurysm (42%) at 25 years after the initial coarctation repair.<sup>[3]</sup>

Untreated pseudoaneurysms and aneurysms at the site of coarctation have a 100% rupture rate within 15 years.<sup>[4]</sup> These aneurysms may remain asymptomatic for a long time and can be cruelly revealed by aortic rupture or dissection, particularly in patients with persistent hypertension.<sup>[5]</sup>

Another situation in our case was bovine aortic arch (BAA). The prevalence of BAA was seen in 1 to 27.4% of imaging studies.<sup>[6]</sup> In recent years, BAA has emerged as a novel marker or risk factor for thoracic disease due to the higher prevalence and the increased aortic growth rate. Wanamaker et al.<sup>[7]</sup> analyzed arch anomalies in thoracic aortic dissections and found an incidence of 24.2% of BAA in patients with acute type A dissections and 35.4% in type B dissections. Our patient had these two risk factors, postcoarctation repair and bovine arch anomaly, to develop dissecting aneurysm of the descending aorta.

Thoracic endovascular aortic repair (TEVAR) is a recent technique which is less invasive compared

to conventional open surgery. Despite the technical evolutions, such as the spinal cord protection techniques, comorbidities such as age, complex anatomy, and associated diseases have increased and surgery renounced to this group of patients, which leads to a decrease in life expectancy and to an increase in the morbidity.<sup>[8]</sup> According to the meta-analysis, Eggebrecht et al.<sup>[9]</sup> reported that the success rate was 98.1%, with a conversion rate for the conventional procedure of 1.6%. As this pathology necessitates extended widely coverage of the aorta and, as a factor for improvement of neurological complications, the drainage of the brain-spinal fluid was used in our intervention, as mentioned in different series of studies.

In conclusion, TEVAR may be an effective alternative in the treatment of aneurysm formation after coarctation repair, with good long term results, and is appealing for patients with existing aortic arch anomalies and with late complications after aortic coarctation repair, albeit necessitates long-term follow-up.

#### **Declaration of conflicting interests**

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## **REFERENCES**

1. Cohen M, Fuster V, Steele PM, Driscoll D, McGoon DC. Coarctation of the aorta. Long-term follow-up and prediction of outcome after surgical correction. *Circulation* 1989;80:840-5.
2. Verheugt CL, Uiterwaal CS, Grobbee DE, Mulder BJ. Long-term prognosis of congenital heart defects: a systematic review. *Int J Cardiol* 2008;131:25-32.
3. Cramer JW, Ginde S, Bartz PJ, Tweddell JS, Litwin SB, Earing MG. Aortic aneurysms remain a significant source of morbidity and mortality after use of Dacron® patch aortoplasty to repair coarctation of the aorta: results from a single center. *Pediatr Cardiol* 2013;34:296-301.
4. Marcheix B, Lamarche Y, Perrault P, Cartier R, Bouchard D, Carrier M, et al. Endovascular management of pseudo-aneurysms after previous surgical repair of congenital aortic coarctation. *Eur J Cardiothorac Surg* 2007;31:1004-7.
5. Roos-Hesselink JW, Schölzel BE, Heijdra RJ, Spitaels SE, Meijboom FJ, Boersma E, et al. Aortic valve and aortic arch pathology after coarctation repair. *Heart* 2003;89:1074-7.
6. Jakanani GC, Adair W. Frequency of variations in aortic arch anatomy depicted on multidetector CT. *Clin Radiol* 2010;65:481-7.
7. Wanamaker KM, Amadi CC, Mueller JS, Moraca RJ. Incidence of aortic arch anomalies in patients with thoracic aortic dissections. *J Card Surg* 2013;28:151-4.
8. Almeida RM, Leal JC, Saadi EK, Braile DM, Rocha AS, Volpiani G, et al. Thoracic endovascular aortic repair - a Brazilian experience in 255 patients over a period of 112 months. *Interact Cardiovasc Thorac Surg* 2009;8:524-8.
9. Eggebrecht H, Nienaber CA, Neuhäuser M, Baumgart D, Kische S, Schmermund A, et al. Endovascular stent-graft placement in aortic dissection: a meta-analysis. *Eur Heart J* 2006;27:489-98.