

Staged Hybrid Repair of an Aneurysmal Retroesophageal Aberrant Right Subclavian Artery Arising from Kommerell's Diverticulum

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Introduction

- Aberrant right subclavian artery (ARSA) with Kommerell's diverticulum (KD) is a rare congenital anomaly of the aortic arch, occurring in 0.5–1% of the population.
- In most cases, it is detected incidentally on imaging performed for unrelated reasons.
- Although frequently asymptomatic, aneurysmal compression of adjacent structures can produce significant clinical symptoms requiring intervention.

How can staged hybrid repair of aneurysmal aberrant right subclavian artery with Kommerell's diverticulum be performed safely while preventing delayed spinal cord ischemia?

Patient Description

- The patient is a 68-year-old male with an aneurysmal aberrant right subclavian artery arising from a Kommerell's diverticulum, and concomitant descending thoracic and pararenal abdominal aortic aneurysms.
- Symptomatic presentation including progressive exertional dyspnea, dysphagia, odynophagia, chest pain, and left leg claudication.
- Given the extent of disease and symptomatology, a staged hybrid repair was planned.

Intervention

- The first stage involved a right carotid-subclavian bypass using an 8 mm Gelsoft Dacron graft in an end-to-side fashion.
- The second stage was performed three days later using a thoracic endovascular aortic graft and thoracic branch endoprosthesis (TBE) to exclude the ARSA aneurysm.
- A 34 mm main endograft with a side-arm branch was guided into the subclavian artery.

Intervention (continued)

- This was complicated by graft migration that required proximal and distal extensions and serial ballooning to achieve an adequate seal.
- A Type IA endoleak was resolved with further proximal balloon molding.
- The patient tolerated both procedures well and was discharged home in a stable condition on postoperative day three.
- On follow up, his aneurysm size decreased and there was no endoleak.
- He later presented to an outside hospital with delayed spinal cord ischemia, which resolved after iliac balloon angioplasty improved perfusion to the hypogastric arteries.

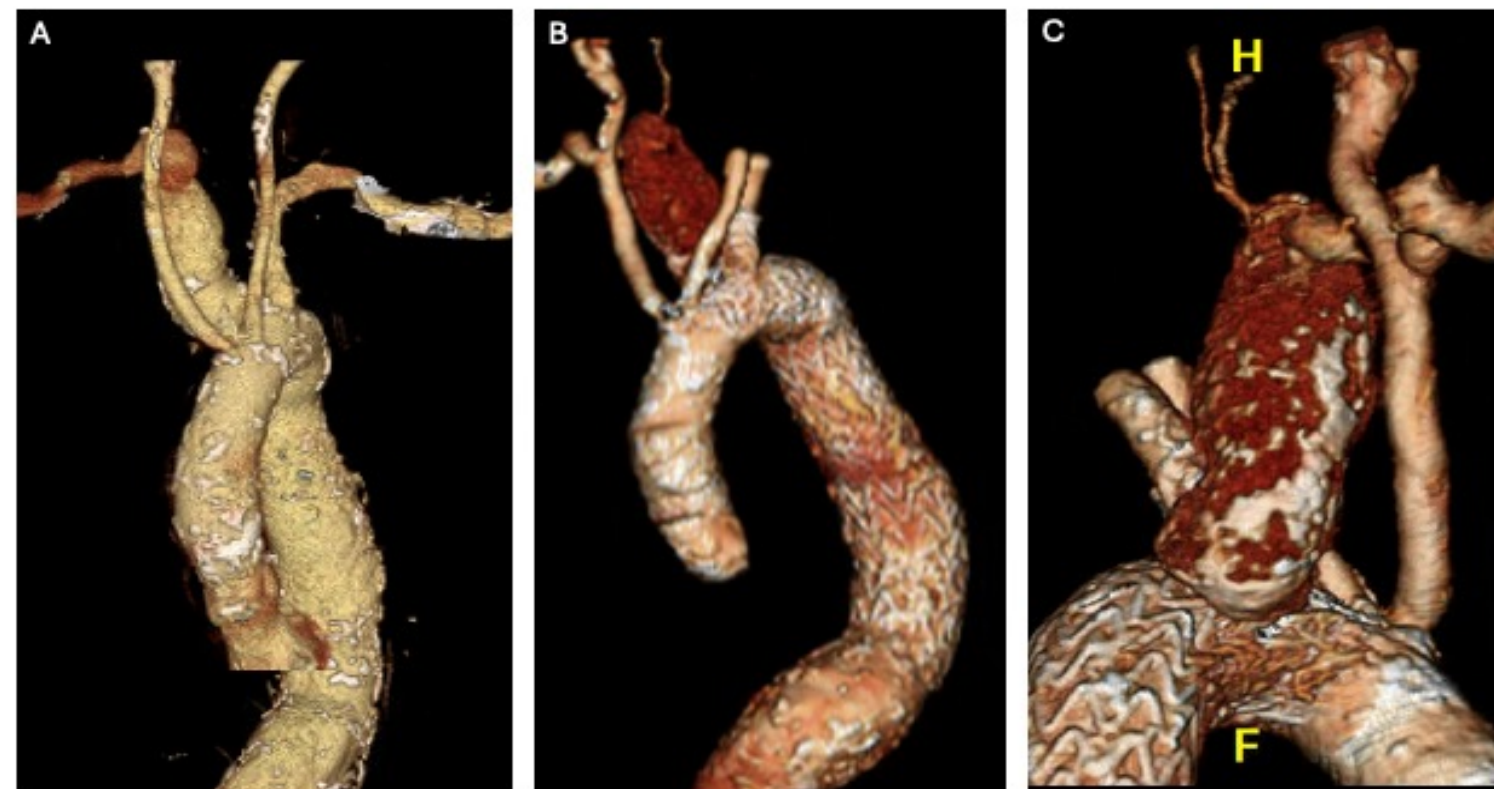


Figure 1 Computed tomography (CT) pre and post procedure. CT angiogram reconstructions pre (A) and post (B,C) treatment. (A) Aberrant right subclavian artery extending posterior to the trachea and esophagus with fusiform bilobed aneurysm in the intrathoracic segment measuring up to 3.7 cm. (B) A stent remains in the arch and throughout the descending segment in stable position and appears widely patent. The stent covers the origin of the aberrant right subclavian artery which has been reimplanted. (C) Image demonstrating the transection of the aberrant right subclavian artery and reanastomosis to the right common carotid artery.

Discussion

- This case highlights the feasibility of staged hybrid repair for aneurysmal ARSA with KD, achieving durable aneurysm exclusion while preserving cerebral and upper extremity perfusion.
- Although classic treatment for compressive symptoms is open surgical repair, in patients with comorbid conditions that preclude safe open repair, a hybrid approach highlights the importance of a complex aortic program offering hybrid repair approaches with access to newer technologies.
- It also underscores the risk of delayed spinal cord ischemia after extensive thoracic aortic coverage.
- Resolution following iliac revascularization emphasizes the importance of maintaining pelvic collateral circulation, particularly through the hypogastric arteries, to mitigate this complication.

Conclusion

- Hybrid and endovascular repair techniques have been increasingly reported as safe and durable approaches for treating aneurysmal ARSA with KD, particularly in older or high-risk patients.
- This case demonstrates that staged hybrid repair can achieve effective aneurysm exclusion while preserving branch perfusion.
- Vigilance for delayed spinal cord ischemia, the ability to rescue, and preservation of pelvic collateral circulation remain essential to optimize outcomes.

Resources

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- Yang C, Shu C, Li M, Li Q, Kopp R. Aberrant subclavian artery pathologies and Kommerell's diverticulum: a review and analysis of published endovascular/hybrid treatment options. *J Endovasc Ther*. 2012;19(3):373-382. doi:10.1583/11-3673MR.1

