

Hybrid repair of aortic anastomotic aneurysm 40 years after original repair

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CASE REPORT

A 48-year-old man presented with symptoms of off-and-on left-sided chest heaviness. His past medical history was significant for coarctation of the aorta. At the age of 6 years, he had undergone left posterolateral thoracotomy. The segment of thoracic aorta with coarctation was removed. The posterior aortic wall of the aorta was reapproximated with running 4-0 Prolene sutures, and the anterior aortic wall was approximated with interrupted 5-0 Prolene sutures. On completion of the anastomosis, the aortic lumen appeared to be narrow at the site of anastomosis; therefore, an anterior longitudinal aortotomy was performed, and the aorta was repaired with interrupted 5-0 Prolene sutures.

At the time of his recent presentation, findings on physical examination were normal. Computed tomography aortography revealed a large, 8-cm anastomotic aneurysm at the site of previous aortic repair, extending into the proximal left subclavian artery (A). The left vertebral artery was diminutive in caliber and had antegrade flow. There was no feasible option for revascularization of the left vertebral artery. In my judgment, the best surgical option was to treat this disease entity with a three-stage, hybrid operation. There was an interval of 4 to 6 weeks between each stage. In the first stage, a left carotid to subclavian bypass was performed. A longitudinal incision was made along the anterior border of the left sternocleidomastoid muscle, and the left common carotid artery was exposed. Next, a left infraclavicular incision was made to expose the distal left subclavian artery. The distal part of the subclavian artery was chosen so that the normal portion of the subclavian artery just distal to the extent of aneurysm could be used for placement of the occlusive devices. An 8-mm ringed polytetrafluoroethylene graft was sewn end to side to the left common carotid artery for inflow and end to side to the distal left subclavian artery for outflow. The second stage was percutaneous placement of two Talent (Medtronic, Santa Rosa, Calif) endografts (26 × 26 × 150 mm and 30 × 30 × 200 mm) under spinal cord protection. The third stage was left brachial artery cutdown and coil embolization of the proximal subclavian artery aneurysm. Angiography confirmed patent carotid to subclavian bypass (B). His postoperative course was uneventful. Two months after the third-stage operation, he was doing well, and chest heaviness symptoms had completely resolved. Computed tomography aortography performed 6 weeks after the last operation showed successful coverage of the aneurysm with a small type II endoleak from the proximal left subclavian artery (C). The patient gave consent for publication of this case report.

DISCUSSION

Subclavian aneurysms are rare and represent <1% of all peripheral artery aneurysms.¹ This case is unique as it represents the true anastomotic aneurysm of the previously repaired aorta with extension into the proximal

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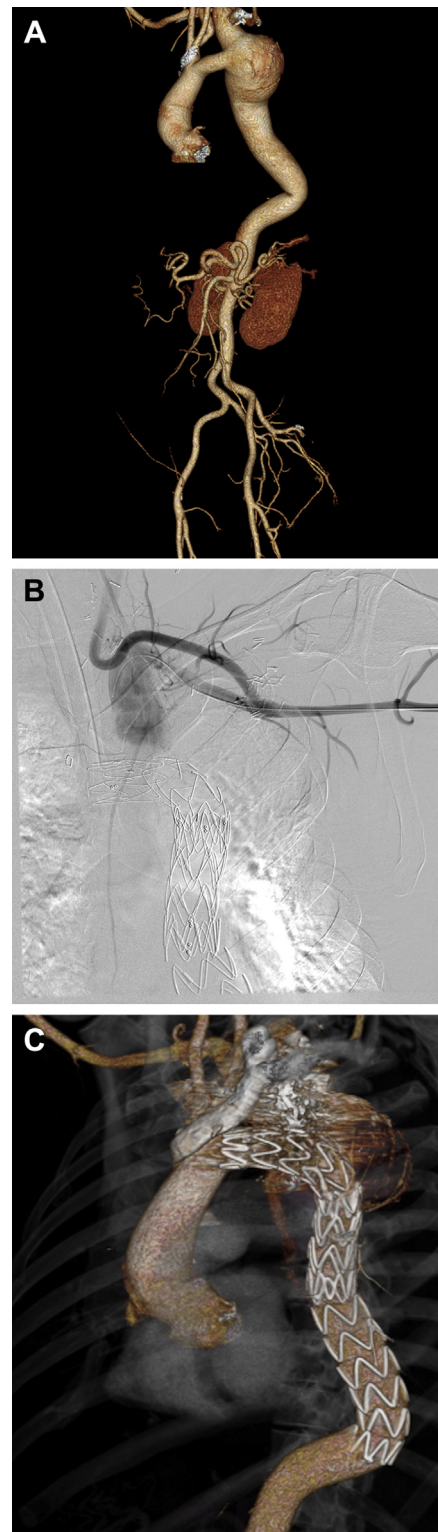
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left subclavian artery. A retrospective study by von Kodolitsch et al² quoted a 9% incidence of anastomotic aneurysm for operations performed for coarctation of the aorta in previously published literature and identified risk factors associated with this complication. A learning point from the review of our case is that a vascular anastomosis is a delicate operation requiring meticulous attention to details. There should not be any tension on the vessel segments that are being anastomosed. If there is any concern about the stretch or tension on the anastomosed vascular segments or if there is any concern about stenosis at the anastomosis, it should be taken down completely and replaced with an interposition graft. As highlighted in this case, it may take four decades for an anastomosis performed under tension to develop an anastomotic aneurysm. Another learning point is to consider the expected increase in body height while operating on pediatric aortas as it may have implications for future tension on the anastomosis and resultant complications. This case also underlines the importance of lifelong follow-up for these patients as they are prone to development of anastomotic aneurysms many years after the index operation.

Conservative management of aortic anastomotic aneurysm after repair of coarctation of the aorta is associated with rupture and mortality rates as high as 36%.² Open repair of thoracic aortic anastomotic aneurysm can be fraught with several serious perioperative complications and mortality. Reported perioperative mortality after surgical treatment of aortic anastomotic aneurysm for patients who underwent an index operation for treatment of coarctation of the aorta is 9%.² In this case, involvement of the left subclavian artery especially represented a challenging anatomy for open repair, and hence a hybrid approach was chosen. Thoracic endovascular aortic repair is an accepted alternative to open surgical repair for this complicated problem because of lower perioperative morbidity and mortality and quicker return to baseline function compared with open repair.³ Review of recent literature shows that adults with a new diagnosis of aortic coarctation can be primarily treated with thoracic endovascular aortic repair.⁴ Mohan et al⁵ have described a technique of endovascular stent grafting of subclavian artery aneurysm. In a literature review by Vierhout et al,¹ the authors noted a changing profile of diagnostic and therapeutic options for subclavian artery aneurysms, including increasing use of the endovascular approach to treat such aneurysms.

CONCLUSIONS

This case highlights the importance of anastomotic technique at the time of an index operation performed for coarctation of the aorta, need for lifelong follow-up, and use of hybrid operations to treat the complications associated with open repair of coarctation of the aorta.

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