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Commentary: Aberrant vertebral arteries in aortic repair: Small but mighty!

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Aberrant origin of the vertebral artery (VA) is an uncommon anatomic variant. The VA originates as the first branch of the ipsilateral subclavian artery. Its aberrant origin is variable and can arise from the aortic arch, common, or internal or external carotid arteries.^{1,2} Despite being clinically asymptomatic, knowledge of the precise origin of aberrant VA can be critical before performing open surgical or endovascular procedures involving the arch or distal aorta.

Martin-Gonzalez and colleagues³ present a case of a patient with an extent I thoracoabdominal aortic aneurysm with aberrant right and left VAs originating distal to the left subclavian artery (LSA). They describe their open thoracoabdominal aortic aneurysm repair technique with preservation of both VAs through direct reimplantation. This report demonstrates that when the origin of 1 or more aberrant VAs is located in the intended area of replacement, critical steps must be taken to preserve perfusion in certain clinical situations.

INCIDENCE

Multiple aberrant origins of both VAs have been reported.⁴ The most common aberrancy is the left VA origin off the aortic arch between the left common carotid artery and LSA, with a prevalence of 2.4%-5.8%.^{1,5-7} In contrast, an aortic origin of the right VA is rare.² Although the true incidence remains unknown,⁸ only 13 cases of an

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INDICATIONS FOR ABERRANT VERTEBRAL ARTERY REVASCULARIZATION
• Dominant or co-dominant vertebral artery
• Absent, atretic, or occluded contralateral vertebral artery
• Planned extensive coverage of the descending thoracic aorta
• Internal iliac artery occlusion
• Prior infrarenal aortic operation with previously ligated lumbar and middle sacral arteries
• Inability to evaluate anatomy of the vertebrobasilar circulation prior to intervention

Indications for aberrant vertebral artery revascularization.

CENTRAL MESSAGE

When the aberrant vertebral artery origin is located in the intended area of replacement or zone of endovascular coverage, critical steps must be taken to preserve its perfusion in certain situations.

aberrant right VA with an origin distal to the LSA have been reported.⁴

INDICATIONS FOR VA REVASCULARIZATION

VA variants are usually of no clinical significance except when treating cerebrovascular or thoracic aortic pathology.^{9,10} Posterior circulation strokes or vertebrobasilar insufficiency and spinal cord ischemia are well-described complications of LSA coverage during thoracic endovascular aortic repair in patients with normal VA origins.¹¹ Hence, indications to preserve perfusion of the aberrant VA can be extrapolated from published indications to preserve perfusion to the LSA.¹² These include dominance of the aberrant VA; absent, atretic, or occluded contralateral VA; or inability to evaluate the anatomy of the vertebrobasilar circulation before intervention.¹³ As the VA provides perfusion to the spinal cord, planned extensive coverage of the descending thoracic or thoracoabdominal aorta, previous infrarenal aortic operation with previously ligated lumbar and middle sacral arteries, or internal iliac artery occlusion are also indications for preservation.^{13,14} In addition, in elective settings, where coverage of the aberrant VA is necessary, routine revascularization should be attempted when possible.¹³ The *Figure 1* summarizes the indications for VA revascularization.

SURGICAL TECHNIQUES FOR ABERRANT VA REVASCULARIZATION

Surgical options for VA revascularization are similar to the techniques used for symptomatic VA occlusive disease.

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FIGURE 1. Indications for aberrant vertebral artery revascularization.

The proximal VA can be revascularized by reattaching it on a patch to the aortic repair, transposing it to the common carotid artery, or by performing a vein graft bypass.^{15,16} Proximal VA reconstructions can be performed safely with low stroke and mortality rates of 0.9%.¹⁵⁻¹⁷

In summary, although aberrant VA origins are usually asymptomatic, it is important to identify them before aortic arch or distal aortic intervention. VA artery revascularization is indicated in certain clinical situations before covering or ligating its origin during aortic repair.

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