



Case Report

A case report of microvascular decompression for cervical myelopathy and radiculopathy caused by tortuous and abnormal bilateral vertebral artery

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ABSTRACT

Background: Tortuous/abnormal vertebral arteries (VAs) sometimes cause neurovascular compression syndromes (NVCs), such as trigeminal neuralgia, hemifacial spasm, and, rarely, myelopathy/radiculopathy. Abnormalities/tortuosity of the VA at the level of the atlas and axis are of particular note; these may be characterized by a persistent first intersegmental artery (PFIA) and C2 segmental type of VA. Herein, we report a 72-year-old male who presented with cervical myelopathy/radiculopathy due to bilateral tortuosity of the PFIA resulting in spinal cord compression at the craniocervical junction.

Case Description: A 72-year-old male presented with cervical pain when turning his neck and progressive gait disturbance. The neurological examination demonstrated a moderate myeloradicular syndrome (Nurick Grade III). The magnetic resonance revealed compression of the medulla and spinal cord due to tortuosity of both dorsal VA at the C1 vertebral level. The three-dimensional computed tomography angiogram confirmed bilateral PFIA running medially. In addition, the left side of VA forms fenestration. Surgery through a C1 laminectomy and midline small suboccipital craniectomy, both VAs were transposed and tethered to the ipsilateral dura utilizing Aron Alpha and vinyl prostheses. In addition, a large vinyl prosthesis was inserted between both VAs to protect them from contacting the spinal cord. Following this decompressive procedure, the patient's symptoms fully resolved, and he remains asymptomatic 10 years later exhibiting no recurrent vascular pathology.

Conclusion: Microvascular decompression of anomalous VAs contributing to cord compression at the C1 level was safe and effective in a 72-year-old male.

Keywords: Cervical myelopathy and radiculopathy, Microvascular decompression, Persistent first intersegmental artery, Vertebral artery anomaly

INTRODUCTION

Tortuous/anomalous vertebral arteries (VAs) sometimes compress the upper cervical cord and brainstem at the C1 level, resulting in myeloradicular syndromes that include such symptoms/signs as dizziness and ataxia.^[2,4-7] Persistent first intersegmental arteries (PFIA: unilateral and occasionally bilateral) are found in 3.2% of cases involving VA anomalies at the C1-C2 level.^[8] PFIA rarely cause neurovascular compression syndromes (NVCs) and commonly improved following microvascular decompression. (MVD).^[2,3,6,7] Here, we report a 72-year-old male who

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presented with cervical pain myelopathy/radiculopathy attributed to bilateral tortuous VA/PFIA at the C1 level that resolved following MVD.

CASE DESCRIPTION

A 72-year-old-male complained of cervical pain while turning his neck, accompanied by progressive dizziness, ataxia, and spasticity. On examination, he demonstrated a diffuse upper and lower extremity myeloradiculopathy along with hyperreflexia.

Diagnostic studies: magnetic resonance (MR) and computed tomography (CT) angiogram

The MR showed compression of the medulla/spinal cord posteriorly due to bilateral tortuous/anomalous VAs running medially at the C1 level [Figure 1a-c]. The three-dimensional CT (3D-CT) angiogram additionally confirmed bilateral PFIA running medially and entering the spinal canal between the C1 and C2 levels, and on the left side, a “fenestration of the VA [Figure 1d].”

Operation

As bilateral VAs/PFIAs were the cause of his C1 cord compression/myelopathy, the patient underwent a decompressive C1 laminectomy with a small midline suboccipital craniectomy. Once a Y-shaped incision was made in the dura at the C1 level, bilateral elongated and tortuous VAs/PFIAs were visualized compressing the spinal cord. Both VAs/PFIAs were transposed and dissected away from the underlying dura and separated from the cord utilizing Aron Alpha and vinyl prosthesis. In addition, a large vinyl prosthesis was placed between both VAs /PTIFAs to prevent them from contacting and compressing the cord [Figure 2].

Postoperative

The postoperative MR and 3D-CT angiograms confirmed that both VAs were no longer compressing the spinal cord [Figure 3]. Seven days postoperatively, and at 10 years follow-up, the patient remains asymptomatic.

DISCUSSION

MVD is a popular treatment for NVCs.^[1] Arteries of posterior fossa such as the VA, and PFIA is one of the most common VA variations at the C1-C2 level, may be responsible for NVCs in a few cases.^[2,3,6,7] These anomalies/tortuosities are most frequently detected on MR (3.2%); they occasionally form bilateral fenestrations.^[8] Although many of the cases are asymptomatic, PFIAs need to be treated and must not be injured during posterior C1-C2 fixation.^[3] Although radiculopathy and myelopathy caused by tortuous VAs are relatively rare, the

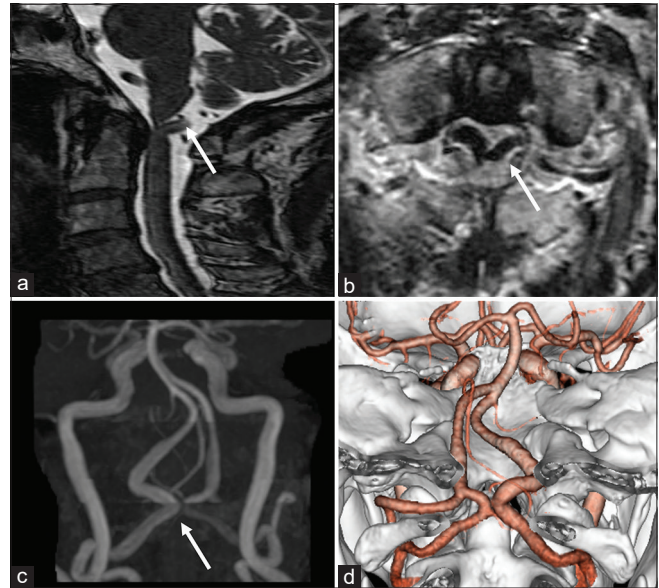


Figure 1: Preoperative magnetic resonance imaging and three-dimensional computed tomography (3D-CT) angiogram (Arrow: spinal cord was compressed from behind by vertebral arteries [VAs]. Both sides of VAs were running touched medially). Bilateral VAs compress spinal cord from behind. These VAs are close to each other. a: sagittal T2-weighted image. b: axial T2-weighted image. c: magnetic resonance angiography. d: 3D-CT angiogram of preoperative. Bilateral persistent first intersegmental arteries were running medially and were entering at C1 and C2 level. The left side of VAs formed fenestration.

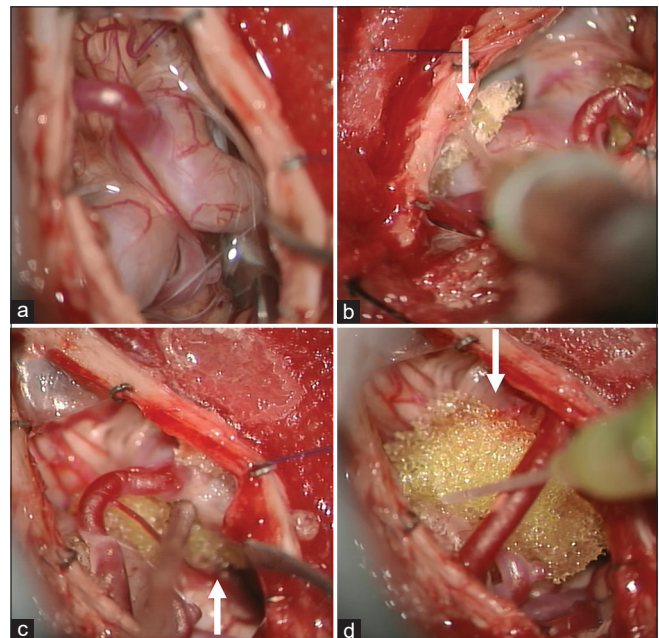


Figure 2: Intraoperative photographs. a: bilateral vertebral arteries (VAs) compressed the spinal cord at the C1 level. b: vinyl prosthesis (arrow) inserted between dura and the right side VA. This VA was fixed to prosthesis with Aron Alpha. c: left-side VA was fixed in the same way. d: finally, large vinyl prosthesis anchored between both of VAs due not to reposition VAs.

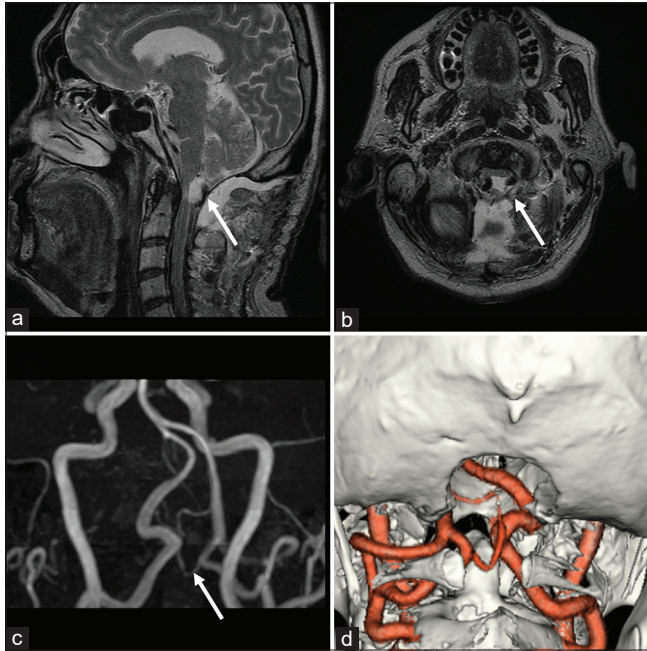


Figure 3: Postoperative magnetic resonance imaging and three-dimensional computed tomography (3D-CT) angiogram. Compression of the spinal cord was released by vertebral artery movement (arrow). a: sagittal T2-weighted image. b: axial T2-weighted image. c: magnetic resonance angiography. d: 3D-CT angiogram.

symptoms can be cured completely with MVD.^[2,6,7,9] Our patient underwent bilateral VA transposition with Aron Alpha and insertion of a large vinyl prosthesis between both VAs and the cord. Postoperatively, his neurological symptoms and signs as well as MR imaging findings resolved.

CONCLUSION

Bilateral anomalous VAs/PFIAs at the C1 level resulted in significant myelopathy/radiculopathy and spinal cord compression in a 72-year-old male. Following MVD and transposition, the patient's symptoms and signs fully resolved and have not recurred 10 years later.

Declaration of patient consent

Patient's consent not obtained as patient's identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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