Scapular Pain Caused By an Anomalous Vertebral Artery

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Letter to the Editor

A 39-year-old woman presented to my office with neck pain after a motor vehicle accident. The neck pain described radiated into her left periscapular region, consistent with a c4 dermatome. The patient did not demonstrate weakness or numbness during the physical examination and is an otherwise healthy middle-aged female. After failing conservative management, the patient returned and an MRI was ordered. This, specifically the sagittal cuts through the foramen, demonstrated a space-occupying lesion consistent with the left vertebral artery compressing the exiting nerve root correlating with the patient’s described symptoms (Figures 1-3). This is a newly described vertebral artery anomaly demonstrating atypical symptomology.

No surgical intervention was performed. Instead, the patient opted for conservative management with a selective nerve root block and 6 weeks of physical therapy. Two months later, the patient reported improvement of symptoms.

Discussion

Vertebral artery (VA) anomalies or tortuosity are a rare cause of cervical radiculopathy [1-3]. The normal variant VA anatomy is described as originating from the subclavian or innominate artery and begins anterior to the C7 transverse foramina. The artery then enters the transverse foramina for the C6 vertebral body and continues to pass through the superior vertebral bodies foramina to the base of the axis. The artery transitions posterior to enter the foramen transversarium in the posterolateral part of the ring of the atlas. It continues posterior through the atlantoaxial membrane to enter the foramen magnum where it combines with the contralateral VA to form the basilar artery providing the blood supply to the brain stem and cerebellum [4].

Tortuous VA anomalies are reported to affect men and women...
equally, with the C4-5 level being the most frequent, followed by C3-4 and C5-6, respectively [5-7]. Tortuous VA occurs unilaterally more frequently than bilaterally, and has equal frequency on both sides [6]. They can be congenital or acquired [1]. Cadaver studies have reported prevalence at 2.7% and incidence studies of tortuous VA causing pain at 7.5% [5,8]. Tortuous VA anomalies can cause bony erosion, neurovascular compression, or vertebrobasilar insufficiency [5]. There are multiple hypotheses as to what causes tortuous vertebral arteries and related symptoms, but no clear answer or consensus has been found [5,8,9].

Symptoms described commonly correlate with the area involved. Most described are cervicobrachial neuralgia with paraesthesias and dysaesthesias without triggering factors. Other symptoms include rarity of neurologic defect and lack of nocturnal symptoms [5].

Workup of radiculopathy begins with cervical spine x-rays. These may show erosion of bone structures with sclerotic margins. Commonly the intervertebral neural foramen will show enlargement on plain radiographs [2,5]. The gold standard for diagnosing vascular radiculopathy remains angiography or magnetic resonance angiography. Magnetic resonance imaging in cases of vascular radiculopathy show signal void in T1- and T2-weighted images extending into the neural foramen. Computed tomography will show neural foramina widening and homogenous VA enhancement on post contrast computed tomography scan [8]. Computed tomography angiography can also be used with advantages including cheaper cost and the ability to show the vertebral artery in relation to the spine [5].

Review of reported cases has described equally favorable outcomes between conservative and surgical management [7]. Multiple surgical approaches have been described in the literature regarding methods to relieve the patient's symptoms. Hage et al. [6] provides a procedure literature search describing several methods for decompressing the foramen including: an anterolateral approach with microvascular decompression, a posterior cervical decompression with microvascular decompression, an anterolateral approach combined with posterolateral decompression with VA transaction and anastomosis, as well as a suboccipital craniectomy with cervical laminotomy/laminectomy and durotomy. Besides the approach, several papers have described the repair from using a direct microvascular decompression, to using a Teflon plug, using an oxidized cotton plug, or using a cellular dermis sling [2]. All of these approaches were tailored to the patient and all had good to complete resolution of symptoms at long term follow up [6].

The most important note is the risk of iatrogenic injury to an undiagnosed tortuous VA. To standard VA is at most risk anterior to C7, lateral from C7-C3, and posterior from C2-C1. In the tortuous VA, this may not hold true [9]. The patient's diagnostic imaging must be thoroughly reviewed pre-operatively to diagnose and plan safe alternative surgical approaches to relieve patients symptoms. It is important to confirm with neuroradiology that there is no aberrant VAs. In Aubin’s study, six neuroradiologists were given 40 normal and 39 aberrant VA MRIs. When asked to review without any symptoms or request for VA course, the tortuous VA was identified 0% of the time. When presented with symptoms and specific request regarding VA, three neuroradiologists identified 100% and three identified 97% [10].

In conclusion, tortuous vertebral arteries are a rare, but significant culprit in the cause of cervical pain and radiculopathy. The treating physician should always include this pathology in the differential diagnosis and be vigilant in identifying the vertebral artery course in all advanced imaging. When a tortuous VA is present, the treating surgeon should include this into preoperative planning to prevent any iatrogenic injury.

References

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