Case report: Early detection of vertebral artery dissection

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Summary

Vertebral artery dissection (VAD) is a rare cause of ischemic stroke in young patients. The largely nonspecific symptoms and delayed presentation pose a serious diagnostic challenge. Patients with VAD usually describe a trivial minor neck trauma preceding the event. Such traumas may be associated with spinal manipulation or sudden movements of the neck. We present an unusual case of vertebral artery dissection in a 27-year-old female patient following an episode of neck massage. She developed dizziness and headache, nausea, and imbalance following the procedure. After investigations, the patient was diagnosed with VAD, and treatment was initiated. She was discharged in stable condition. This case suggests that careful history taking and awareness of the symptoms of VAD are necessary to diagnose this entity as timely diagnosis and treatment can prevent permanent disability or even death.

Keywords: Stroke, neck massage, vertebral artery dissection.

I. BACKGROUND

Vertebral artery dissections (VADs) can be described as either spontaneous or traumatic. Traumatic dissection may be caused by penetrating or blunt force, including excessive flexion or extension of the neck. Chiropractic manipulation is a well-documented precipitating factor. Many conditions have been identified in association with spontaneous dissection. Although rare event, they are one of the most recognised causes of stroke in those aged under 45 years. Injury to the vertebral artery can lead to potentially fatal posterior circulation ischaemia. In this report we describe a case of VAD in a young woman after neck massage. She was treated with aspirin and discharged with no residual neurological deficits.

II. CASE PRESENTATION

A 27-year-old female patient with no significant past medical history presented to the Emergency Department with a two-days history of progressively worsening dizziness and headache, nausea. It was sudden onset following a head and neck massage. The salon employee massaged the patient's neck till she heard a crack in her neck. Instead of being alarmed, she thought it was an indication of a "successful" massage. When she started to walk back home, she realized something was wrong. She felt uneasy, dizzy and could not walk steadily. When she symptoms started increasing, she attended the Emergency Department.

When we examined the patient, she was alert. Vital signs were all within normal limits. Her temperature was 36.5 degrees celsius; heart rate was 72 beats per minute; blood pressure was 118/78mmHg; and respiratory rate was 20 breaths per minute. On examination, she demonstrated full range of motion of the neck without pain. She had no audible carotid bruit, no notable swelling, ecchymosis, or midline cervical spinal tenderness to palpation. On a detailed neurologic examination, she had a Glasgow Coma Scale of 15 and was alert and oriented to person, place, and time. She had a normal cranial nerve exam, full strength in the upper and lower extremities, normal reflexes, sensory examination was unremarkable. She had a negative

***Received**: 28 September 2023, **Accepted**: 26 December 2023*
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nystagmus. The finger-to-nose testing was positive at right, the heel to shin testing was positive at right. Cardiac, respiratory and abdominal examination were all within normal limits.

Investigations

Her blood tests, urine tests and ECG were all unremarkable. Due to the history and description of symptoms, an urgent both a non-contrast computed tomography (CT) of the brain and a CT angiogram (CTA) with intravenous contrast of the head and neck were obtained. The CT showed well-defined area of hypodensity involving the right cerebellar hemisphere. The CTA of the head and neck revealed a long segment of irregular severe stenosis of the right vertebral artery extending from the second to the fifth cervical vertebra, most compatible with a vertebral artery dissection (VAD). This confirmed a right VAD with a 1cm dissection flap. We was consulted with an interventional radiologist and recommended conservative therapy with aspirin orally, and admission for observation with neurological checks every one hours.

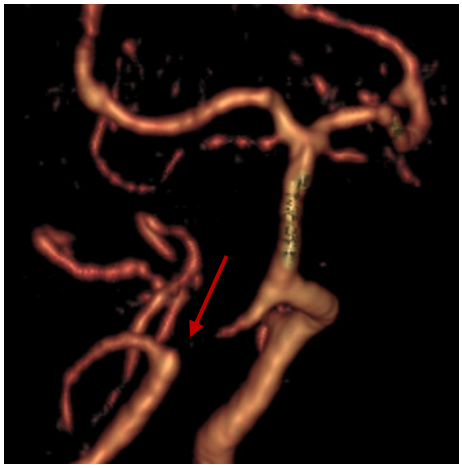

Figure 1. MRA shows significantly reduced flow within the right vertebral artery
Red arrowhead: Reduced blood flow of the right vertebral artery (RVA)

The patient was administered 100mg aspirin orally everyday. The patient was neurologically stable during the admission. She was given follow-up with neuro-interventional radiology in two weeks. A magnetic resonance imaging brain was performed and revealed T2/FLAIR hyperintensities with restricted diffusion in the right cerebellar hemisphere. Magnetic resonance angiography was performed and showing narrowing of the V4 segment, consistent with dissection with poor distal flow. The right VAD not to have healed of the right vertebral artery with poor distal flow and no expanding of right cerebellar infarction.

The patient was discharged with prescriptions for 100mg aspirin orally daily and with outpatient neurology clinic follow-up.

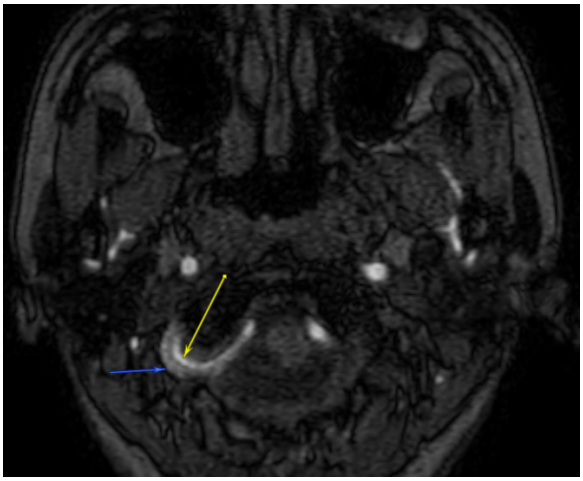

Figure 2. MRA shows subacute blood in the area of wall thickening. Yellow arrowhead indicating true lumen, green arrowhead indicating false lumen.IV.

III. DISCUSSION

VAD is a rare clinical event. Despite this, it is the leading cause of ischaemic strokes in patients under 45 years of age (13%)[1]. Upon close review of the literature, we found very few cases reported of VAD secondary to neck massage. Recently, the incidence of VAD has increased, in part because of the higher use of modern diagnostic imaging studies rather than a true increase. There is no clear sex predominance; however, women tend to develop this condition 5 years earlier than men[2]. Vertebral artery aneurysms and dissections are known complications of spinal manipulation procedures[3], however, dissection following a neck massage has rarely been described. When considering the anatomy of the extracranial vertebral artery, it is susceptible to dissection in three segments: Its origin at the subclavian artery; as it traverses the

intervertebral foramen; or at the site of entry into the cranium and this last segment is the most common location for dissection[4]. The risk for stroke following neck trauma/manipulation appears to be inherently dependent on the manipulation technique and the rotational forces applied to the neck[5]. Neurologic sequelae after VAD vary widely based on the location of the dissection and the amount of ischemic damage to the posterior circulation territory (cerebellum, brainstem, and posterior cerebrum). Frequent patterns of ischemic brain damage are cerebellar infarction in the posterior inferior cerebellarartery territory and lateral medullary infarction[2]. Because its clinical features and symptoms tend to be vague and/or nonspecific include headache, neck pain, and dizziness, vertigo, nausea, vomiting, then diagnosis may not even be considered. These symptoms and signs are very common chief complaints that are evaluated in the ED and outpatient clinics. The clinician must make a distinction between patients who have benign conditions and patients with life-threatening conditions. Much of this determination rests upon clinical suspicion based on a patient's history as well as the use of imaging modalities. The diagnosis of vertebral artery dissection is usually established by MRI, MR or CT angiography[6]. Management options for VAD are varied and based on numerous factors such as presentation, time of onset, and imaging results. Options include antiplatelet or anticoagulation medications, endovascular management, or vascular surgery[7]. In patients with severe deficits, reperfusion therapy is an option to more immediately restore blood flow to areas of the brain that can be salvaged. These options include alteplase, tenecteplase, or mechanical thrombectomy. These therapies are not without risk as they have the potential to increase the size of the intramural hematoma. These therapeutic modalities have been studied much more thoroughly in cases of cervical artery dissections with minimal literature to support their use in cases of VAD.

VAD are shown to heal within the first few months of the inciting event. In one study of patients with VAD (Arauz A, 2010), 62% of cases showed complete healing of the dissection at six months[8].

IV. CONCLUSION

This report illustrates the potential hazards associated with neck massage. The vertebral arteries are at risk for dissection, which can lead to acute stroke. This case also suggests that careful history taking and awareness of the symptoms of VAD are necessary to diagnose this entity as timely diagnosis and treatment can prevent permanent disability or even death.

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