Case Report

Isolated temporal infarct due traumatic vertebral artery dissecting pseudo-aneurysm: a rare case report

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ABSTRACT

The authors describe a rare case of traumatic vertebral artery dissecting pseudo-aneurysm with temporal lobe infarct in the pre-foramina segment of the left vertebral artery following knife injury of the left anterolateral neck area. A 40 years old man was admitted to the emergency department after a penetrating injury in the left anterolateral neck. On contrast-enhanced CT and Doppler ultrasonography in the neck, a dissecting pseudo-aneurysm of the vertebral artery was revealed.

On day 2, MRI scanning revealed an ischemic infarct in the temporal lobe, which can be attributed to vertebral artery injury. The case was treated conservatively and the patient was discharged on the fourth hospital day. Owing to the position of the artery, traumatic vertebral artery dissections are uncommon, and they are linked with a high mortality rate due to aneurismal rupture and embolic impact of the dissections, culminating in stroke in young people. Our findings demonstrate the necessity of imaging in head and neck traumatic injuries to detect vertebral artery injuries far sooner in order to prevent complications.

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Introduction

Although vertebral artery dissecting pseudo-aneurysm is considered to be an extremely rare disease with a reported incidence of 5 per 100,000, it is more likely to be under diagnosed and more common than previously thought due to a high rate of mortality during the early stages as a result of severe hemorrhage [1,2].

Extracranial vertebral artery injuries are uncommon [3], owing to the artery's deep placement and anatomical protection [4,5]. Because of the high risk of rebleeding or regrowth, traumatic pseudoaneurysm ruptures are linked with a high mortality rate [6], whereas vertebral arterial dissection (VAD) and carotid artery dissections may account for 25%-30% of ischemic strokes in people below the age of 50 years [7]. We present a case of traumatic vertebral artery pseudo-aneurysm leading to temporal lobe infarction.

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Fig. 1 – Color-flow Doppler imaging showed a swirling blood pattern, which reveals an aneurysm.

Fig. 2 – On CT angiography, a 4 × 3.0 cm pseudoaneurysm from the pre-foraminal segment left vertebral artery and non-occlusive vertebral artery dissection with surrounding 3 × 2 cm hematoma formation.

Case report

A 38-year-old man with a normal conscious level (GCS = 15) came to the emergency room after sustaining a stab wound in the left anterolateral area of his neck. He was complaining of left anterolateral pain and swelling at the injury location. He didn’t have any relevant medical history. Except for swelling on the left anterolateral side of the neck and loss of hand abduction, which was consistent with brachial plexus injury, the physical examination was normal. An anechoic vascular mass primarily containing thrombus was seen in close proximity to the left carotid artery on real-time and Doppler sonography. Color-flow Doppler imaging showed a swirling blood pattern, which reveals a pseudo-aneurysm. A zone of rapidly flowing blood was discovered around the mass’s base (Fig. 1). On CT angiography, a 4 × 3.0 cm pseudoaneurysm from the pre-foraminal segment left vertebral artery and non-occlusive vertebral artery dissection with surrounding 3 × 2 cm hematoma formation was detected (Figs. 2 and 3). He began to demonstrate behavioral alterations on the second day of his admission. A magnetic resonance imaging (MRI) of the brain later indicated a left temporal lobe infarct (Fig. 4).

Discussion

VADA (vertebral artery dissecting aneurysm) is a very uncommon disease, accounting for just 3% of cerebral aneurysms. Subarachnoid hemorrhage and ischemic stroke may occur as a result of VADA. [2] The high association of ver-
tebral artery dissecting pseudo-aneurysm with ischemic stroke, particularly in young adults, makes it a critical diagnosis [2].

Aneurysms can be classed as either acquired or congenital. The most prevalent cause of this situation is blunt or penetrating trauma [3,5,8], which generally necessitate a significant surgical surgery [8]. Due to the vertebral artery’s relatively protective placement within the transverse foramina of the cervical vertebrae, traumatic vertebral arteriolar artery damage is uncommon [3–9]. Direct artery damage from a foreign body or bone fragments as a result of a skull fracture, or vascular twisting, stretching, and pressure against neighboring tissues are the mechanisms [6].

The vertebral artery is divided into four segments anatomically: the V1 segment, which runs from the origin to C6, the V2 segment, which runs from C6 to C2, the V3 segment, which runs from C2 to the dura, and the V4 segment, which runs from the dura to the basilar artery. The temper-occipital artery receives blood flow from the vertebrobasilar system, which nourishes the inferior surface of the temporal lobe [9,10].

Penetrating trauma is the most common cause of lesions in the first and second sections of the vertebral artery. Pseudoaneurysms in the third section of the vertebral artery, on the other hand, are frequently associated with blunt trauma or neck flexion-extension injuries [3].

The rupture of the vertebral artery results in catastrophic subarachnoid hemorrhage and the patient’s death [11], whereas dissection of the vertebral artery causes vessel wall disruption and thrombosis, leading to posterior circulation stroke and brain stem ischemia in young people [7,11].

Because the symptoms vary depending on the location of the lesion, it’s difficult to diagnose a vertebral artery damage based just on clinical symptoms. A cervical lump, frequently pulsatile and emitting noises, is the most prevalent discovery. With ischemic events, it’s also possible to identify abnormalities in the cranial nerves, cerebellar dysfunctions, Horner’s syndrome, and neurological symptoms [4]. Conventional digital subtraction angiography was previously used to diagnose dissection of the vertebral arteries. Noninvasive procedures such as MRI, MR angiography, CT angiography, and duplex ultrasonography have rapidly replaced this procedure in recent years. Due to the nature of the VA’s location (between the transverse processes of the cervical vertebrae), it’s difficult to

Fig. 3 – 3D image of neck CT angiogram showing the vertebral artery and pseudoaneurysm.

Fig. 4 – DWI/ADC sequence showing diffusion restriction involving left temporal lobe consistent with infarct.
detect AVA dissection on color Doppler US [8], and previous investigations have demonstrated only a 70% to 80% sensitivity for VADA [1].

With the advancement of high-resolution ultrasonographic methods, diagnosing a dissecting pseudo-aneurysm of an extracranial vertebral artery is becoming more challenging. With a higher proportion of the flow directed into the transducer during diastole, duplex ultrasonography can identify disorders ranging from uneven thickening of the artery wall without hemodynamic change to the significant structural lesion [12]. Color-flow during the cardiac cycle, Doppler sonography revealed a jet of high-frequency blood flow near the base of the aneurysm, as well as a swirling pattern of blood flow [13].

MRI and MRA are less sensitive and specific for identifying VA dissections due to the smaller diameter of normal VAs and the extensive physiological variability in vascular calibre [5,7]. The artery lumen is commonly unequal in normal people, making dissection of the cervical (V2) segment difficult to identify [8]. CT angiography is the diagnostic technique of choice for vertebral arterial dissection, with a sensitivity of 100% and specificity of 98% [1], detecting stenosis, occlusive, and aneurysmal dissections of the VA [8].

The optimum management plan for VADA is a subject of controversy. Because it is not widely identified, it is difficult to conduct a thorough comparison study of the two treatment options: antiplatelet and anticoagulant therapy versus surgical endovascular stenting.

Conclusion

A traumatic dissecting pseudo-aneurysm of the vertebral artery is a rare but serious cause of stroke in young people. Doppler ultrasonography, CT angiography, and MRI are all useful in determining a patient’s diagnosis, therapy, complication risk, and prognosis.

Authors’ contributions

- AME wrote the case report and discussion.
- MK examined the radiological films and wrote the radiology report.
- FAOO approval of the final version

Availability of data and materials

The data that support the findings of this study are available in Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital information system. Data are however allowed to the authors upon reasonable request and with permission of the education and research committee.

Ethics approval and consent to participate

- Ethical approval for this study was waived by ethical committee of Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital.
- The Patient was invited to participate and written informed consent was obtained.

Patient consent statement

The patient was invited and written informed consent was obtained for his anonymized information to be published in this study.

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