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Internal carotid artery dissection causing pulsatile tinnitus

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1. Case presentation

A 51-year-old female with hypertension, presented with right-sided tinnitus for 4 weeks. She described the tinnitus as a continuous, pulsatile "swooshing" sound. Associated symptoms included right-sided otalgia and cervicalgia that began acutely around the time of the tinnitus and were not preceded by trauma. She had no significant otologic history and a review of systems was negative, including neurologic complaints, hearing loss, dietary changes, and thyroid abnormalities. Otologic exam was unremarkable and her audiogram demonstrated only mild right-sided sensorineural hearing loss at 8000 Hz. Head and neck exam was notable for a bruit auscultated over the right parotid gland. Differential diagnosis included atherosclerotic disease, venous malformations including sigmoid sinus or jugular bulb dehiscence, arteriovenous malformation, vascular neoplasm, or intracranial hypertension.

Given the high suspicion for a vascular etiology of her pulsatile tinnitus, magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) of the brain and neck were obtained. Imaging revealed a 3-centimeter distal right cervical internal carotid artery (ICA) dissection extending to the right petrous segment (Fig. 1), with an associated small pseudoaneurysm and 25% stenosis.

2. Discussion

Carotid artery dissection has an incidence of 2.5 to 3 per 100,000, with a peak incidence in the fifth decade and a slight male predominance [1,2]. Dissections more commonly occur in the extracranial (90%) portion of the ICA and carotid dissections are more common than vertebral artery dissections (1.7:1). Dissections are produced by a tear in the vessel wall that enables blood to penetrate between the wall's layers [1,3]. Risk factors for spontaneous or non-traumatic dissections include underlying arteriopathy as well as fibromuscular dysplasia, connective tissue disorders (Marfan syndrome, Ehlers-Danlos syndrome, Loeys-Dietz syndrome), hypertension, hypercholesterolemia, and infection [1].

While headache, neck pain, neurologic deficits, and Horner's syndrome are the most common symptoms of ICA dissection, pulsatile tinnitus is reported in only 5–15% of patients [2–5] and presents as an isolated symptom in only 4.8% [5]. Mechanisms for pulsatile tinnitus in patients with ICA dissection include turbulent or high-velocity blood flow due to a pseudoaneurysm or narrowed vessel lumen [1,2].

The decision to obtain diagnostic imaging is guided by the clinical suspicion for the underlying cause of pulsatile tinnitus. MRI/MRA is often the primary choice to screen for vascular pathologies such as dissection or aneurysm, intracranial pathology, or a soft tissue mass [6,7]. If there is clinical concern for an osseous abnormality such as superior semicircular canal dehiscence or sigmoid sinus dehiscence then computed tomography angiography (CTA) should be performed first [7,8].

The primary management strategy for carotid artery dissections depends on the presence of neurologic deficits. While acute stroke or major neurologic deficits may warrant thrombolysis, endovascular intervention, or surgery to restore blood flow, the majority of carotid artery dissections heal spontaneously. Vessel stenosis resolves in 46–90% of patients, usually within 3–6 months [1]. Therefore, patients without neurological deficits, are often treated with observation and anticoagulation or antiplatelet therapy to minimize the risk of thromboembolism. Follow-up imaging is often obtained to guide the duration of therapy [1].

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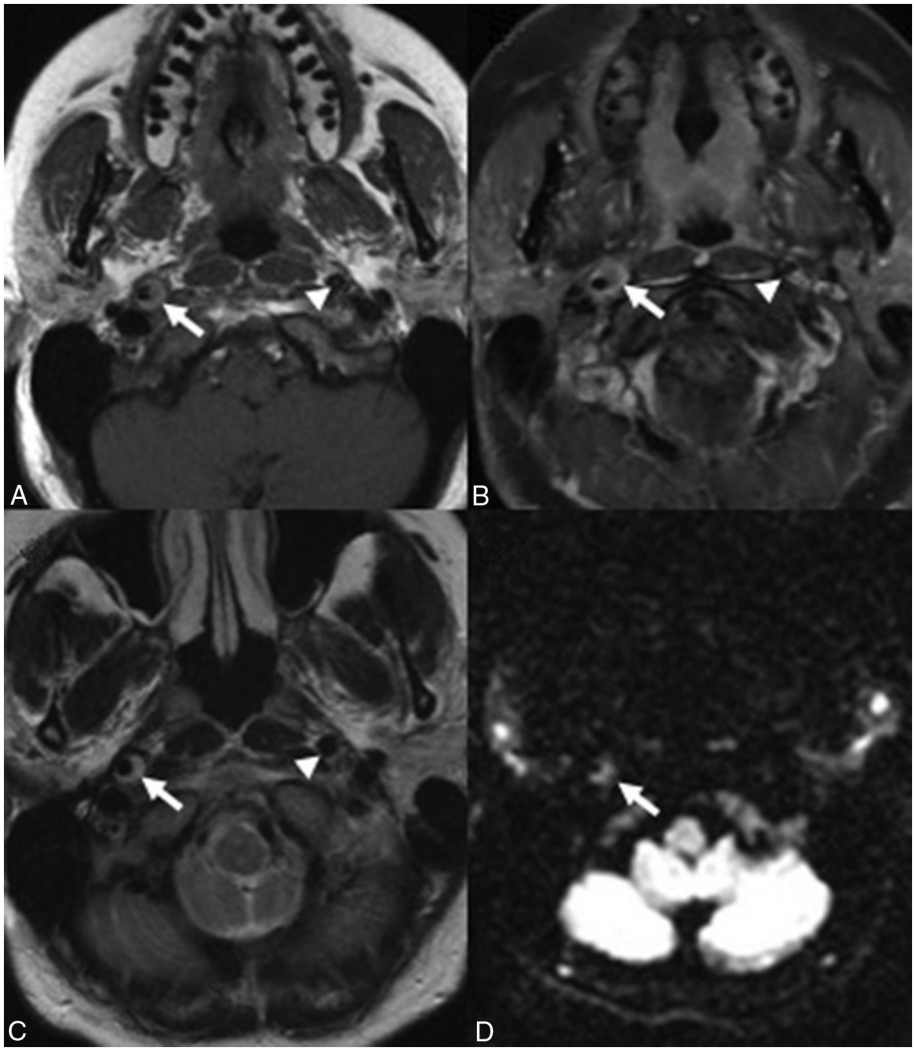

Fig. 1. Right carotid artery dissection (arrow) on axial, magnetic resonance imaging (MRI) of the brain. The left carotid artery (arrowhead) is patent. A) T1-weighted, fast-spin echo without contrast. B) T1-weighted, fat-suppressed with gadolinium. C) T2-weighted, fast-spin echo. D) Diffusion-weighted imaging shows restricted diffusion, seen as high signal, at the right carotid.

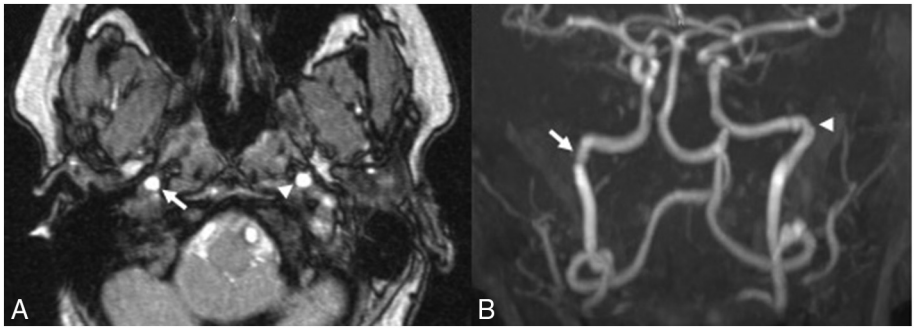

Fig. 2. Follow-up magnetic resonance angiography (MRA) after 7 months of aspirin therapy. The right internal carotid artery (arrow) shows improved patency. The left internal carotid artery is marked with an arrowhead for reference. A) Axial sequence. B) Angiography.

In the presented case, repeat imaging after 7 months demonstrated interval improvement of the stenotic segment of the petrous ICA but persistence of the pseudoaneurysm (Fig. 2). Her pulsatile tinnitus and otalgia have resolved. There has been no neurologic sequalae. She continues on full-dose aspirin therapy long-term for her chronic dissection. Future imaging will be reserved only for symptomatic changes. The clinical presentation and radiographic findings in this case highlight the importance of a systematic evaluation for pulsatile tinnitus, including peri-auricular auscultation.

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Conflicts of interests

None.

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IRB

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