

Selected Topics: Neurological Emergencies

Iatrogenic Vertebral Artery Dissection with Posterior Fossa and Lateral Medullary Stroke After Uncomplicated Cervical Nerve Ablation

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Abstract—Background: A cervical radiofrequency ablation is a procedure that can be performed to treat arthritis-related pain in the neck and upper back. There have been no large studies reporting complications after this procedure. We report a case of a 55-year-old woman with iatrogenic vertebral artery dissection of C3–C4 with segmental occlusion leading to a posterior fossa stroke and lateral medullary stroke after a high-grade cervical nerve ablation. **Case Report:** A 55-year-old woman presented to the Emergency Department with vomiting, neck pain, temperature changes, dizziness, and dysarthria after undergoing C2–C3, C4–C5 nerve ablation 30 min prior to arrival. The patient was found to have a vertebral artery dissection with posterior fossa and lateral medullary stroke. **Why Should an Emergency Physician Be Aware of This?:** Vertebral artery dissection and subsequent stroke should be considered with recent cervical facet joint injections, such as intra-articular facet joint injections, medial branch blocks, or medial branch radiofrequency nerve ablation. The case we report shows devastating outcomes that can result from what many consider a relatively simple procedure. © 2023 Elsevier Inc. All rights reserved.

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Introduction

Radiofrequency ablation is a procedure that involves the insertion of an electrode adjacent to a nerve followed by the application of radio waves to create heat and destroy the nerve. A cervical radiofrequency ablation is most commonly performed to treat arthritis-related pain in the neck and upper back, but the procedure has been used in other injuries such as whiplash, neuropathic pain conditions, and prior back surgeries (1). This case report examines the case of a 55-year-old woman with iatrogenic vertebral artery dissection leading to posterior fossa and lateral medullary stroke after a cervical nerve ablation.

Case Report

A 55-year-old woman presented to the Emergency Department (ED) with a past medical history of ischemic stroke (with no residual deficits) and chronic neck pain, with the chief complaint of slurred speech. The patient had a C2–C3, C4–C5 nerve ablation at an outpatient clinic 30 min prior to arrival to the ED. She underwent con-

scious sedation and, upon awakening, was noted to have dysarthria and right-sided hemiparesis. A code-stroke was activated in the field by Emergency Medical Services report, and the patient was transported to the computed tomography (CT) scanner on arrival. The patient complained of episodes of vomiting upon awakening, inability to move and temperature changes to the right-side of her body, dizziness, and severe neck pain. She denied numbness or weakness prior to undergoing the procedure.

Upon arrival to the ED, she was noted to be mildly hypertensive, with blood pressure of 153/83 mm Hg, heart rate of 85 beats/min, and respiratory rate of 20 breaths/min, with oxygen saturation of 97% and afebrile.

On physical examination, she appeared in distress lying on the CT scanner. On mental status examination, she was alert and oriented to person, place, and date. She was noted to have right-beating nystagmus with pupils round, reactive to light, and extraocular movements were intact. Upon neurological examination, she had mild dysarthria. Repetition was intact. She was unable to identify sensory stimuli on the right. Right upper extremity strength was noted to be 4/5 and right lower extremity strength 5/5. She had dysmetria on the right. She was noted to have myoclonus of the right upper and lower extremities. Gait was not tested.

Suspicion for a vertebral artery dissection and posterior circulation stroke upon initial presentation was high secondary to high-grade cervical ablation prior to presentation. She was deemed to not be a candidate for thrombolytic pharmacotherapy due to concerns for potential development of cervical epidural hematoma as a consequence of thrombolytics after the procedure.

CT scan of the head was performed, which demonstrated a hypodensity of the left lentiform nucleus thought to represent an infarction of indeterminate age. No evidence of acute bleeding was seen. CT perfusion was performed with no visualized perfusion deficit. CT angiogram of the head and neck demonstrated abrupt termination or occlusion of the right vertebral artery at the C3–C4 disc space level, compatible with vertebral artery dissection with segmental occlusion (Figure 1). The imaging was also notable for gas in the right posterolateral neck in proximity to the cervical spine.

The patient was not a candidate for neurosurgical intervention. As per discussion with neurosurgical, and stroke neurology teams, the patient was initiated on a heparin drip to decrease risk of clot formation and propagation and admitted to the neurocritical care service for further monitoring. Upon magnetic resonance imaging performed 2 days later, she was found to have acute infarcts involving right inferior and medial cerebellum and adjacent right lateral medulla (Figure 2).

During her hospital course, she was initiated on anti-coagulation therapy with apixaban. She initially presented



Figure 1. Coronal views of computed tomography angiogram demonstrating disappearance of R vertebral artery at the level of the C4 vertebra.

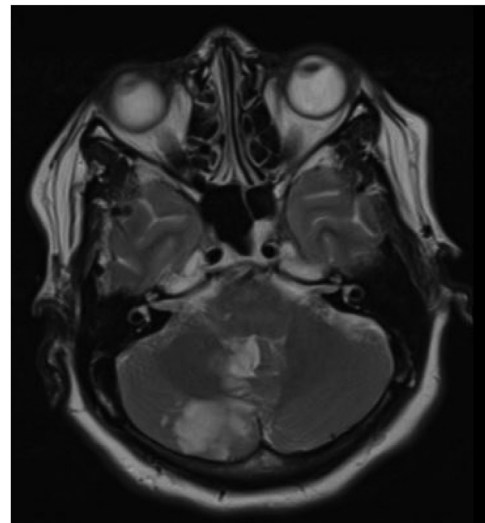


Figure 2. Magnetic resonance imaging of the brain without contrast. T2 axial view. Acute infarct involving right inferior and medial cerebellum and adjacent right lateral medulla.

with a National Institutes of Health Stroke Scale (NIHSS) score of 9, which improved to 2 by the time of discharge. Her neurological examination improved, but she continued to have dizziness and difficulty ambulating secondary to ataxia and dysmetria at time of discharge to an outpatient rehabilitation center.

Discussion

Injuries to the vertebral artery can be traumatic or spontaneous in nature. Traumatic injuries are the result of blunt injury to the head or neck, but can be associated with penetrating trauma. If there is intrinsic weakness of the vessel wall secondary to vascular or connective tissue disorders, it may lead to spontaneous dissection (2).

Vertebral artery dissections can be classified as intracranial or extracranial. Extracranial dissections typically involve distal extracranial segments. Intracranial dissections are associated with subarachnoid hemorrhage, cerebellar and brain stem infarction, and portend a poor prognosis (3).

Neck and posterior head pain is prevalent worldwide, but noted to be most common in the United States, Western Europe, East Asia, Northern Africa, and the Middle East (4). There are numerous modalities that are being performed to manage spinal pain in the United States annually (5).

No large studies have been performed reporting complication rates utilizing imaging guidance during cervical selective nerve root block procedures in the outpatient setting (6). There have been minimal case reports describing complications after radiofrequency cervical nerve ablation (7).

For the emergency physician, vertebral artery dissection can be clinically challenging to detect and diagnose due its diverse presentation. As in this case described above, it should be considered with recent cervical facet joint injections, such as intra-articular facet joint injections, medial branch blocks, or medial branch radiofrequency nerve ablation. In this particular case, it was unclear whether vertebral artery dissection extended intracranially and, as such, thrombolytic pharmacotherapy was not initiated, as there is a risk for subarachnoid hemorrhage with thrombolysis. In addition, there was concern for hematoma development in the setting of recent procedure.

It is important for the emergency physician to consider vertebral artery dissection as a possible cause of stroke symptoms, particularly in the young, and in patients who have recently undergone chiropractic neck manipulation and, as this case shows, other cervical procedures. It is also important to communicate this concern with the consulting neurologist, as this could change management.

For patients presenting with vertebral artery dissections within the thrombolysis window, thrombolysis should not be withheld unless there is evidence of intracranial extension of the dissection (due to concern for causing subarachnoid hemorrhage) (2). Operationally, this means that, although normally, thrombolysis could be administered after noncontrast CT of the head is completed, in cases in which vertebral artery dissection is

suspected on clinical grounds, thrombolysis should be delayed until CT angiography rules out intracranial extension. For patients presenting outside the thrombolysis window, therapy with either antiplatelet agents or anticoagulation is reasonable (8). Blood pressure goals have not been clearly established, but permissive hypertension is typically preferred.

The biggest concern with vertebral artery dissection is the possibility of clot propagation to the basilar artery, which could cause a catastrophic brainstem stroke resulting in locked-in syndrome. Whereas endovascular therapy for vertebral artery dissection remains controversial, mechanical thrombectomy for basilar artery occlusion is standard of care after the recently published BAOCHÉ trial (9). Any sign of decrease in the level of consciousness should trigger a transfer to a thrombectomy-capable center in patients.

Much has been written about the NIHSS tendency to de-emphasize strokes other than in the dominant middle cerebral artery territory. This patient presented with an NIHSS of 9, and by the time of discharge, had improved to an NIHSS of 2. However, despite the improvement, she continued to require assistance with ambulation. Posterior National Institute of Health Stroke Scale (POST-NIHSS) has shown higher prognostic accuracy than NIHSS and may be useful to identify posterior circulation stroke patients with NIHSS < 10 at higher risk of poor outcome (10). This case serves as a reminder of how disabling dizziness can be to the patient when making treatment decisions.

The case we report shows the potentially devastating outcomes that can result from what many consider a relatively simple procedure. Physicians performing cervical nerve root blocks or cervical nerve ablation should be aware that inadvertent needle insertion into vertebral artery can result in vascular injury, with its associated complications of arterial dissection, stroke, and death.

Why Should an Emergency Physician Be Aware of This?

This case report aims to raise awareness for health care providers, especially emergency physicians, regarding injuries in the adult population after a high-grade cervical nerve ablation. We report a case of iatrogenic vertebral artery dissection of C3–C4 with segmental occlusion leading to a posterior fossa stroke and lateral medullary stroke after a high-grade cervical nerve ablation. It is important to recognize symptoms of vertebral artery dissection and concurrent stroke. This diagnostic challenge requires physicians to keep a broad differential diagnosis in patients presenting with neck pain and stroke symptoms. It is imperative to consider historical context along

with presenting symptoms. A high clinical suspicion is needed to facilitate timely diagnosis and management.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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