Vertebral Artery Dissection: An Under-Recognized Cause of Stroke in the Young

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The Case

A 33 YOM with a one-week history of a worsening URI presented to the emergency department (ED) after sudden onset of a posterior headache immediately followed by extreme vertigo. These symptoms began 2 hours earlier following a particularly violent coughing episode in which he flexed his neck forward while lying supine in bed. He felt as though he might vomit, lurched from bed, and was noted to stumble to the left as he ran to the bathroom. He then vomited profusely. Upon return to bed he complained that the room was spinning; he continued to vomit intractably. Medics were called; he was transported to the ED. While in the ED, he denied numbness, focal weakness, dysarthria, or swallowing difficulty. He denied any trauma to the head or neck.

ED Examination results:

- PMH: No history of hypertension or stroke.
- HEENT: PERRL; EOM testing showed some rotatory nystagmus in all directions of gaze.
- Neck: supple without meningismus or audible bruits.
- Neurological exam: normal motor and sensory exam to light touch. Gait was ataxic to the left. Finger to nose
showed left sided dysmetria. Reflexes were symmetric and Babinski testing was negative.

- The remainder of the physical exam was normal.

During the patient's emergency department stay, he was intravenously hydrated and medicated with Zofran. After the CT was completed, he continued to vomit. He was then medicated with Phenergan and Antivert, but began to complain of difficulty swallowing and started to choke. A repeat CT of the head showed no acute abnormalities.

The patient was administered an aspirin rectally and arrangements were made, per the family's request, to admit the patient to another hospital. The patient arrived with a diagnosis of intractable vertigo and vomiting—possible cerebellar CVA. Upon reevaluation, the patient exhibited new numbness of the left face and decreased sensation in the right arm and was hyperreflexic in the lower extremities with plantars upgoing bilaterally. A neurologist was called and recommended stat MRA and MRI Imaging. Imaging results revealed an area of infarction in the left-lateral medulla with associated narrowing of the lumen of the left vertebral artery caused by blood that had collected within the vessel wall—a vertebral artery dissection (VAD). The patient's status had completely changed.

The neurologist's differential diagnosis included ischemic cerebrovascular accident, VAD and cervical spinal cord injury. Subsequently, the patient suffered significant strokes involving the brainstem and right cerebellar hemisphere and occipital lobe secondary to VAD. The VAD caused basilar artery thrombosis and embolism. The patient is now totally disabled.

**Risk Management Commentary:**

This patient filed suit against the ED physician, the ED group, and the hospital, alleging failure to diagnose and treat his condition in a timely manner, as well as failure to obtain a neurology and/or neurosurgery consult. The case was settled for a large dollar amount.

**The key lesson from this case is to consider vertebral artery dissection**

- in the relatively young and middle aged adult (pre-atherosclerotic age group) with a history of what appears to be minor head and neck trauma who present with cerebellar stroke symptoms (nonpositional vertigo, vomiting, ataxia and rotatory or vertical nystagmus)
- in the presence of significant associated head and neck pain
- when there are any focal signs or symptoms of cranial nerve abnormalities ipsilateral to the pain

These signs are further impetus for pursuit of angiographic imaging and once identified, urgent neurology consultation should be sought.

**Clinical Commentary:**

Dissection of the vertebral artery is a rare diagnosis, even in large tertiary care hospitals who report only 0.5 to 2.5 cases per year. It can occur either spontaneously or secondary to trauma. The spontaneous dissection can be associated with hypertension, fibromuscular dysplasia, Ehlers-Danlos syndrome, Marfan's syndrome or rheumatoid arthritis. The mechanism of traumatic dissection is thought to be due to applied torsion and stretch to the artery as it passes through the upper cervical region where it becomes tortuous. Severe trauma to the head and neck can precipitate this problem, but benign appearing trauma such as, sudden active flexion of the neck during cough, trivial head and neck movements, chiropractic manipulation, and benign everyday activities (playing tennis, weight lifting, turning the head while driving the car in reverse, reaching over to turn off an alarm clock), can precipitate vertebral artery dissection.

Vertebral artery dissection can be very difficult to diagnose and requires a high index of suspicion. There are some suggestive clues. Posterior circulation stroke symptoms and signs in a young adult should elicit consideration. If accompanying symptoms such as, unilateral occipital headache and unilateral neck pain are also present, then dissection should be included in the differential diagnosis.
The diagnosis is made with catheter angiography where the findings include an intimal flap or a double barrel lumen on contrast injection. If angiography is not available, a MRA or CTA should be performed.

A neurology consultation to determine treatment should be obtained. Many patients are candidates for anticoagulation with heparin. This is thought to minimize the potential for propagated emboli from thrombus that has formed at the site of dissection, which is the most common cause of ischemic stroke. At this time, there is little literature support for thrombolytic therapy.

Additional Resources:

- Vertebral Artery Dissection: Natural History, Clinical Features and Therapeutic Considerations http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2588305/ [3]
- Vertebral Artery Dissection Diagnosed with CT http://www.ajnr.org/content/16/4/952.full.pdf [4]