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## Vertebral Artery Dissection After Rapid Head Turning

Unlike carotid artery trauma, which commonly is due to penetrating injury, injuries of the vertebral arteries are more frequently related to factors such as abrupt changes in the position of the head or neck, as with chiropractic cervical manipulation, hyperextension and cervical rotation, and blunt trauma or basilar skull fracture [1]. In a normal vertebral artery, flow can be compromised by movement of the neck, most effectively by rotation, and predisposing factors such as atlantoaxial instability, cervical degenerative changes, or atherosclerosis need not be present [2–7]. Abrupt turning of the head may result in brain or spinal cord ischemia or infarctions, although the mechanism is often unclear [3, 6, 8–10].

### Case Report

A 41-year-old previously healthy man was lifting a railroad tie from a squatting position when he lost his grip and his head snapped quickly to the left. He then turned his head quickly back to the right and suddenly experienced diplopia and vertigo. Examination revealed a right ptosis, weakness of left cranial nerve VI, bilateral cranial nerve III paresis, and a truncal ataxia. On admission, CT of the head was normal. Vertebral angiography (Fig. 1) showed a dissection of the left vertebral artery. The tear began approximately 1 cm cephalad to the artery's origin and extended to the level of C1–C2. MR revealed

abnormal signal in the left cerebellum and right thalamus consistent with ischemia. After 4 weeks of treatment with IV heparin, follow-up MR showed nearly complete resolution of the abnormalities, and a vertebral angiogram showed a normal-appearing left vertebral artery.

### Discussion

Dissections of the vertebral arteries are rare but, when present, are more likely to involve the intradural rather than the extracranial portion of the vessel [11]. Dissections of cervical vertebral arteries can occur at any level, possibly from stretching or shear stress after hyperextension or rotation at areas of potential compression, such as the transverse foramina of C1 to C6, the atlantoaxial joint, and the atlantooccipital joint, which could then lead to intramural dissection and hemorrhage [8, 12, 13]. In particular, chiropractic manipulation has been implicated in a wide variety of vertebral artery abnormalities, including thrombosis, dissection, and intramural hematoma [10, 12].

The case presented is unusual because the dissection extended from the low cervical part of the vessel, near its origin, up to C1–C2. Inasmuch as the first part of the vertebral artery may be compressed by muscular and fascial bands after cervical rotation [14], this may explain the level of injury in this patient, given his muscular build.

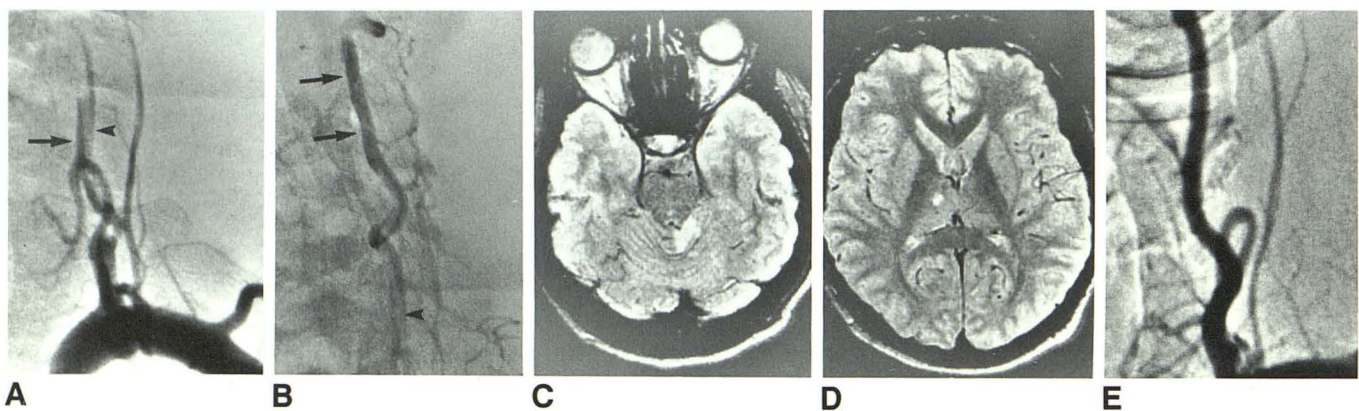


Fig. 1.—Vertebral artery dissection after rapid head turning.  
 A and B, Vertebral angiograms show a tear beginning near origin of vessel and extending cephalad to level of C1–C2. Subintimal contrast medium (arrows) is seen outlining an intimal flap (arrowhead).  
 C, Axial MR image (2000/80) shows an area of increased signal in left vermis of cerebellum.  
 D, MR image (2000/20) shows a smaller abnormality, a focal area of increased signal in right thalamus.  
 E, Angiogram obtained after 4 weeks of conservative management shows normal-appearing left vertebral artery.

Because dissections of vertebral arteries may lead to brain ischemia and infarctions, MR should be quite useful in identifying and following any brain injuries, even when CT is negative, as in this case.

Injury of vertebral arteries that is associated with infarction of brain and spinal cord after an abrupt change in the position of the head has been reported in more than 50 patients. It may be the result of dissection leading to luminal narrowing, which causes formation of thrombus followed by progression of thrombus or embolization [6, 10]. Symptoms often include neck pain on the side of the injury [6] and also may include signs and symptoms of posterior fossa ischemia or infarction, such as dizziness, vertigo, ataxia, syncope, or visual disturbances [3, 13]. Often, conservative therapy alone is used [6, 10–12], including anticoagulants and immobilization, despite potential risks of hemorrhage into infarcted brain. However, successful surgical repair has also been used [13]. Dissection of the vertebral artery should be strongly considered in a patient with signs and symptoms related to the posterior fossa after any type of abnormal cervical movement.

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