Vertebral artery dissection after rapid head turning.

R F Traflet, A R Babaria, R D Bell, S E Sollenberger, H T Doan, C F Gonzalez and M M Mishkin

AJNR Am J Neuroradiol 1989, 10 (3) 650-651
http://www.ajnr.org/content/10/3/650.citation

Abbreviated Report

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.

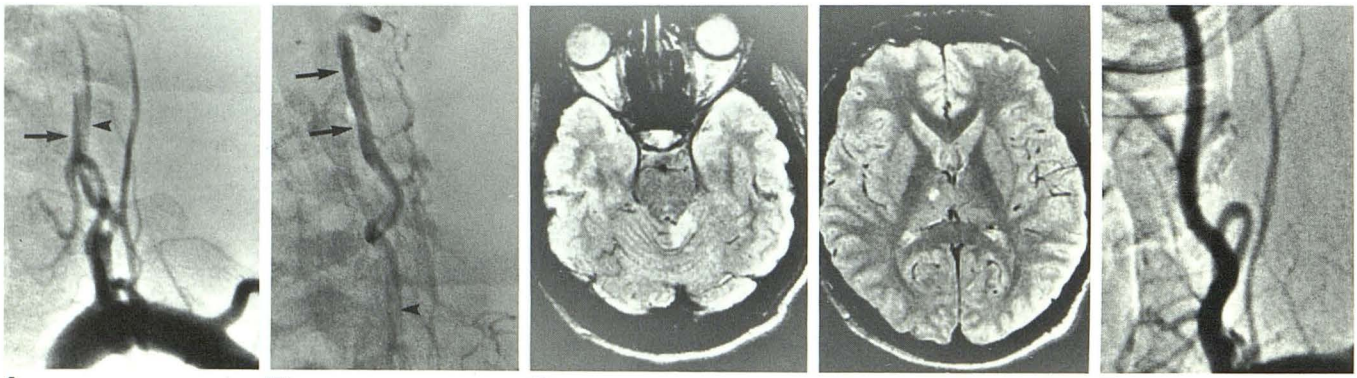

Fig. 1.—Vertebral artery dissection after rapid head turning.

***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.

Robert F. Traflet
Ashok R. Babaria
Rodney D. Bell
Stanton E. Sollenberger
H. T. Doan
Carlos F. Gonzalez
Mark M. Mishkin
Thomas Jefferson University Hospital
Philadelphia, PA 19107

REFERENCES

1. Dragon R, Saranchak H, Lakin P, et al. Blunt injuries to the carotid and vertebral arteries. *Am J Surg* **1981**;141:497–500
2. Toole JF, Tucker SH. Influence of head position upon cerebral circulation: studies on blood flow in cadavers. *Arch Neurol* **1960**;2:616–623
3. Krueger BR, Okazaki H. Vertebral-basilar distribution infarction following chiropractic cervical manipulation. *Mayo Clin Proc* **1980**;55:322–332
4. Lewis DW, Berman PH. Vertebral artery dissection and alternating hemiparesis in an adolescent. *Pediatrics* **1986**;78:610–613
5. Roualdes G, Lartigue C, Boudigue P, et al. Dissection de l'artere vertebrale dans sa portion extra-cranienne apres un match de tennis. *Presse Med* **1985**;14:2108
6. Sherman DG, Hart RG, Easton JD. Abrupt change in head position and cerebral infarction. *Stroke* **1981**;12:2–6
7. Vanezis P. Techniques used in the evaluation of vertebral artery trauma at post-mortem. *Forensic Sci Int* **1979**;13:159–165
8. Bladin PF, Merory J. Mechanisms in cerebral lesions in trauma to high cervical portion of the vertebral artery: rotation injury. *Proc Aust Assoc Neurol* **1975**;12:35–41
9. Shimoji T, Bando K, Nakajima K, et al. Dissecting aneurysm of the vertebral artery. *J Neurosurg* **1984**;61:1038–1046
10. Davis JM, Zimmerman RA. Injury of the carotid and vertebral arteries. *Neuroradiology* **1983**;25:55–69
11. Goldstein SJ. Dissecting hematoma of the cervical vertebral artery. *J Neurosurg* **1982**;56:451–454
12. Katirji MB, Reinmuth OM, Latchaw RE. Stroke due to vertebral artery injury. *Arch Neurol* **1985**;42:242–248
13. Alexander JJ, Glagov S, Zarins CK. Repair of a vertebral artery dissection. *J Neurosurg* **1986**;64:663–665
14. Hardin CA, Poser CM. Rotational obstruction of the vertebral artery due to redundancy and extraluminal cervical fascial bands. *Ann Surg* **1967**;158:133–137