Arteries that enter bony tunnels tend to be protected from trauma until the bone is fractured, in which case the fixation of the artery in its foramen together with the propinquity of mobile bone is hazardous. The vertebral arteries, unique in passing through a series of bony rings, appear particularly vulnerable in this respect. Reports of vertebral artery thrombosis following trauma are, however, few. The following report is of a case in which the site of vascular damage in the lower part of the neck was verified at autopsy and found paradoxically to be contralateral to the main vertebral fracture.

CASE REPORT

A 42-year-old man, previously healthy, fell 10 feet to the ground from a tree. He was unconscious for 2 minutes and afterwards was unable to move his legs. At a nearby hospital he was put into a Glissou sling with 5 lbs. of traction in mild hyperextension. He was admitted to the Montreal Neurological Institute 6 hours after his fall.

Examination. On admission his pulse rate was 80 per minute, respirations 24 per minute, blood pressure 86/60 and temperature 101°F. Bruises were present on the left side of his face. There was tenderness over the spinous processes of the lower cervical vertebrae. His abdomen was distended. A Foley catheter was in place. He seemed slightly drowsy but was fully cooperative. Cranial-nerve functions were normal. There was weakness of the left triceps and flexors of the left hand. The left triceps jerk was absent. Perception of pin prick was impaired over the ulnar side of the left arm, forearm, and hand. All sensation was lost below the level of the 2nd rib on the left and the 3rd rib on the right. There was flaccid paralysis of all muscles of the legs and abdomen.

Soon after the initial examination, the patient complained of sudden intense vertigo and vomited. He now displayed horizontal nystagmus, accentuated on right lateral gaze.

Roentgenograms showed a compression fracture of C7 with splaying out of the vertebral body and increase in the interpeduncular distance (Figs. 1 and 2). The C6-C7 disc had ruptured the superior surface of the body of C7; the posterior two-thirds of the superior surface of C7 were displaced downwards and posteriorly, so that a portion projected 4–5 mm. into the spinal canal in the midline. A fracture of the right lamina of C7 was also visible. Soft-tissue swelling anterior to C7 was prominent.

Course. Cone-Barton tongs were applied with 20 lbs. of traction. Lumbar puncture yielded bloody fluid at 210 mm. pressure; manometry indicated a complete block. On the following morning the patient's left-hand grip was weaker, and he complained of difficulty in breathing. Treatment included oxygen, a Levine tube,
Prostigmin, and Chloromycetin. In the evening his respirations were shallow; he showed cyanosis. While preparations for a tracheostomy were being made, his breathing stopped, and 3 minutes later cardiac arrest occurred. The time of death was 29 hours after his injury.

Autopsy was limited to the head and back. Bruises were present over the left eye and on the left cheek. The scalp, skull, and cranial dura mater were unremarkable. During removal of the brain, the lower part of the brain stem was found to be displaced to the right by the enlarged left cerebellar hemisphere. The brain weighed 1460 gm. Gross abnormality was limited to the cerebellum, the left hemisphere of which was soft and swollen over its entire inferior surface (Fig. 3). The left vertebral artery was distended with firm thrombus almost up to the origin of the anterior spinal artery. The thrombus extended into the left posterior inferior cerebellar artery, which on this side was the sole major vessel supplying the inferior surface of the cerebellum. The vertebral arteries were equal in size.

The left vertebral artery in the neck did not pass through any part of the 7th cervical vertebra. Proximal to its entry into the transverse foramen of C6 the artery was thrombosed and its wall had a pale greenish tint. The left lateral mass of C7 was intact. The fractures corresponded to their roentgen-ray description: collapse of the body of C7 with protrusion of the posterior superior surface into the spinal canal slightly to right of midline; fracture of the right lamina, and in addition, a fracture through the right pedicle. The cord was flattened and bruised in its 1st and 2nd thoracic segments. On section the whole thickness of the cord at T1 was pulped.

Histological Examination. Step serial sections of medulla and lower pons showed an early infarct extending from the sensory decussation to just below the acoustic striae. This infarct, which was limited to the left lateral medullary region, involved the spinocerebellar tracts, the spinal tract and nucleus of the trigeminal nerve, the subtrigeminal nucleus, the lateral cuneate nucleus, and (rostrally) the medial vestibular nucleus and the nucleus of the tractus solitarius. The inferior folia of the left cerebellar hemisphere were freshly infarcted; there was early polymorphonuclear infiltration of their meninges.

The 1st and 2nd thoracic segments of the spinal cord were lacerated and necrotic. The anterior spinal artery was uninjured. No abnormality was seen in segments above the 8th cervical or below the 3rd thoracic.

The wall of the left vertebral artery at the level of the C6-C7 interspace had been disrupted by hemorrhage. The muscularis was destroyed in much of its circumference (Figs. 4 and 5). The lumen was filled with ante-mortem thrombus. Numerous polymorphonuclear leukocytes had invaded the adventitia. Immediately proximal and distal to this level the artery was much less damaged, although blood had dissected beneath the intima, and a small intimal cushion of atheroma was present.

DISCUSSION

The closest parallel to the present case is Murray's account of a 16-year-old boy whose right arm was drawn into a band saw. It was later surmised that his head had been forced strongly to the left. The arm had to be amputated. Several hours later the patient became comatose and Babinski's signs developed. Eventually he had respiratory arrest. At autopsy there was massive softening of the right lobe of the cerebellum, with a small hemorrhagic area in the left lobe. The right vertebral artery was thrombosed from close to the basilar artery down to its entrance through the dura mater. The artery in the neck could not be examined. No dislocation or fracture was seen in the cervical spine.