CASE REPORTS AND TECHNICAL NOTES

UNILATERAL VERTEBRAL ARTERY LIGATION
REPORT OF A CASE ENDING FATALLY WITH THROMBOSIS OF THE BASILAR ARTERY

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Ligation of the large vessels of the neck has always been viewed with some hesitancy by surgeons because of the ever present danger of brain ischemia. In the 151 odd years since Abernathy\(^1\) ligated the common carotid artery for a lacerated internal carotid, confidence in this procedure has increased until now such ligations are rather commonplace. Dandy\(^2\) stated that immediate complications are less than 4 per cent and delayed, less than 2 per cent. However, Reid and Andrus (cited by Keegan\(^3\)) believed that the hazard of ischemia is 20–25 per cent.

Ligation of the vertebral arteries has been relatively rarely performed. Matas\(^4\) stated that Maisonneuve and Favrot performed the first ligation in 1852, for a gunshot wound, thus disputing the statement of Sanson, made in 1836, that the “wounds of this vessel are beyond the resources of art.” Ligations of the vertebral vessels had increased in frequency to a point where Dandy\(^2\) stated, based on the work of Alexander, that “both vertebrais can be ligated, even at the same operation, with impunity.”

With the increasing popularity of the angiogram as a diagnostic procedure, and thus the frequent exposure of the great vessels, and with increasing knowledge of the value of ligation in the treatment of vascular lesions, it has become increasingly important to know accurately the risk involved with ligation. It is our purpose here to report a case of unilateral vertebral artery ligation, done following an angiogram, resulting in brain stem ischemia and death.

CASE REPORT

A 48-year-old white male was admitted to the University of Minnesota Hospitals on Dec. 9, 1948 with a history of progressive neurological deficit of 11 years’ duration.

There had been 3 previous admissions, the first of which was on Aug. 5, 1939, at which time a history was obtained of dizzy spells, occipital headaches, visual hallucinations, and gait disturbance. Examination revealed a right facial paresis of central type, bilaterally positive Hoffmann signs, decreased left abdominal reflexes, and disturbance of equilibrium. CSF protein was 90 mg. per cent. Skull roentgenograms revealed no abnormality. He was discharged, but kept under observation as a brain tumor suspect.

Because of persistent neurological abnormalities, he was readmitted on Mar. 8, 1940. At this time, all his deep tendon reflexes were hyperactive, the Hoffmann sign was positive on the left, the right abdominal reflex was reduced and the speech slurred. A ventriculogram revealed a defect in the occipital horn of the left lateral ventricle. A left occipital craniotomy was performed and a very vascular fibroblastic meningioma arising from the upper surface of the tentorium was encountered. Subtotal removal of the tumor was done, total extirpation being impossible because of extreme vascularity. A right homonymous hemianopsia was present after operation.

The patient was readmitted on May 16, 1940. He was feeling well, but there was some recent memory loss, a mild expressive aphasia, and a right homonymous hemianopsia. The
craniotomy wound was reopened but, in spite of ligation of the left lateral sinus and multiple transfusions, total removal of the tumor was not accomplished because of excessive bleeding.

Examination on Final Admission, Dec. 9, 1948. The patient was more lethargic and profound personality changes had developed. Psychological testing revealed marked mental deterioration. He had had numerous generalized convulsive seizures. There was right facial paresis of central type, a positive left Hoffmann sign, left dysdiadochokinesia, trunkal ataxia, questionably positive Romberg sign, right homonymous hemianopia, and a formulation aphasia with anomia and alexia.

Operation. A further attempt at removal of the tumor was considered. It was deemed advisable to first ascertain the source of blood supply to the tumor so that the extreme vascularity could be overcome at the onset of the operation. A vertebral angiogram (Fig. 1) was made by the open method, the left vertebral artery being visualized some 2 cm. above its origin from the subclavian artery. It was about the size of the usual common carotid artery. The angiogram revealed a large mass of small vessels, occupying an area about 8 cm. in diameter in the left cerebellar region and extending well above the tentorium. The source of blood to the tumor was obviously the posterior cerebral arteries. In order to reduce the supply, the left vertebral artery was ligated.

Course. On the evening of the 1st postoperative day it was noted that the patient had a left Horner's syndrome, horizontal nystagmus of the left eye on left lateral gaze, and paralysis of medial gaze in the right eye. Aphasia had increased. By the next day there was right hemihypesthesia and hemiparesis and an increase in the right facial paresis. In the left eye the quick component of the nystagmus was to the left on lateral gaze and rotatory on upward gaze. Deep reflexes on the right were increased and there were positive Mayer, Oppenheim, and Babinski signs on the left. On the 3rd day he was somewhat improved; the right ophthalmoplegia had largely disappeared. However, during the night he was observed to cough and choke while taking medication and following this he became stuporous and expired.

Autopsy. There was thrombosis of the entire left vertebral artery and of the basilar artery up to 2 1/2 cm. above the origin of the superior cerebellar artery. The pontine tissue on either side of the upper portion of the basilar artery was soft, the softening extending downward more on the left. In the left parieto-occipital area and involving the greater part of the left cerebellar hemisphere was a firm, reddish, nodular tumor mass, some 6 X 5 X 4 cm., appearing to arise from the tentorium (Fig. 2). Histological diagnosis: Fibroblastic meningioma. The cause of death was considered due to infarction of the pons.

DISCUSSION

Ligation of a vertebral artery has been accomplished without complications. Shumacker\(^8\) ligated the vertebral artery in 4 cases of traumatic arteriovenous fistulae, in 1 case one vertebral and one common carotid, without ill result. However, he did mention 1 other case in his experience in which there was homolateral cerebellar necrosis occurring without evidence of embolism or thrombosis. Elkin and Harris\(^8\)