The Value of Vertebral Angiography in the Treatment of Cervical Neurofibroma*

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RECENTLY there has been increasing awareness among surgeons and radiologists that extracranial tumors of the neck have not been as fully examined by angiography as might be possible.\(^1\)\(^{2}\)

All of the current reports have emphasized soft tissue masses which are often palpable but offer difficulties in specific diagnosis prior to operation. These studies have been confined almost exclusively to lesions of the extracranial carotid system in the neck. The neoplasms studied most frequently by carotid angiography have been carotid body tumors, glomus jugulare tumors, hemangiomas, and lymphangiomas of the orbit and nasopharynx. Primary and metastatic neoplasms in the neck causing actual occlusion of the extracranial carotid artery also have been examined by this method.\(^1\)\(^{2}\)

There is almost no information on angiography in neurogenic tumors of the neck with the exception of an interesting report by Putney, \textit{et al.},\(^7\) in which a neurolemmoma of the vagus nerve in the oropharynx displaced and compressed the carotid bifurcation. Little data are available on vertebral angiography in patients with lesions of the spinal canal or paraspinal areas such as might occur in cervical neurofibromas or neurofibromatosis. One unusual case of vertebral angiography was reported in which an extremely tortuous vertebral artery simulated a neurofibroma of the C-5 nerve root due to an enlargement of the C-4–C-5 intervertebral foramen in a patient with neck pain.\(^8\) An unnecessary operation was prevented by a good arteriographic study of the area.

The purpose of this paper is to emphasize the value of vertebral arteriography in demonstrating the relationship of a cervical nerve root tumor to the artery. We have chosen three cases to illustrate pertinent points.

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Case Reports

\textit{Case 1.} A 19-year old right-handed man first felt a snapping pain in the neck while wrestling 2 years prior to admission to the hospital. The following morning he noted weakness in the right arm and hand. Over the next 18 months he developed progressive weakness and clonus in the arms and legs which he described as “bothersome shaking.”

\textit{Examination.} On February 6, 1966, examination showed a broad-based, spastic gait with clonus in all four extremities. The grip was very poor bilaterally; he had marked weakness of the left triceps and right biceps muscles and the extensor muscles of the right wrist. There was weakness of dorsiflexion of both feet. He had a sensory level with loss of pain and impairment of vibration sense bilaterally below the level of the C-5 dermatome, with sacral sparing. Touch and proprioceptive sensations were intact. He had no neck pain.

X-rays of the cervical spine showed an extensive but smooth and regular erosion of the right C3–C4 intervertebral foramen as well as erosion of the posterolateral portion of the bodies and pedicles of the C3–C4 vertebrae (Fig. 1). There was a slightly elevated right diaphragm on chest x-ray. A cervical myelogram was unsuccessful; the cerebrospinal fluid protein was \(67\%\). A right retrograde brachial arteriogram demonstrated a large right vertebral artery displaced far anteriorly and medially by tumor at the C3–C4 level (Fig. 2).

\textit{Operation.} On February 10, cervical laminectomy with the patient in the sitting position revealed the spinal cord and dura displaced to the left by a large 3\texttimes{}5 cm mass at the C-3 level. Upon opening the dura, the cord was found to be compressed by the encapsulated mass originating from the C-3 nerve root. The tumor was removed piecemeal intracapsularly, and then the capsule was carefully dissected away from the dura and the cord, medially,
and the vertebral artery, anteriorly. Following total removal, a large vertebral artery was clearly visible as it ran along its distorted course in the hollowed bed of the C-3 and C-4 vertebral bodies.

The patient was discharged 9 days later with much improvement in the strength of the legs and arms, an absence of clonus and pyramidal tract signs, a resolution of his sensory deficit, and a normal gait. In August, 1966, he was working full time and believed his strength was back to normal. His only neurological findings were the persistence of bilateral Hoffman signs.

Comment. Case 1 is an example of a large tumor causing quadripareisis with pressure