Osteoclastoma of the Jugular Foramen

Case Report

PETER D. MOYES, M.D., F.R.C.S. (C), F.A.C.S., PAUL J. A. BRATTY, M.D., F.R.C.P. (C), AND CLARISSE L. DOLMAN, M.D., F.R.C.P. (C)

We are reporting a case which, as far as we have been able to ascertain, is unique, namely, a giant-cell tumor occurring in the area of the jugular foramen. There have been a number of reports of giant-cell tumors of the cranial vault, but no reference has been found to such a tumor occurring in the jugular foramen.

Lichtenstein describes the subject of osteoclastoma as "being in a state of confusion for a long time because its diagnosis was frequently applied indiscriminately to other bone lesions, mainly because they present a scattering of multinuclear cells." He goes on to say that the genuine giant-cell tumor is not nearly as common as was formerly supposed. He feels that at least 60% of all giant-cell tumors develop in large limb bones although some have been observed in the mandibles and occasionally in the vertebral column. In his long experience he has never encountered one in a bone of the calvarium although they have been observed by others in the calvarium mainly as a complication of Paget's disease. Dahlin, however, described a giant cell tumor that occurred in the sphenoid bone of a 25-year-old woman.

Many studies have been made of tumors of the jugular foramen. The clinical manifestations are chiefly the result of involvement of the ninth, tenth, and eleventh cranial nerves. Cerebellar and long-tract signs may also be present, and there may be increased intracranial pressure. The radiographic findings include enlargement of the jugular foramen and erosion of adjacent bone. Pneumoencephalography may show a mass, and the ventricles may be dilated. Some of the pathological lesions described include gomus jugulare tumor, neuromas of the ninth, tenth, or eleventh cranial nerves, meningioma, chordoma, metastatic carcinoma, chondroma, carcinoma of the tympanic cavity, cholesteatoma, vagal body chemodec-toma, and aneurysm of the carotid artery. However, again no reference could be found in the literature to the occurrence of an osteoclastoma of the jugular foramen.

Case Report

This 13-year-old girl was admitted to the Health Center for Children, Vancouver, B. C., in March, 1968. She first complained of pain in the low occipital region and neck in November, 1967. By the time she was admitted she was having difficulty with swallowing and talking and complained of some hearing loss on the right.

Examination. The patient had a slight torticollis with marked wasting and weakness of the right sternomastoid and upper trapezius. There was questionable involvement of the lower trapezius, supraspinatus, rhomboids, and deltoid on the right. There was paralysis of the palate on the right, and paralysis and wasting of the right side of the tongue. There was no evidence of increased intracranial pressure and no evidence of cerebellar or long-tract involvement.

Plain x-rays of the base of the skull and of the cranio-vertebral junction were considered to be normal. Posterior fossa myelography, pneumoencephalography, and right retrograde brachial arteriography were all interpreted as showing no abnormality. Tomography of the cranio-vertebral junction was performed on May 2, 1968, and showed a defect 1.5 cm in diameter at the base of the right occipital condyle in the region of the anterior condylar canal and the medial margin of the jugular foramen and jugular tuber-cle (Fig. 1). The lateral margin of the jugular foramen and the inferior margin of petrous bone in the region of the jugular tuber-cle appeared to be intact. An x-ray survey of the skeleton on May 7 suggested some generalized demineralization which was more evident in the bones of the hand. There was no evidence of active osseous disease.

Received for publication February 26, 1969.
still had a mildly nasal voice but had some slight function of the tongue, soft palate, and sternomastoid on the right. She had excellent function of the upper trapezius, which had been confirmed electromyographically on October 9, 1968. By February 16, 1969, her voice had returned almost to normal, and function of the tongue, soft palate, and sternomastoid was further improved. She looked and felt generally well.

*Pathology.* (Clarisse L. Dolman M.D.). Grossly, the tumor consisted of fragments, some hemorrhagic, others fairly tough and fibrous, aggregating to about 3 cc. Microscopically, the tumor was composed of two elements, spindle cells and giant cells, the latter being very numerous and containing anywhere from 2 to 100 nuclei (Fig. 2). Mitotic figures were occasionally seen in the spindle cells. At the edges of the tumor, portions of dura and ligament were included. Here there was new bone formation, the giant cells were rare, and the stroma more fibrous. In some fragments the tumor was adjacent to fibrous tissue without any intervention of bone, or invaded fat and muscle.

*Operation.* On May 8, 1968, the tumor was exposed via a suboccipital approach. Because of the defect in the occipital bone, a small cut was accidentally made in the right vertebral artery but this was successfully repaired by Dr. W. B. Chung. The tumor appeared to be a fairly well-encapsulated rubbery grayish mass located in the area of the atlanto-occipital membrane on the right. There was erosion of part of the right occipital condyle and adjacent occipital bone. The tumor was removed piecemeal by means of a cutting loop and suction; as much of the capsule as possible was removed, chiefly by sharp dissection because of its adherence to surrounding structures, including the right vertebral artery. We felt that although the major part of the tumor and capsule had been removed some of the capsule had been left in place. Because of this, the patient later received 10 x-ray treatments at the British Columbia Cancer Institute: 2650 rads in 12 days applied to the right mastoid area.

*Postoperative Course.* The patient’s progress following the operation was most satisfactory. When seen on December 17, 1968, she was free of any pain in the occipital or cervical area and had lost the torticollis. She

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**Fig. 1.** Tomogram showing bony defect in the region of the right occipital condyle.

**Fig. 2.** A spindle cell stroma with giant cells of various sizes. H&E., ×380.
Tiny osteoid spicules were present in a few areas, at some distance from the outer shell of the tumor.

The differential pathological diagnosis lies between an osteoclastoma or a benign osteoblastoma. Of four pathologists who examined the slides, three decided on an osteoclastoma, the fourth on benign osteoblastoma because of the location in which the lesion was found. The reason for choosing the term “osteoclastoma” was the giant cells seemed to form a distinct part of the tumor, and the nuclei of the stromal and giant cells were similar to each other. The new bone formation, which might suggest an osteoblastoma, was only abundant at the margins of the tumor; this finding has been reported in osteoclastomas, sometimes accompanied by more diffuse osteoid formation throughout the tumor. Hutter, et al., 6 for example, report the presence of osteoid, or osteoid and bone, in no less than 55% of giant cell tumors.

**Discussion**

The clinical findings in this case were related to the presence of a mass that caused pain and to involvement of the ninth, tenth, and eleventh cranial nerves. There seemed also to be minimal involvement of the eighth cranial nerve. There was no evidence of obstructive hydrocephalus or generalized increased intracranial pressure. Tomography was delayed because the plain x-rays seemed normal. It is probable that the diagnosis would have been reached sooner if tomography had preceded the contrast studies, but the latter were carried out partly because we thought the cervical spinal canal was also involved.

The extent of recovery of the cranial nerves traversing the jugular foramen has so far been minimal. Whether further recovery will occur and whether the tumor will recur both remain matters for speculation.

We have been unable to locate any report of a previous case of osteoclastoma of the jugular foramen.

**Summary**

We have reported the case of a 13-year-old girl with a “jugular foramen syndrome” on the right side due to an osteoclastoma which was treated by subtotal surgical removal followed by x-ray therapy.

**Acknowledgments**

We wish to thank Dr. Leon Komar for referring this patient to us. We also wish to thank Dr. Gordon E. Trueman who interpreted the x-ray films.

**References**