Neurinoma of the Gasserian Ganglion
Report of a Case and Review of the Literature

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By reason of their rarity, the complex clinical problems which they may present and the difficult technical aspects involved in their removal, neurinomas of the gasserian ganglion are of extreme interest.

The benign tumors, which most commonly are encountered arising from the gasserian ganglion, are either meningiomas or neurinomas. Of the 294 meningiomas reported by Cushing and Eisenhardt, 5 were gasserian tumors. Olive and Svien reported 13 cases of solitary neurofibromas of the 5th nerve. Jefferson reported in detail 7 cases of trigeminal neurinomas studied at the University of Manchester. From a careful search of the literature he found descriptions of not more than 26 cases. Of this number, the authenticity of a few was questioned.

Many of the reports in the earlier literature are open to question because of the frequency of malignant tumors in this location, particularly those invading the region of the gasserian ganglion from the nasopharynx. Cohen (1933), after reviewing the 83 cases of tumor of the gasserian ganglion reported in the literature to that date, stated that 49 were certainly malignant. He questioned the remainder except for 6 which he regarded as neurinomas.

The neurinoma arises from the cells of the sheath of Schwann. Microscopically, the neurinoma of the fifth nerve resembles in all respects its counterpart, the acoustic neurinoma. Russell and Rubinstein have described the histological characteristics of this tumor. Both type A and type B tissue of Antoni may be distinguished. In type A the tissue is compact and there are groups of elongated, bipolar, spindle-shaped cells which tend to intermingle. The nuclei are oval or rod-shaped with varying amounts of chromatin. Occasional palisading is seen. Type B may be intermingled with that of type A. The texture of the tissue is looser and the cells are polymorphic. Between the somewhat indefinite cellular outlines is a finely honeycombed eosinophilic matrix in which there are sparse fibers of reticulin.

This tumor, arising as it does from the gasserian ganglion, causes most commonly a middle-fossa syndrome. The tumor to be described arose from the gasserian ganglion and was characterized by a middle-fossa syndrome, presenting several interesting features.

Case Report

J.W.P., a 17-year-old white female, was first seen on June 18, 1957. She complained of numbness of the left side of the face. She had first noted double vision about 1 year before. This complaint was attributed to an ocular imbalance and no diagnostic studies and no treatment were carried out at that time. The patient began to notice increasing numbness of the left side of the face but at no time did she complain of any pain. At times it was noticed that she would be unaware of drooling from the left side of her mouth. There were no other complaints and her past history was noncontributory.

Examination. The patient was alert, clear and cooperative. There was no dysphasia. The optic discs were normal. Visual fields were normal on testing by confrontation. On June 10 the visual acuity was 20/15 O.U. and the visual fields were normal to a 3 mm. white test object. Testing of the extra-ocular muscles revealed an incomplete paralysis of the left abducens. There was marked atrophy of the muscles supplied by the motor 5th nerve and complete loss of sensation over all three divisions of the 5th nerve. The remaining cranial nerves were intact. Sensory findings over the body were intact to all modalities. There was no motor weakness and there were no cerebellar signs. The gait was normal.

Preliminary studies were performed in the outpatient department. An electroencephalogram was normal. An audiogram and caloric studies were both within normal limits. A spinal tap revealed an opening pressure of 150 mm. of water. The fluid was clear and colorless. There were no cells and the total protein was 62 mg. per cent.

Roentgenogram of the skull on June 13, 1957 revealed partial erosion of the dorsum sellae and the left posterior clinoid process. There was also an irregularity of the apex of the left petrous ridge and slight shortening of the left anterior clinoid process. A small linear calcification was noted just behind the left posterior clinoid process. This did not appear to be a calcified petroclinoid ligament and was interpreted as calcification within a mass of tumor.

The patient was admitted to the hospital on June 18, 1957 for spinal tap and angiography. The angiogram, carried out on June 18, revealed straightening and elevation of the carotid siphon with an irregular, feathery vascular stain in the left temporal region. The clinical history and findings, as well as the abnormalities noted on the plain roentgenograms of the skull, and the vascular stain present in the angiogram were presumed to indicate either a trigeminal neurinoma or meningioma (Fig. 1).

Course. The patient was discharged on June 19, 1957 for the purpose of consultation with Dr. A. Earl Walker.

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The history and findings elicited by Dr. Walker were essentially the same as presented above.

Readmission, June 28, 1957, for surgical removal of the left parasellar lesion.

Operation, July 1, 1957. A lumbar spinal needle was inserted and the patient then was positioned for a left temporal craniotomy. A large flap was turned and the temporal squama was rongeured away to the base of the middle fossa. The dura mater was extremely tense but was relaxed after drainage of spinal fluid through the lumbar needle. An initial attempt was made to approach the tumor extradurally but the mass could not be mobilized adequately and therefore the dura mater was opened inferiorly and the temporal lobe was gently retracted. Gradually a large, globular tumor was exposed overlying the region of the gasserian ganglion. The tumor was approximately 4 x 5 cm. in diameter. Progressive mobilization of the tumor was then begun. The interior was hollowed out to facilitate the dissection and the tumor was removed piecemeal. The divisions of the 5th nerve issuing anteriorly could be identified and these were divided to mobilize the anterior aspect of the tumor. The tumor extended back to the tentorial edge but did not appear to extend into the posterior fossa. As the medial aspect of the tumor was gently dissected away from the cavernous sinus there was periodic profuse hemorrhage from the sinus which was controlled by gently packing with Oxycel cotton. A total removal was accomplished. There was some superficial necrosis of the tip of the temporal lobe secondary to edema and the minimal trauma from retraction of the temporal lobe. The dura mater was left open and the bone flap was replaced.

Postoperative Course. The patient was drowsy after the operation but moved all extremities well and responded to verbal stimuli. The drowsiness cleared rapidly. She was noted to have a slight aphasia in the early postoperative period but this had cleared well by July 10, 1957. Palsy of the left abducens was complete postoperatively as compared to the partial palsy present preoperatively. There was, of course, no change in the complete motor and sensory findings of the 5th nerve. The patient was ambulatory and was discharged on July 14, 1957.

Pathology. Microscopic sections of the specimen revealed that the tumor consisted of interlacing, parallel rows of elongated cells with thick darkly staining nuclei. There were areas of palisading with intervening zones of acellular connective tissue. Other areas revealed foamy cells with small, round nuclei and occasional macrophages. Some areas of the tumor were markedly vascular with clusters of thin-walled blood vessels giving a somewhat angiomatosus appearance. The histologic diagnosis was neurinoma (Figs. 2 and 8).

Subsequent Notes. On Aug. 27, 1957 the patient was seen for follow-up examination. She was feeling well at this time and was less troubled with diplopia. The subtemporal decompression was soft and there was definite improvement in the palsy of the left 6th nerve. There was some involvement of the 4th nerve. There was also a slight, right cut in the homonymous upper quadratic field. By December there was complete resolution of the palsy of the left 6th nerve and there was no complaint of diplopia. When seen again on May 2, 1961 the patient had no complaints and there was no evidence of weakness of extra-ocular muscles. The involvement of the 5th nerve had remained unchanged. The most recent follow-up information in August 1963 indicated that the patient was working as a full-time medical secretary and had no deficit except for the persisting loss of the 5th nerve.

Discussion

This case presents several interesting features. The first of these is the progressive, painless involvement of the 5th nerve. Jefferson pointed out that facial pain had not been a uniformly significant feature and that a change in the corneal reflex and a decrease in sensation over the face are more common than severe pain. He also called attention to the fact that a completely numb face with wasting is more suggestive of a malignant than of a benign tumor. In this case, however, complete absence of trigeminal sensation with marked atrophy was associated with the presence of a benign tumor. When present, the pain of a tumor of the gasserian ganglion is more likely to be diffuse and nonparoxysmal though still in the trigeminal distribution. Intense pain appears to be more characteristic of a malignant lesion. Though the tumor is closely applied to the wall of the cavernous sinus, involvement of the extra-ocular nerves is not present uniformly. In the case under discussion there was early involvement of the 6th nerve but the remaining extra-ocular nerves were intact.

Trigeminal tumors may occur in two ways. They may be limited to the region of the middle fossa and exhibit signs of involvement of the 5th nerve, both motor and sensory, or they may extend in dumb-bell fashion beneath the tentorial edge into the posterior fossa. In the latter instance signs of involvement of the 5th nerve may be associated with both cerebellar and pyramidal-tract signs. The tumor may also involve the tri-