The radiographic diagnosis of trigeminal neurinomas

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Trigeminal neurinomas are rare, benign tumors, amenable to surgery. The characteristic features of these lesions are discussed and illustrated with two cases. The importance of the use of the various radiographic techniques for evaluation of these tumors is stressed.

KEY WORDS - trigeminal nerve neurinoma - radiographic diagnosis - angiography - tomography

Neurinomas of the trigeminal nerve arise from the cells of the sheath of Schwann and comprise 0.2% of all brain tumors. The tumor occurs most frequently in the fourth decade without definite sex predilection. The insidious onset and slow progression of symptoms may cause delay in their recognition. They occur in the middle cranial fossa where they fill Meckel's cave, subtentorially in the posterior fossa, or less frequently in both fossae as a dumbbell tumor. They are well-circumscribed, relatively avascular lesions with thin capsules.

Neurinomas of the trigeminal nerve give rise to a fairly typical clinical syndrome. The initial symptoms are caused by impaired function of the trigeminal nerve and usually consist of mild, diffuse, non-paroxysmal pain or paresthesia in the trigeminal distribution. A decreased corneal reflex is usually found. Involvement of the motor division of the trigeminal nerve with weakness of the mastication...
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FIG. 2. Case 2: 52-year-old woman. Left: Tomograms of the sella turcica demonstrating erosion of the dorsum sella and posterior clinoid process on the right, indicating medial and posterior extension of the lesion. Right: Tomogram of the base of the skull demonstrating sharp destruction of the apex of the petrous portion (arrows). Trigeminal neurinoma was verified at surgery (8 × 5 × 3 cm) extending into the cavernous sinus and posterior fossa.

Radiographic Features

The most constant finding on plain skull films is destruction of the anteromedial portion of the petrous apex,7 which is typically smooth and well delineated (Fig. 1). This destruction is pathognomonic of tumor extension into the posterior fossa.4 Not infrequently the lesion extends anteriorly toward the foramen ovale or foramen rotundum. These changes can be best demonstrated with the use of tomography (Fig. 2). Medial tumor growth may be associated with erosion of the posterior clinoid process and dorsum sellae (Fig. 2 right).

Radioactive brain scanning is an important test for evaluating intracranial tumors. Although generally not diagnostic for small masses located near the base of the skull, it was markedly positive in one of our patients (Fig. 3).

Characteristic changes may be demonstrated with internal carotid arteriography particularly with selective technique. In the presence of trigeminal neurinomas the gang-
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FIG. 4. Case 1. Left: Anteroposterior projection of the carotid arteriogram showing medial displacement of the ganglial portion of the carotid siphon by the lesion (arrows). Right: Subtraction film of the lateral view of the carotid arteriogram showing multiple pathological tumor vessels (arrows) arising from the anteriorly displaced extradural ganglial portion of the siphon.

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Fig. 6. Case 1. Left: Tomogram obtained during pneumoencephalography delineating the trigeminal neurinoma on the right (arrows). Note on the left, two distinct densities corresponding to the normal gasserian ganglion and petrosal vein, structures that are not seen on the affected side. Right: Pneumoencephalogram showing slight elevation of the right temporal horn produced by the tumor (arrow).

...may be displaced upward, suggesting a middle fossa mass. Posterior displacement of the upper portion of the basilar artery indicates subtentorial tumor extension (Fig. 5).

Cavernous sinus venography is a recently refined modification of retrograde jugularography and may provide important information about venous drainage and cavernous sinus involvement with tumor.

Pneumoencephalography with special attention to the basal cisterns adds additional information about the size and extension of the tumor. With the aid of modern pneumoencephalographic devices that allow tomography in the coronal plane (Fig. 6) these lesions can be demonstrated with better detail. The temporal horn on the affected side (Fig. 6 right) as well as the aqueduct of Sylvius and fourth ventricle may be distorted or incompletely filled due to encroachment of the tumor; these also are better demonstrated with tomography.

Conclusions

Trigeminal neurinomas, as well as other extradural tumors in the parasellar region, are a diagnostic challenge. Radiographic evaluation with modern techniques including plain films, tomography, and angiography with subtraction technique offers considerable help in assessing these lesions preoperatively.

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References


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