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Posttraumatic Cutaneous Meningioma of the Face

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Summary: We present the CT and MR features of a posttraumatic cutaneous meningioma of the face. We postulate that the patient's trauma and associated skull fracture resulted in a trapping of extracranial meningeal tissue, which many years later gave rise to a secondary facial meningioma.

Index terms: Meninges, neoplasms; Face, computed tomography; Face, magnetic resonance; Face, trauma

Extracranial meningiomas account for only 1% to 2% of all meningiomas. Cutaneous meningiomas are an even smaller proportion of these extracranial tumors. Such lesions are generally felt to be primary in nature and arise from ectopic arachnoid cell rests within the skin as a result of a developmental defect (1–15).

Case Report

A 65-year-old woman presented with a history of an enlarging right supraorbital mass over a period of 2 years. At 17 years of age, she had sustained major trauma after a motor vehicle accident, resulting in facial and right frontal fractures that extended into the dura. At that time, surgery

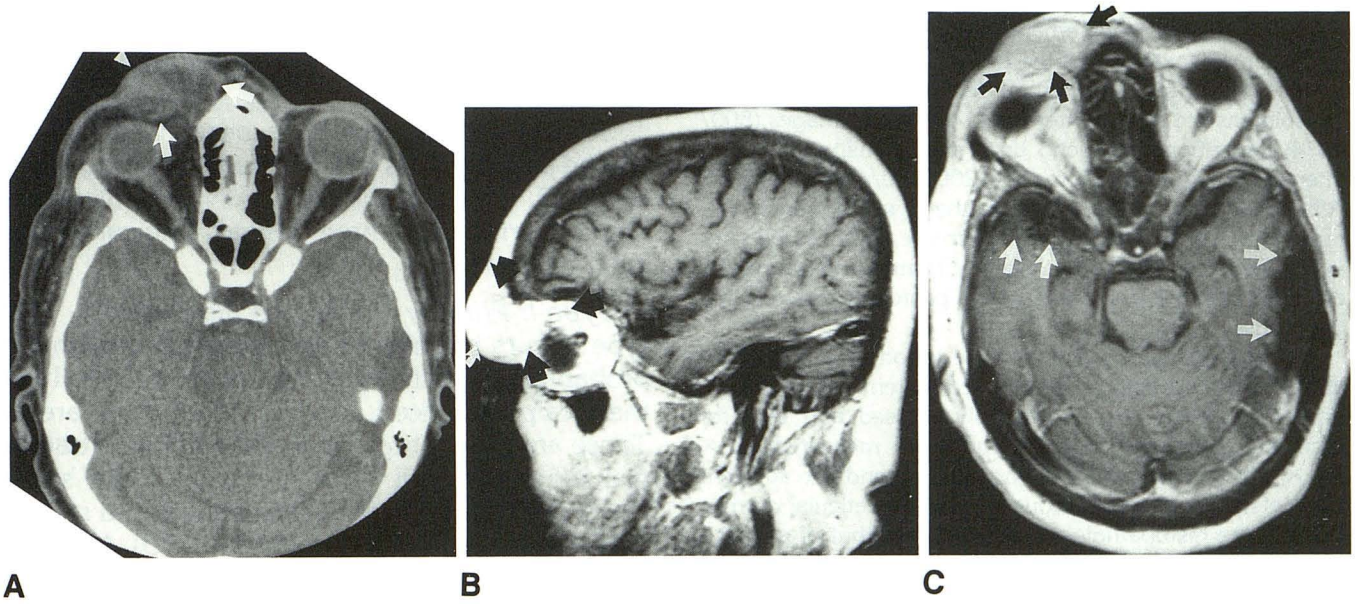

Fig. 1. *A,* Non-contrast–enhanced axial CT image at the mid to upper orbits reveals a heterogeneous 3-cm-diameter right periorbital mass (*arrows*). The lesion involves the cutaneous and subcutaneous tissues over the medial right orbit and extends into the preseptal fat.

B, T1-weighted (800/20) gadolinium-enhanced sagittal image of the face and brain (without fat suppression) reveals a relatively homogeneously and avidly enhancing right supraorbital mass with preseptal intraorbital extension (*arrows*). There is no evidence of intracranial extension.

C, T1-weighted (800/20) gadolinium-enhanced axial image at the level of the superior orbits (without fat suppression) again reveals the enhancing right periorbital mass (*black arrows*). Also note the posttraumatic bitemporal tissue loss, left greater than right (*white arrows*).

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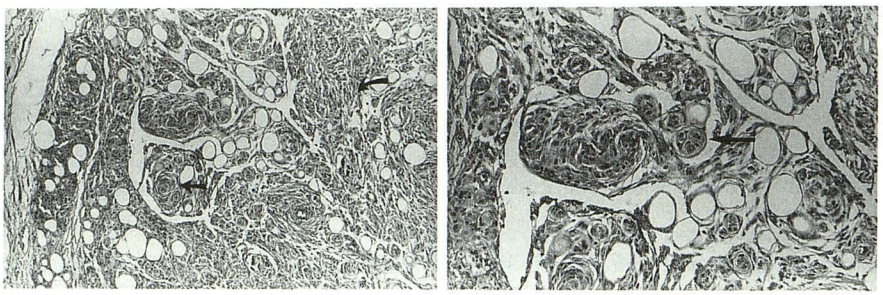

Fig. 2. Meningioma, transitional type.

A, Note admixture of both meningothelial and fibrous pattern consisting of whorls of round to oval shaped cells (*arrow*) and mixed with spindle-shaped cells (*curved arrow*) (hematoxylin and eosin stain; magnification 200×).

B, Higher magnification of A showing whorls of round to oval cells (*arrow*) (hematoxylin and eosin stain; magnification 400×).

for dural repair and skin graft was performed. She had an uneventful recovery and had been well until 2 years before admission, when she noted the slow growth of a right supraorbital mass. Precontrast craniofacial computed tomographic (GE 9800) and magnetic resonance (1.5-T GE Signa Scanner, Milwaukee, Wis) scans with and without gadolinium were performed. Axial computed tomographic scans through the orbits revealed a 3-cm-diameter heterogeneous right periorbital mass extending into the preseptal fat and abutting the nasal bones medially. There was no evidence of bone involvement (bone windows not shown) or intracranial extension (Figs 1A–1C). Magnetic resonance scans (without fat suppression) demonstrated the mass to be isointense to gray matter on T1-weighted images (800/20/4) [repetition time/echo time/excitations]) and hyperintense on T2-weighted images (2000/80/4) (not shown). After gadolinium administration, there was relatively homogeneous enhancement. Furthermore, both studies revealed evidence of striking bilateral frontotemporal parenchymal volume loss consistent with postcontusion cerebral tissue loss.

Before surgery, a biopsy of the lesion was performed and revealed pathologic features consistent with meningioma. The lesion was successfully excised and sent for complete pathologic analysis. The lesion measured 4.0 × 2.0 × 2.0 cm. The tumor was noted to extend into adjacent skeletal muscle, subcutaneous fat, and the reticular dermis. Overall, the histopathologic features were that of a transitional type of meningioma (Fig 2).

Discussion

Meningiomas are common intracranial tumors accounting for approximately 18% of all intracranial neoplasms (1). However, extracranial, extraspinal meningiomas are reported to account for only 1% to 2% of all meningiomas (2, 3, 6, 7, 9, 10, 11). The ectopic location of these tumors outside the central nervous system can be accounted for in three ways: 1) direct extension of an intracranial/intraspinal meningioma into the adjacent soft tissues and skin through bone foramina; 2) metastatic meningioma; and 3) primary ectopic meningioma (1–8, 13).

In a review of the literature in 1974 of 140 cases of ectopic meningioma, Lopez et al noted that of these, only 90 cases represented primary extracranial tumors, and the rest were secondary extensions from underlying intracranial meningiomas (2). When these ectopic meningiomas arise within the skin, they are referred as cutaneous meningiomas. The first case of a cutaneous meningioma was described by Winkler in 1904 (15). Of the 90 cases of primary extracranial meningiomas reviewed by Lopez et al, only 40 met the criteria for the subgroup of cutaneous meningioma. Few case reports have been added to the literature since (9–13).

Several mechanisms have been hypothesized for the pathogenesis of extracranial meningiomas (2–4, 12, 13). Lopez et al (2) divides cutaneous meningiomas into three distinct clinical-pathologic patterns:

Type I: Primary Cutaneous Meningioma. This type occurs in children and young adults and is probably congenital. It is seen most frequently in the scalp, forehead, and paravertebral areas. These are thought to arise from ectopic extracranial arachnoid cell rests. Because these share features in common with meningoceles, a similar pathogenesis is thought possible (2, 13). Absence of a central nervous system tumor is essential for diagnosis. Prognosis is good.

Type II: Meningioma of Soft Tissue and Skin. These are ectopic soft tissue meningiomas that extend to the skin from sensory organs (eg, orbital, nasal, aural, and buccal). They occur in the approximate distribution of cranial and spinal nerves and are derived from arachnoid cells that extend along nerve sheaths as they penetrate the skull. These tumors are found primarily in adults and are acquired. Distinction from cutaneous extension of intracranial meningioma is difficult. Prognosis is guarded secondary to their sensitive locations.

Type III. These are direct extensions of intracranial meningiomas into the skin. They are more

common in adults and at the time of presentation are usually inoperable.

This case is interesting in that the patient's cutaneous meningioma was predated by significant craniofacial trauma with resultant right supraorbital fractures and associated meningeal disruption. Thus, we postulate that unlike the development of primary cutaneous extracranial meningioma, this patient's cutaneous meningioma developed secondary to disruption of the craniofacial bony structures and underlying meninges with resultant transplantation of aberrant fragments of meningeal tissue within the dermis, which years later gave rise to a neoplasm: a posttraumatic cutaneous meningioma.

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