Intraosseous meningioma of the sphenoid bone

Some sphenoid wing meningiomas are associated with a significant hyperostosis of the adjacent sphenoid ridge that may even exceed the size of the intradural mass. The decision-making process and surgical planning based on neuroanatomic knowledge are the mainstays of management of this group of lesions. Given their natural history and biologic behavior, many hyperostosing meningiomas at this location require long-term management analogous to a chronic disease. This is particularly true when making initial decisions regarding treatment and planning surgical intervention, when it is important to take into consideration the possibility of further future interventions during the patient's life span [1)].

The relationship of the development of intraosseous meningioma to the entrapment of dura containing arachnoid cells is discussed in considering the cause of such lesions, and it is stressed that calvarial fractures and cranial sutures may contribute to the entrapment of arachnoidal tissue and later the formation of a meningioma [2)].

Intraosseous growth is a unique feature of sphenoorbital meningioma. Quantitative assessment of the biological behavior of intraosseous remnants revealed a continuous slow growth rate independent of the soft tumor component of more than half of SOM. According to our data, application of a multimodal image guidance provided high accuracy and significantly increased the resection rate of the intraosseous component of SOM [3)]

Case reports

A 24-year-old woman presented with subdural hemorrhage, and subsequent radiology depicted an osteolytic mass-like lesion in the sphenoid bone. Intraoperatively, a solid and cystic hemorrhagic lesion mimicking an aneurysmal bone cyst was observed in the sphenoid bone with dural tearing. Frozen cytology showed singly scattered or epithelioid clusters of round to elongated cells intermixed with many neutrophils. Tumor cells had bland-looking round nuclei with rare prominent nucleoli and nuclear inclusions and eosinophilic granular to globoid cytoplasm in capillary-rich fragments. Histology revealed intraosseous meningothelial and microcystic meningioma (World Health Organization grade 1) in right lesser wing of the sphenoid bone. Considering its unusual location and cytologic findings, differential diagnoses included chordoma, chondroma, chondrosarcoma, and aneurysmal bone cyst. The present case posed a diagnostic challenge due to possible confusion with these entities [4)]

A 43-year-old female presented with a 1 year history of headache, peri-orbital pain, proptosis, and severe vision loss. She had previously undergone subtotal resection of a large Simpson Grade 1 spheno-orbital meningioma 3 years prior at an outside institution. Workup at our institution revealed

hyperostosis of the left greater wing of the sphenoid bone and narrowing of the optic canal along with bony enhancement concerning for residual tumor. The patient was given the recommendation from outside institutions for radiation, presumably due to the chronicity of her visual loss. Our institution recommended resection of the residual osseous tumor with orbital reconstruction. Less than 2 weeks after surgery, the patient noted significant improvement in orbital pain and vision. At 3 months, she had regained full and symmetric orbital appearance with no orbital pain. Her visual acuity improved to 20/30 with full visual fields. Conclusion Surgical decompression of the optic canal and orbital contents for tumor related sphenoid wing hyperostosis should be strongly considered, despite an extended duration of visual change and loss. This case report shows that vision can be significantly restored even after symptoms have been present for greater than 6 months [5].

A 30-year-old female patient presented to the Emergency Department (ED) with a six-week history of right eye pain, diplopia on lateral gaze, and proptosis. She had reported progressive onset of symptoms over the past 12 months. Her only previous medical issue was asthma. Haematological and biochemical results were all normal.

Non-contrast CT orbits were undertaken to evaluate for intraconal or extraconal masses or collection. Findings demonstrated poorly marginated diffuse right greater sphenoid wing cortical thickening, resulting in mass effect on the lateral rectus muscle. Post-contrast CT orbits did not show lesional or soft-tissue enhancement. A CT thorax/abdomen/pelvis was undertaken to exclude a primary malignancy.

MRI orbits pre-and post-contrast demonstrated low-signal thickening of the right greater sphenoid wing with lesional and adjacent dural enhancement on post-contrast sequences. [6].

Use of an acrylic jig to aid orbital reconstruction after resection of a sphenoid intraosseous meningioma: a technical note [7]

A 50-year-old female presented to the Neurosurgery clinic with dimness of vision and proptosis of her right eye. Maxillofacial CT showed a hyperostotic mass involving the right sphenoid ridge, anterior clinoid process, orbital roof, and lateral wall with mass effect on the intraorbital contents and lateral wall of the sphenoid sinus. MRI of the brain and orbit showed a heterogeneous enhancement of underlying dura and right orbital apex extending into the cavernous sinus. The patient underwent a staged resection in which pathological analysis showed an intraosseous meningioma. When a hyperostotic mass of the skull is encountered, meningioma should be considered in the differential diagnosis. Although primary intraosseous meningiomas are rare benign tumors, they can be associated with morbidity secondary to mass effect. [8]

A 40-year-old man treated for systemic hypertension complained of decreased vision and floaters in his right eye. Initial examination revealed decreased visual acuity to 20/50 of the right eye with a slight dyschromatopsia, but a lack of afferent pupillary defect and normal visual fields. Fundus examination showed the presence of a slightly swollen right optic disc and chorioretinal folds. A

diagnosis of presumed anterior ischemic optic neuropathy was made. Symptoms persisted and, five months later, right proptosis was noted. Magnetic resonance imaging revealed a diffuse thickening of the parieto-temporal bone and the greater wing of the sphenoid bone on the right side. Radiological differential diagnosis included fibrous dysplasia and metastasis.

Bone biopsy revealed a grade I intraosseous meningioma. Conservative management was chosen because the lesion was too extensive to be resected and radiotherapy is usually not efficient on grade I meningiomas.

Intraosseous meningiomas are benign tumors which are due to meningeal cells entrapment during vaginal delivery. It is a rare tumor of slow progression. Therapy usually consists of resection and cranioplasty and/or radiotherapy. In the present case, decompression of the optic canal remains feasible in case of further visual loss [9].

A 71-year-old woman with a long history of slowly progressive proptosis was found to have an intraosseous meningioma of the right sphenoid bone. Radiologically, the lesion resembled fibrous dysplasia. The key to the diagnosis is irregularity of the inner table of the skull. The histologic appearance is characteristic. Intraosseous meningioma is one part of the spectrum of diseases known as primary extraneuraxial meningioma. In this paper we discuss the theories of cellular origin as well as the radiologic differential diagnosis [10]

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