Sphenoid Sinus Mucoceles

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The neurosurgeon is familiar with the frontal sinus mucocele as a common cause of unilateral exophthalmos and disorders of eye movement, but the less common sphenoid sinus mucocele may have escaped his experience. These lesions are potentially more serious, and are often misdiagnosed and operated on as pituitary tumors. A mucocele of the sphenoid sinus was first described in 1889 by Berg.5 Since then there have been sporadic reports, primarily in the European literature, the best being that of Lundgren and Olin.42 It is the purpose of this paper to review the world literature, add two additional cases, and alert the neurosurgeon to a lesion easily mishandled. Data on 63 cases have been analyzed as the basis of this report. Nineteen other cases have been mentioned but are not included in the analyses because the clinical information was too sparse to be useful.1,11,13,27,41,51,62 Three cases were not translated.20,33,57 Nine cases are used in this analysis but are not identified in the text.2,15,33,20,26,44,50,34,58

If the cyst contents are purulent, pyocele might be the more proper term. Frequently, however, the sphenoid sinus mucocele contains a creamy substance which has the appearance of a purulent exudate but is sterile. One case called a pyocele and two others called abscesses all failed to grow pathogens when cultured.34,67 Because it is difficult to determine what is a true pyocele and what is a mucocele,16 we have included the “pyoceles” in this series. We have also included as mucoceles the lesions termed sphenoid “cysts.”37,28,43

These lesions frequently involve the posterior ethmoidal cells and have been called spheno-ethmoidal mucoceles,63,42 but since the symptoms are related primarily to the sphenoid area, and the posterior ethmoids are only involved secondarily, we prefer the term “sphenoid sinus mucoceles.”

The etiology of a mucocele is conjectural. It would be convenient to consider them as simple retention cysts of the sinus resulting from inflammatory blockage of the draining ostium. However, they do occur when the ostium is patent. Nor does a blocked ostium always result in mucoceles.17,47,61 Others have considered them as originating from cystic dilatation of the mucus glands of the epithelial lining of the sinus, or from the cystic degeneration of contained polyps.3,17 Schüller64 has raised the possibility of the development of a hypophyseal cyst from cell rests in the inner or under half of the sella turcica, but evidence for this is lacking. The location of the lesion and the finding of cho- lesterin crystals in the cyst fluid in 10 cases raises the question of whether these cysts may represent an unusual form of craniopharyngioma. However, cholesterin crystals may be a non-specific finding, and the clinical and pathologic features are not those of a craniopharyngioma.

Whatever the cause, there is no exit for the cyst contents, and the accumulating secretions thin and expand the cavity, ultimately causing compression of surrounding structures. In the case of the sphenoid sinus, the adjacent non-bony structures include the first six cranial nerves, the carotid arteries, the cavernous sinus, and the pituitary gland. It is the involvement of the cranial nerves which brings the patient to the physician. In many individuals, there is only a thin papyraceous partition of bone separating the sinus from the optic nerve, cavernous sinus, tuberculum sella, and medial wall of the superior orbital fissure and orbit.57 Examination of a disarticulated skull (Fig. 1) shows how easily expansion of the sphenoid sinus could enroach upon these structures.

Case Reports

Case 1. This 33-year-old man was admitted on March 20, 1961, because of right ptosis, severe headache, and limitation of inward gaze with the right eye. He had had in-

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termittent frontal headaches and periorbital pain for 11 years, associated with nasal stuffiness. During a severe headache 8 years before admission he suddenly became blind in the left eye. Operation on the maxillary sinuses improved the headache. A year later the diagnosis of glaucoma was made. A year before admission he began having intermittent visual disturbances in the right eye.

Examination. There was optic atrophy and no light reflex in the blind left eye. Visual acuity in the right eye was 20/70. There was extensive glaucomatous excavation of the left disc, and slight right ptosis. Both eyes were prominent but this was greater on the left. There was no adduction of the left eye. He had a normal sense of smell. Skull x-ray films showed an enlarged sella turcica with erosion of the floor. The posterior clinoids were preserved but the left anterior clinoid was blunted. There appeared to be a pharyngeal mass (Fig. 2). It was felt that the patient had a pituitary tumor, and on April 3 a left carotid arteriogram showed narrowing of the carotid siphon and slight elevation of the first portion of the anterior cerebral artery. The next day his headache was worse, and vision in his right eye suddenly diminished to light perception only.

He was unable to adduct the eye. The diagnosis of pituitary apoplexy was made.

Operation. A left frontal craniotomy was performed. Upon exposing the left optic nerve, a tense midline, dome-shaped mass was seen in the region of the jugum sphenoidal, elevating the dura and causing destruction of a large area of bone in the midportion of the posterior frontal fossa. No fluid was obtained on aspiration of the mass. Incision of the mass released a brown mucoid substance. Aspiration disclosed a glistening wall chamber 6 × 4 cm in the region of the sphenoid sinus. The diagnosis of sphenoid sinus mucocele was made and the linear dural incision closed with interrupted silk.

The cyst contents were described pathologically as eosinophilic mucous-like material containing filamentous structures, red blood cells, and neutrophils. Routine, fungus, and acid-fast cultures of the cyst fluid all failed to grow organisms.

Postoperative course. The next day the patient’s headache was gone, and he could count fingers with his right eye. The visual field on the right was full to gross confronta-