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Posttraumatic Ethmoidal Pseudomeningoencephalocele

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Three cases are presented that illustrate the potential of craniofacial trauma to generate pseudomeningocele formation in the region of the ethmoidal air cells. In each case there was the further association of herniation of cerebral substance through the chronic diastatic fracture resulting in an acquired encephalocele. Contrast cisternography showed this important combination of anatomic findings and aided in planning the subsequent reparative surgery.

Encephaloceles are most commonly encountered as midline developmental anomalies of the cranium [1-16]. Recent experience with three cases of ethmoidal pseudomeningocele secondary to past trauma illustrate the CT and water-soluble contrast CT cisternographic (CTC) features of acquired basal encephalocele formation.

Subjects and Methods

Three patients aged 15, 21, and 24 years were studied with a GE-9800 CT apparatus 6 to 12 years after craniofacial trauma. Three- and 5-mm sections were obtained in the axial and coronal planes traversing the cribriform plate and ethmoidal air cells. These sections were obtained both before contrast administration and after intrathecal enhancement with 4-5 ml of iopamidol-200. No complications or untoward reactions were encountered as a result of these procedures.

Results

Each patient had a combination of (1) a diastatic fracture centered at the cribriform plate on one side; (2) a soft-tissue density within the ethmoid air cells and upper nasal airway representing the pseudomeningoencephalocele; and (3) intrathecal contrast filling a variable portion of the ethmoid/nasal mass and outlining the gyrus rectus that had herniated to or through the diastasis into the pseudomeningoencephalocele (Figs. 1-3) [17-24].

A subfrontal surgical approach confirmed these findings in all three cases, was successful in enabling the elevation of the herniated gyrus rectus out of the pseudomeningocele, and facilitated the repair of the diastasis with a dural/fascial graft.

Discussion

The complications of craniofacial trauma include fracture into the paranasal sinuses, CSF leak, and secondary meningitis/encephalitis. As seen in the present cases, the involved area may wall off to form a pseudomeningocele. Over a period of years, the pulsations of the CSF and overlying brain may enlarge the diastasis and possibly the cavity of the pseudomeningocele as well. With time, and possibly

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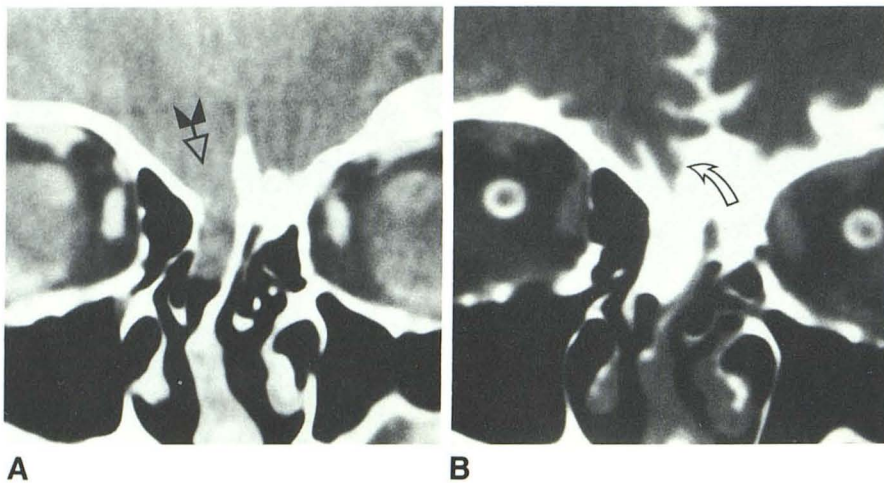


Fig. 1.—21-year-old man, 8 years after motor vehicle accident, with three intervening bouts of acute meningitis.

A, Coronal section through cribriform region shows dehiscence of bone and associated small superior intranasal soft-tissue mass (arrow).

B, Coronal CT from ethmoidal cisternography illustrates downward herniation of frontal gyri led by gyrus rectus (arrow) and ethmoidal pseudo-meningocele corresponding to nasal soft-tissue mass in Fig. 1A.

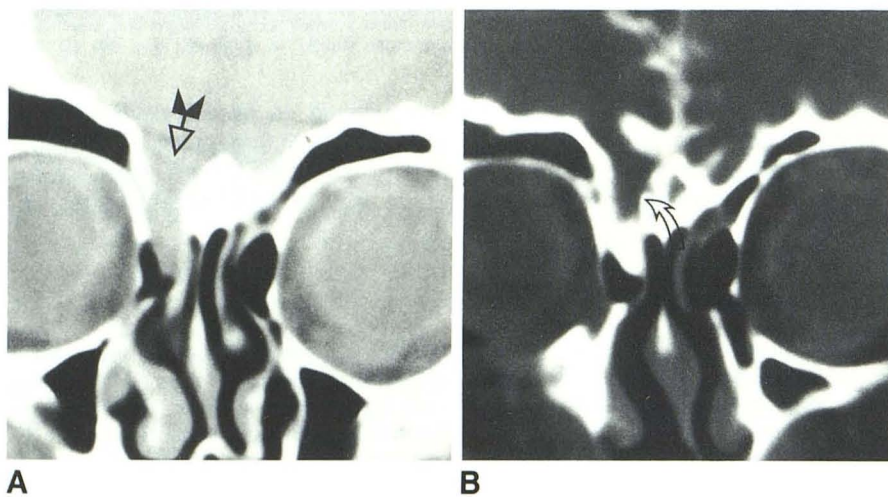


Fig. 2.—24-year-old woman, 6 years after motor vehicle accident, with two past incidences of acute meningitis and recurrent episodes of active CSF leakage.

A, Coronal CT illustrates cribriform plate dehiscence and intranasal soft-tissue mass (arrow).

B, Coronal CT section from ethmoidal cisternogram demonstrates complete herniation of gyrus rectus into pseudomeningocele with surrounding intrathecal contrast (arrow).

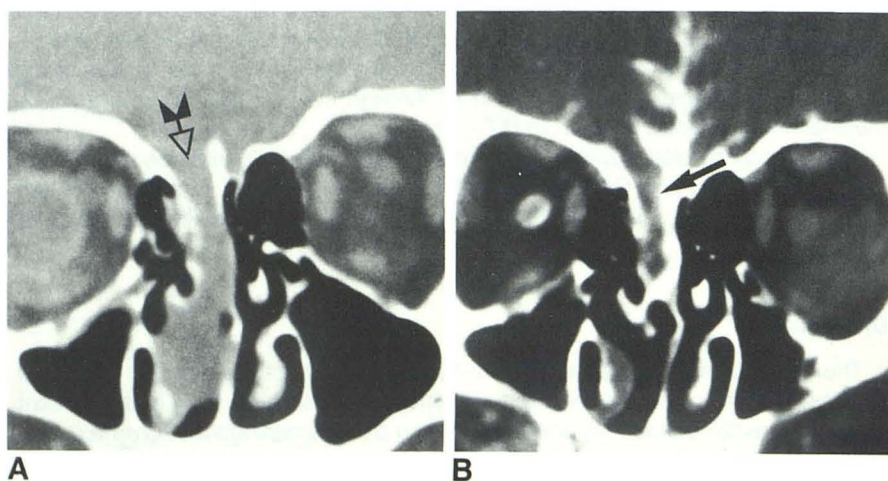


Fig. 3.—15-year-old girl, 12 years after vertical fall and multiple facial fractures, with recurrent episodes of meningitis.

A, Coronal CT illustrates large intranasal soft-tissue mass and dehiscence of cribriform plate (arrow).

B, Coronal CT from ethmoidal cisternogram demonstrates extreme herniation of gyrus rectus through bony dehiscence and into pseudomeningocele (arrow).

a sump effect of the pseudomeningocele, the brain itself may gradually herniate through the opening to form a true encephalocele.

This sequence seems likely to be dependent on the size of the original fracture, on an extended period of years to evolve [25], and possibly on the degree of elasticity of the brain and support structures: all these patients were young at the time of original injury. In addition, this phenomenon may well be a manifestation of a "growing fracture" or leptomeningeal cyst centered in the cribriform/ethmoidal region [25-27].

It is important to recognize this entity in patients presenting with a history of past craniofacial trauma and a nasal mass, with or without CSF rhinorrhea and meningitis, in order that the surgical approach can be geared toward the management of the underlying acquired encephalocele associated with the more obvious pseudomeningocele component.

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