Epidermoid cyst of the frontal bone invading the frontal sinus: a case-report

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INTRODUCTION

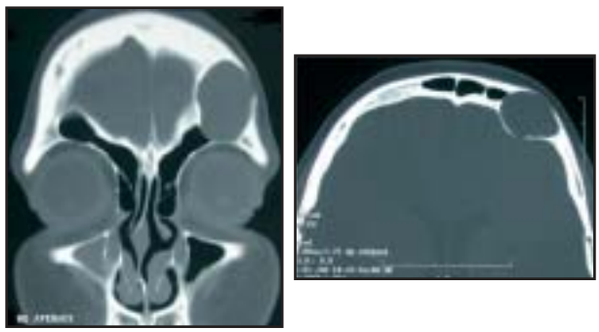
Intradiploic epidermoid cysts are benign slow-growing lesions that can extend to the facial sinuses. Although uncommon, they share similarities with a prevalent tumor, namely, cholesteatoma of the middle ear. We report a case of intradiploic epidermoid cyst developed in the frontal bone and invading the frontal sinus in a young woman. The etiopathogenic, clinical, and therapeutic issues raised by intradiploic epidermoid cysts are discussed.

CASE-REPORT

A 26-year-old woman with an unremarkable medical history presented with bilateral nasal obstruction, watery rhinorrhea, and sneezing, suggesting allergic rhinitis. The symptoms had failed to respond to appropriate medical therapy. She reported pain over the left frontal sinus. No redness of the eyes or tearing was noted. An antrochoanal polyp was seen in the right nasal cavity.
Computed tomography (CT) disclosed not only an antrochoanal polyp in the right maxillary sinus, but also a cystic lesion in the frontal bone extending to the lateral aspect of the left frontal sinus and responsible for lysis of the anterior and posterior aspects of the frontal bone (Figure 1). Magnetic resonance imaging (MRI) showed this lesion as a heterogeneous image with low signal intensity on T1-weighted sequences, high signal intensity on T2-weighted images, and no postgadolinium enhancement. These findings suggested an epidermoid cyst.

Surgery was performed. The antrochoanal polyp was first removed via the endonasal approach. The coronal approach was used to expose the left frontal bone. Immediately upon incision of the frontal periosteum, a dehiscence in the anterior aspect of the frontal bone was identified. The appearance of the tissue located in the cystic cavity was highly suggestive of an epidermoid cyst (Figure 2). The cyst and its capsule were removed en bloc. Posteriorly, the cyst wall was in contact with, but not adherent to, the dura mater. The cyst cavity communicated with the frontal sinus. This opening into the sinus was enlarged and the bone flap was replaced. The incision was sutured over two suction drains. Histological examination showed overproduction of keratin indicating a diagnosis of epidermoid cyst.

Figure 1. Computed tomography, coronal and axial sections. ***Homogeneous density of the right maxillary sinus. Cystic lesion in the left frontal bone seen as a sharply marginated, lytic lesion extending into the left frontal sinus.***



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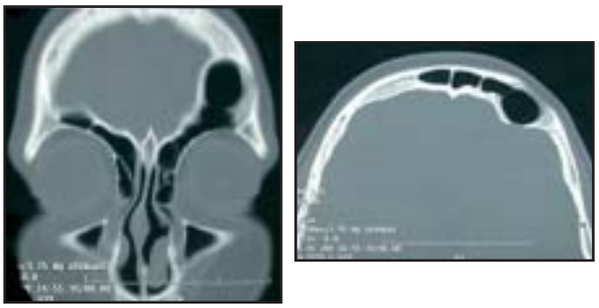
The postoperative course was uneventful. All symptoms resolved. A follow-up CT scan done 6 months after surgery showed a clear frontal sinus and newly formed bone filling the cystic cavity (Figure 3).

Figure 2. ***When the anterior scalp flap was reclined and the frontal periosteum dissected, a dehiscence filled with whitish tissue was seen in the anterior aspect of the frontal bone.***

Figure 3. Computed tomography 6 months after surgery, coronal and axial sections.
The frontal sinus is clear. Ossification of the cyst cavity walls is visible.



DISCUSSION

Cholesteatomas of the frontal and fronto orbital regions were described more than a century ago. A variety of names have been used to designate these tumors, however. “Epidermoid cyst” and “keratoma” may be the most appropriate terms [1]. Epidermoid cysts are lined by stratified squamous keratinized epithelium devoid of skin appendages or glands.

The etiopathogenesis of epidermoid cysts is a matter of active debate. Inclusion of ectodermal tissue into the skull during embryogenesis is one prevalent hypothesis. Another is secondary development of the lesion after inclusion of, migration of, or metaplasia to epidermal cells within the skull.

Epidermoid cysts of the skull develop within the diploë. In the frontal bone, they arise along the trajectory of facial clefts in the Tessier classification. In our patient, the cyst was on the trajectory of the Tessier number 1-14 cleft. Facial clefts follow the lines of facial prominence fusion. Fusion results in part from apoptosis of the ectodermis that lines the facial prominences. The location of epidermoid cysts along well-defined lines strongly supports inclusion of ectodermal cells during facial prominence fusion as the mechanism underlying epidermoid cyst development.

Epidermoid cysts account for 1% of all intracranial tumors. Epidermoid cysts may arise secondary to trauma and may undergo malignant transformation [2]. Most patients are aged 20 to 60 years at diagnosis. Men are affected more often than women. The capsule is thin and the surface nodular and uneven.
An epidermoid cyst of the frontal bone should be considered in all patients with pain or swelling of the supraorbital region, with or without exophthalmos or other ocular manifestations. Late complications include development of a fistulous tract opening to the skin lateral to the eyebrow, discharging sinus infection, and meningeal manifestations.
CT shows an intradiploic sharply-defined lytic lesion and may disclose posterior extension or spread to the sinus or orbit. The lesion develops insidiously within the diploë, gradually extending to the frontal sinuses and adjacent structures. CT and MRI provide complementary information: a hypodense or isodense lesion without contrast enhancement on CT scans and a heterogeneous high-signal lesion on T2-weighted MRI scans suggest the diagnosis [3].

Several other lesions can produce the same clinical and imaging study abnormalities as epidermoid cyst. First, a malignancy must be ruled out. Other differential diagnoses include mucocele, granulomatous lesions, and connective-tissue tumors.

Surgery is indispensable in patients with epidermoid cysts invading the frontal sinus. Adequate exposure is essential to allow complete removal of the mass and capsule in order to prevent recurrences [4]. The eyebrow or coronal approach with frontal craniotomy ensures satisfactory exposure [5]. Long-term follow-up is needed given the risk of local recurrence.

CONCLUSION

Epidermoid cysts of the frontal bone with frontal sinus invasion are rare. Although the preoperative diagnosis is difficult, CT and MRI images can suggest an epidermoid cyst, thereby helping to plan the surgical approach. Surgery is indispensable, and adequate exposure is needed to allow complete excision with the goal of preventing recurrences.

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