COMBINED APPROACH (ABOVE AND BELOW) FOR A FRONTAL OSTEOMA - CAMILO REYES GELVES, MD

Introduction

Osteomas are the most common benign tumor of the sinonasal cavity, where frontal and fronto-ethmoidal osteomas are its most frequent location site. Symptoms can be nonspecific as in other sinonasal masses; however, these patients may complain most frequently of headaches. Nevertheless, as they grow, they can cause cosmetic deformity, recurrent sinusitis, mucoceles secondary to sinonasal obstruction, CSF leak, and in some cases meningitis.

Histologically, they are classified into three groups: Ivory, Mature, or Mixed. Mixed osteomas are the most common. Compact lamellar bone with minimal fibrous tissue is characteristic of Ivory osteomas whereas Mature osteomas contain trabecular bone with significant fibrous tissue.

There are no clear guidelines for surgical treatment. Some proposed indications for asymptomatic osteomas are frontal recess obstruction, >1mm growth in one year, and >50% filling of a sinus cavity. Surgical indication for symptomatic osteomas is generally straightforward.

CT of the sinuses is the gold standard for evaluation and surgical planning of osteomas; they can be incidentally found in up to 3% of them. MRI is generally not required unless there is the concern of invasion to surrounding structures such as the eye or the brain and to differentiate between ossifying fibroma (well defined with a peripheral dense rim and heterogeneous center) and fibrous dysplasia (lytic or ground-glass appearance on CT).

Different factors play a role in deciding which approach is best for a specific osteoma. Attachment to the posterior table of the frontal sinus, orbital wall, interorbital distance, and surgeons' experience plays a pivotal role in decision making. When doing an endoscopic approach, the balance between complete resection of an osteoma attached to the posterior table must be weighed against the risk of CSF leak and the ability to repair a skull base defect.

External approaches, including the Lynch frontoethmoidectomy, trephination, or osteoplastic flap should be in everyone's surgical tool armament as the approach will be dictated by the individual patient's anatomy and disease location. Nevertheless, while they provide great exposure, they also carry with them the risk of postoperative cosmetic deformity, specifically forehead deformity and supraorbital nerve injury leading to paresthesia. Extended endonasal approaches continue to evolve and are considered by many the standard of care for many sinonasal and skull base lesions. While endoscopic approaches provide excellent visualization, limit external incisions/scars, and allow to re-establish the natural drainage of the frontal sinus; complete resection and management of complications can be compromised by a tight corridor, proximity to the orbit, and skull base, difficulty reaching laterally located lesions and surgeons experience.

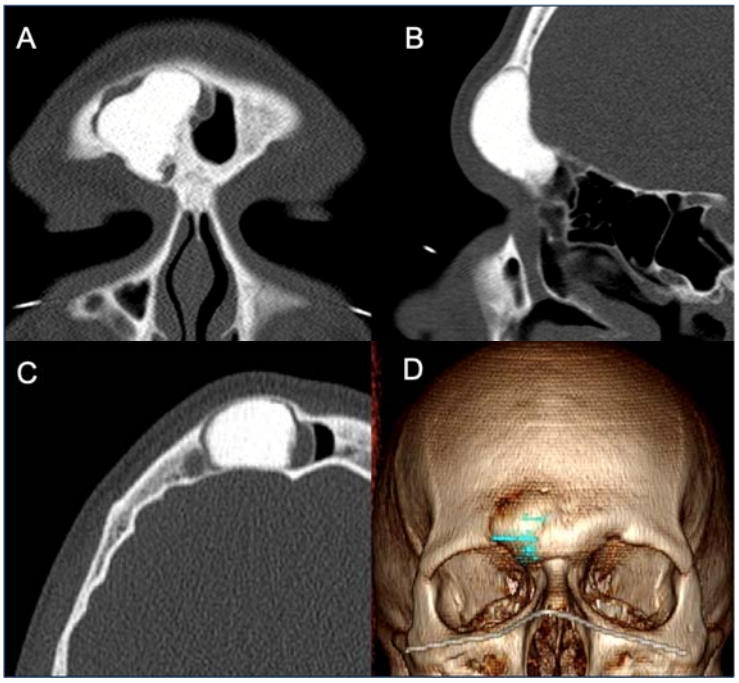

Figure 1. A, B and C) Coronal, sagittal, and axial CT sinus respectively showing right frontal osteoma with associated mucocele of the right frontal sinus. D) 3D Reconstruction showing right anterior table deformity and mass effect upon the right orbit.

As both approaches have their specific risks, their combination is a valuable tool when removing frontal osteomas. In this case I present a frontal osteoma resected by an above and below approach (endoscopic and osteoplastic flap).

Case presentation

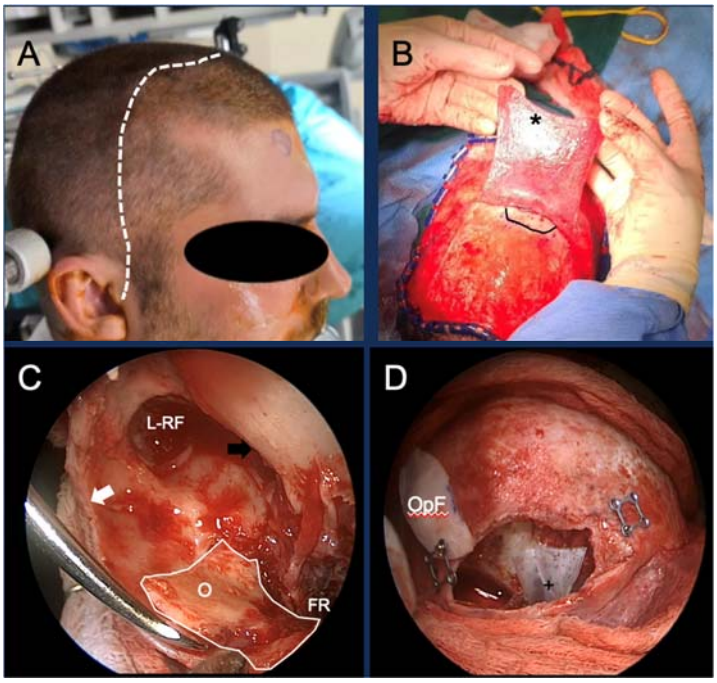

Figure 2. A) Preoperative planning. The patient's head was placed on a Mayfield head holder, the coronal incision is marked with the white dotted line. B) Coronal approach. * marks pericranial flap and the black continued line marks osteoplastic flap osteotomy. C) Endoscopic view from above (through anterior table window). L-RF: Lateral Right Frontal sinus. FR: Frontal recess. White arrow: anterior table, black arrow: posterior table, O: frontal osteoma. D) OpF Osteoplastic flap. The picture shows the anterior table window and

A 19 y/o white male presented with a long history of right-sided frontal headaches, swelling of his forehead, and slight right eye dystopia. He denied any rhinologic symptoms. His CT sinus showed a frontal sinus mass with a cortical bone density that expanded and remodeled the right frontal sinus and right frontal recess. It measured 23 x 19 x 34 mm. This lesion was invested by a relatively low-density lesion that completely opacified and remodeled the right frontal sinus and right frontal recess. There was mild impingement upon the superior nasal margin of the right orbit (Figure 1). After explaining benefits and risks of the procedure, he was scheduled for an above and below approach.

An Endoscopic Modified Lothrop Procedure-Draf 3 was done first. Then, a coronal incision was made, a pericranial flap was elevated and a frontal osteotomy (osteoplastic flap) was done. Pre-plating was done before removing the anterior table. The tumor was drilled down with a cutting 4mm drill bit, and its capsule was freed from the posterior table of the frontal sinus and orbit without complications. The anterior table of the frontal sinus was preserved and fixed back in place by two 4-hole square titanium fixation plates (Figure 2). The pericranial flap was re-

suspended. Bilateral JP drains were placed, the incision was closed with staples, and the patient stayed one night at the hospital for observation. He was discharged the next day uneventfully and his drains were removed 5 days postoperatively (Figure 3). He recovered without complications. He had to undergo an in-office frontal sinus balloon dilation for a stenotic frontal sinusotomy despite undergoing an EMLP. After this, he recovered uneventfully and has been disease-free 1-year postop.

Conclusion

The constant evolution of endonasal endoscopic techniques has made open approaches play a secondary role in frontal sinus surgery, nevertheless, they are still required in specific situations such as complex frontal sinus anatomy, and for both benign and malignant tumors of the frontal sinus. This case illustrates how an osteoplastic flap provides wide exposure for a frontal sinus osteoma with satisfactory postoperative cosmesis.

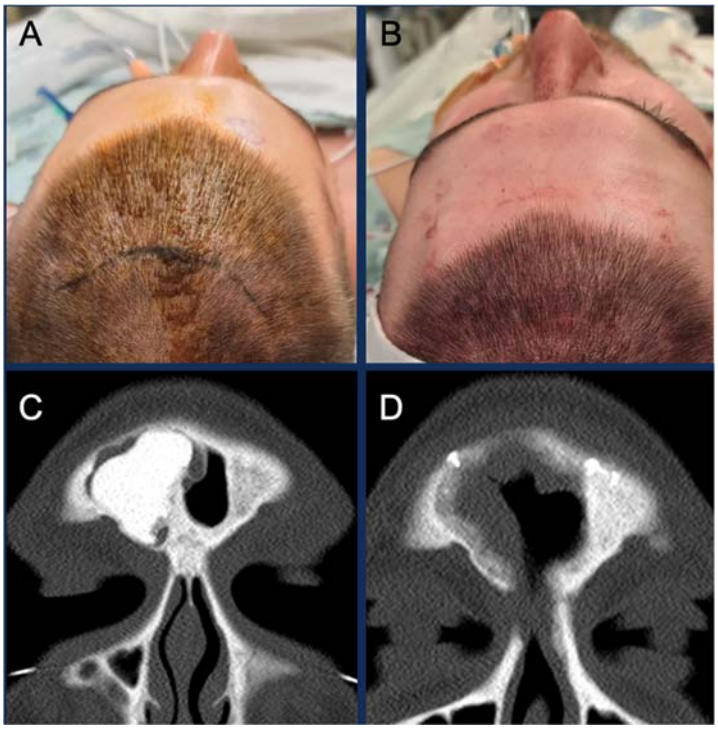

Figure 3. A-B) Pre and postoperative pictures. C-D) Pre and postoperative coronal CT scan 1 month postop. Significant osteitis and mucosal edema of the frontal sinus.