Open Surgical Management of an Asymptomatic Giant Frontal Sinus Osteoma

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Abstract

Osteomas are benign, slow-growing tumors that arise most frequently in the craniomaxillofacial region, and in particular in correspondence of the nose and paranasal sinuses. Osteomas may be asymptomatic for a long time until they cause deformation of the bone or compress adjacent structures. The treatment of osteomas of the frontal sinus may involve endoscopic approach or open approach. Although endoscopic treatment is the most common approach for frontal sinus osteomas, a coronal approach combined with the use of titanium mesh may still constitute a valuable option for the reconstruction of the anterior wall of the frontal sinus. This intervention is extremely important and delicate because the restoration of the integrity of the frontal sinus is crucial for its function. The purpose of this article is to present a case of frontal sinus osteoma that was treated by a coronal approach and a titanium mesh to restore frontal sinus contour.

Keywords

- frontal sinus osteoma
- surgical treatment
- titanium mesh

Osteomas are benign, slow-growing tumors that arise most frequently in the craniomaxillofacial region, and in particular in correspondence of the nose and paranasal sinuses. Osteomas may be asymptomatic for a long time until they cause deformation of the bone or compress adjacent structures.[1]

The treatment of osteomas of the frontal sinus may involve the reconstruction of the anterior wall of the frontal sinus. This intervention is extremely important and delicate because the restoration of the integrity of the frontal sinus is crucial for its function.[2] The restoration of bone contour after the resection of benign tumors of the frontal region may still represent a problem.

Several operative techniques and autogenous, allogenic, and implant biomaterials have been extensively used to restore the frontal contour.[3,4] The use of titanium mesh allows to restore great bony loss, being easy to shape and also sufficiently rigid to prevent displacement. The purpose of this article is to present a case of frontal sinus osteoma that was treated by a coronal approach and a titanium mesh to restore frontal sinus contour.

Case Report

A 53-year-old man with an unremarkable medical history was referred by his ophthalmologist for the management of a frontal sinus osteoma. Patient was asymptomatic (►**Fig. 1**). Computed tomographic (CT) scans showed that left frontal sinus was occupied by an osteoma that extended through the orbital roof in the left orbita (►**Fig. 2**). The nasofrontal duct appeared to be involved too.

The removal of the osteoma and the immediate reconstruction of the anterior wall of the frontal sinus by a titanium mesh were decided together with the patient. A reconstruction with autologous bone graft was proposed too, but the patient after a detailed informed consent preferred a reconstruction by titanium mesh. Surgical intervention was performed under general anesthesia.

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Figure 1 Preoperative view of the asymptomatic patient.

A coronal flap was lifted. The osteotomy of the anterior wall was performed to visualize the frontal sinus osteoma (►**Fig. 3**) that was sectioned and removed (►**Fig. 4**). A Rains self-retaining Silastic stent was placed in correspondence of the nasofrontal duct to avoid a possible stenosis or obstruction and subsequent mucocele formation. Then, the frontal contour was reconstructed by a 0.3-mm-thick titanium mesh that was shaped with the aid of a template (►**Fig. 5**).

Closure of the flap was performed. Postoperative course was uneventful. The patient did not complain of pain or diplopia, and he showed neither paresthesia nor infection (►**Fig. 6**). The patient was clinically and radiologically monitored during the year after the surgery. Postoperative CT scans confirmed an appropriate reconstruction of the anterior wall of the frontal sinus (►**Fig. 7**). This article was exempted from Institutional Review Board approval being a case report. We followed Helsinki Declaration guidelines.

Discussion

Paranasal sinuses osteomas are rare bony neoplasms that present different clinical presentations. The most frequent symptoms are headache and pain, though associated signs and symptoms depend on the location, size, and direction of tumor growth. In fact, neurologic disturbances may appear when compression of adjacent nerves is associated with the tumor.[1]

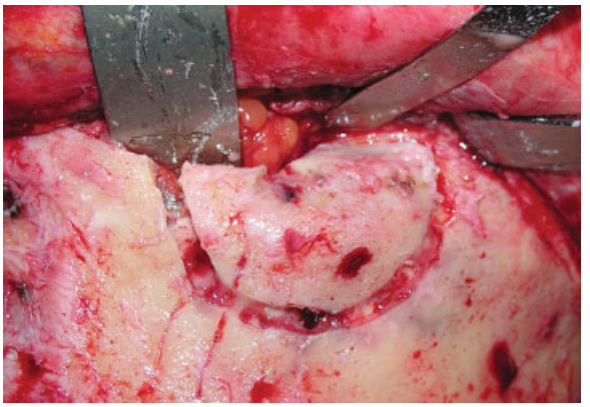


Figure 3 Intraoperative image showing the osteotomy of the anterior wall.

CT scan is the gold standard for diagnosis and planning the surgical approach, whereas magnetic resonance imaging may be useful in cases with intracranial extension of the tumor.[5] Osteomas appear as radiopaque masses with well-defined borders. In this case, the intraorbital extension of the tumor was an important issue that was considered for the decision of the surgical intervention, though no symptoms because of compression of intraorbital were referred yet. In fact, the patient was not available for a strict follow-up with a serial imaging to determine if the mass could continue to grow. Therefore, he was willing to undergo a surgical intervention to remove the disease.

The differential diagnosis of this tumor should include other similar lesions of the bone, such as fibrous dysplasia, and ossifying fibroma. Furthermore, the presence of multiple osteomas associated with intestinal polyposis suggests the diagnosis of Gardner syndrome.[6] As aforementioned, surgical treatment is not suggested in most of the asymptomatic cases; rather, observation and radiologic follow-up of osteomas are advised because of their slow growth.[7]

However, this case was considered an exception because of the already sizeable dimensions of the tumor and its intraorbital extension with the high risk of compression of orbital muscles or optic nerve.

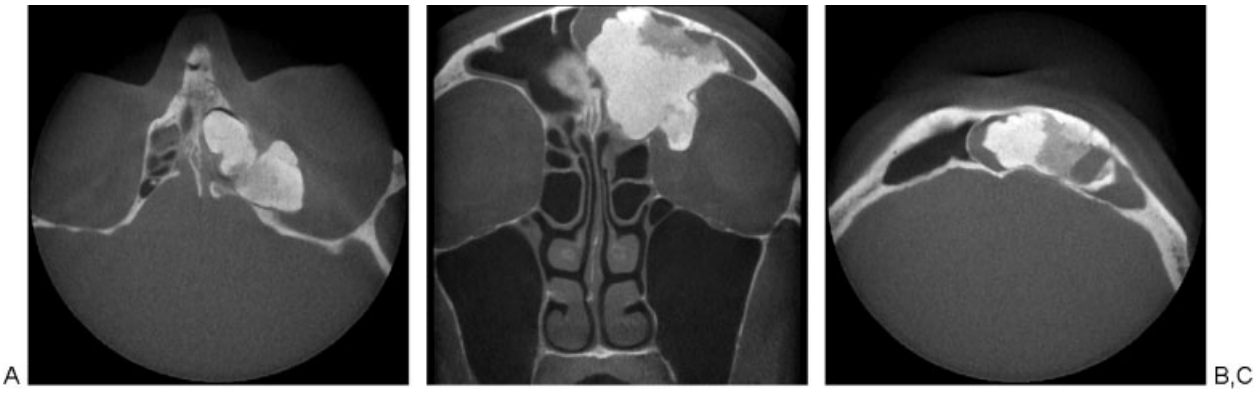


Figure 2 (A) Preoperative axial, (B) coronal, (C) and axial computed tomographic scans showing a left frontal sinus osteoma that extended through the orbital roof in the left orbita.

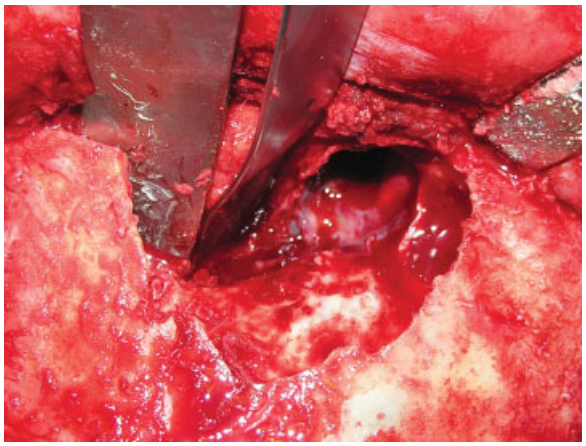


Figure 4 Intraoperative image of the left frontal sinus after the removal of the osteoma.

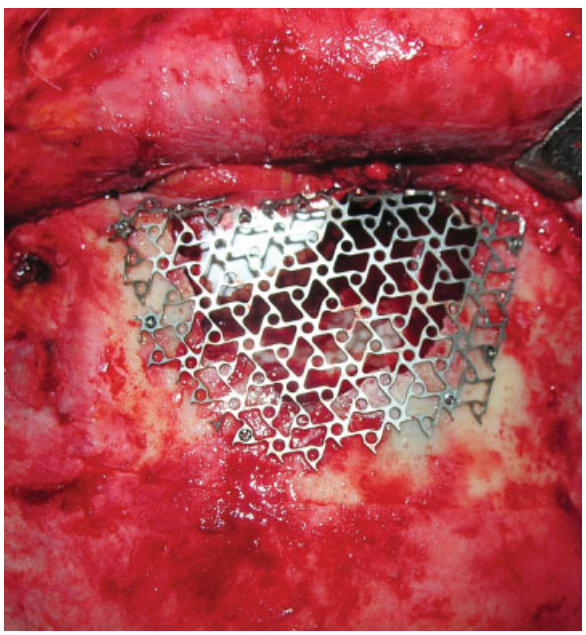


Figure 5 Intraoperative image showing the reconstruction of the frontal contour by a 0.3-mm-thick titanium mesh.



Figure 6 Postoperative view of the asymptomatic patient.

Both open and endoscopic procedures produce good results. In the present case, an open coronal surgical approach was decided together with the removal of the anterior wall of the frontal sinus and the osteoma. Frontal sinus obliteration could be an option, but we preferred to preserve the function of frontal sinus by removing the osteoma and maintaining the patency of the nasofrontal duct, thanks to a stent (►**Fig. 8**).

Finally, the reconstruction of the frontal contour by the placement of a titanium mesh allowed an appropriate reestablishment of the involved region. Of course, another option could be represented by the use of autologous cranial bone, but the patient preferred not to have a donor site, in spite of a relatively low morbidity. Titanium mesh is particularly useful when restoration of frontal contour is needed after tumor resection, and it could represent a valid alternative to autologous reconstruction that still remains the gold standard (►**Fig. 9**).[8]

Titanium mesh systems present several advantages, such as excellent biocompatibility, easy handling and shaping, reasonable stability, and versatility.[3,4,9] Moreover, a minimal imaging artifact can be observed on magnetic resonance and CT imaging,[3,10] and there is little concern that the mesh alone could be visible through the skin. An important issue associated with the use of titanium mesh is the low susceptibility to infection, even when in direct contact with paranasal sinuses,[4] that makes it an ideal material for frontal sinus restoration.

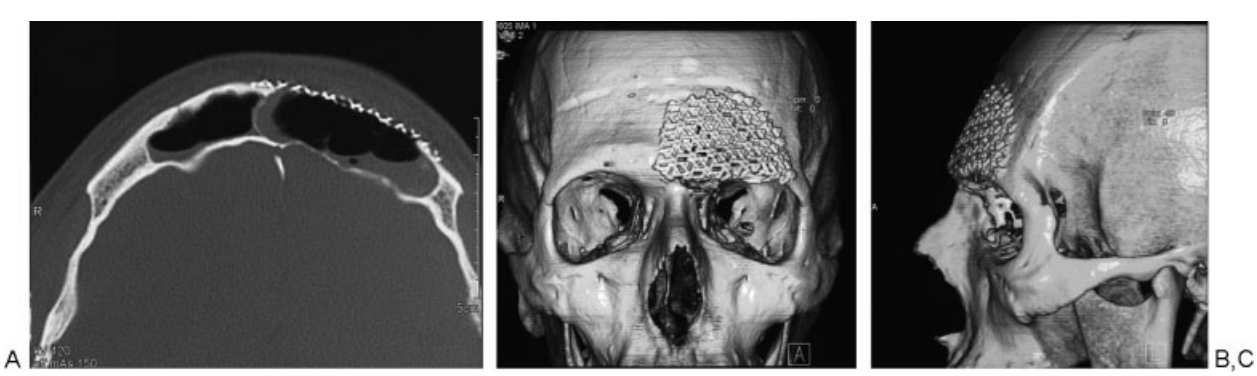


Figure 7 (A) Postoperative axial (B, C) and three-dimensional computed tomographic scans confirming an appropriate reconstruction of the anterior wall of the frontal sinus.

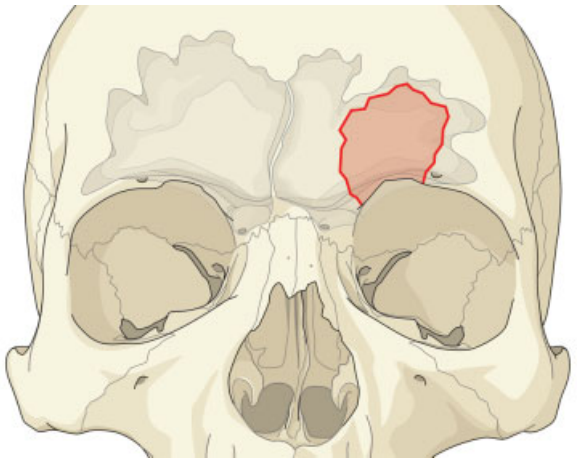


Figure 8 Image of the parts of the resection.

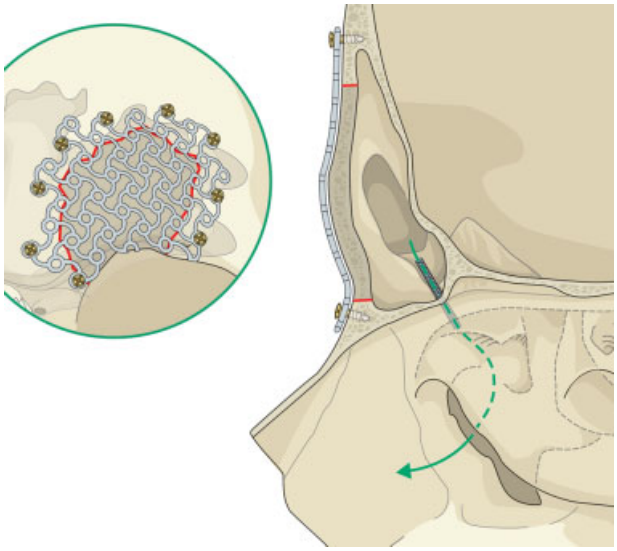


Figure 9 Image of the anterior wall reconstruction by mesh with the stent.

In conclusion, although endoscopic treatment is the most common approach for frontal sinus osteomas, a coronal approach combined with the use of titanium mesh may still constitute a valuable option, as it provides an excellent frontal contour. No complications were observed, confirming that this treatment option could be still considered in the treatment of frontal sinus osteomas.

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