

# Management of giant osteomas of the frontal sinus: A case report

C. Halwani, C. Zgolli, N. Hamroun, I. Zoghlami, G. Chebbi, R. Benmhamed, K. Akkari  
Department of Otorhinolaryngology and maxilla-facial surgery. Military hospital of Tunis. Tunisia.  
Medicine faculty of Tunis. El Manar University

Received: 1 April 2020; Accepted: 21 May 2020; Published on line: 31 October 2020

---

## ABSTRACT:

**Objective:** This article aimed to detail the management of giant osteomas of the frontal sinus and the possibilities of reconstruction after surgery.

**Observation:** 45-year-old patient presented with headache and a feeling of heaviness of the face and chronic rhinorrhea. CT scan revealed a giant osteoma of the left frontal sinus extending to the orbit and the homolateral ethmoid sinus, completely obstructing the nasofrontal canal. The patient underwent surgery. An external approach was made. The tumor was drilled out, leaving behind the thin posterior wall. The remaining mucosa was removed. We opened the two sinuses one on top of the other to allow ventilation and avoid the formation of mucocele. A reconstruction of the anterior wall of the sinus was made. In postoperative the symptoms significantly decreased, and no complications were noted, the patient has been followed for one year.

**Conclusions:** Frontal giant osteomas are often symptomatic. They lead sometimes to serious complications depending on the location, size, and direction of the tumor growth. They usually require surgical resection. The outcome of surgery is good, with a low recurrence rate.

**Keywords:** Frontal sinus, Giant osteoma, Frontal sinus surgery, Treatment.

---

## RÉSUMÉ

**Objectif:** Détailler la prise en charge des ostéomes géants du sinus frontal et les possibilités de reconstruction après chirurgie.

**Observation:** un patient âgé de 45 ans a été admis pour des céphalées, une sensation de lourdeur de la face et une rhinorrhée chronique. La tomodensitométrie a révélé un ostéome géant du sinus frontal gauche s'étendant vers l'orbite et le sinus ethmoïdal homolatéral, obstruant complètement le canal nasofrontal. Le patient a été opéré par voie externe. La tumeur a été fraisée, laissant une fine paroi postérieure du sinus. La muqueuse restante a été enlevée. Les deux sinus frontaux ont été ouverts l'un sur l'autre pour éviter la formation de mucocèle. Une reconstruction de la paroi antérieure du sinus a été réalisée. En postopératoire, les symptômes ont nettement diminué et aucune complication n'a été notée. Le patient a été suivi pendant un an.

**Conclusion:** Les ostéomes géants frontaux sont souvent symptomatiques. Ils entraînent de graves complications en fonction de leur localisation, leur taille et de leur direction de croissance. Ils nécessitent généralement une résection chirurgicale. Le résultat de la chirurgie est bon, avec un faible taux de récurrence.

**Mots-clés:** Sinus frontal, Ostéome géant, Chirurgie des sinus frontaux, Traitement.

---

## INTRODUCTION:

Osteoma is the most common benign tumor of the nose and paranasal sinuses. It is often an asymptomatic slow-growing bony tumor, occurring mainly in frontal and ethmoid sinuses [1]. Osteoma's size usually ranges from 2 to 30 mm. 'Large' or 'giant' osteomas are defined by a diameter >30 mm or weighing >110g [2]. Complications such as chronic sinusitis and mucoceles may occur with potential intraorbital or intracranial complications. Surgical excision is usually required and exposes to risks which leads to either incomplete excision or reconstruction. This article aimed to detail

the management of the frontal sinus osteomas and the modalities of reconstruction after surgery.

---

## OBSERVATION:

A 45-year-old patient with no medical history, presented with headache of progressive installation over several years, associated with a feeling of heaviness of the face and chronic rhinorrhea without epistaxis or other associated neurological or ophthalmological signs. The examination noted pain on palpation of the left frontal sinus. The anterior rhinoscopy found purulent rhinorrhea at the level of the left middle meatus. The

Corresponding author: Chiraz Halwani  
Address: Department of otorhinolaryngology and maxillofacial surgery, military hospital of Tunis. Tunisia  
Email: chirazhalwani@yahoo.fr



nasopharyngeal and the ophthalmologic examinations showed no abnormalities. A computerized tomography (CT) scan revealed a bone density mass apparently based in the left frontal sinus (figure 1), which suggested a giant osteoma of the left frontal sinus extending towards the orbit and the homolateral ethmoid sinus completely obstructing the nasofrontal canal. Internal and external table were unimpaired.



**Figure 1:** Axial CT scan showing a bony mass occupying the left frontal sinus.

Keeping in mind the increasing size of the osteoma and the frequency of the headache, we decided to operate on the patient. The size of the tumor and its attachment to the posterior wall led us to opt for an external approach. The patient was operated through a supraorbital left incision. A bony window was made using a cutting burr. The edges of bone cuts were made beveled. The osteoma was exposed and was found to be arising from the posterior wall of the sinus (figure 2).



**Figure 2:** Giant osteoma of the left frontal sinus occupying the entire sinus cavity, seen after removal of the anterior wall of the sinus.

The tumor was drilled out using both cutting and diamond burrs, leaving behind a thin posterior wall. The remaining mucosa was removed. Due to the total blockage of the nasofrontal canal and the connection of the osteoma with the papyrus blade, we decided to open the two right and left frontal sinuses one on top of the other, to allow ventilation of the left frontal sinus by the right nasofrontal canal and thus avoiding the formation of mucocele (figure 3). No orbital damage was found during surgery.



**Figure 3:** Sinus cavity after excision of the anterior wall and drilling of the osteoma, removal of the mucosa and opening of the right sinus.

The mucous membrane of the sinus was also completely removed. Finally, the bony window was replaced and positioned by suturing to the bone above with steel wire and the wound was closed in 2 layers (figure 4). In postoperative the symptoms significantly decreased, and no complications were noted, the patient has been followed for 1 year.



**Figure 4:** Reconstruction by repositioning of the anterior wall and suturing with steel wire.

**DISCUSSION:**

Giant osteoma is a rare but serious entity since it can lead to several complications [3]. Frontal sinus osteomas preponderantly lead to intracranial complications (53.6%), while ethmoid giant osteomas often cause orbital complications (68.9%) [2]. In the present case, a giant frontal osteoma was found extending towards the orbit and the homolateral ethmoid sinus, completely obstructing the nasofrontal canal.

Their pathogenesis remains unclear, they would be triggered by trauma or infection or linked to an abnormality in embryological or genetic development [4]. Our patient had no history of sinusitis, surgery or trauma.

They may be asymptomatic for a long time. Clinical presentations depend on the location, size, and direction of tumor growth: they may lead to headaches, proptosis, diplopia, dizziness, facial deformity or fatal complications [5].

CT scan is the gold standard for diagnosis and planning of the surgical approach. Resonance imaging may be useful in differential diagnosis and in cases of orbital involvement or intracranial spread [6].

Treatment of asymptomatic cases remains controversial. Surgery is reserved for those asymptomatic lesions involving >50% of the sinus volume, rapidly evolving osteomas (>1mm/year), intracranial or intraorbital extension, frontal osteomas located in the frontal recess and sphenoid osteomas [7].

The surgical resection aims are to re-establish the sinus drainage and prevent further complications. In most series, surgical resection is done by an external or combined approach. However; with the advancements of techniques, a solely endoscopic approach is feasible. For Sally, among a series of 10 cases of giant osteomas, one patient was treated with an exclusively endonasal endoscopic approach [4]. For other authors, there is no relation between the size of the osteoma and the method of its removal, but of all giant osteomas, only 20% were removed endoscopically [1]. According to Hazarika, osteomas of the frontal sinuses arising

from the back wall of the sinus with a wide base should not be operated endoscopically due to complications, including cerebrospinal fluid leak [7]. In the present case, an open surgical approach was decided taking into consideration the large size of the osteoma and its attachment to the posterior wall. A supraorbital left incision following the natural curve of the eyebrow was made. Tissues were elevated in a subperiosteal manner and a rectangular flap was drawn then resected.

Resection of giant osteoma often requires reconstruction after removing the tumor. Reconstruction of the anterior wall is, a crucial step. Several operative techniques and autogenous, allogenic, and implant biomaterials have been proposed. Autologous reconstruction remains the gold standard. The use of titanium mesh could represent an alternative to restore great bony loss. Titanium mesh systems have several advantages, such as excellent biocompatibility, easy handling and shaping, reasonable stability and versatility with a low susceptibility to infection, even being in direct contact with paranasal sinuses [8]. In the present case, a rectangular bony flap was resected then replaced after tumor removal. It was positioned by suturing to the bone above with steel wire. Frontal sinus obliteration could be an option too, but we preferred to preserve its function by opening the intersinus wall to allow drainage through the contralateral nasofrontal canal.

**Conclusion:**

Frontal Giant osteomas are very rare. They are often symptomatic, leading sometimes to serious complications depending on the location, size and direction of the tumor growth. A giant osteoma usually requires surgical resection. Endoscopic treatment is a challenge for the operator for these tumors. The outcome of surgery is good, with low recurrence rate.

**Compliance with ethical standards**

**Conflict of interest:** The authors stated that there is no conflict of interest.

**Funding Statement:** The authors received no specific funding for this work.

**REFERENCES:**

- Humeniuk-Arasiewicz M, Janik MA, Stryjewska-Makuch G, Kolebacz B. Giant fronto-ethmoidal osteoma - selection of an optimal surgical procedure. *Braz J Otorhinolaryngol.* 2018;84(2):232–9.
- Cheng K-J, Wang S-Q, Lin L. Giant osteomas of the ethmoid and frontal sinuses: Clinical characteristics and review of the literature. *Oncol Lett.* 2013;5(5):1724–30.
- Erdogan N, Demir U, Songu M, Ozenler NK, Uluç E, Dirim B. A prospective study of paranasal sinus osteomas in 1,889 cases: changing patterns of localization. *The Laryngoscope.* 2009;119(12):2355–9.
- Nguyen S, Nadeau S. Giant Frontal Sinus Osteomas: Demographic, Clinical Presentation, and Management of 10 Cases: *Am J Rhinol Allergy* [Internet]. 2018 Oct 11 [cited 2020 May 16]; Available from: <https://journals.sagepub.com/doi/10.1177/1945892418804911>
- Vishwakarma R, Joseph ST, Patel KB, Sharma A. Giant Frontal Osteoma: Case Report with Review of Literature. *Indian J Otolaryngol Head Neck Surg.* 2011;63(Suppl 1):122–6.
- Boffano P, Rocchia F, Campisi P, Gallesio C. Review of 43 osteomas of the craniomaxillofacial region. *J Oral Maxillofac Surg Off J Am Assoc Oral Maxillofac Surg.* 2012;70(5):1093–5.
- Hazarika P, Zachariah PKJ, Victor J, Punnoose SE, Sharma S, Devi C. Frontal sinus osteoma: a difficult surgical decision in the era of endoscopic sinus surgery. *Am J Otolaryngol.* 2011;32(6):611–4.
- Boffano P, Zavattero E, Rocchia F, Ramieri G. Open Surgical Management of an Asymptomatic Giant Frontal Sinus Osteoma. *Craniomaxillofacial Trauma Reconstr.* 2014;7(1):51–4.