

CASE REPORT

Giant Frontal Sinus Osteoma with Orbital Extension: Case Report and Review of Literature

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ABSTRACT

Aim: The authors hereby present a case of giant frontal osteoma, i.e., not so rare but in the present case, the size and orbital involvement of this tumor make it a unique case.

Introduction: Paranasal sinus osteoma most commonly presents in frontal sinuses. Their growth is slow, and patients usually seek physician's advice only for cosmetic reasons.

Case description: A 20-year-old male presented to us with the complaint of swelling over forehead and medial side of left eye for last 1 year. After investigations, he was diagnosed with frontal osteoma, which was excised en bloc using bicoronal approach. There was a dural tear and cerebrospinal fluid (CSF) leak intraoperatively, which was managed using pericranial flap. He remained free of disease in 2 years of follow-up.

Conclusion: Frontal sinus osteomas are slow-growing bony tumors, which are amenable to complete cure provided adequate preoperative planning and meticulous surgical technique are used.

Clinical significance: This case highlights the need for outreach of tertiary care to remote areas where medical facilities are scarce. Patients usually visit the apex hospitals only when the disease has grown significantly. The authors also would like to reiterate that computed tomography (CT) scan is the best modality for the diagnosis of paranasal osteoma. Small dural tears, if encountered during removal of large osteomas, can be repaired using pericranial flap.

Keywords: Bicoronal approach, Frontal osteoma, Orbital extension, Paranasal osteoma.

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INTRODUCTION

Osteoma of paranasal sinuses most commonly involve the frontal sinus. Rest of the sinuses may also be affected

with relatively lower frequency.¹ Osteoma of the sinuses does not produce symptoms until they grow sufficiently large as to obstruct the outflow of sinus secretions or to cause facial disfigurement. These are usually detected incidentally on computed tomography (CT) scan done for complaints of sinusitis, and the treatment is required only when patient presents with symptoms. Sometimes, they enlarge to involve the orbit, leading to the displacement of eyeball and restricted ocular motility.²

CASE REPORT

A 20-year-old man presented to the hospital with the complaint of swelling on the left side of the forehead, involving medial side of orbit and persistent frontal headache for the past 1 year. The swelling was gradually progressive. The patient had no history of trauma or seizures. There was no history of similar swellings in the family. On examination, there was swelling on the left side of the forehead going into left orbit (Fig. 1). Movement of the left eyeball was restricted in superior quadrant. The ophthalmological examination revealed normal vision in both the eyes. The examination of fundus appeared normal. His physical and neurological examinations were normal.

Noncontrast CT scan of head, orbit, and paranasal sinus was done, which showed well-defined, multilobulated bony lesion involving superior orbital margin, frontal bone, and ethmoid plate on the left side of the forehead (Figs 2 and 3). The lesion on medial aspect was causing



Fig. 1: Patient show swelling on left side of the forehead obscuring the view of left eyeball

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Fig. 2: Computed tomography scan coronal section showing well-defined, multilobulated bony lesion involving superior orbital margin, frontal bone, and ethmoid plate on right side of the forehead

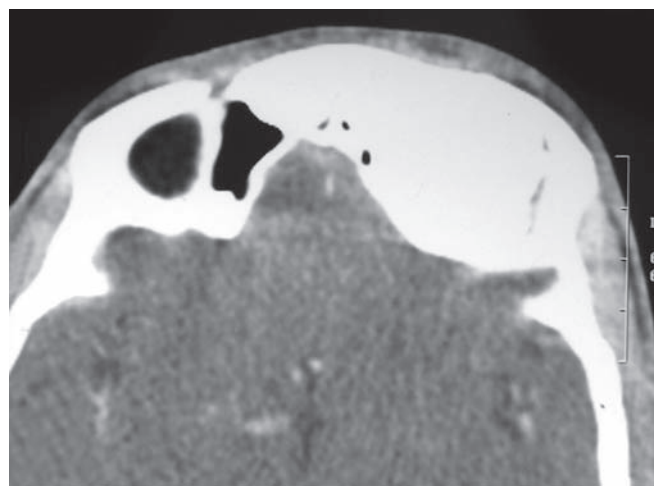


Fig. 3: Computed tomography scan axial section showing well-defined, multilobulated bony lesion involving superior orbital margin, frontal bone, and ethmoid plate on left side of the forehead



Fig. 4: Plain X-ray water's view showing osteoma and to be used as a frontal sinus template as a guide for margins of frontal sinus

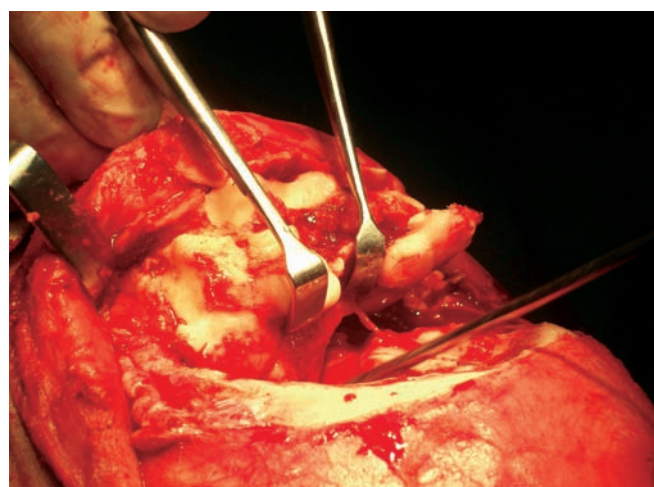


Fig. 5: Intraoperative photograph showing frontal osteoplastic flap approach and disimpaction of osteoma from frontal sinus

deviation of the left eyeball laterally with small portion of the lesion extending intraorbitally. Clinical and radiological diagnosis of frontal sinus osteoma was made. As there is association of frontal osteoma with the rectal polyp, proctoscopy was done to rule out Gardner's syndrome. All baseline hematological investigations were within normal limits.

After preoperative evaluation, we planned for complete excision of the tumor through bicoronal incision under general anesthesia. Plain X-ray water's view was done to delineate all the walls of frontal sinus, and template was made to be used as a guide for margins of frontal sinus intraoperatively (Fig. 4). A frontal osteoplastic flap was raised, and osteoma was visualized. Osteoma was disimpacted from frontal sinus completely using drill and chisel (Fig. 5). There was a marked thinning of the posterior table of frontal sinus that was deficient at places, and periosteum was directly adherent to the dura of frontal lobes. There was a dural tear of around 2×2 cm

which was subsequently repaired using pericranial flap (Fig. 6). Frontal sinus was obliterated using abdominal fat after stripping the mucous membrane (Fig. 7). The tumor measured $8.0 \times 5.0 \times 4.5$ cm, which is among the largest reported in the literature (Fig. 8). The postoperative period was uneventful, and there was no cerebrospinal fluid (CSF) leak. Patient was discharged on 7th postoperative day. After surgery, eyeball movements completely recovered, and the frontal swelling was completely reduced.

Patient underwent regular follow-up, and he was completely asymptomatic till 2 years of follow-up except for some visible pulsations on his forehead (Fig. 9).

DISCUSSION

Osteomas are rare, benign, and slow-growing tumors of bony origin.³ The most common location among paranasal sinuses is frontal sinus followed by ethmoid, maxillary, and sphenoid sinus.⁴ These are more commonly seen in males.

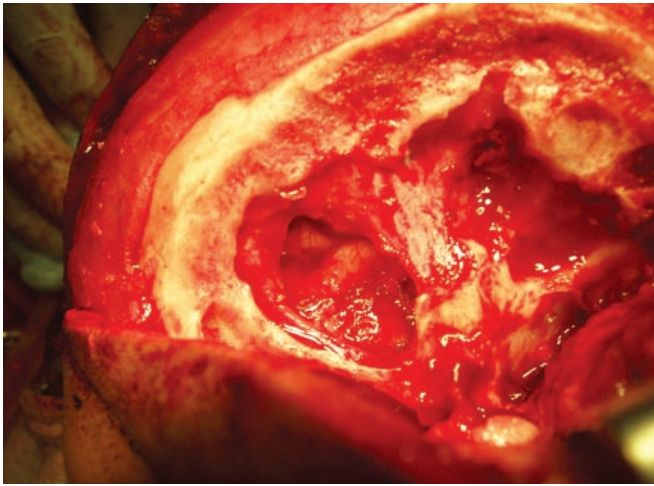


Fig. 6: Intraoperative photograph showing dural tear which was subsequently repaired using pericranial flap

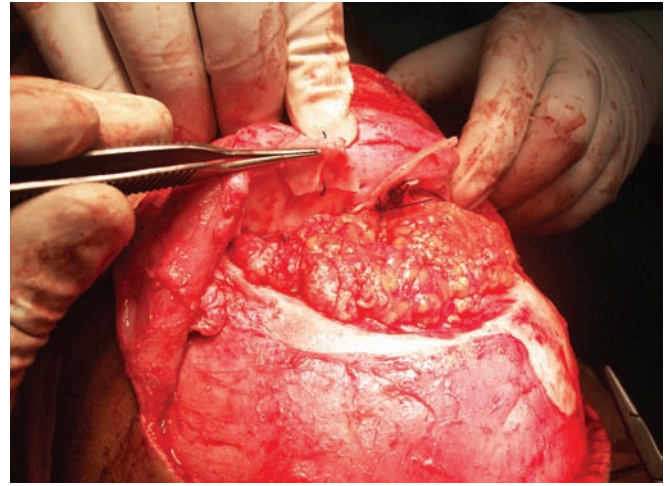


Fig. 7: Frontal sinus was obliterated using abdominal fat after stripping the mucous membrane



Fig. 8: Surgical specimen of osteoma



Fig. 9: Patient after 2 years of follow-up

The symptoms, with which patients of paranasal sinus osteoma commonly present are rhinosinusitis, compression of neighboring structures leading to displacement of eyeball, facial deformity, and headache.³ Most common presentation of osteoma of frontal sinus is headache. Patients may present with complications due to anatomical relationship of frontal sinus with orbit and cranial cavity. Complications, such as mucocele, pneumocephalus, CSF rhinorrhea, meningitis arising due to frontal sinus osteoma have been reported in the literature.⁵

There are multiple theories of development of osteomas of paranasal sinuses. The fact that many osteomas appear to arise at the junction of the ethmoid and frontal sinus, a location where membranous and cartilaginous tissues meet during embryonic life, gave rise to developmental theory.² The presence of bony hyperplasia as a result of chronic infection and inflammation supports the infectious theory of development of osteoma.³ The traumatic theory explains that the origin of osteoma may be due to previous trauma. The developmental and the

traumatic theories are the most widely accepted. Patients with Gardner's syndrome, an autosomal dominant disease, are at increased risk of developing osteomas.⁶

Computed tomography scan of head, paranasal sinuses, and orbit is the investigation of choice for osteomas to diagnose exact size and location as well as relationship with surrounding structures. Osteomas can be diagnosed by plain X-ray water's view. Radionuclide bone scans can be used to differentiate actively growing lesion (hot) from stable lesion (cold).²

Paranasal sinus osteomas should be differentiated from osteosarcoma, osteoblastoma, and fibrous dysplasia using their radiological and pathological features.³

Histologically, osteomas can be divided into ivory, mature, and mixed types depending on the proportions of dense and cancellous bone.⁷ Ivory osteoma also known as eburnated osteoma is a dense bone lacking haversian

system. Mature osteoma resembles “normal” bone, including trabecular bone often with marrow. Mixed osteoma is a mixture of ivory and mature histology.⁷

Asymptomatic osteomas that are diagnosed incidentally do not require any treatment and can be radiologically followed up. Osteoma with a diameter >30 mm or weighing >110 g is considered as a “large” or “giant” osteoma and then surgery is required.⁸ Large osteomas causing facial deformity, restriction of eye movements, reoccurring sinusitis, and complications require surgery. The treatment methodology of symptomatic osteoma comprises either en bloc resection of tumor or curettage of the tumor.⁹ The preferred approach depends on the location and size of the tumor. In the orbital region, anterior lesions can be removed via an anterior orbitotomy, while more posterior tumors require an orbitocranial procedure.¹⁰ Very small frontoethmoidal osteomas can be managed endoscopically which can be enhanced by stereotactic localization. External approaches are useful for larger tumors. The external approaches include the transfacial approach through a Howarth–Lynch incision which can be extended to lateral rhinotomy. It gives good access to frontal, orbital, anterior, and posterior ethmoids. A bicoronal osteoplastic flap technique as used in our case gives excellent exposure to both frontal and endocranium, thus allowing complete exposure and reducing complications. Moreover, it has less recurrence rates and good esthetic results. The use of an endocranial approach or mixed craniofacial approach has been recommended by some authors in cases of endocranial complications.¹¹

Complete removal can be curative, but incomplete removal can lead to recurrence. According to some authors, the incidence of recurrence rate after incomplete resection may be up to 10%.¹² In our case, the patient is symptom free and there are no signs of recurrence in 2 years of follow-up.

CONCLUSION

To conclude, it can be stated that with careful preoperative planning, such big tumors can successfully be treated without much morbidity to the patient.

CLINICAL SIGNIFICANCE

This case is significant because of the size of the tumor as it is among the largest reported osteomas of frontal sinus. This highlights the need for outreach of tertiary care to remote areas where medical facilities are scarce. Patients usually visit the apex hospitals only when the disease has grown significantly.

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