A Giant Frontoethmoidal Osteoma: A Case Report with Review of Literature

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Abstract

Aim: To present a typical case of frontal and ethmoidal osteoma and its management.

Methodology/case description: A 45-year-old female presented with a complaint of swelling over the right supraorbital region medially associated with right-sided headache and decreased vision in the right eye. She was diagnosed with right frontoethmoidal osteoma (dense bony lesion of 49 × 34 × 26 mm in both right frontal sinus and anterior ethmoid sinus. Defect in the superomedial orbital wall with intraorbital protrusion on right side) on CT PNS, which was then managed by bilateral endonasal sinus surgery with septoplasty with right frontoethmoidal osteoma excision—combined (endoscopic and external) approach with fascia lata grafting (inner table of frontal bone was dehiscent). No intraoperative or postoperative complications were seen.

Results: No complications or recurrence were seen at 1 year follow-up. Complete resolution of symptoms was achieved.

Conclusion: Osteoma of paranasal sinuses is amenable to surgery with excellent results and no recurrence.

Keywords: Endoscopic resection, External nasal surgery, Frontoethmoid osteoma, Howarth-Lynch incision.

Introduction

Osteomas are the most common benign neoformations of the nose and the paranasal sinuses, which are bosselated and sessile growths projecting from subperiosteal or endosteal surfaces of the bony cortex.

There are three variants depending upon the amount of fibrous tissue:

- Cortical (~30%)—slow-growing, lobulated, and ivory-like growth with bony lamellae in parallel layers.
- Cancellous (~20%)—rapidly growing spongy bone with fibro-fatty marrow.
- Mixed—most common variant constituting nearly 50% of the osteomas.

They may remain asymptomatic throughout one’s life but may have symptoms if large like:

- Mucocoeles
- Sinusitis
- Proptosis
- Diplopia
- Intracranial complications rarely

Most common sites are:

- Frontal
- Ethmoid

Case Description

A 45-year-old female patient presented to ENT OPD of PDU Medical College and Hospital, Rajkot, with primary complaints of right supraorbital swelling since 3 months and right frontal headache and right-eye double vision since last 15 days.

The patient was relatively asymptomatic before 3 months. Then, the patient developed right supraorbital swelling limited to the medial end of right eyebrow since 3 months, which gradually increased in size and involved half of the right eyebrow and pushed the right orbit inferolaterally. The increase in size was associated with double vision and constant, dull, boring type of right frontal headache for 15 days.

The patient had no history of trauma or significant medical or surgical comorbidities.

Fundoscopy was normal.

Nasal endoscopy revealed submucosal hard mass in the right nasal cavity.

Computed tomography of paranasal sinuses revealed a dense bony lesion of 49 × 34 × 26 mm in both frontal sinus and anterior ethmoid sinus on right side causing indentation over right superior and medial rectus. Defect is noted in the superomedial orbital wall on either side with intraorbital protrusion of lesion on right side. Thinning with defect in the posterior wall of frontal sinus on right side was seen. No definite evidence of intracranial extension was seen. Polypoidal mucosal thickening was found in frontal sinus on either side, sphenoid sinus on either side, both maxillary sinuses...
and ethmoid sinuses, suggestive of sinusitis. Polypoidal lesions were found in the nasal cavity suggestive of bilateral sinonasal polyposis (Fig. 1).

Bilateral endonasal sinus surgery was undertaken under general anesthesia for complete clearance of polyps from all the sinuses. Bony deviation toward right was found for which septoplasty was performed. Bony protrusion was identified in anterior ethmoidal air cell adjacent to the lateral process of crista galli. It was not attached to lamina papyracea. Right Lynch-Howarth incision was kept (Fig. 2).

Osteoma was identified after opening right frontal outer table and drilled out from right frontal and anterior ethmoid sinuses. Inner table of the frontal bone was found dehiscent. Dura was intact. The defect was covered by mucoperichondrial flap and right thigh fascia lata and superimposed with surgicel. One drain was kept through the frontal sinus opening into the nasal cavity. Biopsies of osteoma and polyps were sent for histopathological examination (Fig. 3).

Histopathological examination of

- Drilled-out material revealed well-circumscribed, dense, ivory-like lesions of mature, bony trabeculae without fatty marrow spaces suggestive of cortical type of osteoma (Fig. 4).
- The excised polypoidal lesions were suggestive of inflammatory reaction.

Postoperatively, the patient was given nasal saline drops and betadiene wash through the drain for 10 days. Drain was removed on 10th postoperative day.

No complications were found and complete resolution of symptoms was achieved.

On 1 year follow-up, no recurrence or complaints were noted.

**Discussion**

**Incidence**

They are more commonly seen in second to fifth decades with male predominance of 2:1, more so because of greater occurrence of trauma and larger size of sinuses in males.

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**Fig. 1:** Computed tomography of the osteoma

**Fig. 2:** Right Howarth-Lynch incision

**Fig. 3:** Specimen of osteoma

**Fig. 4:** Histopathological picture of the osteoma
The most common sites are (1) frontal and (2) ethmoidal.

**Theories**

- Embryological/developmental
  
  Osteomas may arise in the frontoethmoidal junctions where the membranous and cartilaginous tissues meet during embryonic life.

- Traumatic
  
  Osteomas may arise due to trauma especially during puberty.

- Infective
  
  Sinusitis may induce osteoblastic proliferation within mucoperiosteal lining of sinuses that cause tumor formation.

  However, mostly two etiological factors coexist and contribute to the neoformations.

  1. Gardner’s syndrome
  2. Fibrous dysplasia

**Clinical Features**

The most common complaint is headache or localized pain secondary to obstruction of sinus drainage. Other symptoms are sinusitis, proptosis, diplopia, or epiphora. In rare cases, further involvement by osteoma may cause facial deformity, periosteal orbital abscess, and orbital cellulitis.

Intracranial complications include spontaneous cerebrospinal fluid leaks, pneumocephalus, or meningitis.

**Management**

- Plain computed tomography— for delineating the extensions of the osteoma.
- Magnetic resonance imaging— for defining dural or soft tissue involvement, orbital extensions, and evaluation of roof of orbit.
- Nuclear magnetic resonance— for suspected endocranial and orbital complications.
- Spiral computed tomography— for three-dimensional reconstructions.
- Radionuclide bone scan— for differentiating active-growing lesion from stable lesion.
- Orbital venography— for demonstrating compression of superior ophthalmic vein.
- Computed tomography densitometry.
- Intralumbar injection of 1 mL of sodic fluorescein (5%) if lesion is attached to anterior skull base— for highlighting cerebrospinal fluid leaks.

**Prerequisites for Surgical Planning**

- Radiological delineation of anatomical features
- Anteroposterior diameter in relation to volume of frontal sinus
- Interorbital distance

**Indications for Surgery**

- Neuro-ophtalmological and endosinusinal complications
- Mechanical complications like ostial obstruction, facial deformity, proptosis, involvement of more than 50% of sinus volume, and rapidly evolving osteomas

**Exclusion Criteria for an Exclusively Endoscopic Endonasal Approach**

- Small anteroposterior diameter in relation to large volume of frontal sinus
- Erosion of the posterior wall of frontal sinus with large intracranial multilobulated osteoma
- Extension through anterior frontal plate
- Posttraumatic changes in frontal bone
- Lateral or superolateral orbital wall attachment

Grade I and II osteomas (medial to sagittal line passing through lamina papyracea)— amenable to endoscopic resection.

Grade III and IV osteomas (lateral to sagittal line passing through lamina papyracea)— external or combined approach used.

**Different Surgical Modalities Used According to the Site of Osteomas**

- Small osteomas with frontoethmoid localization
  - Endoscopic endonasal approach, the results of which can be improved with stereotactic localization.

  Endoscopic resection with intranasal drill (cutting and diamond) with 0° endoscope decreases the morbidity associated with the external approach even in osteomas with frontal involvement.

  If periorbita is preserved, the patient is protected against diplopia, enophthalmos, and facial deformity; hence, no reconstruction is required.

  As per Turri Zanoni et al., the endoscopic endonasal approach requires anterior ethmoidectomy and Draf type II or III frontal sinusotomy.

  Draf type III median drainage (Lothrop modified procedure) with partial removal of nasal septum helps to reach the contralateral nasal fossa so that the lesion in the far lateral recess with greatest angle of tilt can be approached and complete clearance obtained (two nostril, four-hand technique).

  - Uncomplicated large osteomas
    - En bloc resection or curettage (preferably endoscopically)
    - Ogston-Luc fronto-orbital external approach
  - Orbital complications
    - Anterior lesions: anterior orbitotomy
    - Posterior lesions: orbitocranial approach
  - Extension into frontal and posterior ethmoid area (not a contraindication for endoscopic procedure)
    - Howarth-Lynch incision extended to Moure-Sebileau lateral rhinotomy (transcutaneous paranasal approach for protection of lacrimal apparatus) for osteo-plastic flap in addition to endoscopic clearance.
    - Bicoronal bifrontal osteo-plastic technique (avoided in osteomyelitis of frontal bone)
    - Intracranial extension
      - Frontobasal craniotomy and craniofacial bone reconstruction
      - Intraorbital extension
Follow-up
All the patients were closely followed up by either nasal endoscopy or computed tomographic evaluation to check for

- Recurrence
- Residual lesion
- Frontal scar stenosis

For which repeat exploration is warranted.

Management of Surgical Complications

- Damage to peri-orbita—medial wall reconstruction
- Cerebrospinal fluid leak—repair in multiple layers
- Dural defect—in most of the cases, skull base defect was found over olfactory fissure with dural exposure but no cerebrospinal fluid leaks for which reconstruction using the mucoperiosteal free graft from nasal septum was done with the overlay technique over bony portion of defect extracranially after total stripping of nasal mucosa.

Recent Advances
Sonopet omni ultrasonic bone curette has been used for transthyroidal approach lateral to middle turbinate.

Points to Remember

- Cavitation of osteoma causing a thin tumor shell, which could be easily and then removed transnasally to obtain clear margins.
- The core of the tumor as thin, hollowed bony skull can be fractured

Outcomes research

Level of Evidence

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