Case Report
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OSTEOMA OF THE ETHMOID SINUS CAUSING PROPTOSIS

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Abstract

Osteomas are relatively rare, slow-growing benign osteogenic tumours. Involvement of ethmoid sinus is a rare event. Such osteomas with orbital extension can have functional as well as cosmetic symptoms, apart of various sino-nasal symptoms.

We report a case of Osteoma of ethmoidal sinus who presented with unilateral proptosis and ophtalmoplegia. He underwent excision by external approach. Post operatively, there was complete recovery of extraocular muscle function with return of normal facial features.

Keywords:
Ethmoid Osteoma, Orbital extension, Proptosis, External front oethmoidectomy

Introduction

Osteomas are benign, slow growing bone tumours, with a mesenchymalosteo- plastic nature composed of well-differentiated osseous tissue with a laminar structure. [1]Paranasal sinus osteomas are rare with incidence ranging from 0.4% to 3%in the general population.[2]

Ethmoid osteomas are usually slow growing and asymptomatic. They are detected incidentally on imaging done for other reasons. If osteoma is asymptomatic than patient can be offered to be on follow up with serial imaging to see if the size is increasing.

Its when osteomas are significantly large causing mass effect does they cause various sinonasal symptoms like rhinosinusitis due to impaired drainage, frontal pressure or headache. When orbital vault is invaded and orbital contents are displaced then ocular symptoms like headache, diplopia, ophthalmoplegia, impaired vision, proptosis presents. However, primary intraorbital involvement without sinonasal complaintsare extremely rare.[3,4]

Traditionally ethmoid osteomas depending upon their size and involvement of adjacent sinus and orbit, are approached externally by external frontoethmoidectomy, lateral rhinotomy or osteoplasticflap techniques. Endoscopic endonasal approach has also been introduced for ethmoid osteomas which are limited to ethmoid sinuses and nasal cavities.[5]

We report a case of ethmoid osteoma with intraorbital extension causing proptosis and visual disturbances. He was operated by external approach, which led to successful reversion of symptoms.

Case report

A 49 year old male, referred from Ophthalmology department presented with complaints of painless, gradually progressive protrusion of right eye along with epiphora and diplopia since 5 months.

Ophthalmologic examination of right eye

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revealed outward, downwards and lateral protrusion of right eye with restricted medial movement. (Figure 1). Vision was 6/36 with aid.Anterior segment of the right eye revealed axial proptosis of 23 mm, measured by Hertel'sexophthalmometer. fundoscopy was normal. Left eye was normal.

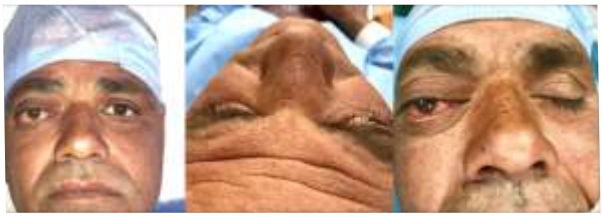

Figure 1: Unilateral proptosis of right eye and inability to close the eye completely

External nasal examination revealed no deformity. Diagnostic nasal endoscopy revealed no obvious mass noted protruding into nasal cavity and middle meatus. Mucosa was normal. There was no mucoid discharge and no paranasal tenderness could be elicited.
Computed tomography revealed, a well-defined mushroom shaped pedunculated bony outgrowth measuring 2.8x 2.6x 2.8 cm in right ethmoid cells with dense calcifications. Posteriorly skull base wasfree. Laterally, mass was extending into orbit pushing extra ocular muscles of the right eyeball. Magnetic resonance imaging was also done to evaluate for displacement of extraocular muscle and its relationship with respect to optic nerve and skull base. Findings similar to CT scan were noted. Thin T2 hyperintense covering,likely to be cartilaginous cap approx. 3.5mm thickness, which could suggest an osteochondroma was noted. Medial rectus and superior oblique muscles closely abutting the lesion. (Figure 2). A differential diagnosis of osteoma or osteochondroma of the right ethmoid was made.

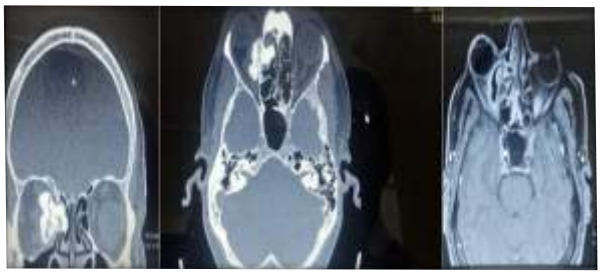

Figure 2: CT scan and MRI showing mushroom shaped dense bony mass which was intraorbital but extra conal. This extension was responsible for proptosis and diplopia

In view of size and extension of mass into orbit, normal nasal endoscopy and uninvolved skull base external approach was preferred over endoscopicendonasal approach. Excision by external approach using Howarth-Lynch incision under GA was performed. (Figure 3)

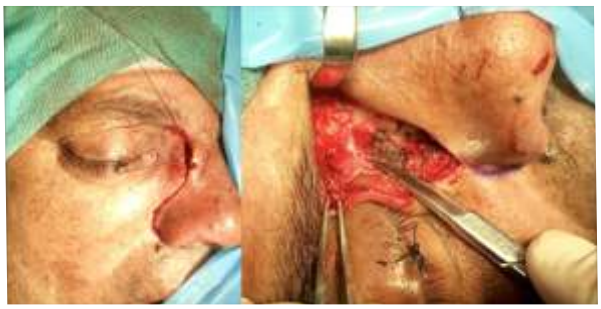

Figure 3: Intraoperative view. (a) Howarth Lynch incision (b) Medial canthal ligament divided under vision

Firstly, right sided tarsorrhapy stitch was taken to protect the eye and cornea. Howarth lynch incision was taken. Subcutaneous tissue dissected till lateral nasal bone. Periosteum was elevated. Medial canthal ligament visualized and was divided. Peri-orbital structures separated and orbit pulled laterally with a scoop. Once eye was separated from mass all around, a 4mm osteotome was used on medial, lateral and superior aspects. Bony mass was separated from all around and with Freer's elevator, finger

dissection, it was gradually manipulated out in toto. (Figure 4).

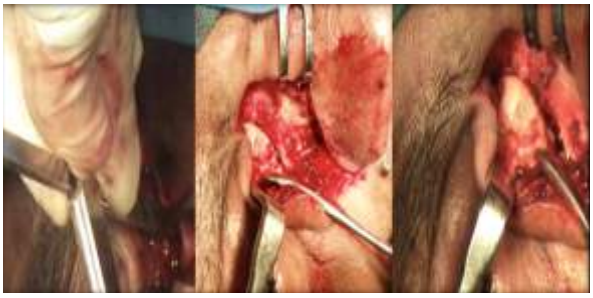

Figure 4: Intraoperative view. (a) Osteotomy being done to separate osteoma from its attachment. (b, c) Freer's elevator being used to extract the tumour.

Anterior ethmoidal cells were visualized which revealed no residual bony mass. Anterior skull was also examined using nasal endoscope to look for skull base defect and possible CSF rhinorrhoea; no CSF leak was noticed. Medial canthal ligament was resutured. Haemostasis achieved and wound closed in layers.

Post operatively no residual proptosis or ptosis was noticed. There was no telecanthus and no CSF rhinorrhoea. Complete bony tumour extirpated matched with imaging findings. (Figure 5).

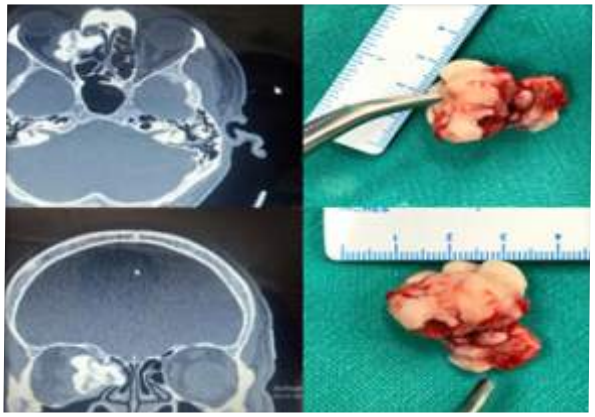

Figure 5: Mushroom shaped osteoma resected, matching in shape with preop imaging findings.

There was return of eye movements in all directions of gaze. (Figure 6)

Figure 6: Postoperative view. No proptosis with no ophthalmoplegia.

Histopathology revealed dense, compact lamellar bone with medullary cavities that contain fibroblasts and other mesenchymal elements. There were narrow anastomosing trabeculae of woven bone with osteoclastic rimming within a fibrovascular stroma favouring Osteoma.

Discussion

Paranasal sinus osteomas are generally asymptomatic and are diagnosed incidentally on imaging. Ethmoid sinus osteomas remain asymptomatic till they increase in size which hampers the sinus ventilation and drainage leading to rhino-sinusitis or when they invade the orbit, displacing orbital contents and causing various ocular symptoms.

Ethmoid osteomas generally originate from lateral part of ethmoid sinus roof and thus have the tendency to grow towards orbit, explaining ocular symptoms and no nasal symptoms, as noticed in our patient.[5]

A review article mentioned male: female sex predilection of 1.6:1 with frontal sinus to be the most common site (71.8%), followed by the ethmoidal sinus (16.9%), maxillary sinus (6.3%) and sphenoid sinus (4.9%).[6] All age group ranging from 4 years to 82 years has been ,with a peak incidence in the 4th to 6th decades of life.[6]

These osteomas are generally slow growing with a mean growth rate 3 of 1.6 mm/year.[5]

Ethmoid osteomas generally measures between

2-30mm, and are considered large or giant if it measures more than 30mm or weighs more than 110 gm.[7]

The aetiology of osteomas is controversial. There are 3 main theories regarding the aetiology of osteomas have been proposed:[6]

(i) ***Developmental*** – osteomas have been noticed arise where membranous and cartilaginous tissues meet during embryonic life. Orbital region is one such place, which is prone to osseous hypergenesis due to close contact of many bones like - frontal, maxilla, lacrimal, osplanum, sphenoid, and palatine. Chronic sinus infection or an unsuspected fracture, thus stimulates the osteogenic activity.

(ii) ***Traumatic*** – Trauma sustained to maxillofacial region can cause osteoblast proliferation within sinus mucoperisoteum leading to osteoma formation.

(iii) ***Infective*** – Sinusitis may stimulate osteoblastic proliferation within the sinus mucoperiosteum, leading to tumor formation.

Apart from above, genetic factor has also been implicated in development of osteoma as in Gardner Syndrome, an autosomal condition characterized by intestinal polyps, multiple hamartomas of the retinal pigment epithelium, pigmented skin lesions, and multiple osteomas. In Gardner syndrome, osteomas involve preferentially the skull and maxillary sinus.[5]Our patient gave history of sustaining trauma to head 01 year back which points towards traumatic pathogenetic theory.

Most of the times osteoma is detected incidentally on imaging done for some other purpose. Computed tomography is investigation of choice, which gives information regarding its origin and its extent into sinus or orbit and also assists in planning surgery via external or endonasal approach. The densityof the mass depends on the amount of ivory and cancellous bone in the tumor. Earwaker observed fivematrix patterns by CT: uniformly sclerotic, targetlike,partially corticated shells with heterogeneousmatrix, heterogeneous matrix without well-defined shells, and laminated.[2]

MRI can be used as an adjunct to CT scan in complicated cases to assess introrbital or intracranial extension. Both CT scan and MRI of the patient led us to the differentials of osteoma and osteochondroma of the right ethmoid.

Radionuclide bone scan can help to differentiate an actively growing lesion ("hot") from a stablelesion ("cold").[8]

Macroscopically, osteomas are round or oval, hard, ivory-white, bosselated, wellcircumscribed lesions attached to the underlying bone by a broad base or occasionally by a small stalk and covered by a thin layer of fibrous periosteum.[9]

Histologically, osteomas can be classified into 3 types: ivory or compact, mature or cancellous, or spongiotic and mixed.[10] The HPE findings of our specimen goes in favour of a mixed osteoma.

The surgical approach depends on the size, location, and extension of the tumour.If the tumour is large and is located near or extends into the orbit, tumour can be approached externally by external fronto-ethmoidectomy, lateral rhinotomy or osteoplastic flap techniques. However, the disadvantage of external approach is the resultant visible scar, trauma to eye and surrounding structures, trauma to lacrimal system which may lead to dacryocystitis, and possible risk of CSF rhinorrhoea. Moreover, it is not a suitable approach for paediatric patients. In such patients, a coronal approach is suitable, even though it may require the temporary removal of some bone.[1]

If the tumor is small and is possible to extract it via the nostril, an endoscopic endonasal approach is the best choice. However, as per Y Pons *et al*, T Muderris*et al*, it is possible to extract evenlarge osteomas endoscopically.[4,5]

In our patient, tumour size was approximately 3 cm in size with intraorbital extension

withnormalendonasal appearance. It was felt prudent to approach this tumour via external approach without breaching nasal mucosa. The mass was removed en bloc in toto.

Conclusion

Ethmoid sinus is an uncommon location forosteomas to occur. Due to involvement of orbit, the patient seeks medical advice early. Radiology plays an important role in diagnosis. Treatment of ethmoid sinus osteoma is surgical, which can be external approach or endoscopic endonasal approach depending on various factors like size, site, associated symptoms and complications.

Conflict of Interests

We have no conflict of interests to declare.

Informed patient consent

A written informed consent has been taken from the patient for publication of pictures in medical journal.

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