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Case study of giant frontal-ethmoid sinus osteoma

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Abstract

Aim: The authors hereby present a case of giant frontal-ethmoid sinus osteoma which is 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 female presented to us with the complaint of proptosis of left eye near medial canthus for last 6 months. After investigations, she was diagnosed with frontal-ethmoid sinus osteoma, which was excised by endoscopic approach. There was dense, compact bone and broad trabeculae of mature bone i.e. compact osteoma which was confirmed on histopathology.

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

Keywords: Osteoma, giant frontal-ethmoid sinus osteoma, endoscopic approach, paranasal osteoma

Introduction

Osteoma is a benign tumor composed of mature compact bone or cancellous bone. This tumor is essentially restricted to the craniofacial skeleton and rarely, if ever is diagnosed in other bones ^[1, 2]. In some countries the prevalence of the osteoma is about 1% of all patients in the ear, nose and throat (ENT) clinics ^[2]. The mandible and paranasal sinuses are the most commonly affected sites in the maxillofacial region ^[3-5].

Peripheral osteoma is defined by centrifugal growth from the periosteum, while central osteomas arise centripetally from the endosteum. An osteoma located away from the sinus ostium usually does not cause symptoms for a long time, although symptoms develop when the osteoma enlarges or is situated in the drainage pathway of the sinus. Symptoms of ethmoid osteoma occur earlier than osteoma of the frontal sinus due to the small volume of the sinonasal cavity ^[6]. Extension to the orbital and/or skull base is not common. When osteomas expand into the orbital vault, they displace the orbital contents and give rise to symptoms like headache, ocular symptoms like diplopia, exophthalmos and proptosis. Grossly, osteoma is hard and lobulated with an ivory like appearance often mixed with a coarse granular component. On histology, the bone is compact or cancellous, with vascular or connective tissue components. In this paper we report a case of a large frontal-ethmoid sinus osteoma with orbital expansion, treated with surgical excision.

Case Description

A 20-year-old female was referred to our hospital with a six month history of proptosis of the left eye that was progressing slowly. She complained of decreased vision and pain around the left eye as well as nasal obstruction. Ophthalmologic examinations showed severe proptosis of the left eye near medial canthus. Her visual function was perception to light and finger movement up to 15-20 feet. The left globe was pushed downward and laterally. There was mild swelling of the left upper lid. A hard nodular mass could be felt on and below the left medial canthus. (fig 1) Preoperative radiographic diagnostic work-up of coronal computed tomography (CT) scan revealed large multilobulated predominantly bony lesion from left nasal cavity- ethmoid sinus and frontal sinus region extending within left orbital cavity with resultant left proptosis, periorbital oedema and soft tissue swelling.(fig 2) Patient was taken for surgery and the orbital mass was removed in two pieces. First piece was removed by endoscopy from ethmoid sinus, second piece was removed by dissection between ethmoid sinus and orbital bone above upper eyelid.

They were polypoidal with bosselated surface on the external surface and was dense and compact on cut surface after decalcification. (Fig 3) After 1 week of operative procedure patient was discharged and patient's condition was better in follow up. Histopathological examination revealed dense, compact bone and broad trabeculae of mature bone. Outer surface was sharply demarcated and lined by respiratory epithelium. Underlying fibroconnective tissue is infiltrated by chronic inflammatory infiltrate and showed presence of mucous glands. (Fig.4,5,6)



Fig 1: Clinical photograph showing the orbital swelling near medial canthus of left eye

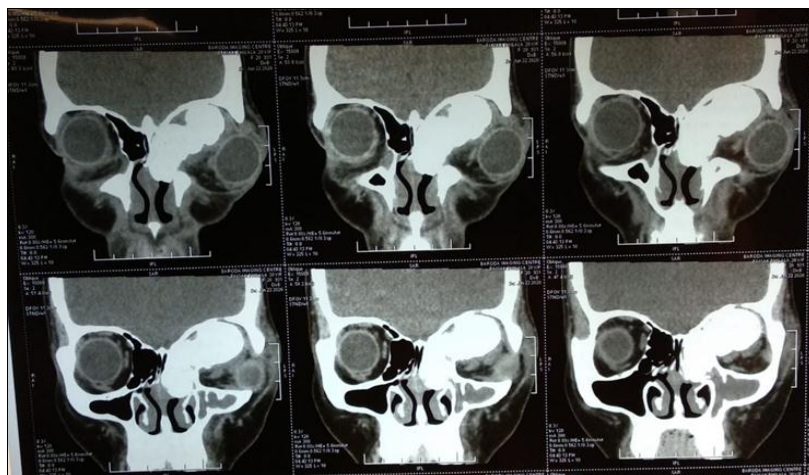


Fig 2: CT (coronal plane) shows pedunculated, cauliflower like growth extending within orbital cavity



Fig 3: The macroscopic appearance of lesion submitted for histology after excision

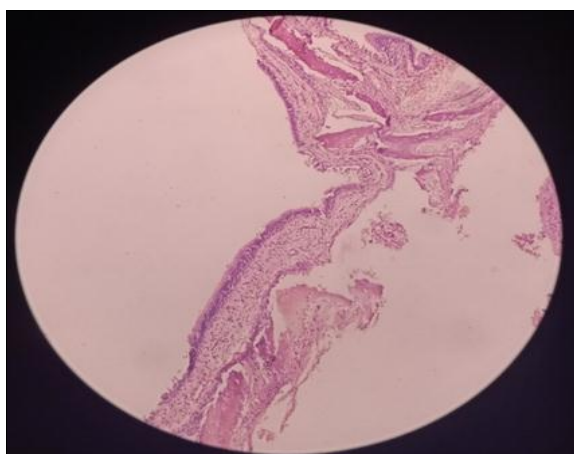


Fig 4: Respiratory epithelium

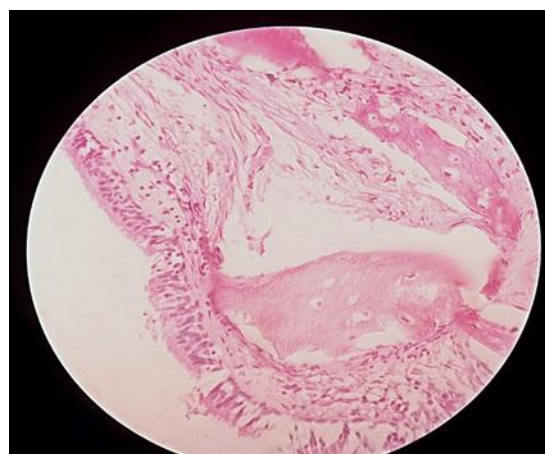


Fig 5: High power view

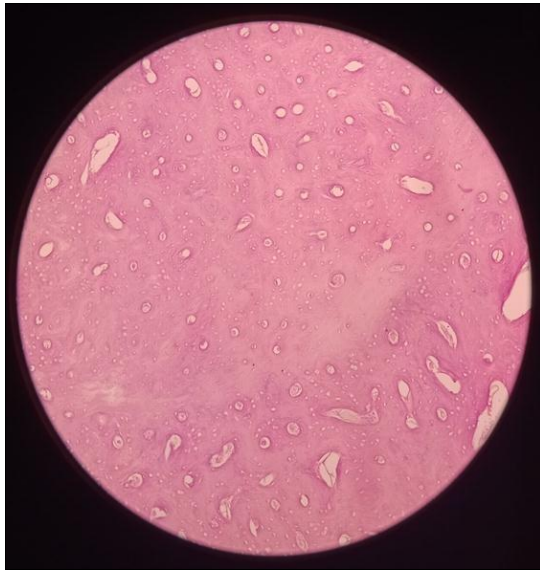


Fig 6: Dense and compact bone (Low power)

Discussion

Osteoma is the most common benign tumor of the paranasal sinus. It usually grows slowly. However, it may extend to the surrounding structures and cause severe intracranial or orbital complications.⁴Larrea-Oyarbide *et al.*,^[3]Sayan *et al.*,^[7] and Longo *et al.*^[8] reported that the most frequently affected paranasal sinus of osteoma was the frontal, followed by the maxillary, ethmoidal, and sphenoidal sinuses. Frontal sinus osteomas account for 57% of all paranasal osteomas, with an incidence of 0.1 to 3%.^[9] Paranasal sinus osteomas are generally asymptomatic and are diagnosed only as a coincidental radiological finding.¹⁰ The condition most commonly presents during the second to fifth decades, with a male to female ratio of approximately 3:1^[11].

Furlaneto *et al.* contended that none of the proposed hypotheses related to the etiology of these lesions has been proven. Neoplastic and reactive causes have been suggested as possible aetiological factors. Some researchers have considered that osteomas arise from either embryological cartilaginous rests or persistent embryological periosteum^[12]. The possibility that Peripheral Osteoma may be a reaction to trauma was first suggested by Thoma^[13]. If one accepts the reactive pathogenesis of Peripheral Osteoma, then the term osteoma seems to be inappropriate because it implies a benign neoplastic process. Few considered that a term that better reflects the non-neoplastic nature of Peripheral Osteoma is 'parosteal osseous hyperplasia'^[14]. Minor trauma, not likely to be remembered by a patient years later may cause subperiosteal oedema or bleeding, and the muscle traction could locally elevate the periosteum. This can initiate an osteogenic reaction that could be preserved by the continuous muscle traction^[15]. In the present case, the patient did not have any history of trauma or infection.

The growth of the tumor is caused by the activity of either the periosteum or the endosteum. It can also be called central, peripheral, or extra skeletal. Due to restricted space in the ethmoidal region, Osteoma of the ethmoidal sinus tends to cause symptoms earlier than those in the frontal sinus and also the consequent earlier encroachment on the neighbouring structures. Extension to the orbit may lead to

diplopia and proptosis.

Lesions more than 3 cm in diameter are considered giant tumors^[16]. Most authors, however, have described osteomas of a standard size. In a retrospective evaluation of 34 patients with frontoethmoidal osteomas, Schick *et al.* reported a diameter ranging from 8 to 35 mm and a mean of 17 mm. We have presented a case of a large osteoma near medial canthus of left eye. The lesion had grown slowly for six months and caused proptosis, visual impairment and nasal obstruction. Our patient had lesion of approx. 4.5 cm. Following surgical excision, histological diagnosis was done. Recurrence of peripheral osteoma after surgical excision is extremely rare. However, it is appropriate to provide periodic clinical and radiographic follow up after surgical excision of a peripheral osteoma.

Histologically, osteomas are composed of a normal-appearing, dense mass of lamellar bone. Although they contain osteoblasts, fibroblasts and giant cells in intertrabecular stroma, haemopoietic cells are rarely observed. Osteoma presents a variable amount of osteoblastic and osteoclastic activity^[17]. On the basis of microscopic findings, osteoma can be either a compact osteoma containing marrow tissue or cancellous osteoma showing trabeculae of mature lamellar bone with intervening fatty or fibrous marrow. The compact osteoma usually has a sessile base, normal-appearing dense bone with minimal marrow spaces, and occasional haversian canals. The cancellous osteoma is usually pedunculated and resembles the bone of origin, containing trabeculae of bone and fibrofatty marrow with osteoblasts. The surface can be irregular or smooth, with cortical bone at the margin. The size of the different types of osteoma ranges from several millimetres to several centimetre. However, part of the lesion may be in bone, masking the true size^[18].

In this case, histopathology slides show primarily dense, compact bone and broad trabeculae of mature bone, i.e a compact osteoma. Outer surface is sharply demarcated and lined by respiratory epithelium. Underlying fibroconnective tissue is infiltrated by chronic inflammatory infiltrate and show presence of mucous glands.

Surgical excision by endoscopy or open surgery is the treatment of choice. The most appropriate approach for a frontal-ethmoid sinus osteoma is selected according to location, tumor volume, side of the osteoma, anatomical situation including dimension, frontal recess, and extra sinus extension^[19]. A number of reports in the literature describe the use of an endoscope to remove osteomas of ethmoidal origin, but none of these cases had an ophthalmic complication. In the present case the patient did have some ophthalmic symptoms of decreased vision, pain along with protrusion of the eyeball(proptosis), in spite of which surgeon could use an endoscopic approach. It should be remembered that because of their close contact with the healthy bone, especially in tumors with a wide base, osteomas easily recur if their resection was insufficiently radical.

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