

GIANT OSTEOMA OF FRONTAL, ETHMOIDAL AND MAXILLARY SINUSES AND NOSE: A CASE REPORT

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Giant osteoma is a rare entity among paranasal sinus lesions with only few dozen cases reported in literature. We report a case of 45 year old patient who presented to our OPD with history of visual blurring & epiphora right eye, frontal headache and nasal obstruction. Radiological workup revealed paranasal sinus osteoma involving right frontal, ethmoidal and maxillary sinuses with extension to right nasal cavity. It was extending to the orbit. Surgical excision of the lesion was done using open approach via right lateral rhinotomy. There was no intracranial extension with intact posterior wall of frontal sinus. Owing to its extension in multiple sinuses and broad base, we had to excise the tumor in pieces by help of high speed drill and then piecemeal. Patient had good outcome with complete excision of tumor and resolution of symptomatology.

Osteomas of the paranasal sinuses are well-defined, slowly growing, non-neoplastic masses that arise from the sinus wall and are covered by the mucoperiosteum of the sinus. They are frequently asymptomatic and usually discovered incidentally. Mostly involve frontoethmoidal sinuses followed by maxillary sinus. Osteomas of sphenoid sinuses are very rare. While osteomas are common benign tumors, giant osteomas are infrequent entities presenting to otolaryngologist and at times with complications to neurosurgeons. When symptomatic, they present with features of involvement of local structure or adjacent viscera including eye, brain and meninges. Asymptomatic cases need no intervention but close clinical and radiological follow-up regularly for any significant increase in size or clinical deterioration. Symptomatic cases require surgical excision either through open, endoscopic approach or a combination of the two. Results of surgery are fairly good with only rare cases of recurrence. We present successful management of a case of giant osteoma of right nasal cavity and paranasal sinuses who presented with features of local mass effect and those of orbital extension with visual deterioration.^{1,2}

CASE REPORT

History and Examination

A 45 year old male patient presented to our OPD with history of Epiphora right eye, nasal obstruction and frontal headache on the right side for 3 years with exacerbation of symptomatology for the last 6 months. Speculum examination showed a hard mass in the right nostril. Clinical evaluation revealed significant anosmia bilaterally with minimal perception of smell and that too with strong sniffing. Vision was blurred in right eye and perimetry revealed obvious right nasal field deficit. (Figure 1) Fundus examination was normal with no evidence of raised Intra cranial pressure.

Workup

Plain radiographs nose and paranasal sinuses were obtained in both lateral and occipitomental views. There was a radiopaque shadow extending from upper limit of right frontal sinus superiorly to hard palate inferiorly, orbit laterally and right nasal cavity medially extending into right maxillary sinus (Figure 2). Diagnosis of osteoma was made. To delineate the lesion further CT scan (thin cuts paranasal sinuses and skull base) were obtained. The same lesion was hyper dense on CT sequences and was extending to orbit laterally and nasal septum medially and involving all sinuses on right side approaching up to sphenoid sinus. There was no encroachment superiorly at the frontal base (figure 3, 4). 3D reconstruction was also reviewed for surgical planning.

Operation

Open external approach with Right lateral rhinotomy incision was used to expose the tumor. Periosteum was elevated up to midline, periorbital elevated up to posterior limit of the tumor. To have a complete view of the tumor lacrimal sac was transected from its duct. Portion of it deep to maxilla was exposed using medial maxillectomy. It was hard bone with a broad base. Lateral extent of our exposure was periorbital and

infraorbital nerve both of which were preserved. Tumor was excised in pieces with the help of cavitating it first using high speed drill and then fracturing it with chisel technique. Portion of frontal bone overlying frontal sinus part of tumor was thinned out but integrity preserved. This part was excised last and there was no intracranial extension. Posterior wall of frontal sinus was preserved. No CSF leak observed on the table. BIPP packing was done in the cavity created after tumor removal. Anterior nasal packing was also done in the opposite nasal cavity. Blood loss was 300 ml. Duration of surgery was 2 and a half hours. (Figure-5)

Figure 1: Pre-operative perimetry

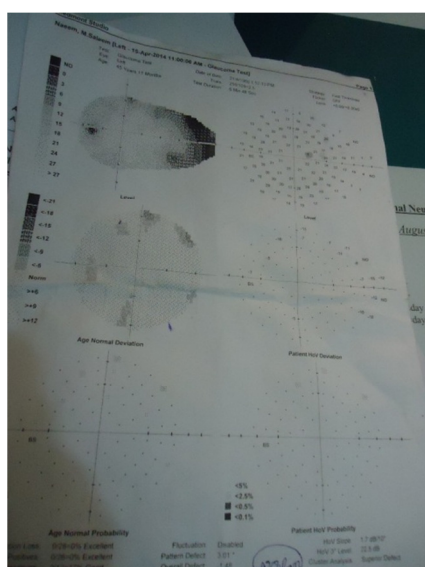


Figure 2; Plain radiograph , Occipitofrontal



Figure 3:CT scan Axial

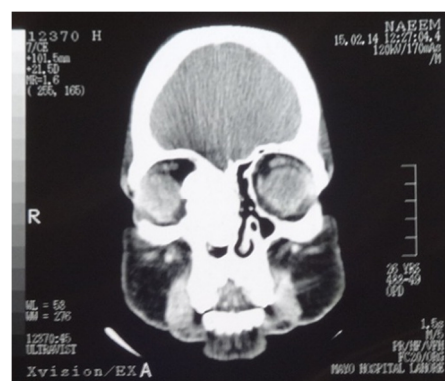


Figure 4: C T Scan coronal

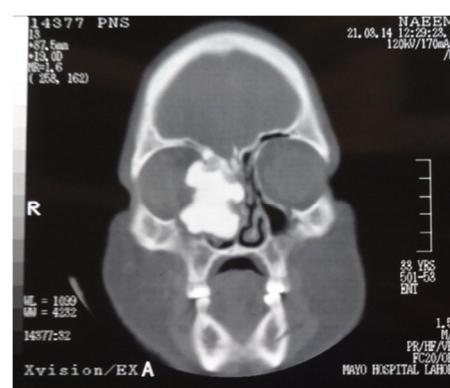


Figure 5:Surgical Specimen –Osteoma



Postoperative Course

Postoperatively on day 1 patient had mild edema right side of face with mild numbness in right V1 and V2 distributions. Nasal packing was removed 48 hours after the surgery. Pupillary reflex and vision was intact. There was no CSF leak or any other complication. Patient was discharged on 3rd post-operative day and is on regular follow-up.

Follow-up visit on 17th post op day revealed cavity on the right side with minimal crusts. Patient had normal extraocular movements with no Epiphora.

Perimetry done same Day showing improvement from preoperative assessment. Occipitomenal and lateral view radiographs showing no residual tumor. Patient had improvement in his sense of smell.

DISCUSSION

Vieja was the first to document sinus osteoma in 1506². Osteomas of the paranasal sinuses are benign tumors, arise from the sinus wall and are covered by the mucoperiosteum of the sinus with a prevalence of 0.01_0.43 % with slight male predisposition 1.3_3:1 (attributed in theory to the large size of sinuses in males and their predilection for trauma) while their incidence is reported between 0.43_1% of general population. True incidence is uncertain as they are frequently asymptomatic and discovered incidentally⁴. They usually affect middle age group; Age of onset varies 8-77 years with the highest incidence in 4th-7th decades of life. Osteomas can be found sporadically or in association with Gardner syndrome (familial adenomatous polyposis). In the latter case, osteomas tend to be multiple and appear ~15 years before colon polyps

Osteomas usually range in size from 2_30 mm. Osteomas with diameter >30 mm or weight >110 grams are defined as Large/Giant osteomas. Giant osteomas of the paranasal sinuses are rare, with only a few dozen cases reported in the literature. A review of the literature from 1975 to 2011 yielded in total, 45 patients with giant osteomas arising from the ethmoid and frontal sinuses in 41 articles³. Given its rarity, the clinical characteristics and treatment of this disease remain controversial.

Osteomas have a tendency to grow slowly. Studies have been done previously to determine their growth rate. In one retrospective study of 44 patients, these lesions showed a growth rate of 0.44_6.0 mm (mean 1.61mm/year) followed with sinus radiographs at intervals⁴. In one another retrospective study of 46 patients with paranasal osteomas, an increase in size of osteoma was detected. The mean growth rate of osteomas^{4,5} was estimated to be 0.79 mm/y in the cephalocaudal direction and 0.99 mm/y in the mediolateral direction. No significant differences were found in the growth rate according to location and growth directions. Bone scans using Tc-99 may have some role in determining rate of growth of osteomas. Noyeh et al., suggested hot scans represent bone with high metabolic activity and should be monitored closely.

They can develop on edge of bone termed "Cortical" osteoma or in deep structures where they are named as "Central/Medullary" osteomas. If spread

outwards they cause marked facial deformities and are noticed early but if mainly inside sinus they may not be perceived for a long time.

Three variants can be seen on histologic examination; ivory, mature and mixed. Ivory osteoma, which is the most common type is characterized by dense, compact bone lacking Haversian system and usually found in frontal sinus osteomas while Mature type is less common, usually found in ethmoid and maxillary osteomas and resembles normal adult bone i.e., trabecular pattern with marrow cavities.

There is a particular frequency predisposition of these osteomas for paranasal sinuses with majority being in frontoethmoid region and overall occurrence is as follows; Frontal(80%)Ethmoid(15%)Maxillary (5%) while cases of Sphenoid osteomas are very rare⁸

Most of these patients are asymptomatic, usually discovered incidentally and are found in 1% of plain radiographs & 3% of CT scans of paranasal sinuses done for complaints suggesting sinus pathology. Symptoms usually result from local mass effect, obstruction of normal sinus drainage and additionally in giant osteomas from compression of orbital contents and erosion of underlying bone with subsequent involvement of dura and brain. Symptomatic patients usually present with headache, facial pain localized to area of osteoma, facial deformity or asymmetry, anosmia and recurrent sinusitis. Orbital complications include proptosis, diplopia, vision changes and ophthalmoplegia while intracranial pneumatocele, meningitis and subdural abscess can result from intracranial extension.

Plain radiographs are needed to establish the diagnosis of paranasal osteoma while CT scan helps delineating the lesion in terms of its relation to neighboring structures and planning surgery. MRI is needed only when intracranial or intraorbital extension is suspected (usually they are low signals on all sequences)

Regarding management either the conservative approach with close observation or surgery is opted. Conservative approach is opted for asymptomatic cases (discovered incidentally on radiographs done with suspicion of sinus pathology) and are regularly followed every 1 or 2 yearly to check for persistent symptoms or rapid increase in size of tumor. Long term prognosis for these tumors is excellent and sarcomatous change has not been reported and recurrence after resection is rare. Indications for surgery^{6,7,8,9} are;

- i) Progressive symptomatology
- ii) Enlargement of asymptomatic osteoma with growth rate exceeding 9mm/year
- iii) If signs of chronic sinusitis are present

- iv) Osteomas of Ethmoid and sphenoid sinuses irrespective of their size due to their propensity to cause complications early in course of disease
- v) Osteomas localized adjacent to nasofrontal duct
- vi) Giant osteomas with orbital or intracranial involvement
- vii) Obstruction of Frontal sinus outflow by medially located osteomas & osteomas occupying > 50% of frontal sinus volume
- viii) Osteomas causing facial deformity (cosmetic)

Grossly these osteomas are oval or round in shape, yellowish white in color and hard in consistency.

Because of benign nature of disease and excellent prognosis aim of surgery is complete excision of tumor but osteomas close to dura, optic nerve and internal carotid artery may be left behind as attempts for removal is fraught with complications and in such cases close and long follow-up is essential especially when tumor is partially left behind.

Important differentials to consider are fibrous dysplasias, osteoblastoma and osteosarcoma. Fibrous dysplasias exhibit typical ground glass appearance on radiology and has the tendency to affect the outer table more than the inner table while osteoblastomas and sarcomas are ill defined, non-homogenous contrast enhancing lesions (as opposite to osteomas). Also on histology they are seen to contain mitotic figures not seen in osteomas.

Historically, conventional surgical treatment options⁹ for sinonasal osteomas include Calwell Luc procedure, Midfacial degloving, Howarth Lynch procedure, Moure Seibeleau lateral rhinotomy and osteoplastic flaps like coronal flaps for frontal osteomas. Data from last 17 years confirm efficacy and safety of minimally invasive endoscopic endonasal techniques in treatment of selected ethmoid, frontal and sphenoid sinuses osteomas. In more recent cases, surgery assisted by ENT navigation system, curved drills and ultrasonic bone emulsifier with no recurrence⁵

Whatever the approach, cavitation of the lesion with high speed burrs, then fracturing it and piecemeal removal of eggshell remnants is the method of choice.

First endoscopic osteoma excision was achieved in 1994 (was a case of frontal osteoma). In nutshell, endoscopic approach offers excellent cosmesis, clear and more direct visualization of osteoma and adjacent structures while its limitations are cases of laterally placed frontal osteomas and giant osteomas and the inherent tendency of field obscuration by blood. On the other hand, open approach offers excellent results for maxillary osteomas and is the only available approach at present for giant osteomas. It is required in cases

where anterior frontal sinus wall has to be removed and reconstructed. Disadvantages of open approaches are that patient is left with a permanent scar, more blood loss, chances of having paresthesia and sinocutaneous fistula postoperatively.

CONCLUSION

- Giant Osteoma PNS is a rare entity
- It can be associated with orbital & Intracranial complications
- Open surgery needed most of the times for Giant osteomas
- Endoscopic surgery where possible is Treatment of Choice

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