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TEMPORAL BONE OSTEOMA – A RARE BENIGN TUMOR : A CASE SERIES

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ABSTRACT **Background:** Osteomas, arising from osteoblasts, are slow-growing benign mesenchymal tumors. While they can appear in any bone, their rarity in the temporal bone and middle ear (0.1% to 1% of benign skull tumors) emphasizes their distinctiveness. Initially asymptomatic, osteomas may become symptomatic with increasing size, commonly causing pain. Their unique prevalence underscores the importance of vigilance, as early stages may lack noticeable symptoms. This insight into osteomas highlights the potential for evolving clinical manifestations, particularly pain, necessitating attention as these benign tumors progress. **The Case series:** We are describing a case series of 3 unique cases of painless post-aural swelling. Clinical evaluation and a high-resolution CT scan of the temporal bone aided in diagnosing the swelling. Surgical excision was done for all the patients. Post-surgery, histopathological examination confirmed the diagnosis by scrutinizing tissue characteristics, validating the nature of the swelling as an osteoma. This comprehensive approach highlights the importance of accurate diagnosis and subsequent surgical intervention in osteoma cases. **Conclusion:** Osteomas in the mastoid area of the temporal bone, often presenting as asymptomatic swelling causing cosmetic disfigurement, can be effectively treated with total excision, yielding a good prognosis. Despite the lack of ear-related symptoms, vigilance for syndromic associations and extratemporal symptoms is essential. Timely diagnosis and management, especially in cases with potential complications like pain, are crucial. Given the unique rarity of osteomas in these locations, healthcare professionals must adopt a specialized and careful approach to diagnosis and treatment

KEYWORDS :

INTRODUCTION

Temporal bone osteomas constitute a rare subset of benign osteoblastic tumors known for their slow growth and favorable prognosis. Their global incidence is estimated in 0.1-1% and it is described as gradually increasing.[1,4-6] Osteomas are typically asymptomatic, and temporal bone osteomas may cause pain or mass effects as they enlarge, necessitating surgical excision for optimal aesthetic and curative outcomes.[2,3]

Osteomas can manifest in various regions and those in the temporal bone region can appear in different areas, including the external auditory canal, mastoid, squamous portion, middle ear, eustachian tube, petrous apex, internal auditory canal, zygomatic process, glenoid fossa, and styloid process.[4,6] Temporal bone osteomas may be linked to external auditory canal cholesteatoma and its complications, adding complexity to their clinical presentation.[6] Accurate diagnosis relies on imaging studies reflecting the underlying pathology and diagnosis is supported by histopathological findings.[4]

This case series illuminates the extraordinary rarity of temporal bone osteomas, emphasizing their atypical clinical manifestations and distinct radiological features. By giving a detailed account, this case series aims to enrich medical literature and enhance the comprehension of clinical, radiological, and management aspects of this uncommon condition. The insights provided may facilitate more accurate and timely diagnoses in similar cases in the future

Case 1

A 30-year-old female was evaluated at the outpatient department of our tertiary care hospital, presenting with a painless swelling in the left postauricular area for six years. The swelling had an insidious onset and had gradually increased to its current size. There was no associated hearing loss, discharge from the affected ear, or history of trauma, headache, dizziness, or any focal neurological deficits. The patient did not have any other swelling elsewhere.

On examination, a solitary, spherical swelling measuring approximately 4 × 3 cm was noted over the mastoid area of the left side[fig. 1]. The swelling was hard, with smooth margins, immobile, non-translucent, non-fluctuant, non-tender, and the skin over the swelling was normal and adherent to the underlying bone. Examination of the left ear pinna, external auditory canal, and tympanic membrane revealed no abnormalities, and the examination of the opposite side was normal. A pure tone audiogram indicated no hearing loss in either ear. High-resolution computed tomography (HRCT) of the temporal bone identified a 3.9 × 2.7 cm bone density lesion with irregular margins in the left postauricular area, originating from the outer table of the skull without intracranial extension.[fig. 3] . Mastoid pneumatization was preserved, and the middle ear cavities on both sides were normal with intact ossicles. Based on the clinical presentation, physical examination, and radiological findings, a diagnosis of osteoma was established.

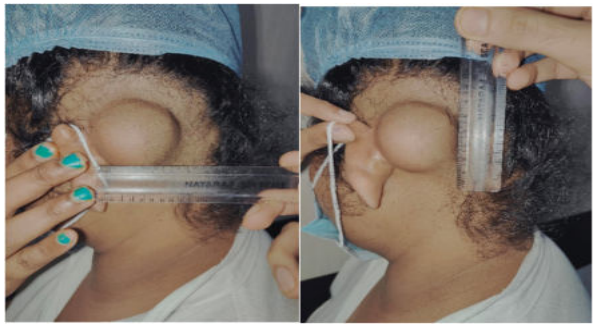

Fig. 1-Tumor Appearance On Local Examination

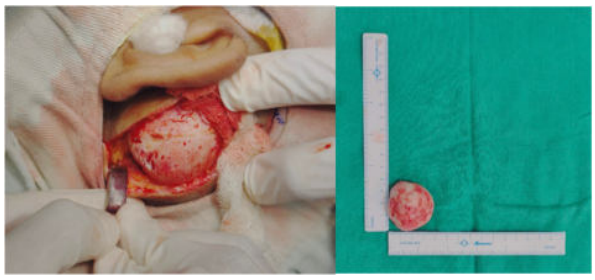

Fig 2- Intra Operative Exposure Of Tumor

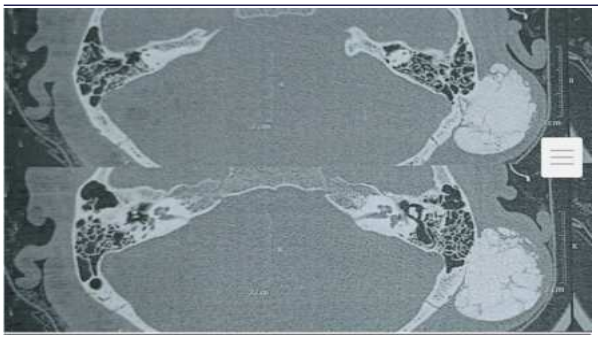

Fig 3- HRCT TEMPORAL BONE showing the tumor on left side in area of mastoid region.

Case 2

Another interesting case reported was of a 28 year old female presenting with similar complaints of left post aural swelling since 5 months. She had no other complaints related to ear. Ear examination was normal. On examination, a solitary swelling measuring approximately 3 × 3 cm was perched prominently over the mastoid area of the left side [fig.4] Swelling had smooth margins, and was immobile, bony hard in consistency and the overlying skin was normal. HRCT temporal bone showed similar findings as case 1. Patient underwent surgical excision under general anaesthesia and the specimen was sent for histopathological examination.

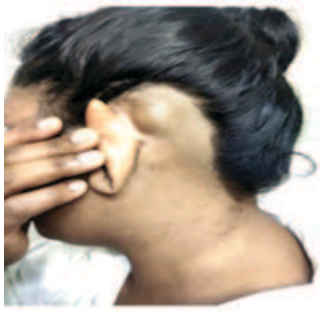

Fig. 4 – left sided postaural swelling.

Fig. 5- intraoperative exposure of the swelling.

Fig. 6- surgical site after excision of the tumor.

Case 3

A 45 year old female presented to the ENT OPD with similar complaints of left sided postauricular swelling. During the examination, a singular swelling was seen over the left mastoid region. It measured approximately 3.5 ×2.5 cm, exhibiting a palpable firmness and smooth boundaries. Clinical findings were similar to the above mentioned cases. The overlying skin appeared undisturbed, seamlessly adhering to the underlying bone. High-resolution computed tomography (HRCT) of the temporal bone [fig.9] revealed a 4 × 2.8 cm bone density lesion with irregular margins in the left postauricular area, originating from the outer table of the skull without intracranial extension. Mastoid pneumatization was preserved, and the middle ear cavities on both sides were normal with intact ossicles.

Fig. 7- intraoperative surgical exposure of the tumor

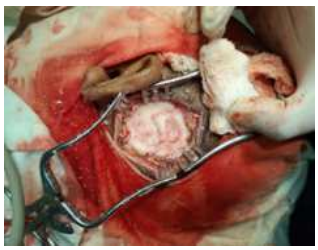

Fig. 8 –after excision of the tumor

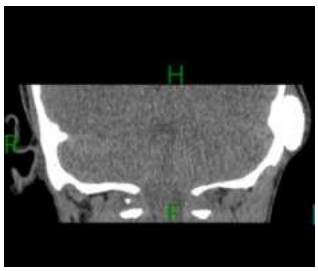

Fig 9 – Hrct temporal bone showing left sided postaural swelling in case 3

Operative procedure :

All the 3 patients underwent surgical excision of the tumor under general anesthesia. The surgical approach was determined based on the radiological and clinical extent of the tumor, taking into consideration the patient's preference for either local or general anesthesia. A vertical incision was made over the swelling, and subcutaneous flaps were elevated on both sides of the incision. The periosteum was elevated to expose the bone.[Fig. 2, fig. 5 , fig. 7]. A distinct slit delineated the lesion from the cortical bone, facilitating separation. The base of the lesion was detached from the cortex using a hammer and chisel, and the margins were smoothened with a mastoid drill. [Fig.6 , Fig.8]

The excised specimen was sent for histopathological examination, which confirmed a benign bone-forming tumor characterized by compact mature trabecular bone within a paucicellular fibrous stroma, indicative of a compact type osteoma.

At the one-week follow-up, the mastoid dressing was removed, and the wounds were evaluated for gaping, swelling, or hematoma formation. No local complications were noted, and the patient was able to resume daily activities. Subsequent follow-ups at three and six months showed healed wounds with scarring, no evidence of recurrence or residual tumor, and no active symptoms.

DISCUSSION

What sets this case apart lies in its rarity and the comprehensive approach to diagnosis and management. Temporal bone osteomas are uncommon tumors, and this case offers a unique opportunity to dive into the intricacies of their presentation, diagnosis, and treatment. With a focus on detailed clinical and radiological evaluations, the case sheds

light on the nuanced growth patterns, various histological types, and proposed etiologies associated with temporal bone osteomas. Through meticulous clinical and radiological assessments, the case highlights the importance of comprehensive evaluation in guiding treatment decisions.

Histological Types and Growth Pattern

There are four histological types of osteoma of the mastoid that have been reported worldwide: osteoma compactum, osteoma cancellare, osteoma cartilagineum and osteoma mixtum. They can also be divided depending on their growth pattern into ingrowing or outgrowing and can be unilateral or bilateral. It is difficult to distinguish the type of osteoma on clinical basis given the similarity of the symptoms and presenting signs.[7]

Etiology and Associated Factors

Various etiologies including trauma, surgery, radiotherapy, chronic infection and pituitary dysfunction are all related to mastoid osteomas. However the precise etiology is still not known and considered to be a true bone tumor.[8,11] Yamasoba et al reported osteoma to be congenital in nature, based on their case of an osteoma that was seen in conjunction with congenital cholesteatoma[4] .Graham et al. reported that osteomas arise from perosseous connective tissue from the suture line and hence it is tough with thick subcutaneous layer and also rich blood supply.[9] Haymann suggested it was due to an alteration in the growth of the cranial bones.[12] Freidberg opined that it occurred as a result of trauma followed by periostitis.[12]. Kaplan et al opined a combination of trauma and muscle traction which play a role in the development of osteoma.[16] Varboncoeur et al were of the opinion that osteomas arise from an embryonal cartilaginous rest or maybe from a persistent embryologic periosteum.[18]. It was reported that temporal bone osteomas occur twice as often in females, whereas external auditory canal osteomas occur twice as often in males. This was also true in this case.[13] Osteosarcoma, osteoblastic metastasis, isolated eosinophilic granuloma, Paget's disease, giant cell tumor, osteoid osteoma, calcified meningioma and monostotic fibrous dysplasia are some of the differential diagnoses that can be considered for temporal bone osteoma. All of these lesions have radiologically less clear borders in contrast to osteomas which have clear borders, well demarcated and dense growth of sclerotic lesion from the mastoid bone on CT scan.[5,15]

Diagnostic Imaging

HRCT temporal bone is the investigation of choice for these tumors. Mature osteomas show central marrow in contrast to ivory osteomas which appear radio dense like a normal cortex on the scan.[15] In this case the HRCT temporal bone showed mature osteoma with clear borders and a well demarcated lesion confiding it to be an osteoma on radiology. In cases of multiple osteomas in the body, Gardner's syndrome should be one of the diagnoses which is an autosomal dominant syndrome characterized by multiple intestinal polyps, epidermoid inclusion cysts, fibromas of the skin and mesentery and multiple osteomas. One of the characteristics of osteomas in Gardner's syndrome is that they have tendency to involve membranous bones and the mandible and maxilla are more commonly involved.[14] As in this case there were no multiple osteomas, there was no involvement of membranous bones and also systemic other symptoms of Gardner's syndrome were absent, it was not considered as one of the diagnosis. Osteomas of extra canalicular area are predominantly seen in young females and mostly composed of mature bone. Likewise middle ear osteomas are extremely rare and if present they usually arise from promontory resulting in progressive conductive hearing loss due to inclusion of ossicles.[16]

Clinical Symptoms and Surgical Management

Usually being asymptomatic, these tumors can present with symptoms like fullness of ear, reduced hearing, ear discharge and in extremes cases may present with facial nerve weakness, giddiness or focal neurological deficit.[16] The osteoma must completely be excised until normal mastoid air cells are exposed. Osteomas are limited to the external cortex generally hence a cleavage plane is encountered where the tumor meets the normal bone. Hence surgical excision involves excision of the tumor at its junction with cortex as was done in this case. In mastoid osteomas extending into the bony labyrinth and facial nerve, complete removal is usually not indicated as there can be damage to these structures.[17]

Clinical Implications for Future Practice

Firstly, it emphasizes the importance of considering temporal bone osteomas in the differential diagnosis of patients presenting with symptoms or imaging findings suggestive of skull base lesions. Secondly, it highlights the significance of conducting thorough clinical and radiological evaluations to accurately diagnose and characterize these tumors. Additionally, the successful surgical outcome in this case underscores the efficacy of complete excision for achieving favourable outcomes.

CONCLUSION

Temporal bone osteomas, although rare, demonstrate favourable surgical outcomes when completely excised, as evidenced by this case. While often asymptomatic, these tumors can cause pain and cosmetic concerns. The preferred diagnostic tool is a high-resolution CT scan of the temporal bone, which reveals mature osteomas with distinct borders, aiding in differentiation from similar tumors. The conclusive diagnosis is confirmed through histopathology. Recurrence is uncommon. This case underscores the importance of comprehensive clinical and radiological assessments, highlighting growth patterns, various histological types, and proposed aetiologies. The association with Gardner's syndrome adds further significance to understanding and managing temporal bone osteomas. Overall, this report contributes valuable insights into the nuanced understanding and effective treatment of this uncommon tumour.

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