Mastoid Osteoma – Is "Trauma" A Possible Etiologic Factor

Pirabu Sakthivel,[1] Rijendra Yogal,[1] Kapil Sikka,[1] Alok Thakar,[1] Madhu Rajeshwari[2]

[1]Department of ENT, All India Institute of Medical Sciences, New Delhi, India, [2]Department of ENT, All India Institute of Medical Sciences, New Delhi, India.

ABSTRACT

A 19 year old female presented with painful postaural swelling of three years duration with preceding history of trauma. Clinically and radilogically the diagnosis of mastoid osteoma was made. As patient was symptomatic the osteoma was removed and cortical mastoidectomy was done. We emphasise that symptomatic mastoid osteomas must be treated early even if they are small in size to prevent the development of giant osteomas. The case is reported for its rarity with relevant review of literature. To the best of our knowledge this is the first case report in which there is a definitive history of trauma preceding the development of osteoma suggesting its possible role as an inciting factor.

Keywords: *mastoid osteoma; temporal bone; cortical mastoidectomy.*

INTRODUCTION

Head and neck osteomas are rare, benign, circumscribed, slow growing mesenchymal bone forming tumors that are common in frontoethmoid region. Mastoid temporal bone osteomas are exceptionally rare. Its occurrence is of 0.1% to 1% of all benign tumors of the skull.[1-3] Although osteomas secondary to trauma, surgery, irradiation or chronic infection have been described, the aetiopathogenesis and pathophysiology of mastoid osteoma still remain unclear. Most of the cases remain aymptomatic, nevertheless can cause cosmetic deformities, local tenderness and can interfere with wearing glasses.[4] Treatment involves complete removal of the tumor for symptomatic osteomas or those with cosmetic deformity.

We report a case of painful mastoid osteoma in a 19 year old female, which was preceded by a history of trauma. Excision of the lesion resulted in relief of symptoms. The case is reported for its rarity and its possible association with trauma as the inciting factor.

CASE REPORT

A 19 year old female presented to our OPD with history of progressively increasing swelling behind the right ear for the past two years. There was an episode of minor blunt trauma to the post-aural region three months before the onset of swelling and it did not require any intervention. The swelling was painless initially, but has been associated with continuous dull aching pain since one year. Increase in size also led to difficulty in wearing spectacles. Patient had no other systemic complaints. There was no history of any scalp infection. On clinical examination, there was a sessile, bony hard, retro auricular mass (approximately 5 x 2 cm), associated with mild tenderness. Overlying skin was free with a scar over it (Figure 1). Otoscopic examination and audiometry were normal. No other abnormality was detected on ear, nose, throat and rest of the systemic examination.

Correspondence: Dr. Pirabu Sakthivel, Department of ENT, All India Institute of Medical Sciences, New Delhi, India. Email: pirabusakthivel@gmail.com, Phone: +91-9958744547.

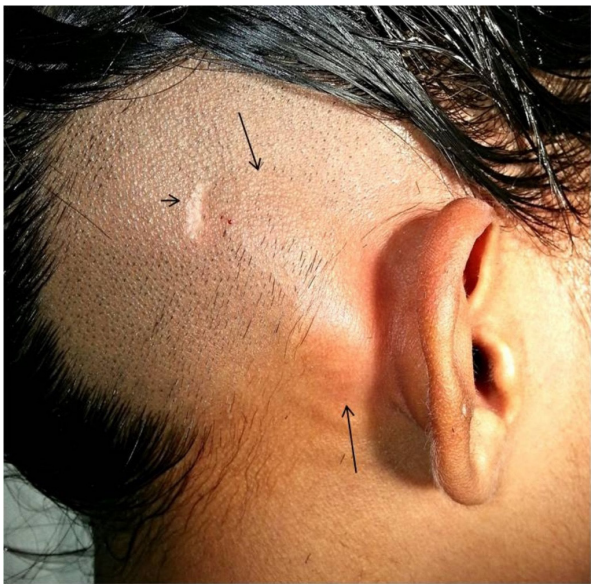

Figure 1. External appearance of osteoma (large arrows) with a healed scar (small arrow) over skin.

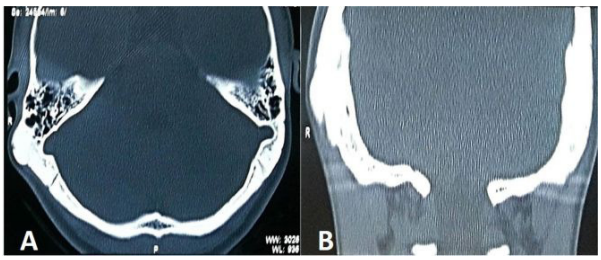

Figure 2. Osteoma in (A) axial and (B) coronal cuts. Note the broad based radiodense lesion overlying mastoid air cells.

All routine laboratory tests including serum calcium, phosphorus, and alkaline phosphatase levels were within the normal limits. CT scan of the temporal bones demonstrated a radiodense, broad based lesion arising from the right mastoid cortex, typical of a mastoid osteoma, with no other associated abnormality of the other parts temporal bone (Figure 2A, 2B). As the patient was symptomatic, surgical intervention was performed under general anaesthesia via modified postaural incision to have complete exposure of the osteoma (Figure 3). Following skin dissection and exposure of the osteoma, a groove was drilled around the base and the osteoma was removed using a bone chisel. Cortical mastoidectomy was done as mastoid air cells were encountered during the anterior part of dissection, and also to ensure complete removal (Figure 4). The incision was closed in layers with a drain (removed on 2nd post-op day) and stitches were removed on 7th post-op day without any complications. Histological examination was consistent with compact osteoma (Figure 5). Patient remains recurrence and pain free after one year follow up.

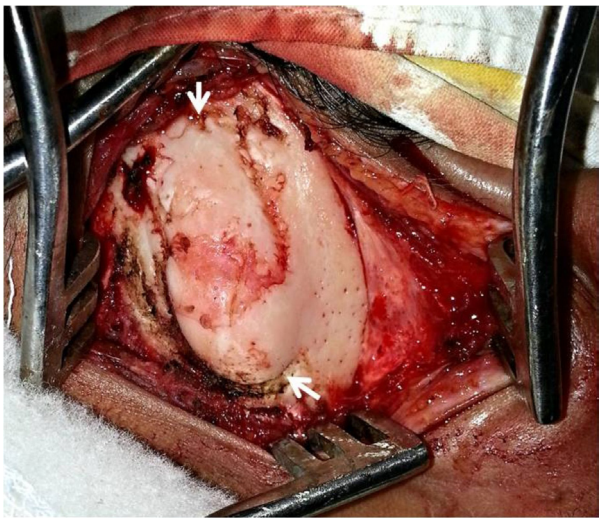

Figure 3. Appearance after elevating periosteum all around (white arrows).

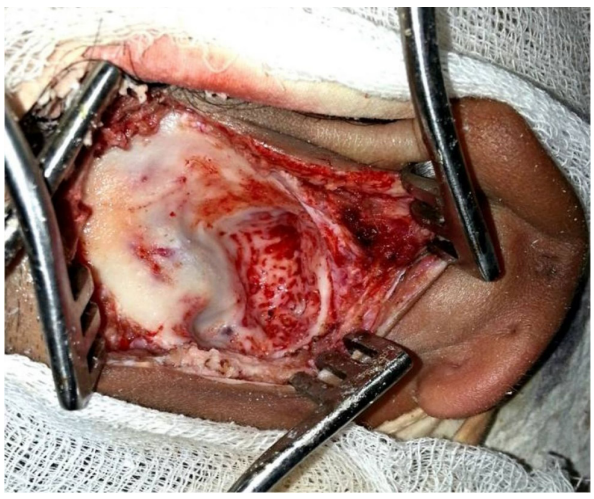

Figure 4. After complete removal of tumor with dural and sinus plate exposed.

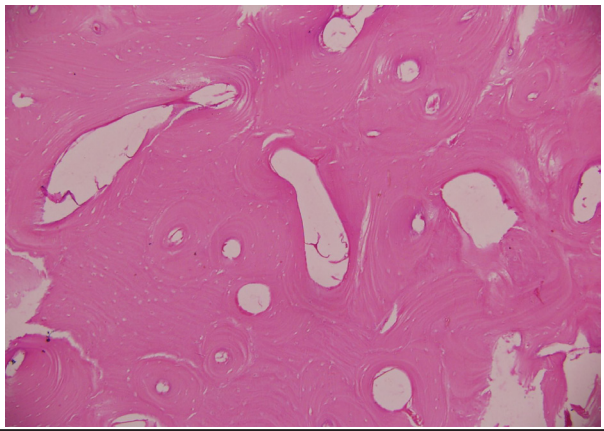

Figure 5. Photomicrograph showing thickened trabeculae of mature lamellar bone suggestive of osteoma (H&E x 100).

DISCUSSION

Head and neck osteomas are slow growing, circumscribed, benign mesenchymal, osteoblastic tumor with an average incidence of 1%- 3% and are most commonly found in young and middle-aged males in the fronto-ethmoid region.[1,5] Osteomas have been reported in all parts of the temporal bone including squama, mastoid, middle ear, glenoid fossa, temperomandibular joint, Eustachian tube, styloid process, and both internal and external auditory canals.[1,2,6,7] Among them, the external auditory canal is the most common location, followed by mastoid and squama. Mastoid osteomas are exceptionally rare, with only about 150 cases published till date since the first publication by Adam Politzer in 1887.[2,5] They constitute 0.1% to 1% of all benign tumors of cranial bones, occurring predominantly in females during second and third decades, and are rare before puberty.[1-3] They are solitary, sessile or pedunculated and commonly produce an external swelling.

The aetiopathogenesis and pathophysiology of mastoid osteomas remain unknown, although various congenital, traumatic, inflammatory, metaplastic, infectious, hormonal and hereditary factors have been proposed.[5,6,10-12] History of trauma preceding the development of osteoma may suggest trauma as a possible etiological factor in our case.

Three types of mastoid osteomas have been described, based on structural characteristics: Compact or ivory, cartilaginous and spongy or osteoid. Compact osteomas are the most common type and usually involve the outer cortex, whereas spongy type, being the rarest, have a tendency to expand to the diploe and involving the internal and external lamina of the affected bone.[10,11] Compact osteomas have a wider base and are very slow growing whereas spongy osteomas are more likely to be pedunculated and grow relatively faster.[10]

Depending on the site of origin of osteoma in the temporal bone there may be tinnitus, hearing loss, vertigo or facial paralysis.[13] Mastoid osteomas are normally asymptomatic stable lesions, but it may produce cosmetic deformities (external bulging of the mass or auricular protrusion), local site tenderness by widening of periosteum or internal lamina cortical involvement and can also interfere with wearing glasses.[1,4] Pressure-induced pain can be referred to the neck, auricle, or middle ear. Conductive hearing loss and chronic suppurstion can occur in large mastoid osteomas causing meatal obstruction.[2] Usually the size of osteomas are generally smaller than 3 cm at the time of presentation.[8,10] Van Dellen et al reported a giant mastoid osteoma compressing the posterior fossa structures and causing intracranial complications.[14] Although our patient had pain and had an osteoma, it is not clear that the osteoma is the definite cause of the pain and that the trauma was the cause of the osteoma. Patients can also have chronic pain post trauma without an osteoma.

Non-contrast computed tomography of the temporal bones is the investigation of choice for diagnosis. The typical finding of a mastoid osteoma in CT is a unique, high-density lesion with well-defined edges causing no sclerosis, erosion or bone rarefaction of the adjacent bone. Ivory osteomas appear as very radiodense lesions, similar to normal cortex, whereas mature osteomas may demonstrate central marrow.[5] In MRI scans, a hypointense lesion in all sequences with similar characteristics is seen. Differential diagnosis of osteoma includes osteoid osteoma, benign osteoblastoma, ossifying fibroma, fibrous dysplasia, chondroma, osteochondroma, calcified meningioma, isolated eosinophilic granuloma, Paget's disease, monostotic fibrous dysplasia, giant cell tumor, secondarily calcified tuberculous osteitis and hereditary syphilitic osteopetrosis and malignant lesions such as osteosarcoma and osteoblastic metastasis.[5] The differential characteristic of these diseases from the osteoma is that radiologic borders of these other lesions are less clear than those of osteomas.[15]

Treatment is indicated for osteomas that are symptomatic or cosmetically unacceptable. Park et al advised for a wait and watch policy in a small asymptomatic osteomas with regular radiological imaging whereas guerin et al recommended early surgical treatment to avoid the later development of giant osteoma with potential risks of surgical complications.[2,10] The osteoma must be completely excised or drilled to prevent recurrences. The excision should be done till the normal cortical bone is reached all around and if mastoid air cells are exposed, a cortical mastoidectomy should be done.[5,12] If mastoid osteomas extends into the facial nerve or bony labyrinth partial removal is acceptable because damage to these structures is likely.[6,9] Complications during surgery are rare. Facial nerve injury, tearing of the sigmoid sinus, and postoperative auricular discharge, retroauricular subcutaneous depression, recurrence have been reported as complications.[12] In cases of a large mastoidectomy associated with excision of giant osteomas, functional reconstruction of the mastoid cortex can be considered with titanium mesh to prevent postoperative dimpling in the postauricular area.[16] The prognosis is good when the lesion is completely excised. No cases of malignant transformation have been reported.[5]

Mastoid osteomas can be painful and may progressively increase despite having stable growth and these lesions have to be intervened early for benefit of the

patient. Trauma can be a potential inciting factor for the development of osteoma. Although this patient had pain it is not clear that the osteoma is the definite cause of the pain. Patients can have chronic pain post trauma without an osteoma.

Conflict of Interest: None.

Consent: JNMA Case Report Consent Form was signed by the patient and the original is attached with the patient chart.

REFERENCES

1. Ahmadi MS, Ahmadi M, Dehghan A. Osteoid osteoma presenting as a painful solitary skull lesion: a case report. Iran J Otorhinolaryngol. 2014 Apr;26(75):115-8. [PubMed]
2. Park SJ, Kim YH. A case of giant osteoma developed from the mastoid cortical bone. Korean J Audiol. 2012 Sep;16(2):95-8. [PubMed]
3. Smud D, Augustin G, Kekez T, Kurda E, Majerovicc M, Jelincicz Z. Gardner's syndrome: Genetic testing and colonoscopy are indicated in adolescent and young adults with cranial osteomas. A case report. World J Gastroenterol. 2007; 13 (28): 3900-3. [PubMed]
4. El Fakiri M, El Bakkouri W, Halimi C, Aït Mansour A, Ayache D. Mastoid osteoma: report of two cases. Eur Ann Otorhinolaryngol Head Neck Dis. 2011 Nov;128(5):266-8. [PubMed]
5. Domínguez Pérez AD, Rodríguez Romero R, Domínguez Durán E, Riquelme Montaño P, Alcántara Bernal R, Monreal Rodríguez C. The mastoid osteoma, an incidental feature?. Acta Otorrinolaringol Esp. 2011 Mar-Apr;62(2):140-3. [PubMed]
6. Ben-Yaakov A, Wohlgelernter J, Gross M. Osteoma of the lateral semicircular canal. Acta Otolaryngol. 2006;126:1005-7. [PubMed]
7. D'Ottvai LR, Piccirillo E, De Sanctis S, Cenqua N. Mastoid osteomas: review of the literature and presentation of two clinical cases. Acta Otorrinolaringol Ital. 1997; 17(2): 136-9. [PubMed]
8. Denia A, Perez F, Canalis RR, Graham MD. Extracanalicular osteomas of the temporal bone. Arch Otolaryngol. 1979; 105(12): 706-9. [PubMed]
9. Gungor A, Cincik H, Poyazoglu E, et al. Mastoid osteomas: report of two cases. Otol Neurotol. 2004;25: 95-7. [PubMed]
10. Guerin N, Chauveau E, Julien M, et al. Osteoma of the mastoid bone: report of two cases. Laryngol Otol Rhinol. 1996; 117:127–32. [PubMed]
11. Singh I, Sanasam JC, Bhatia PL, Singh LS. Giant osteoma of the mastoid. Ear Nose Throat J. 1979; 58(6): 243-5. [PubMed]
12. Probst LE, Shankar L, Fox R. Osteoma of the mastoid bone. J Otolaryngol. 1991; 20(3): 228-30. [PubMed]
13. Martínez R, Morais D, Ramírez B, Martínez P, Benito JI. Mastoid osteoma. Acta Otorrinolaringol Esp. 2003;54:94-7. [PubMed]
14. Van Dellen JR. A mastoid osteoma causing intracranial complications: a case report. S Afr Med J. 1977; 51(17): 597-8. [PubMed]
15. Estrem SA, Vessely MB, Oro JJ. Osteoma of the internal auditory canal. Otolaryngol Head Neck Surg. 1993;108:293-7. [PubMed]
16. Kim HH, Wilson DF. Titanium mesh for functional reconstruction of the mastoid cortex after mastoidectomy. Otol Neurotol, 2006;27:33-6. [PubMed]