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Review Article

Osteoma of Temporal Bone: A Review

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Received: January 12, 2018; **Accepted:** February 13, 2018; **Published:** February 22, 2018

Introduction

Osteomas are benign tumour which are slow growing in nature and are made up of mature bone. In head and neck, they are regularly seen arising from the fronto-ethmoidal region [1].

Temporal bone osteoma is a rare entity. When Fleming et al; described about mastoid osteomas in 1966, they reported only 39 cases in English medical literature known so far [2].

Exostosis, osteosarcoma and osteoblastic metastasis of mastoid region should be considered as other possible differential diagnosis [3]. Even though most mastoid osteomas are asymptomatic; they are of clinical significance to Otorhinolaryngologist as they can be associated with the complications like cholesteatoma.

In this review, the pathophysiology, clinical presentation and management of mastoid osteomas are described by a reviewing the articles.

Pathophysiology

Even though the exact reason for occurrence of osteoma is not known, various an etiopathogenes is have been proposed so far.

- Varboncoeur et al [4] described that embryologic cartilaginous rest or persistent embryologic periosteum gives rise to osteoma formation.
- Osteoma might be congenital in origin according to Yamasoba et al [5].
- Kaplan et al [6] suggests that trauma and muscle traction may be the reason.
- Similarly Friedberg [7] considers trauma leading to ossifying periosteitis and chronic inflammation, to be a predisposing factor.
- Hormonal stimulations may seem to increase the periosteal osteoblastic activity [8].
- In an institutional study, the author has mentioned surgery, radiotherapy, hereditary glandular dysfunctions as other possible reasons for osteoma.

In case on multiple osteomas, Gardner's syndrome must be kept in mind. Gardner's syndrome manifest with multiple intestinal polyps, epidermoid inclusion cysts, fibromas of the skin and mesentery and osteomas [10]. Preosseous connective tissue from suture line, which has rich blood supply with relatively thick subcutaneous layer, seems to give rise to osteoma of temporal bone [11].

Osteomas involve almost all the parts of temporal bone like external auditory canal, mastoid and squamous portion, middle ear, Eustachian tube, petrous apex, internal auditory canal, zygomatic process, glenoid fossa and styloid process [12,13,14]; External auditory canal being the most common site followed by mastoid region [12].

Classification

They can be classified based on gross examination as non movable and movable, with firm attachment with the broad base and with a pedicle or no attachment respectively in which former being the most common type.

Based on pathological examination they are classified into four types [15].

Type 1

Osteoma compactum, also called as osteoma eburneum is the most common type. In this type osteoma is spherical and hard, ivory-like. Histologically, it consists of dense, lamellated bony tissue which is traversed by few vessels.

Type 2

Osteoma cancellare (rare) consists of cancellous bone with fibrous cellular tissue.

Type 3

Osteoma cartilagineum (uncommon) consists of both bone and cartilage.

Type 4

Osteoma mixtum (uncommon) is a mixture of type 1.

Presentation

The presentation of osteoma mastoid varies from being asymptomatic to presenting with associated complications like cholesteatoma. The presenting symptoms depend on the site where it is seen along with its usual characteristic appearance that is painless, smooth mass which is hard in consistency.

External Auditory Canal Osteoma

This is the most affected site in temporal bone accounting for 0.5% of total otologic surgery [16]. Its associated symptoms may be decreased hearing, fullness in the ear which might be due to mass itself or due to cerumen2.

In this area it needs to be differentiated with other similar presentation which is exostosis. Exostoses are considered to arise due to exposure to cold water or recurrent infection. Exostoses are usually bilateral, multiple with broad base found medial to a suture lines unlike osteomas which are unilateral, single and pedunculated

Citation: Viswanatha B and Abhilasha S. Osteoma of Temporal Bone: A Review. Austin ENT Open Access. 2018; 2(1): 1006.

arising from the suture line [17]. Fenton et al concluded that the two entities cannot be differentiated histologically [18].

Some authors have described a rare association of osteoma EAC with cholesteatoma in there two separate papers [16,19].

Mastoid Region Osteoma

This is the second most involved site. Most of the patient present with progressively increasing swelling behind the ear.

Middle Ear Osteoma

In a study by Kim CW et al [20] they reported that only 23 cases of osteoma of middle ear have been reported so far which shows its rare entity. The patient can present with altered hearing due to involvement of ossicular chain. Most common site on involvement is promontory and other sites like pyramidal eminence, hypo tympanum; lateral semicircular canal can also be seen [9].

Inner Ear Osteoma

This includes wide range of presentation including vertigo, tinnitus, vestibular dysfunction, sensorineural hearing loss and facial nerve palsy [21].

Treatment

On CT scan, osteomas typically appear as a well circumscribed mass without surrounding bony destruction.

The differential diagnosis of mastoid osteomas includes exostosis, osteosarcoma; isolated; Eosinophilic granuloma osteoblastic metastasis; giant cell tumor; osteoid osteoma; calcified meningioma Paget's disease and monostotic fibrous dysplasia [22].

For asymptomatic cases wait and watch is the policy. For tumours arising in middle ear and inner ear which are small observation is preferred. Surgery is reserved for symptomatic cases and for cosmetic reasons. When considering for excision we have to keep in mind to excise until normal mastoid air cells are seen. Complete removal is not indicated when it is seen extending into the bony labyrinth and facial nerve as it may damage the structures [1,23]. Middle cranial fossa approach and sub occipital approach have been suggested in Surgical management of internal auditory canal osteoma [9].

Decision regarding surgery depends on each case based on its size symptoms and associated complications.

Conclusion

Mastoid osteoma is benign, slow growing and rare tumour of the head and neck. Usually asymptomatic with cosmetic disfigurement, it may also present with symptoms of ear occlusion reduced hearing and sometimes be associated with complications. The investigation of choice is computer tomography. When indicated surgical excision is carried out. Overall, with complete resection, recurrence is rare and patient achieves good cosmetic results.

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