

BRIEF COMMUNICATION

The mastoid osteoma, an incidental feature?

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PALABRAS CLAVE

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Hueso temporal;
Colesteatoma;
Vértigo

Abstract Osteoma in the mastoid is a rare benign osteogenic tumour that has been described in literature in only 137 cases. It usually appears in asymptomatic patients, although a few cases are described associated with clinical manifestations. We report three cases of mastoid osteoma: a pedunculated osteoma in the aditus ad antrum (associated with a cholesteatoma), a superficial osteoma of the mastoid surface and a sessile osteoma that progressed to the temporal lobe (associated with vertigo). A brief review of this rare entity is presented and a possible association between mastoid osteoma, cholesteatoma otitis and vertigo is posed.

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El osteoma en la mastoide, ¿un hallazgo incidental?

Resumen Los osteomas mastoideos son tumores óseos benignos que excepcionalmente aparecen en la mastoide, habiendo sido descritos 137 casos en la literatura actual. Suelen presentarse de un modo asintomático, aunque no siempre es así. Presentamos 3 casos de osteomas mastoideos: un osteoma pediculado con base de implantación en el antro mastoideo y con extensión hacia el canalático antral, que coexistía con una otitis media colesteatomatosa, un osteoma mastoideo superficial asintomático y un osteoma sesil dependiente de la tabla interna de la escama del hueso temporal, en una paciente con un cuadro vertiginoso. Hacemos una revisión de esta rara entidad, y planteamos una posible asociación entre el osteoma mastoideo, el síndrome vertiginoso y la otitis media colesteatomatosa.

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Introduction

Mastoid osteoma, like others present in the organism, is a benign tumour with a slow growth rate, which is classified as a bone-forming tumour. These osteomas present an average incidence of 1%-3%, are most commonly found in young and middle-aged males according to most series, and are predominantly present in the skull and facial bones. In radiological reviews of the general population, the estimated prevalence of frontal sinus osteoma is 0.42% this being the most common location of osteoma. It is seldom found in the mastoid (up to 137 cases reported since 1861), extracanalicular appearance is rare and appearance at the level of the mastoid antrum is exceptional.¹

Methods

We carried out a descriptive retrospective study on the radiodiagnostic services database at the Teaching Hospital Virgen del Rocío in Sevilla and the Teaching Hospital Puerto Real in Cádiz. Computed tomography (CT) studies were performed by means of the volumetric acquisition technique; 1mm reconstruction was used, without IV contrast, in a 4-row multidetector acquisition unit, and with subsequent multiplanar reconstruction for a better anatomical understanding. The MRI study was carried out in a 1.5T device, without intravenous contrast, obtaining T1 enhanced sequences, with suppressed fat signal, axial T2 and FLAIR and coronal T2 sequences.

Results

Three patients were found to have osteomas in the mastoid bone, as summarised in Table.

Description of the patients

Patient No. 1. A 63-year-old male consulting due to progressive hearing loss of a two-year evolution. The patient had previously been diagnosed with rheumatoid arthritis. The patient reported no previous audiological problems or otalgia, otorrhea, vertigo and nystagmus. Upon physical exploration, the auricle and mastoid apophyses appeared normal. A unilateral, right transmission hypoacusis was observed during audiometry. The otoscopic study revealed

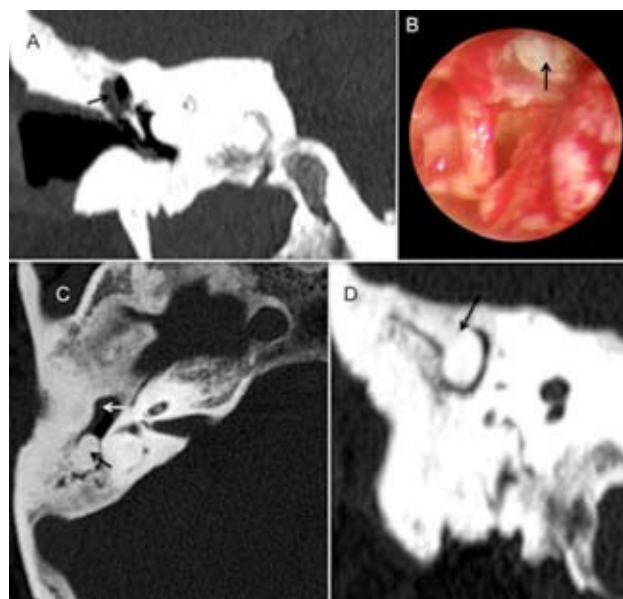


Figure 1 A) Coronal plane CT of the ear, which shows an occupation by soft tissue material, with partial destruction of the ossicular chain (arrow) in relation to a cholesteatoma. B) Intraoperative view of the posterosuperior tympanic quadrant showing cholesteatoma (arrow). C) Axial plane CT of the ear, showing the right mastoid osteoma (black arrow) as a sclerotic lesion with well-defined edges, located at the level of the attic and the antral attic channel. D) Sagittal plane CT of the ear, showing the right mastoid osteoma (arrow) implanted in the top of the attic.

epidermal scales in the posterosuperior tympanic quadrant. An ear CT was performed due to the clinical suspicion of cholesteatoma (Figure 1), determining the existence of partial erosion in the right ossicular chain with the presence of a mass composed of soft tissues from the attic, antral attic canal and mastoid cells, as well as a thickening of the tympanic membrane (not shown). These findings were compatible with medium cholesteatoma otitis. Incidentally, a rounded high-density injury with a pedicled morphology was also identified, which seemed to have settled in the attic and extended towards the antral attic canal, around 7.7 mm at maximum diameter. This was identified as a local osteoma. No images suggesting erosion of the lateral semicircular canal were observed, and there were no

Table Basic characteristics of the patients presented

Patient-age-gender	Anatomical site	Maximum size (mm)	Clinical symptoms	Therapeutic attitude
1-63-M	Attic and antral attic canal	8	Unilateral hypoacusis	Resection of cholesteatoma
2-44-M	External plate of the mastoid	10	No	None
3-61-M	Internal plate of the temporal scale	35	Vertigo.	Follow-up (with no changes alter 3 years)

Figure 2 Cranial CT without IV contrast. Left mastoid osteoma (arrow) appearing as a sclerotic lesion with well-defined edges, which does not remodel local structures and is not associated to soft tissue mass, and which deforms the bone surface of the temporal bone.

evident abnormalities in the rest of the labyrinthine block, internal auditory canal, and acoustic pore or in the rest of the study. The patient was intervened for cholesteatoma through antroatticotomy and tympanoplasty, while the mastoid osteoma remained untouched (Figure 1B).

Patient No. 2. A woman aged 44, with no relevant personal or family medical history. She underwent a cranial CT during a cephalic study that revealed the existence of a well-defined 10mm left mastoid lesion of high density. It was not associated to masses in soft parts and was without sclerosis of the adjacent bone; the lesion corresponded to a mastoid osteoma (Figure 2). In this case, the patient was asymptomatic from the otological point of view. However, a detailed exploration found retroauricular bulging of a very long evolution, which corresponded to an osteoma.

Patient No. 3. A 63-year-old woman with no relevant medical history who presented peripheral vertigo; she underwent an MRI scan for examination purposes (Figure 3). The existence of a 35 mm sessile mastoid osteoma with typical bone signal (hypointense in T1 and T2 enhanced sequences) was discovered incidentally. Its base was implanted in the internal plate of the temporal scale and protruded towards the intracranial temporal fossa, with no changes in the encephalic tissue signal. This created suspicion of parenchymal invasion. The study was completed by a conventional cranium series and an ear CT with no IV contrast administration (Figure 3). Three years after the initial diagnosis, there have been no image changes and the vertigo persists.

Discussion

Osteomas are benign tumours, generally infrequent and with a slow rate of growth, which are classified as bone-forming tumours. They present an average incidence of 1% 3% and are most commonly found in young and middle-aged males according to most series. The estimated prevalence of frontal sinus osteoma is 0.42% in radiological reviews of the general population. The latter is the most common location of osteoma; its presence in the mastoid is rare (up to 137 cases reported since 1861). It may be part of Gardner's

Figure 3 A) T1 enhanced sequence of basal MRI showing a hypointense ovoid lesion (arrow). B) T2 enhanced sequence of basal MRI showing the lesion (arrow) making contact with the meningeal cover, with no mass effect or changes in the temporal lobe signal. C) Skull radiograph in anteroposterior projection showing a calcium density tumour, homogeneous and well defined, visible through the right orbit (asterisk). D) Ear CT showing sessile growth of the osteoma (arrow), from the inner plate of the temporal scale towards the temporal fossa, which it invades.

syndrome spectrum, a family case with dominant autosomal inheritance, which is associated with dental lesions, colonic polyposis and soft tissue tumours.

This entity is usually asymptomatic or limited to a retroauricular bulging, causing pain or purely aesthetic impact, like in case No. 2. Upon exploration, some middle ear osteomas present Tullio's phenomenon, which consists of vestibular activation in response to an acoustic stimulus, presenting as vertigo or imbalance.² Depending on its location, there may be tinnitus, hearing loss, vertigo or facial paralysis when the temporal bone is affected.³ There are few described cases in which a mastoid osteoma causes medical symptoms of vertigo. In these cases, the osteomas are located in the internal auditory canal⁴ or in contact with the dura mater⁵; the location of these osteomas could thus explain medical symptoms of vertigo due to the involvement of different levels of the vestibular nervous pathway. Knowledge about the relationship between cholesteatoma and mastoid osteoma is scarce, but there are nevertheless theories that correlate both entities. Some authors postulate that external auditory canal osteomas may cause retention of epithelial residues and cerumen, and cause secondary cholesteatomas.⁶ This pathogenesis may also be applicable to middle ear osteomas. Cases of association of middle ear

osteomas and congenital cholesteatomas have also been published.⁷

Histologically, mastoid osteoma is classified as osteoid tissue included in osteoblastic tissue and surrounded by reactive bone. Three types of mastoid osteomas can be distinguished: compact osteomas, spongy osteomas and those with mixed characteristics. Compact osteomas are created by Haversian canals obliterated in their central portion, while spongy osteomas present a trabecular aspect with wide medullar spaces. Some authors state that compact osteomas have a large implantation base and a slow rate of growth, while spongy bone osteomas tend to be pedunculated and have a relatively faster rate of growth.

There is no consensus in the origin of mastoid osteomas, with three main theories currently in existence: congenital, infectious and traumatic. The infectious theory posits that the formation of mastoid osteomas, especially those affecting the tympanum and mastoid cells, is related to the existence of previous otitis media.³

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. This may also be observed during the conventional study. In MRI scans, a lesion of similar characteristics with hypointense behaviour in all sequences is shown, since bone does not produce a signal when this technique is performed. The image study is carried out to determine the characteristics of the lesion and to analyse its relationship with neighbouring structures. A differential x-ray diagnosis must include calcified organised haematoma, calcified chronic osteitis, meningioma, osteochondroma,

osteosarcoma, osteoblastoma, monostotic fibrous dysplasia, metastasis, secondarily calcified tuberculous osteitis and hereditary syphilitic osteopetrosis.

The diagnosis of mastoid osteoma may be established as an incidental x-ray finding or the lesion may be clinically palpable when manifested in a superficial structure. Medical treatment is restricted to symptomatic cases or for aesthetic reasons; it requires surgical excision, with milling of the edges and injury exeresis. In our three cases, we adopted an expectant attitude.

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