BRITISH JOURNAL OF HOSPITAL MEDICINE

CASE REPORT

A rare cause of hearing loss: osteoma of the external auditory canal

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Introduction

Osteomas are rare benign bone neoplasms. They are commonly seen in the craniofacial region, particularly in the paranasal sinuses. The incidence of osteomas in the paranasal sinus in the general population is approximately 0.5% (Ishii et al, 2018; Guclu et al, 2022). They are more common in males. Maxillofacial osteomas are less commonly seen in the external auditory canal and mastoid cortex (Lietin et al, 2010; Carbone and Nelson, 2012). Osteomas of the external auditory canal are benign, usually asymptomatic tumours, that are discovered incidentally on examination or head and neck computed tomography. However, they can cause significant symptoms if they obstruct the auditory canal (Orita et al, 1998; Venelin et al, 2008).

This article reports a case of a 35-year-old man that presented with hearing loss caused by an osteoma obstructing the external auditory canal.

Case report

A 35-year-old man was referred to the otolaryngology clinic for a progressive hearing loss in his right ear. He did not have a history of trauma to the ear, otorrhoea or otalgia. On clinical examination, there was a hard mass on the anterior wall of the right external auditory canal covered with normal skin. The tympanic membrane could not be visualised. Pure tone audiometry revealed a moderate conductive hearing loss in the right ear with normal hearing on the left (Figure 1). Thin section (1 mm axial and coronal slices) computed tomography scans of the temporal bone were obtained using a multi-detector computed tomography scanner (Somatom Definition Flash 256-slice dual-source computed tomography scanner; Siemens Healthcare, Forchheim, Germany). Image reconstruction was performed using a three-dimensional cone beam back-projection algorithm with a high-frequency kernel. This revealed a 5 × 7 mm, hyperdense, ovoid mass occluding the inner part of the right bony external auditory canal (Figure 2). The mass arose from the anterior wall of the external auditory canal.

The patient underwent microsurgical removal of an osteoma via a posterior approach under general anaesthetic. The lesion was confirmed as an osteoma by histopathology, and postoperative follow up was uneventful.

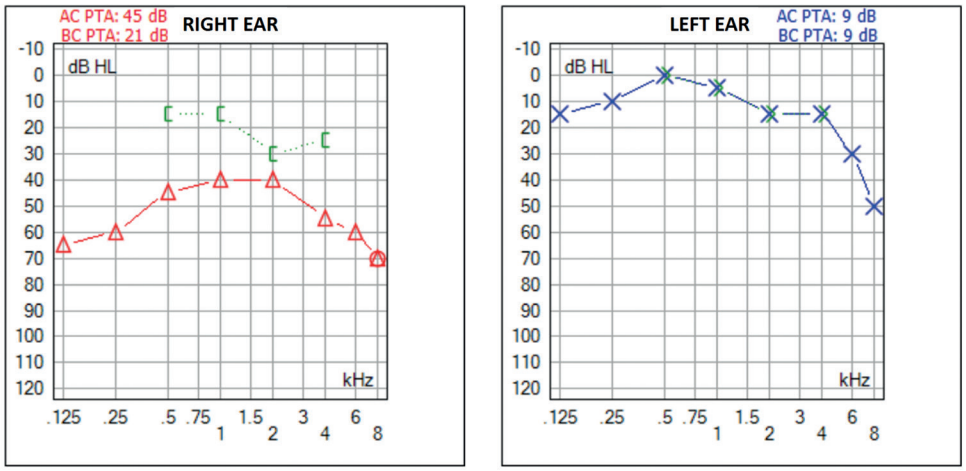

Figure 1. Preoperative pure tone audiogram showing moderate conductive hearing loss in the right ear and normal hearing in the left ear.

How to cite this article:
Guclu D, Unlu EN, Ogul H. A rare cause of hearing loss: osteoma of the external auditory canal. Br J Hosp Med. 2023. https://doi.org/10.12968/hmed.2022.0510

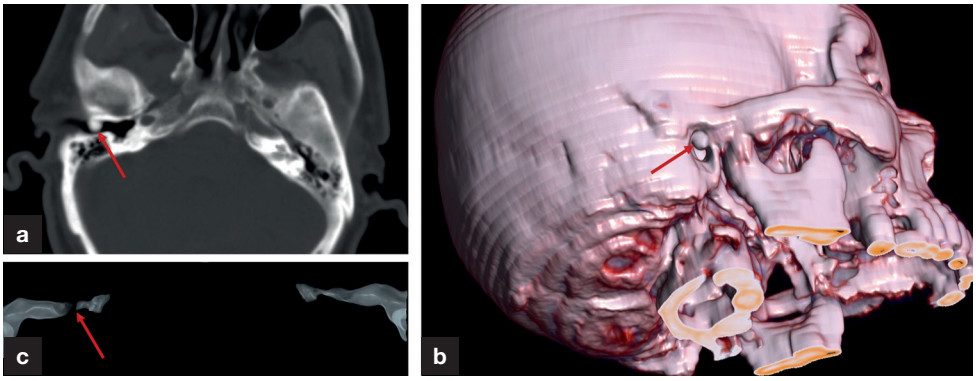

Figure 2. a. Axial computed tomography scan and (b) right lateral oblique three-dimensional volume-rendering computed tomography image showing hyperdense osteoma (arrows) in the right external auditory canal. c. Air-specific volume-rendering three-dimensional computed tomography image showing obliteration (arrow) of the right external auditory canal.

Discussion

There is uncertainty about how to differentiate osteomas from exostoses of the external auditory canal. They are both slow-growing, painless masses, and exostosis is more common (incidence 0.6%) and more frequently seen in middle-aged men. Chronic irritation such as cold water exposure and repeated otitis externa are directly correlated with the development of exostosis, but the exact aetiology of osteoma of the external auditory canal is not clear (Fenton et al, 1996). A few cases of osteomas of the external auditory canal have been reported in surfers and cold water swimmers. Anecdotal evidence suggests injury, inflammation, hormones, infection, developmental disorders and genetic defects as potential aetiological factors for the development of external auditory canal osteomas. As these osteomas are very rare, epidemiological data are insufficient (Fenton et al, 1996).

Symptoms include reduced hearing or fullness in the ear, either as a result of the tumour itself or as a result of cerumen and pain (Venelin et al, 2008; Abhilasha and Viswanatha, 2019). Cholesteatoma cases have been reported, related to an osteoma of the external auditory canal, that are probably secondary to impaired epithelial migration (Orita et al, 1998).

External auditory canal osteoma is easily misdiagnosed as other neoplastic conditions on clinical examination. Radiography, magnetic resonance imaging and computed tomography can be used to detect external auditory canal osteomas. Small osteomas are difficult to detect on plain X-ray, hence their diagnosis is often missed or delayed. On magnetic resonance imaging osteomas are isointense to bone cortex on all spin-echo pulse sequences. T1-weighted magnetic resonance images provide better contrast between bone and soft tissue than proton density and T2-weighted images. Magnetic resonance imaging may demonstrate external auditory canal osteomas, but it is less good at differentiating between osteomas and other low-signal intensity lesions (such as fibroma, scar tissue or calcifications). Furthermore, computed tomography is less expensive, more readily available and faster to perform than magnetic resonance imaging, and thin slice computed tomography is superior to other imaging techniques with its high temporal and spatial resolution (Tuncer et al, 2018, 2019). Multi-detector computed tomography can provide excellent quality images of bone structures using maximum intensity projection and three-dimensional volume-rendering techniques (Tuncer et al, 2018, 2019). Computed tomography is the main diagnostic modality for external auditory canal osteomas because it allows detailed investigation of internal structures of the bone.

On computed tomography osteomas appear as single, unilateral, pedunculated, hyperdense masses that originate from the tympanosquamous or tympanomastoid suture line (Baik et al, 2011; Carbone and Nelson, 2012). Bone marrow within the neoplasm may also be seen on T1-weighted magnetic resonance imaging as a high-intensity area in the centre (Venelin et al, 2008). Exostoses are also seen on computed tomography scans as hyperdense lesions narrowing the external auditory canal; however, their appearance differs from that of osteomas as multiple, bilateral, smooth-bordered, broad-based lesions without deep extension (Fenton et al, 1996; Baik et al, 2011).

Learning points

- Osteomas of the external ear canal are rare tumours.
- They are usually asymptomatic and are discovered incidentally.
- Osteomas should be differentiated from exostoses, which have a different aetiology.
- Physical examination and computed tomography are usually sufficient for diagnosis.

Surgery is the treatment of choice for external auditory canal osteomas if they obstruct the canal causing hearing loss or if they are associated with external auditory canal cholesteatomas. The tumour is removed at the base where it is attached to the cortical bone (Viswanatha, 2008).

Conclusions

Osteomas of the external ear canal are rare, usually asymptomatic and incidentally discovered during ear examinations or on computed tomography. Findings on physical examination and radiological findings on computed tomography scans are typical. If they become symptomatic or grow rapidly, surgical removal is necessary, ensuring complete removal from their base where they attach to the cortical bone.

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