



# A 14-year-old child with a benign osteoma tumor in the external ear canal: a rare case report

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**Introduction:** A benign osteoma is a non-cancerous bone tumor in the external ear canal that can cause hearing loss. Treatment may require surgery if symptoms arise.

**Case presentation:** A 14-year-old child severed right ear pain, thick discharge, and hearing loss for a week after unsuccessful treatment elsewhere. Examination showed swollen ear canal and purulent discharge. After antibiotic treatment, thick debris remained. The osteoma was excised through its pedicle to minimize the risk of recurrence.

**Clinical discussion:** Osteomas are benign ear growths that can cause hearing loss and blockage. Severe symptoms may require surgery, with the endoscopic transcanal method being effective for osteomas. Blockage can also occur from wax buildup or foreign bodies, potentially leading to cholesteatoma. Osteomas are typically asymptomatic and identified through CT scans, predominantly located in the external auditory canal (EAC). Surgery is advised for symptomatic cases, while regular check-ups are recommended for asymptomatic patients.

**Conclusion:** Additional research is necessary to fully comprehend the causes and optimal treatment strategies for benign osteoma in the EAC.

**Keywords:** external auditory canal, osteomas, surgical, tumor

## Introduction

Osteomas are slow-growing benign tumors of unknown origin, rarely involving the temporal bone. They develop in the external auditory canal (EAC), mastoid, and inner ear, classified as spongy or compact and varying by growth direction, laterality, size, surface structure, number, and symmetry. Symptoms result from auditory canal obstruction. Diagnosis involves history, clinical examination, audiology, and computed tomography (CT) scans, confirmed by histopathology. Differential diagnosis includes exostoses, bone tissue proliferation, and osteoid osteomas. They are asymptomatic and progress slowly; surgical intervention is required.<sup>[1]</sup>

Osteoma of the EAC has an incidence of 0.05% of otologic surgeries. Typically asymptomatic due to slow growth and no

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## HIGHLIGHTS

- Osteomas are typically asymptomatic and identified through CT scan
- Differential diagnosis includes exostoses, bone tissue proliferation, and osteoid osteomas
- Surgical intervention is required And Diagnosis is confirmed by histopathology

canal occlusion, it can cause symptoms like conductive hearing loss, aural fullness, and keratin debris accumulation if it grows large enough to block the canal<sup>[2]</sup>.

Most of the authors agree that exostoses are a reaction to cold-water stimulation of the local periosteum, while osteomas are benign osseous tumors<sup>[3]</sup>. The treatment of both conditions is the surgical removal although the method is debatable<sup>[4]</sup>.

This case report highlights a rare benign osteoma in the EAC.

## Case presentation

A 14-year-old child presented to the ear, nose, and throat clinic (ENT clinic) with complaints of severe right ear pain, thick discharge, and hearing loss for the past week. The patient had previously been treated in a private clinic with no improvement. There is a history of a foreign body in the right ear. The patient denies fever, nausea, vomiting, or dizziness but reports occasional tinnitus.

The patient has no significant medical, surgical, or allergic history.

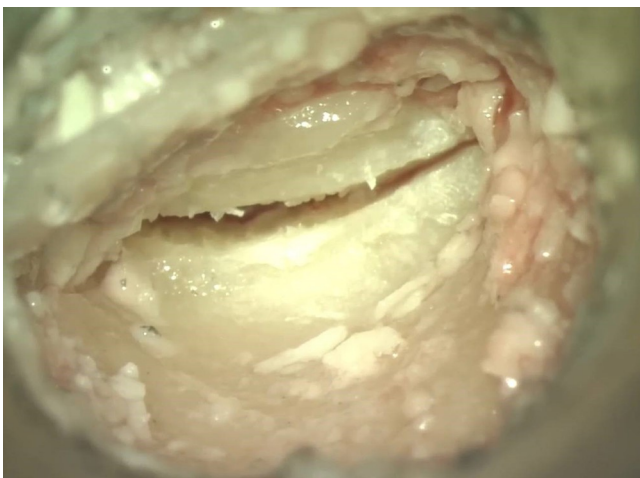
On physical examination, the right ear shows severe edema of the ear canal with purulent discharge, and tenderness of the tragus is noted. The patient was treated with antibiotics and an



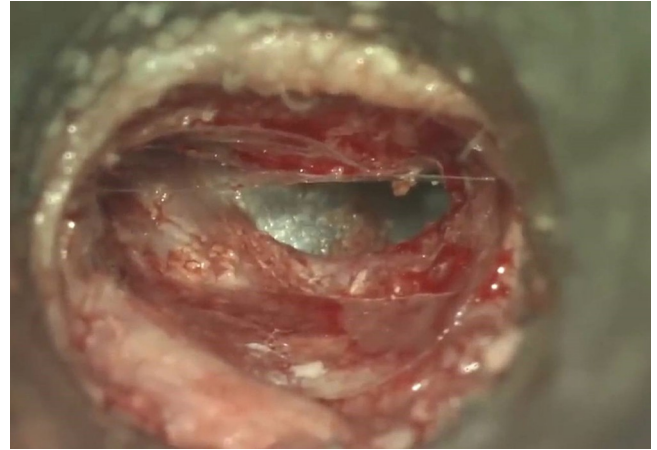
**Figure 1.** CT imaging shows a bony mass that completely fills and occludes the inner part of the right bony external auditory canal.

ear pack. Experimental autoimmune encephalomyelitis can be classified into four grades of severity based on the percentage of obstruction of the EAC, as assessed by otoscopy. EAC demonstrated of 35% to classify it as grade 2.

At the 1-week follow-up, there was an improvement in the ear canal. Upon examination and suctioning, thick debris was found accumulated in the right ear canal.



**Figure 2.** The osteoma is being gradually removed.



**Figure 3.** At the end of the procedure, after the auditory canal became clearly visible, we were able to see the tympanic membrane. Osteomas are typically asymptomatic and identified through CT scan. Differential diagnosis includes exostoses, bone tissue proliferation, and osteoid osteomas. Diagnosis is confirmed by histopathology surgical intervention is required.

The CT mastoid report revealed a bony mass that completely fills and occludes the inner part of the right bony EAC (Fig. 1). While the internal auditory canal appears normal in width on both sides. Adequate pneumatization of the mastoid air cells and middle ear clefts is observed on the left side. Additionally, there is a mild presence of soft tissue density in the right middle ear. The ossicular chain and inner ear structures show no abnormalities. The procedure was performed under general anesthesia. The patient was positioned comfortably, typically lying on their back with the head turned to expose the right ear. The surgical area was cleaned and prepped in a sterile manner to minimize the risk of infection. An incision was made within the ear canal skin along the anterior (front) wall. This approach allows the surgeon to directly access the exostosis while minimizing trauma to surrounding structures. Once the incision was made, the surgeon used retractors (sialistic sheets) to hold the skin back and gain better visibility and access to the exostosis. Using specialized surgical instruments (like chisels and drills), the exostosis was gradually removed (Fig. 2). The surgeon managed to avoid damaging the surrounding structures, such as the skin and underlying bone. Any residual tissue or debris was cleaned out from the ear canal to reduce the risk of infection and promote healing. The incision was closed with sutures. The ear was then packed with a packing material to protect the surgical site (Fig. 3). A histopathological examination of the resected mass was performed to exclude other similar conditions. The results revealed fibrovascular channels surrounded by bony lamellae, thus confirming the diagnosis of an osteoma in the right EAC. Patient then received instructions regarding pain management, care of the ear, and signs of complications to watch for, such as increased pain, drainage, or fever. Patient was generally advised to avoid water in the ear and strenuous activities for a specified period. A follow-up appointment was scheduled to monitor healing and remove sutures.

## Discussion

Osteomas are benign tumors that can cause obstruction of the EAC. Exostosis refers to the overgrowth of the compact bone of

the EAC in adults. Both osteomas and exostoses can result in hearing loss. Surgical treatment is indicated in cases of ear pain, progressive hearing loss, and recurrent otitis<sup>[1]</sup>.

The endoscopic transcanal approach to removing EAC osteomas has shown favorable outcomes, effectively excising the lesions without recurrence or intraoperative complications<sup>[2]</sup>.

Obstruction of the external ear canal is a common condition caused by various factors such as cerumen impaction, infections, and foreign bodies. Bony growths in the ear are classified into exostoses, which are the most common, and osteomas. Exostoses are thought to be a reaction to cold water stimulation, while osteomas are benign bone tumors. The main treatment for both conditions is surgery, although methods may vary in opinion. Osteomas are rare, occurring in about 0.05% of ear surgeries, and can sometimes lead to the formation of cholesteatoma. The exact causes of osteomas remain unknown<sup>[3-5]</sup>.

Osteomas are usually asymptomatic but can cause deformity, swelling, pain, hearing loss, and chronic discharge. Differential diagnoses include osteosarcoma and osteoblastic metastasis.

CT scanning is the preferred method for imaging mastoid and other osteomas. Ivory osteomas appear as radiodense lesions similar to normal bone, while mature osteomas may display central marrow and appear as well-defined, dense sclerotic lesions from the mastoid bone<sup>[6]</sup>.

The most frequently observed location of osteomas was the EAC, accounting for 66% of cases, followed by the mastoid bone at 21% and the middle ear cavity at 13%. In five out of 23 patients, the osteoma was found incidentally. Treatment strategies were established based on the presence of symptoms, the size of the tumors, and their locations. It is advisable to conduct physical examinations and regular follow-ups for patients who are asymptomatic. In cases where patients exhibit symptoms, surgical intervention is recommended<sup>[7]</sup>.

To diagnose such tumors, various methods are employed, including X-ray, magnetic resonance imaging, and CT scans<sup>[8]</sup>. Additionally, a biopsy may be performed to confirm the nature of the tumor and to carry out the appropriate treatment.<sup>[9,10]</sup> As for the differential diagnosis in our case, impressive findings are suggestive of right otomastoiditis (an inflammation of the ear and mastoid bone). The right EAC exostosis is surrounded by soft tissue density, which requires clinical correlation. In our case, the patient was referred from the ENT clinic to a specialist in surgery, and the tumor was surgically removed. After the procedure, the patient has fully recovered and regained the ability to hear well without any pain. A histopathological examination of the resected mass was performed to exclude other similar conditions. The results revealed fibrovascular channels surrounded by bony lamellae, thus confirming the diagnosis of an osteoma in the right EAC.

## Conclusion

There is an urgent need to increase research on this disease to provide a deeper understanding of its treatment and complications. Doctors should highlight the available treatments and document clinical experiences to ensure better patient care. This will help improve health outcomes and raise awareness about this disease.

## Ethical approval

Not applicable

## Consent

Written informed consent was obtained from the patient's parents/legal guardian for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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## Author's contribution

All authors wrote a part of the manuscript and approved the final manuscript.

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No conflict of interest.

## Research registration unique identifying number (UIN)

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## Provenance and peer review

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## Data availability statement

Not applicable.

## Methods

The work has been reported in line with the SCARE criteria<sup>[10]</sup>.

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