

## Osteoid Osteoma of Petrous Bone: A Rare Cause of Sensorineural Deafness

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### Abstract

Osteoma of temporal bone is a rare benign neoplasm commonly arising from mastoid bone. Rarely, it may arise from petrous bone in cerebellopontine angle producing sensorineural hearing loss. This article describes computed tomography scan (CT scan) and magnetic resonance imaging (MRI) findings in a rare case of petrous bone osteoid osteoma producing ipsilateral sensorineural deafness.

**Keywords:** Osteoma; Osteoid; Petrous; Cerebellopontine; Sensorineural

### Introduction

Osteoma is a common benign tumor of long bones that may arise uncommonly from skull bones primarily in fronto-ethmoid region and rarely from temporal and occipital bones [1]. Temporal bone osteoma commonly arise from mastoid part and may be of three types – (1) ivory type consisting primarily of compact bone; (2) cartilage type consisting of osseous and cartilage elements and (3) cancellous or fibrous type consisting of spongy bone or fibrous stroma (also known as osteoid osteoma) with cancellous-type being the rarest [2]. In this article, we are presenting a rare case of osteoid osteoma of petrous temporal bone presenting as cerebellopontine angle tumor causing ipsilateral sensorineural deafness.

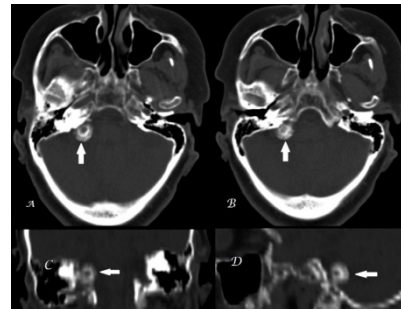
### Case Report

A 65-years old female presented with recent and acute-onset of hearing loss in the right ear. Clinical examination revealed profound sensorineural hearing loss with normal external ear. History of fever, earache and vertigo was denied. Laboratory examination was unremarkable. Clinical findings suggested a possibility of right inner ear or eighth cranial nerve lesion and the patient was advised non-contrast CT (NCCT) brain.

NCCT brain revealed a small (29 × 25 × 22 mm), rounded, osseous mass with small pedicle and central lucency arising from the petrous bone just adjacent and posterior to internal acoustic meatus on right side of midline causing slight mass effect on adjacent part of cerebellum (Figure 1). No evidence of any obvious extension or any other abnormality is noted in the right internal acoustic meatus, visualised part of 8<sup>th</sup> cranial nerve or brainstem. Non-contrast MRI brain was then advised for further evaluation.

Non-contrast MRI brain revealed an extra-axial, pedunculated, ovoid, heterogeneous, right cerebellopontine angle mass just posterior to the internal auditory meatus showing central, intermediate-intensity area on T1 weighted and T2 FLAIR images while hyperintense on T2 weighted and T2GRE images surrounded by uniform rim showing

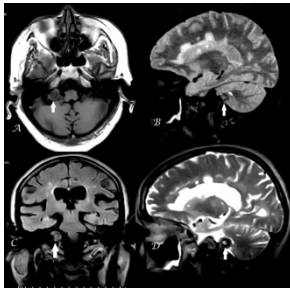
variable hypointensity on all imaging sequences causing widening of ipsilateral cerebellopontine angle cistern and indenting the adjacent part of right cerebellar hemisphere without signs of hydrocephalus or perilesional edema.



**Figure 1: A-D:** Non-contrast CT images (bone-window settings) in transaxial (A, B), coronal (C) and sagittal (D) planes show an osteoid osteoma in right cerebellopontine angle producing mass effect on adjacent cerebellum (white arrows).

There was not obvious extension of the lesion in to the ipsilateral internal acoustic meatus or distortion in the course of visualised part of 8<sup>th</sup> cranial nerve. Post-contrast MRI could not be performed due to financial constraints. Based on the radiological findings, the diagnosis of osteoid osteoma arising from right petrous temporal bone was suggested (Figure 2).

Surgical resection of the lesion was achieved through suboccipital approach which confirmed the diagnosis and in addition revealed numerous adhesions between the tumor and 8<sup>th</sup> cranial nerve that were probably responsible for sensorineural deafness. Patient revealed progressive improvement in hearing till three months of postoperative period before being lost in follow-up.



**Figure 2:** A-D Non-contrast MR images [axial T1W (A), sagittal T2GRE (B), coronal T2 FLAIR (C) and sagittal T2W (D)] show characteristic features of an osteoid osteoma in right cerebellopontine angle producing slight mass effect on adjacent cerebellum (white arrows) in a patient showing profound ipsilateral sensorineural hearing loss. Incidental note is also made of the periventricular and callosal subacute demyelinating lesions secondary to age-related arteriosclerotic changes.

## Discussion

Osteoid osteoma or spongy-type of osteoma is a rare tumor of petrous temporal bone presenting as cerebellopontine angle mass [2]. It may mimic acoustic Schwannoma presenting as hearing loss, tinnitus, vertigo and occasionally trigeminal neuralgia, seizure or contralateral homonymous hemianopia [3-5]. However, when no detectable cause of sudden sensorineural deafness is detected, vascular endothelial dysfunction should be considered which also suggests increased cardiovascular risk secondary to vascular etiology [6].

NCCT usually reveals a sharply-defined, pedunculated, osseous lesion arising from petrous bone (more easily discernible on multi-planar images) with or without central lucency secondary to fibrous or spongy tissue [3-5]. 3DCT is very useful in the preoperative planning of the tumor. MRI reveals an extra-axial, hypointense lesion with T2-

blooming effect with or without central area showing variable intermediate or hyperintensity on different image sequences representing fatty or spongy marrow [3-5]. There may be slight mass effect on adjacent part of cerebellum or brainstem with or without edema. Post-contrast MRI may show rim-enhancement secondary to adjacent reactive meningeal enhancement. Adhesions between tumour and 8<sup>th</sup> cranial nerve are usually responsible for hearing loss rather than its direct compression [3].

The important differential diagnoses are calcifying or calcified meningioma and osteoblastoma with former being associated with subjacent osseous sclerosis and homogeneous post-contrast enhancement while latter reveals a central nidus of usually greater than 2 cm in diameter with multiple spotty calcifications.

## Conclusion

Though osteoma of petrous temporal bone is rare yet it must be considered in the differential diagnosis of cerebellopontine angle lesions whenever the patients present with sensorineural hearing loss. Surgical treatment is usually essential due to involvement of adjacent cranial nerves with CT scan and MRI playing complimentary roles in establishing the correct diagnosis and excluding more common lesions especially acoustic Schwannoma and meningioma.

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