

## Tympanic Paraganglioma on Imaging: The Key Role of MRI And CT

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### Abstract

### Case Report

We report the case of a 49-year-old woman with a tympanic paraganglioma, revealed by left-sided pulsatile tinnitus, progressive conductive hearing loss, and intermittent vertigo. Otoloscopic examination showed a reddish retrotympenic mass. Imaging studies, particularly computed tomography (CT) and magnetic resonance imaging (MRI), suggested a tympanic paraganglioma. The patient underwent surgical excision with a favorable outcome. This case highlights the importance of imaging in the diagnosis and staging of glomus tumors of the middle ear.

**Keywords:** Tympanic paraganglioma, MRI, CT, Pulsatile tinnitus, Conductive hearing loss.

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## INTRODUCTION

Tympanic paragangliomas, also known as glomus tympanicum, are rare benign neuroendocrine tumors but represent the most common tumors of the middle ear [1]. Arising from the paraganglionic cells of Jacobson's tympanic plexus, they develop within the tympanic cavity near the cochlear promontory. Their rich arterial vascularization explains their typical clinical presentation: unilateral pulsatile tinnitus, often associated with progressive conductive hearing loss [2].

Imaging plays a central role in the management of these tumors, from diagnosis to assessing extension and guiding treatment. High-resolution computed tomography (CT) is the first-line imaging modality for evaluating the bony anatomy of the middle ear and temporal bone. It can demonstrate a retrotympenic soft tissue mass, its contrast enhancement, and any bony erosion, particularly of the carotid canal or floor of the tympanic cavity [3].

Magnetic resonance imaging (MRI) offers superior tissue characterization due to its high sensitivity for tumor enhancement and for assessing relationships with adjacent neurovascular structures. The classic "salt-and-pepper" appearance, reflecting flow voids and hyperintense areas on T2-weighted images, is highly suggestive in larger tumors [4]. The differential diagnosis includes other middle ear lesions such as

cholesteatomas, facial nerve schwannomas, or chronic inflammatory conditions.

The primary treatment is surgical excision, sometimes preceded by preoperative embolization [5]. Treatment choice depends on lesion size, extension, and clinical symptoms.

We report a case of tympanic paraganglioma in a 49-year-old woman, diagnosed based on typical clinical signs and evocative imaging, with intraoperative confirmation and a favorable post-treatment course. This case highlights the crucial role of imaging in characterizing vascular middle ear tumors.

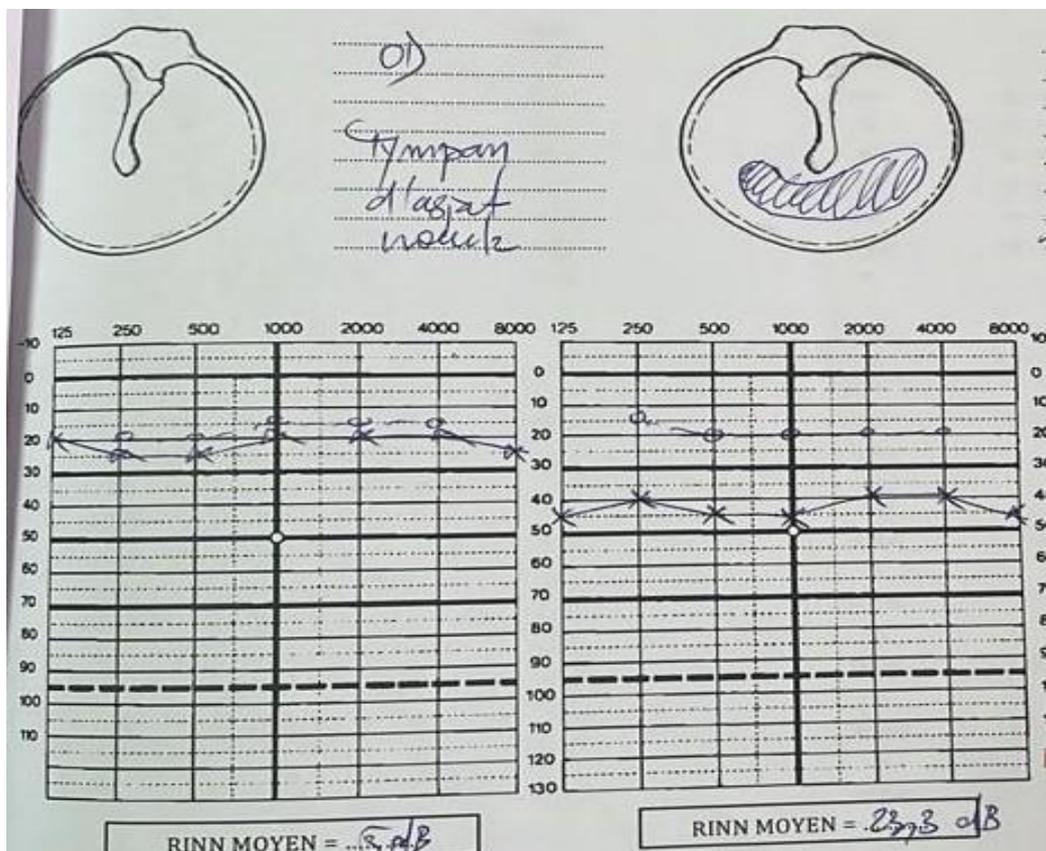
## CLINICAL CASE

The patient was a 49-year-old woman with no significant medical history apart from an appendectomy eight years prior. She presented with left-sided pulsatile tinnitus, progressive hearing loss, and intermittent vertigo over the past two years. She reported no otalgia or otorrhea.

Otoloscopic examination revealed a reddish retrotympenic mass in the inferior quadrant of the left ear (Figure 1). The right ear was normal. Nasal endoscopy was unremarkable. Pure-tone audiometry confirmed left-sided conductive hearing loss (Figure 2).



**Figure 1: Otoscopy of the left ear: Reddish mass in the inferior retrotympenic region**



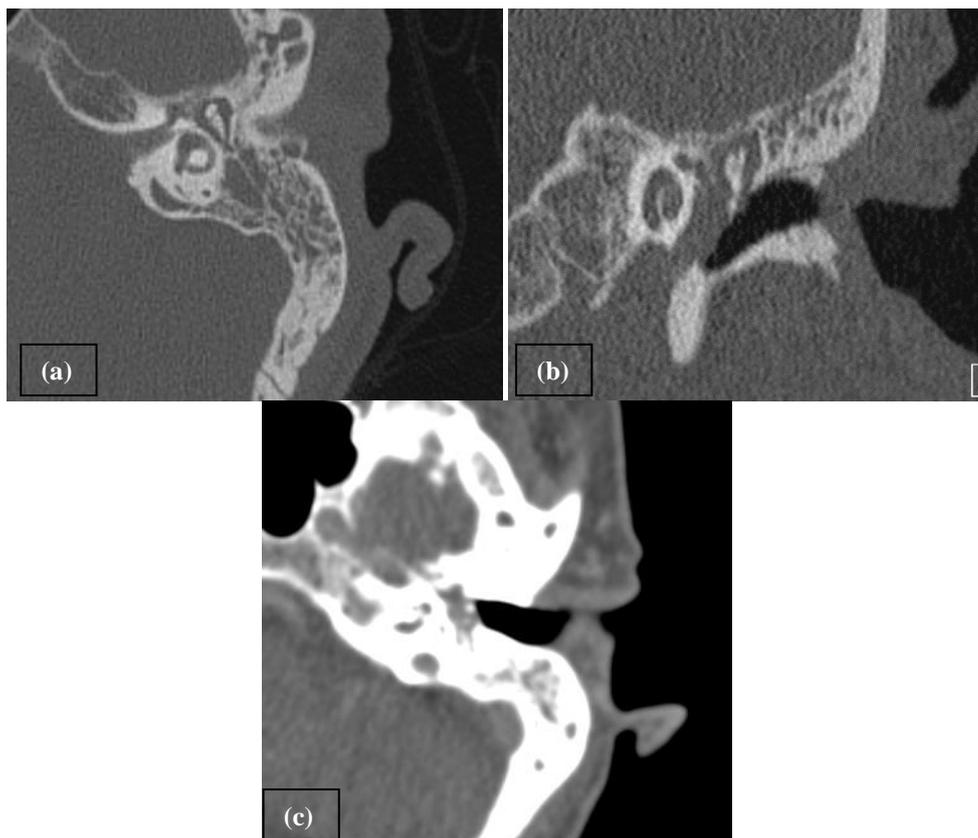
**Figure 2: Pure-tone audiometry: Left-sided conductive hearing loss**

**Imaging Findings**

**Temporal Bone CT Scan (Figure 3):**

CT showed a left retrotympenic mass with lobulated contours centered on the mesotympanum. The lesion was isodense and enhanced heterogeneously after iodine contrast injection. It caused bulging of the

tympanic membrane. The mass was in contact with the carotid canal anteriorly and the jugular bulb posteriorly, without signs of bone aggressiveness. There was complete opacification of the middle ear, mastoid air cells, and Eustachian tube. The ossicular chain, scutum, and tegmen tympani were intact.

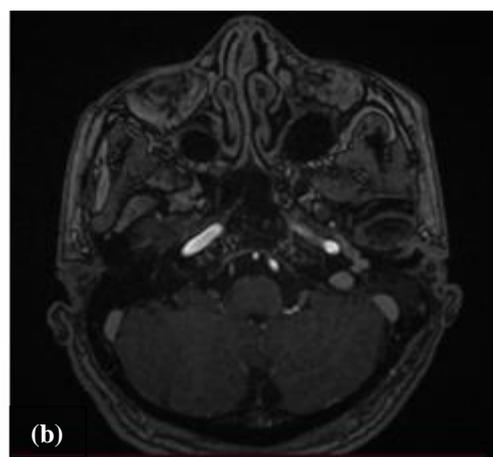
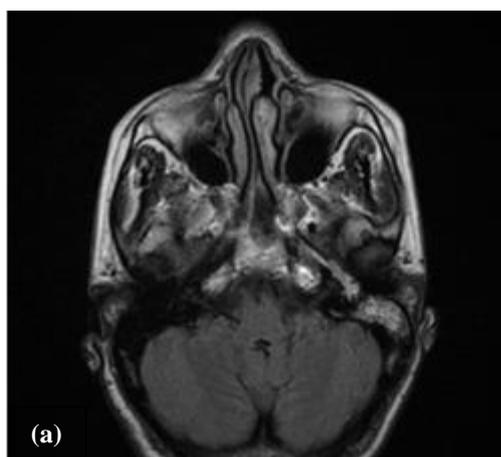


**Figure 3: Axial (a) and coronal (b) CT scans of the left temporal bone showing a retrotympenic process on the left side, with lobulated contours, centered on the mesotympanum. The lesion is isodense and demonstrates heterogeneous enhancement following the injection of iodinated contrast medium (c)**

**Magnetic Resonance Imaging (MRI) (Figure 4):**

The lesion was slightly hyperintense on T2-weighted sequences, isointense on T1, with intense and

heterogeneous enhancement after gadolinium injection—suggestive of a tympanic paraganglioma.



**Figure 4: Axial MRI of the temporal bone (T2 (a) and post-contrast T1 (b)): Left tympanic lesion with slight T2 hyperintensity and strong heterogeneous gadolinium enhancement**

**DISCUSSION**

Tympanic paraganglioma, or glomus tympanicum, is a benign neuroendocrine tumor originating from glomus cells of Jacobson’s tympanic plexus. It is the most common tumor of the middle ear [1]. Though benign, it often presents with troublesome

symptoms such as pulsatile tinnitus, conductive hearing loss, and more rarely, vertigo or otorrhagia [2].

**Role of Imaging**

Imaging is essential for diagnosis, characterization, and staging of these tumors. CT provides excellent evaluation of bone structures,

typically revealing a well-defined, isodense mass with intense contrast enhancement and possible erosion of adjacent structures such as the cochlear promontory or carotid canal [3]. In our case, CT showed a left retrotympenic mass with heterogeneous enhancement and intact bone structures.

MRI allows better tissue characterization. The lesion is usually isointense on T1, hyperintense on T2, with intense post-gadolinium enhancement [4]. The “salt and pepper” appearance, reflecting flow voids and solid tumor areas, is characteristic of larger tumors (>2 cm) [5]. In our case, MRI confirmed significant enhancement without extension to neural or intracranial structures.

Angiography, previously a first-line investigation, is now reserved for cases requiring preoperative embolization or when vascular extension remains uncertain on non-invasive imaging [6].

### DIFFERENTIAL DIAGNOSIS

#### Retrotympenic mass differential diagnoses include:

- **Cholesteatoma:** avascular and does not enhance with contrast.
- **Facial nerve schwannoma:** rarer, with distinct MRI features.
- **Squamous cell carcinoma:** to be considered in aggressive bony destruction or atypical clinical presentation.

Emerging techniques like optical coherence tomography (OCT) may help differentiate middle ear lesions when diagnosis is uncertain [7].

### MANAGEMENT

The standard treatment is surgery. Depending on the tumor’s size and extent, different approaches are possible, including the transcanal endoscopic approach, which allows optimal visualization with reduced morbidity [8]. A recent study of six cases operated via this route showed significant improvement in hearing and reduced tinnitus in most patients [9].

In our case, complete surgical excision was achieved with favorable clinical evolution and partial hearing recovery.

## CONCLUSION

Tympanic paraganglioma is a benign vascular tumor of the middle ear, whose diagnosis primarily relies on thorough imaging. CT provides excellent assessment of bony involvement, while MRI offers key features favoring the diagnosis, such as intense enhancement and relationships with adjacent vascular structures [3,4]. This case illustrates the importance of combining CT and MRI in evaluating retro tympanic masses and the essential role of imaging in surgical planning. A multidisciplinary approach involving ear, nose, and throat specialists and radiologists ensures an adapted treatment strategy and favorable functional and general outcomes [5,8].

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