IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 25, Issue 8 Ser. 1 (August. 2026), PP 73-75
www.iosrjournals.org

Multimodality Imaging (MRI And HRCT) Of Glomus Tympanicum Presenting As Isolated Pulsatile Tinnitus: A Case Report

Dr. Shubham G, Dr. Saumya L G, Dr. Parthasarthy
Department Of Radiodiagnosis, SS Institute Of Medical Sciences

Abstract
Background: *Glomus tympanicum is the most common benign tumour of the middle ear. It develops from paraganglionic cells scattered along the tympanic plexus overlying the cochlear promontory, and usually announces itself through pulsatile tinnitus with conductive hearing loss. Although the histology is benign, delayed diagnosis allows the lesion to erode surrounding bone, which is why cross-sectional imaging occupies such a prominent place in work-up, staging, and surgical planning.*
Case presentation: *A 40-year-old woman presented with left-sided pulsatile tinnitus that had persisted for a year and a half. Temporal bone MRI together with high-resolution CT (HRCT) demonstrated a 13.6 × 7 × 9 mm avidly enhancing lesion centred on the left cochlear promontory, filling the mesotympanum and reaching slightly into the epitympanum and hypotympanum, with accompanying middle-ear and mastoid effusion. HRCT showed early rarefaction along the long process of the incus, no carotid canal erosion, and an intact bony labyrinth an appearance essentially diagnostic of glomus tympanicum. She was referred to ENT for surgical work-up.*
Conclusion: *MRI and HRCT complement one another when glomus tympanicum is suspected: MRI shows how far the soft tissue extends and how it enhances, while HRCT maps the fine bony detail and rules out deeper spread. Recognising the classic promontory centred appearance allows a confident radiological diagnosis and timely referral, which in turn improves outcomes.*
Keywords: *Glomus tympanicum; paraganglioma; pulsatile tinnitus; middle ear; high-resolution computed tomography; magnetic resonance imaging*

Date of Submission: 01-08-2026 Date of Acceptance: 11-08-2026

I. Introduction

Glomus tympanicum is a slow-growing, benign paraganglioma that originates from glomus cells sitting along the tympanic plexus on the cochlear promontory [7,8]. It is the most frequently encountered primary tumour of the middle ear, and along with glomus jugulare it makes up the family of jugulotympanic paragangliomas [7,9]. The tumour behaves in a locally invasive fashion despite its benign histology, and can erode nearby ossicles or bone if it goes unrecognised [9].

Patients most often present in a fairly recognisable pattern: a middle-aged woman with unilateral pulsatile tinnitus and slowly worsening conductive hearing loss, sometimes with a reddish mass visible behind the eardrum on otoscopy [3,4,10]. Because the tumour frequently hides behind an intact tympanic membrane, imaging becomes essential not just to make the diagnosis but to separate glomus tympanicum from the other things that can mimic a middle-ear mass, and to plan surgery [1,5,11,12]. This report describes a case that illustrates how MRI and HRCT work together in that diagnostic pathway.

II. Case Presentation

A 40-year-old woman reported left-sided pulsatile tinnitus lasting one and a half years. She had no hearing loss, otorrhoea, vertigo, or facial weakness, and nothing notable in her past medical or family history. Given how long the symptoms had persisted and the possibility of a vascular or neoplastic middle-ear process, she underwent dedicated temporal bone MRI and HRCT.

Imaging Findings

MRI temporal bone

A well-defined, avidly enhancing soft-tissue lesion measuring 13.6 × 7 × 9 mm was centred over the left cochlear promontory. It occupied the mesotympanum and extended mildly into both the epitympanum and hypotympanum, with associated middle-ear and mastoid effusion most likely a consequence of eustachian tube dysfunction caused by the mass itself. Post-contrast BRAVO sequences showed intense, homogeneous enhancement, a pattern typical of a hypervascular paraganglioma.

HRCT temporal bone

The carotid canal showed no erosion, arguing against any inferior or jugular extension. There was subtle rarefaction along the long process of the incus, consistent with the early osseous involvement that glomus tympanicum often produces, while the bony labyrinth cochlea and semicircular canals remained intact.

[Figure 1: Axial T2-weighted MRI showing the lesion centred on the left cochlear promontory. Figure 2: Post-contrast BRAVO MRI demonstrating avid lesion enhancement. Figure 3: HRCT temporal bone (axial/coronal) showing the mesotympanic soft-tissue lesion with incus long-process rarefaction and an intact carotid canal. Authors should insert de-identified, annotated images from the source study in place of these placeholders before submission.]

Differential Diagnosis

Given the lesion's location, its enhancement pattern, and the absence of deep extension, several alternative diagnoses were considered and ruled out:

- **Cholesteatoma** usually appears as a non-enhancing mass with restricted diffusion, neither of which was present here.
- **Facial nerve schwannoma** would be expected to show fusiform enlargement tracking along the nerve, not a discrete mass centred on the promontory.
- **Middle-ear adenoma** can look similar on imaging, but tends to enhance less avidly and is considerably rarer.
- **Glomus jugulare** was excluded by the absence of jugular foramen widening or carotid canal erosion, confirming that the process was confined to the tympanicum.

Taken together a small, avidly enhancing lesion sitting precisely on the cochlear promontory, an intact carotid canal, and a preserved labyrinth the findings were considered characteristic of glomus tympanicum, corresponding to Glasscock Jackson type I–II [5,13].

Management and Outcome

The imaging findings supported a radiological diagnosis of glomus tympanicum. The patient was referred to ENT for otomicroscopy and audiometric assessment, and the otology team proceeded with surgical planning a transcanal or endaural excision, depending on the extent found at operation. Follow-up imaging was recommended afterward to check for residual or recurrent disease.

III. Discussion

Glomus tympanicum originates from paraganglionic cells associated with the tympanic branch of the glossopharyngeal nerve (Jacobson's nerve) along the cochlear promontory, making it the most common primary middle-ear tumour [7,8,16]. It tends to occur in women in their forties through sixties, with a female-to-male ratio of roughly 3:1 reported in the literature a pattern that matches the patient described here [16].

Imaging matters so much in this condition precisely because the tumour is usually concealed behind an intact eardrum and can be mistaken clinically for other retrotympanic masses [9,10]. Reviews of the pulsatile-tinnitus work-up have repeatedly found that cross-sectional imaging, whether CT, MRI, or a combination, uncovers an underlying cause in a large share of patients, and is recommended whenever a vascular or neoplastic cause is suspected [11,14]. HRCT remains particularly valuable for showing fine bony detail confirming that a lesion originates at the promontory, judging ossicular involvement, and, importantly, checking for erosion of the jugular plate or carotid canal that would point instead to a jugulotympanic (glomus jugulare) lesion rather than a purely tympanicum one [5,13]. MRI adds to this by characterising the soft-tissue extent, vascularity, and enhancement pattern more precisely, and a number of recent reviews now favour MRI/MRA as the first screening test for pulsatile tinnitus given its accuracy and avoidance of ionising radiation [12,13]. Larger jugulotympanic paragangliomas classically show a "salt-and-pepper" appearance on MRI from internal flow voids, though small glomus tympanicum lesions like this one more often enhance homogeneously without that feature.

Other entities that can present as a retrotympanic or middle-ear mass include cholesteatoma, facial nerve schwannoma, middle-ear adenoma, an aberrant carotid artery, and a dehiscent jugular bulb, in addition to glomus jugulare itself [3,6]. Distinguishing between these relies on careful attention to where the lesion is centred, how it enhances, and whether the adjacent bony landmarks particularly the carotid canal and jugular plate remain intact, exactly the reasoning applied in this case.

Treatment decisions follow tumour size and extent, most often graded using the Glasscock–Jackson or Fisch systems [6,10]. Smaller, well-localised tumours such as Glasscock–Jackson type I–II lesions generally respond well to transcanal or endaural microsurgical excision, whereas larger or more extensive disease may call for a mastoid approach, preoperative embolisation to cut down vascularity, or occasionally radiotherapy [1,6,9]. Uncommon local complications such as new bone formation and ossicular fixation have also been described and can make surgical clearance more difficult [9]. In this patient, prompt radiological diagnosis allowed early referral and surgical planning before further ossicular or bony involvement could develop.

Learning Points
- Consider glomus tympanicum in anyone, especially a middle-aged woman, presenting with unilateral pulsatile tinnitus.
- MRI and HRCT complement each other: MRI shows soft-tissue extent and enhancement, HRCT shows fine bony anatomy and rules out deep or jugular extension.
- An avidly enhancing lesion centred on the cochlear promontory, with an intact carotid canal and labyrinth, strongly suggests glomus tympanicum.
- Early radiological diagnosis speeds up ENT referral and surgical planning, improving outcomes and limiting local tissue damage.

IV. Conclusion

This case demonstrates the classic multimodality imaging appearance of glomus tympanicum in a patient whose only symptom was pulsatile tinnitus. Together, MRI and HRCT allowed a confident radiological diagnosis, helped exclude the relevant differentials, and mapped the anatomy accurately enough for surgical planning a reminder of how central imaging is to working up this rare but clinically important cause of pulsatile tinnitus.

Declarations

Patient consent: Written informed consent was obtained from the patient for publication of this case report and any accompanying images. [Authors to confirm and retain documentation per journal requirements.]

Conflict of interest: The authors declare no conflict of interest.

Funding: This case report received no specific funding from any funding agency in the public, commercial, or not-for-profit sectors.

References

[1]. Ramesh AS, Karthikeyan S, Et Al. Post-Embolization Excision Of Glomus Tympanicum: A Case Report. Cureus. Available From: Https://Pmc.Ncbi.Nlm.Nih.Gov/Articles/PMC8856636/
[2]. Imaging Evaluation Of The Cases With Tympanicum And Pulsatile Tinnitus. Lin Chuang Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. Pubmed ID: 24731462.
[3]. Tympanic Paragangliomas: Case Reports. Int Arch Otorhinolaryngol. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/PMC9443525/
[4]. A Case Report Of Glomus Tympanicum Complicated With Facial Nerve Palsy. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/PMC9709390/
[5]. Glomus Tympanicum: A Radiological Dilemma. Indian J Otol. 2017. Available From: Https://Journals.Lww.Com/Ijoo/Fulltext/2017/23020/Glomus_Tympanicum__A_Radiological_Dilemma.17.Aspx
[6]. Effective Surgical Management Of Glomus Tympanicum Tumor Using Diode Laser: A Case Report Study. Int J Surg Case Rep. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/PMC10236192/
[7]. Sweeney AD, Carlson ML, Wanna GB, Bennett ML. Glomus Tympanicum Tumors. Otolaryngol Clin North Am. 2015;48(2):293-304. Doi:10.1016/J.Otc.2014.12.004. PMID: 25659513.
[8]. Jugulotympanic Paraganglioma [Article In French/Spanish]. Pubmed. PMID: 17987728.
[9]. Bell D, Aladwan M, Et Al. Unusual Presentation Of Glomus Tympanicum Tumour: New Bone Formation In The Middle Ear. Available From: Https://Pmc.Ncbi.Nlm.Nih.Gov/Articles/PMC4163770/
[10]. An Unusual Presentation And Diagnosis Of A Type 4 Middle Ear Paraganglioma: A Case Report. Available From: Https://Www.Ncbi.Nlm.Nih.Gov/Pmc/Articles/PMC10039642/
[11]. Cao AC, Hwa TP, Cavarocchi C, Quimby A, Eliades SJ, Ruckenstein MJ, Bigelow DC, Choudhri OA, Brant JA. Diagnostic Yield And Utility Of Radiographic Imaging In The Evaluation Of Pulsatile Tinnitus: A Systematic Review. Otol Neurotol Open. 2023;3(2):E030. PMID: 38516122.
[12]. Non-Invasive Imaging Modalities For Diagnosing Pulsatile Tinnitus: A Comprehensive Review And Recommended Imaging Algorithm. PMID: 39488339.
[13]. Pegge SAH, Steens SCA, Kunst HPM, Meijer FJA. Pulsatile Tinnitus: Differential Diagnosis And Radiological Work-Up. Curr Radiol Rep. 2017;5(1):5. Doi:10.1007/S40134-017-0199-7. PMID: 28203490.
[14]. Systematic Review Of The Diagnostic Imaging Evaluation Of Pulsatile Tinnitus. Available From: Https://Pmc.Ncbi.Nlm.Nih.Gov/Articles/PMC11888499/
[15]. Radiopaedia.Org. Tympanic Paraganglioma. Available From: Https://Radiopaedia.Org/Articles/Tympanic-Paraganglioma
[16]. A Case Report On Surgical Management Of Glomus Tympanicum And Literature Review. Int J Surg Case Rep. Available From: Https://Www.Sciencedirect.Com/Science/Article/Pii/S2210261225000306