



Surgical Management of a Painful Temporal Bone En-Plaque Meningioma: A Case Report and Literature Review

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ABSTRACT

BACKGROUND

When accompanied by debilitating pain, temporal bone en-plaque meningiomas present considerable management difficulties.

OBJECTIVE

This report aims to illustrate the impact of pain on surgical decision-making for temporal bone en-plaque meningiomas.

CASE PRESENTATION

A 42-year-old woman, initially diagnosed with chronic otitis media, was found to have a painful left middle fossa en-plaque meningioma. Despite conservative management, her pain progressed, and she elected to undergo surgical resection, which provided significant pain relief.

LITERATURE REVIEW AND DISCUSSION

Twenty-four cases of temporal bone en-plaque meningiomas have been reported, demonstrating variable presentations and management strategies. Pain remains poorly understood due to the complexities of the underlying mechanisms.

CONCLUSIONS

Pain is an important factor in middle fossa en-plaque meningioma management and may influence the decision to pursue surgical intervention.

OBJECTIVES

- To highlight a case of a temporal bone en-plaque meningioma associated with refractory chronic otitis media and persistent pain.
- To compare surgical and conservative treatment approaches for pain management.
- To identify potential mechanisms of pain.

BACKGROUND

En-plaque meningiomas (EPMs) comprise 2-9% of meningioma cases, making them a rare subtype. Unlike the more common en-masse subtype, EPMs feature diffuse dural invasion, thickening, and hyperostotic bone infiltration.

EPMs commonly occur in the sphenoid-orbital region, but may also affect the cerebral convexity, temporal bone, and foramen magnum. Sphenoid-orbital EPMs often present with proptosis and visual disturbances, while temporal bone EPMs typically present with hearing loss, tinnitus, and otorrhea.

Historically, EPMs were not routinely resected due to surgical risks. Current management primarily involves maximal safe resection, often followed by adjuvant radiation therapy in cases of subtotal resection.

Pain in temporal bone EPMs, often manifesting as persistent otalgia, headaches, and aural fullness, poses a significant clinical challenge because of its resistance to surgical treatment and its impact on quality of life.

CASE PRESENTATION

- A 42-year-old woman with a prior six-year history of chronic otitis media managed with seven tympanostomy tubes and tympanomastoidectomy initially presented with persistent and worsening left-sided hearing loss, headache, otalgia, pulsatile tinnitus, and facial numbness.
- Review of prior CT (Figures 1A and 1C) revealed hyperostosis of the temporal bone, and an updated MRI (Figures 1B and 1D) revealed dural thickening, raising concerns about alternative pathology, particularly an intraosseous meningioma.
- Revision tympanomastoidectomy and ossicular chain reconstruction were performed to attempt restoration of middle ear function and obtain a diagnosis. Biopsy of bone and soft tissue within the epitympanum confirmed intraosseous meningioma.
 - Postoperative recovery was uneventful, but left ear fullness, pain, and pressure recurred despite the placement of a pressure equalization tube.
 - Persistently debilitating left-sided temporal headaches, pulsatile tinnitus, and fullness limited her ability to fulfill academic and professional obligations.
- Given multiple failed conservative measures, her case was discussed at a multidisciplinary conference, and the decision was made to pursue a combined transmastoid and middle fossa craniotomy, subtotal resection, and abdominal fat graft.
 - Postoperatively, she experienced transient temporal encephalopathy.
 - CT (Figure 2E) and MRI (Figures 2F and 2G) confirmed successful resection.
 - At the six-month follow-up, she reported significant improvement in pain.
 - Seventeen months postoperatively, in light of stable mild pain and a maximal conductive hearing loss, a bone-anchored hearing aid was placed.

FIGURE 1: Postoperative CT and MRI After Prior Tympanomastoidectomy

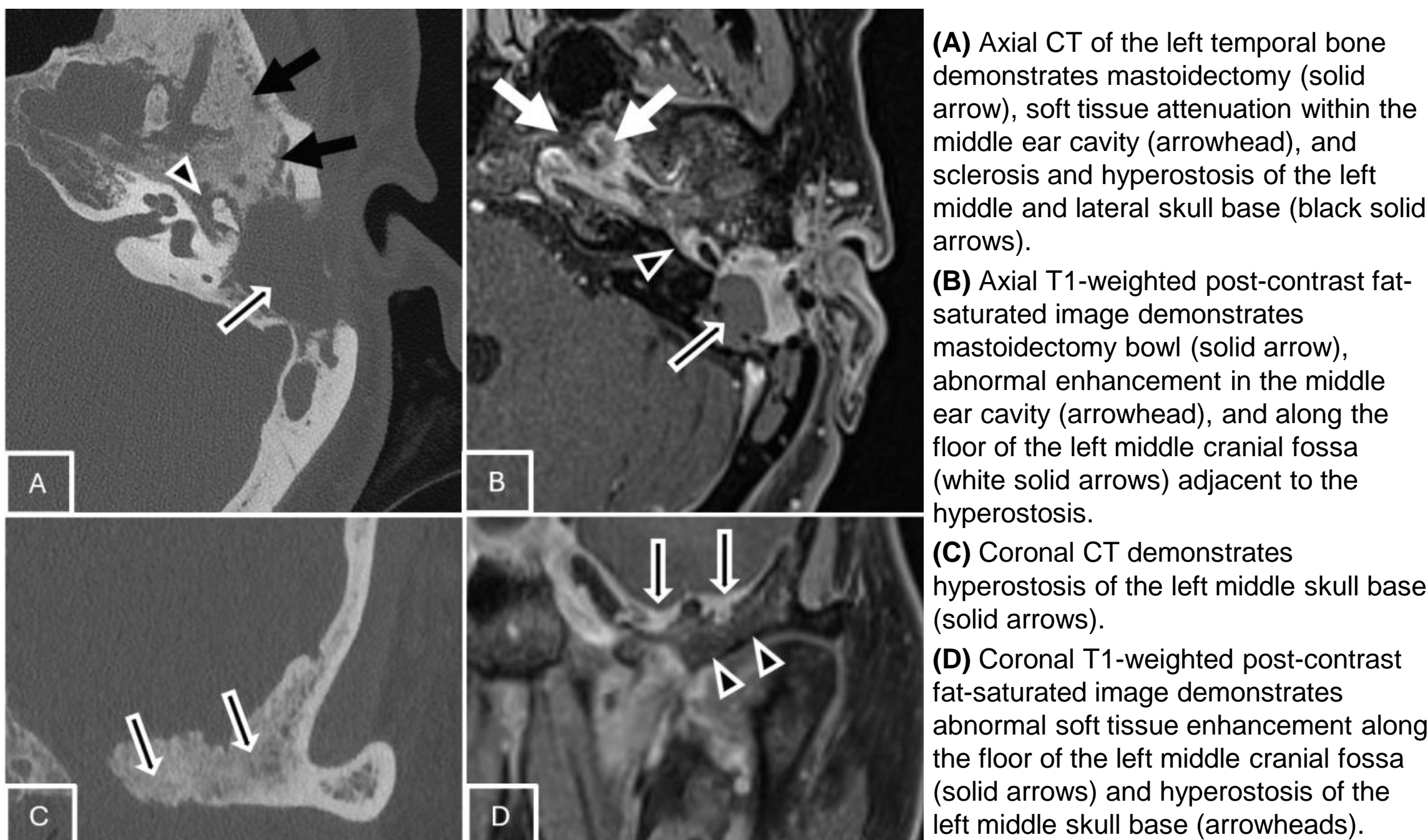
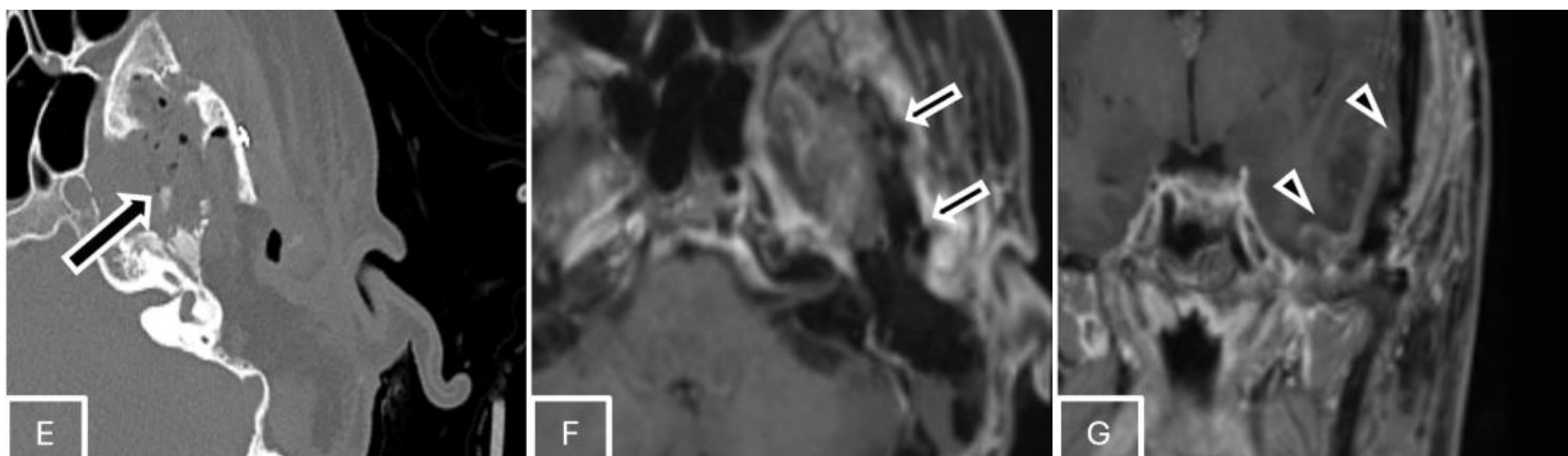


FIGURE 2: CT and MRI Confirming Successful Resection



(E) Axial CT of the left temporal bone demonstrates postoperative resolution of previously noted sclerosis and hyperostosis (solid arrow).
(F) Axial T1-weighted post-contrast fat-saturated image demonstrates left lateral skull base resection (solid arrows).
(G) Coronal T1-weighted post-contrast fat-saturated image demonstrates expected post-surgical changes and a small amount of extra-axial fluid along the left temporal convexity (arrowheads), with no findings to suggest residual disease.

REVIEW AND DISCUSSION

- Twenty-four cases of temporal bone EPMs have been reported.
- Pain was reported in four cases; only one patient, who had trigeminal neuralgia underwent surgery and achieved complete pain resolution despite subtotal resection.
- The conservative management of the remaining pain cases likely reflected tumor location, surgical risks, or comorbidities.
- Of 20 pain-free patients, 10 underwent surgery without complications, while the remaining received either radiation (n = 1) or conservative care (n = 6).
- Pain in this case may have resulted from middle fossa osteitis, geniculate neuralgia, or meningeal inflammation.
- Tumor adherence to the facial nerve, noted during her initial surgery, suggests proximity or inflammation as potential pain sources.
- Persistent pain may also have been due to the tumor's proximity to the geniculate ganglion, which was not initially accessed.
- Middle fossa tumor resection targeting the geniculate region likely contributed to significant postoperative pain relief.

CONCLUSIONS

- Pain is an infrequent yet debilitating manifestation of temporal bone EPMs.
- Resolution of pain despite incomplete bony resection suggests that pain mechanisms may be multifactorial and more complex than local inflammatory factors alone.
- Pain may arise secondary to adhesion and compression of adjacent neural structures.
- A comprehensive understanding of pain pathophysiology is essential for surgical planning, especially when total resection is unachievable.
- A more standardized approach to pain management in temporal bone EPMs is needed and may help improve patient outcomes and quality of life.

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