Introduction

The clinical presentation of patients with non-neoplastic temporal bone lesions can mimic those findings associated with neoplasms. A variety of benign and malignant epithelial, salivary gland, and vasosomatic tumors can invade the temporal bone causing obvious otologic, neurologic, or cranial nerve symptoms. Non-neoplastic processes, on the other hand, can become massive and highly destructive prior to the onset of clinical manifestations. Presented are the clinicoradiographic features of 3 destructive, non-neoplastic lesions of the temporal bone.

Objective

To detail the clinicoradiographic features and management options for these unique and challenging temporal bone disorders.

Methods

Retrospective chart review of 3 patients with non-neoplastic temporal bone disorders with associated review of literature.

Case 1: Cholesterol Granuloma

**Patient History:** 36 y/o male presented with 2 years of progressive left occipital pain and headaches. He denied any tinnitus, otalgia, changes in hearing, or vertigo.

**Physical Exam:** Microscopic otoscopy was remarkable for an erythematous left tympanic membrane without effusion or mass; the right ear was unremarkable. His physical examination was otherwise normal.

**Audiogram:** Normal hearing and word recognition scores bilaterally.

**Imaging:** CT demonstrated a well-demarcated 3.7 cm diameter spherical, expansile extra-axial lesion filling the left temporal bone. MRI showed an extradural lesion hyperintense to brain on T1 and T2 imaging. (See below). MRV demonstrated occlusion of the left sigmoid sinus and jugular bulb.

**Surgical Treatment:** The patient underwent a left temporal bone resection with a radical mastoidectomy, labyrinthectomy, and a transcocchlear approach for resection of this lesion.

Case 2: Destructive Epidermoid

**Patient History:** 35 y/o male with a past history of multiple bilateral PE tubes and bilateral tympanoplasties who presented with a gradual left facial paralysis over the previous year, 1 month of left otalgia, and significantly decreased hearing on the left. He otherwise denied tinnitus, vertigo, HA, and otorrhea.

**Physical Exam:** Notable for a complete L facial paralysis. Microscopic otoscopy demonstrated a retracted pars tensa and flaccid on the right, with total opacification of the superior tympanic membrane and fluid in the hypotympanum on the left.

**Audiogram:** Profound mixed hearing loss with no measurable word recognition on the left and a mild low frequency mixed loss on the right.

**Imaging:** CT demonstrated a large expansile, destructive soft tissue mass filling the left mastoid bone with extension to the sigmoid sinus, internal auditory canal, cochlea, labyrinth, and facial canal. MR demonstrated a soft tissue mass filling the left temporal bone which was isointense to brain on T1 and hyperintense on T2. (See below).

**Surgical Treatment:** None

Discussion

Near total temporal bone destruction was observed in three cases of cholesterol granuloma, destructive epidermoid, and advanced Paget’s disease. A detailed patient history and physical examination combined with CT/MRI assessment can help identify non-neoplastic, yet destructive lesions of the temporal bone (Figure 1). A variety of lateral skull base techniques can be utilized in the operative management of these lesions (Figure 2).

**Figure 1: Destructive Non-Neoplastic Temporal Bone Lesions**

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Clinical Presentation</th>
<th>CT Characteristics</th>
<th>MRI Characteristics</th>
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<tbody>
<tr>
<td>Cholesterol Granuloma</td>
<td>Varied, but most commonly with hearing loss, vertigo, and headache. May have associated deficits of CN’s V-VII.</td>
<td>Well-circumscribed, expansile lytic area with a smooth bony margin.</td>
<td>Homogenous and hyperintense to brain on T1 and T2 with occasional rim enhancement.</td>
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<tr>
<td>Destructive Epidermoid</td>
<td>Most commonly recurrent or persistent otitis and hearing loss. May have associated vertigo and facial paresis or twitching.</td>
<td>Sharply demarcated, homogeneous nodular soft tissue mass, often with adjacent areas of osteolysis.</td>
<td>Hypo-to isointense on T1 and moderately hyperintense to brain on T2.</td>
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<td>Advanced Paget’s Disease</td>
<td>Often with head/neck pain and changes in skull size/shape. Any cranial nerve can be affected, most commonly CN’s I and VIII with associated hearing loss.</td>
<td>“Cotton-wool” appearance of cortical bone, loss of definition of margins of otic capsule and internal auditory canal.</td>
<td>Bone marrow signal decreased on T1 but elevated on T2. Advanced disease with areas of hypointensity and signal void on both T1 and T2.</td>
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**Figure 2: Lateral Skull Base Approaches**

- Transmastoid
- Petrosal
- Infratemporal Fossa
- Translabyrinthine
- Combined Approach

References