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Post-Operative Temporal Lobe Encephalocele

This 24-year-old woman presented to ENT outpatients with an enlarging swelling in the right external auditory canal. A radical mastoidectomy for chronic suppurative otitis media with cholesteatoma had previously been undertaken at another institution. On clinical examination there was an otologic mass that was tender on probing.

High resolution imaging of the temporal bones and a subsequent MRI brain confirmed the mass was a temporal lobe encephalocele.

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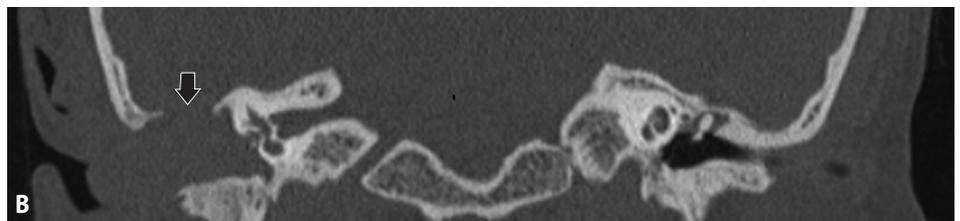
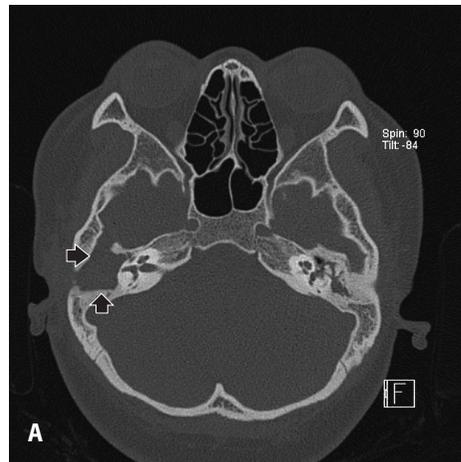


Figure 1. A. (axial) and **B.** (coronal) high resolution CT of the temporal bones showing **A.** Soft tissue (black arrows) within the mastoid cavity; and **B.** Large contiguous defect in the tegmen tympani (black arrow).



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Figure 2. A. (T1 coronal), B. (T2 fat sat coronal and C. (T2 axial fat sat) MRI of the brain and IAMs show a large focus of the right inferior temporal lobe (white arrows) protrudes through the defect in the tegmen tympani into the post-surgical mastoid cavity.

A temporal lobe encephalocele is where a segment of the temporal lobe invaginates through a defect in the tegmen tympani. The brain is separated from the middle ear and mastoid process by an exceptionally thin layer of bone – the tegmen tympani. Damage to the tegmen compromises the barrier with the brain and may occur for a number of reasons. This includes congenital, traumatic, post-infectious, malignant invasion, post-radiation therapy and post-surgical causes.¹ When this occurs the brain may extrude through the defect resulting in a temporal lobe encephalocele.

A bony defect alone, whatever the cause, is insufficient to always result in an encephalocele. Even with dehiscence of the tegmen the dura is capable of supporting the brain issue without herniation. Only when the integrity of the dura is compromised does an encephalocele occur.² This may be due to the underlying disease process (such as cholesteatoma causing an intracranial abscess) or both purposeful (opening dura to drain an adjacent intracranial abscess)/non-purposeful surgical intervention. Mainstream microsurgical techniques however have lowered the incidence of dural violation.³

Historically, infection was a major cause but with the ready availability of antibiotics and prompt management, the key contemporary cause is iatrogenic following mastoid surgery. However, the overall incidence is uncommon following otologic surgery. In a review of 25 years of middle ear/mastoid encephalocele cases, 77% were identified to be iatrogenic in origin.⁴

This patient presented with the finding of a mass observed in the external auditory canal. Less common findings at attendance include tympanic perforation, cholesteatoma, otorrhoea and meningitis.⁴

The key to diagnosis hinges on cross-sectional imaging: combined imaging with CT to assess the osseous structures and MRI for soft tissue review. The high-resolution CT (HRCT) of the temporal bones illustrates a large defect in the right tegmen tympani with a large soft tissue lesion occupying the post-surgical mastoid cavity abutting the tympanic membrane. (Figures 1A, B) The defect of 15mm in the tegmen was more than double the average of 7.2mm reported elsewhere.⁴ The MRI confirms the defect in the tegmen with the protrusion of a knuckle of the right temporal lobe and its overlying meninges through the defect into the mastoid cavity. The dumb-bell appearance is typical with the narrower neck at the site of the tegmental dehiscence. The extruded brain occupies the post-operative middle ear cavity. (Figures 2A, B and C) The defect size and volume of herniated brain can be accurately assessed, both of which may be key determinates of the type of surgical procedure.

Revision mastoidectomy with repair of the tegmen defect and dural integrity using a combined intracranial-mastoid approach is planned as a joint case with neurosurgical colleagues.

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