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Temporal Lobe Brain Abscess Following Refractory Chronic Otitis Media Despite Repeated Antibiotic Therapy

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ABSTRACT

Background: Brain abscess is a rare but potentially life-threatening intracranial infection. Despite advances in antimicrobial therapy and neuroimaging, otogenic brain abscesses remain clinically significant, particularly in patients with chronic otitis media and mastoiditis. Due to anatomical proximity, the temporal lobe is the most commonly affected region.

Case Presentation: A 25-year-old male presented to the emergency department with a 40-day history of left ear pain, purulent otorrhea, high-grade fever, and deterioration of general condition. The patient had a long-standing history of chronic otitis media and multiple recent emergency and otolaryngology visits, during which repeated topical, oral, and parenteral antibiotic treatments were administered. Neurological examination revealed neck stiffness and mild alteration of consciousness. Brain computed tomography demonstrated a 40×30 mm mass lesion in the left temporal lobe with surrounding edema and erosion of the temporal bone, consistent with a brain abscess. Broad-spectrum intravenous antibiotics were initiated, and the patient underwent urgent neurosurgical drainage followed by mastoidectomy. Microbiological cultures showed no growth. The patient improved clinically and was discharged with oral antibiotic therapy.

Conclusion: This case highlights that brain abscess may develop in patients with chronic otitis media and mastoiditis even in the absence of immunosuppression. In patients with refractory otologic infections and clinical deterioration, early neuroimaging and a multidisciplinary approach are essential for timely diagnosis and successful management.

Keywords: Brain abscess, chronic otitis media, mastoiditis, otogenic infection, temporal lobe

Introduction

Brain abscess is an uncommon but potentially life-threatening intracranial infection that remains associated with significant morbidity despite advances in antimicrobial therapy and neuroimaging.[1-3] Otogenic brain abscess is a recognized complication of chronic otitis media and mastoid disease, typically resulting from direct bony erosion or venous spread from the middle ear and mastoid cavity.[1,4] Due to anatomical proximity, the temporal lobe and cerebellum are the most frequently involved regions.[1,4]

Although the incidence of otogenic intracranial complications has declined in the antibiotic era, they continue to occur, particularly in patients with long-standing suppurative ear disease, often associated with cholesteatoma.[1,3] Many reported series involve pediatric or young patients and frequently describe cerebellar abscess predominance, while temporal lobe involvement remains a classical pattern.[5,6] Diagnosis may be challenging, as early symptoms are nonspecific and prior antibiotic therapy can obscure clinical progression and contribute to a high rate of culture-negative abscesses.[5,7]

Management requires a multidisciplinary approach combining prolonged intravenous antibiotics, neurosurgical drainage when indicated, and definitive treatment of the otologic source.[1,8,9] Early recognition and timely intervention are critical to prevent adverse outcomes.[3,10]

We report a case of temporal lobe brain abscess in a young adult with long-standing chronic otitis media and mastoiditis who deteriorated despite multiple healthcare visits and repeated courses of antibiotic therapy. This case highlights that intracranial complications may develop even under ongoing treatment and underscores the importance of early neuroimaging and coordinated multidisciplinary management in refractory otologic infections.

Case Presentation

A 25-year-old male was brought to the emergency department by ambulance with complaints of left ear pain, purulent ear discharge, and progressive deterioration of general condition for approximately 40 days. On admission, vital signs revealed a blood pressure of 100/60 mmHg, heart rate of 65 beats/min, oxygen saturation of 96% on room air, and body temperature of 40°C.

The patient had a history of chronic otitis media since childhood, with the initial diagnosis established in 2010 and intermittent otolaryngology visits thereafter. During the 6 weeks preceding admission, he had multiple emergency department and otolaryngology consultations and received several antibiotic treatments, including three courses of topical ciprofloxacin ear drops, two courses of oral antibiotics (amoxicillin-clavulanate and ciprofloxacin), and two courses of parenteral ampicillin-sulbactam. Despite these treatments, his symptoms progressively worsened. He had no history of smoking, alcohol, or substance use, and no known immunosuppressive conditions.

On physical examination, the patient was somnolent but arousable, with a Glasgow Coma Scale score of 13. Neck stiffness was present. Otoscopic examination revealed purulent discharge from the left ear, while the right tympanic membrane was intact. Oropharyngeal examination was unremarkable.

Laboratory investigations showed leukocytosis and elevated inflammatory markers. Brain computed tomography revealed a 40×30 mm mass lesion in the left temporal lobe with central hypodensity, extensive surrounding edema, and erosion of the squamous portion of the temporal bone, findings consistent with a brain abscess (Figure 1 and Figure 2).

The patient was evaluated by the infectious diseases, otolaryngology, and neurosurgery teams. Broad-spectrum intravenous antibiotic therapy was initiated with ceftriaxone, metronidazole, and vancomycin. Mannitol was administered for cerebral edema management, and levetiracetam was initiated as prophylactic antiepileptic therapy. Urgent neurosurgical intervention was performed, consisting of a left temporal craniotomy with microsurgical drainage of the abscess cavity. Intraoperative findings included a well-encapsulated abscess containing thick purulent material. The patient was admitted to the intensive care unit postoperatively. Subsequently, a left canal wall-down mastoidectomy was performed by the otolaryngology team.

Microbiological cultures obtained during surgery showed no bacterial growth. Postoperative non-contrast brain computed tomography demonstrated the expected post-surgical changes, including a left frontoparietal-temporal craniectomy defect, soft tissue changes secondary to surgery, a 2–3 mm rightward midline shift, and residual perilesional edema. The cerebellum, brainstem, basal ganglia, and thalami were within normal limits (Figure 3). Following intensive care and ward management, the patient's clinical condition improved significantly. He was discharged with a two-month course of oral sulbactam-ampicillin and ciprofloxacin and scheduled for outpatient follow-up.

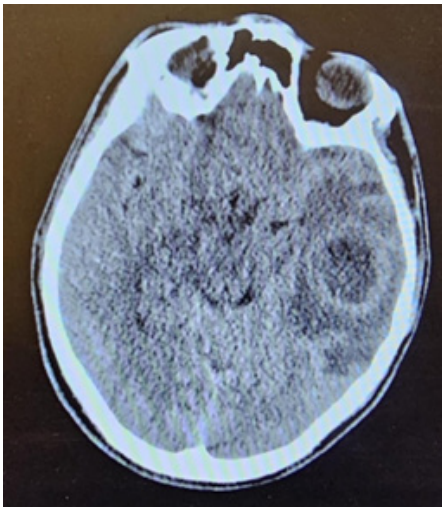

Figure 1. Axial non-contrast brain computed tomography demonstrating a hypodense lesion in the left temporal lobe consistent with a brain abscess. Prominent surrounding vasogenic edema is seen in the adjacent parenchyma. The lesion is located adjacent to the temporal bone, supporting an otogenic origin in the setting of chronic otitis media and mastoiditis.

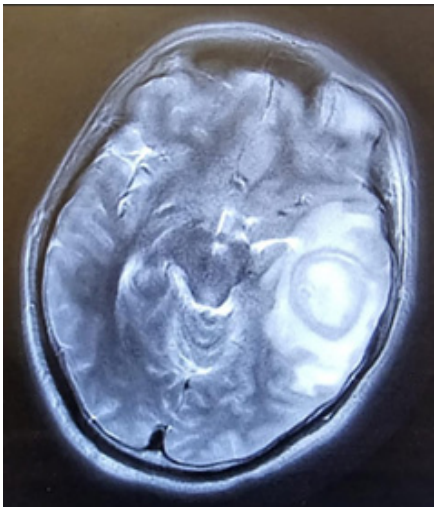

Figure 2. Axial T2-weighted magnetic resonance imaging demonstrating a well-defined lesion in the left temporal lobe with a hyperintense central cavity surrounded by a hypointense capsule, consistent with a brain abscess. Extensive perilesional vasogenic edema is observed in the adjacent temporal lobe parenchyma, producing local mass effect.

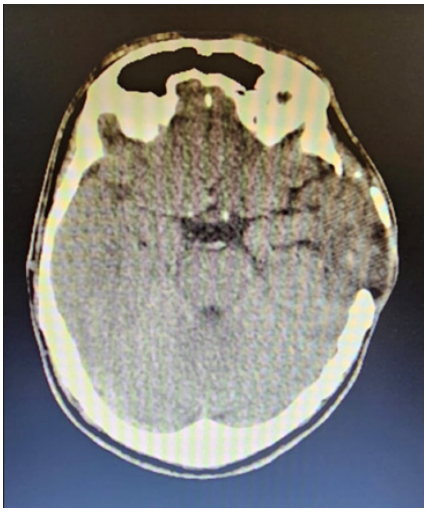

Figure 3. Postoperative axial non-contrast brain computed tomography demonstrating expected post-surgical changes, including a left frontoparietal-temporal craniectomy defect, residual perilesional edema, and a mild rightward midline shift (2–3 mm). No new focal abnormalities are identified, and the cerebellum, brainstem, basal ganglia, and thalami appear unremarkable.

Discussion

Otogenic brain abscess remains a severe intracranial complication of chronic otitis media, although its incidence has declined in the antibiotic era.[1,3] Most reported series describe patients with long-standing suppurative ear disease, frequently associated with cholesteatoma, which facilitates bone erosion and intracranial spread.[1,4,11] Similarly, our patient had a prolonged history of chronic otitis media with persistent otorrhea and recurrent symptoms, consistent with the typical clinical background described in the literature.

The pathogenesis of otogenic brain abscess usually involves either direct extension through eroded temporal bone or indirect spread via venous channels.[1] This explains the predilection for the temporal lobe and cerebellum.[1,4] While classical descriptions emphasize temporal lobe involvement, several contemporary series have reported a predominance of cerebellar abscess, particularly in younger populations.[5,6] In this context, the temporal lobe localization observed in our patient aligns with the classical pattern of direct otogenic spread but contrasts with more recent series reporting cerebellar predominance.

Another notable difference is the age distribution. Many studies report a higher incidence in pediatric and adolescent populations, whereas our patient was a young adult.[5,6] This finding highlights that, although less common, otogenic intracranial complications remain relevant beyond childhood, particularly in patients with long-standing disease.[1]

A key distinguishing feature of our case is the development of a brain abscess despite multiple courses of topical, oral, and parenteral antibiotic therapy and repeated healthcare encounters. In contrast, most series emphasize delayed presentation or neglected disease as the primary contributing factor.[1,12] Our case, therefore, represents a clinically important scenario in which intracranial progression occurs despite ongoing treatment, potentially leading to false reassurance and delayed imaging. Furthermore, prior antibiotic exposure is known to significantly reduce microbiological yield, with sterile cultures reported in a large proportion of cases.[5] The absence of growth in our patient is consistent with this observation and likely reflects extensive pre-treatment rather than the absence of infection.

Clinical presentation in otogenic brain abscess is often nonspecific, including headache, fever, otorrhea, and altered mental status.[1,7] Similar to previously reported cases, our patient presented with persistent otologic symptoms accompanied by systemic deterioration and neurological signs, which prompted neuroimaging. Imaging plays a central role in diagnosis, and several reports emphasize its indispensability in patients with atypical or progressive symptoms.[1,13] In our case, computed tomography demonstrated a temporal lobe lesion with adjacent bone erosion, supporting an otogenic origin.

Management strategies in the literature vary between staged and concurrent surgical approaches.[8,14] Some authors advocate initial neurosurgical drainage followed by delayed mastoidectomy, whereas others report favorable outcomes with single-stage procedures addressing both the abscess and the primary source.[8,14] In our patient, a staged approach was adopted, with urgent neurosurgical drainage followed by mastoidectomy. This approach is consistent with commonly reported practice in clinically unstable patients and allowed both intracranial control and definitive eradication of the infectious focus.[8,9]

Conclusion

Overall, while our case shares several features with previously reported otogenic brain abscesses—such as chronic ear disease, typical clinical presentation, and the need for combined surgical management—it differs in a critical aspect: progression to intracranial infection despite repeated antibiotic therapy and multiple healthcare contacts. This highlights an important clinical message that distinguishes this case from many published reports. Clinicians should maintain a high index of suspicion for intracranial complications in patients with refractory otologic infections, even when ongoing treatment appears adequate, and should not delay neuroimaging in the presence of systemic or neurological deterioration.

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