Increasing ear pain and headache

Visits to the family physician, a specialist, and the ED prompted us to look beyond the initial diagnosis of acute otitis media.

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A PREVIOUSLY HEALTHY 12-YEAR-OLD BOY with normal development presented to his primary care physician (PCP) with a 1-week history of moderate ear pain. He was given a diagnosis of acute otitis media (AOM) and prescribed a 7-day course of amoxicillin. Although the child's history was otherwise unremarkable, the mother reported that she'd had a deep venous thrombosis and pulmonary embolism a year earlier.

The boy continued to experience intermittent left ear pain 2 weeks after completing his antibiotic treatment, leading the PCP to refer him to an otolaryngologist. An examination by the otolaryngologist revealed a cloudy, bulging tympanic membrane. The patient was prescribed amoxicillin/clavulanate and ofloxacin ear drops.

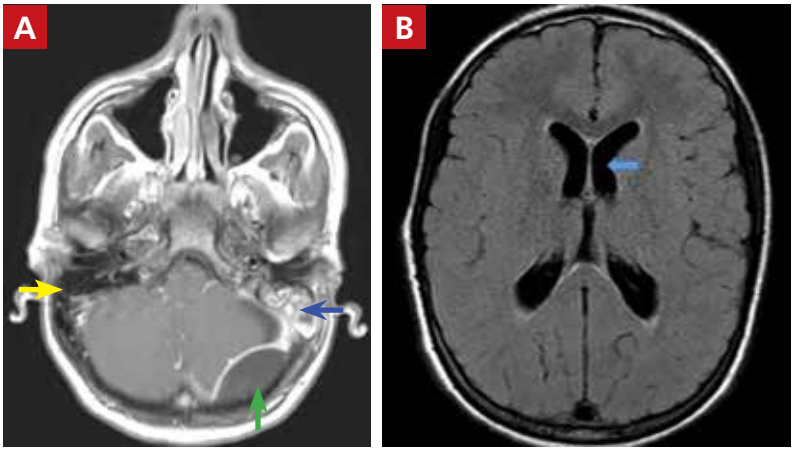
Two days later, he was admitted to the emergency department (ED) due to worsening left ear pain and a new-onset left-sided headache. His left tympanic membrane was normal, with no tenderness or erythema of the mastoid. His vital signs were normal. He was afebrile and discharged home.

A week later, he returned to the ED with worsening ear pain and severe persistent headache, which was localized in the left occipital, left frontal, and retro-orbital regions. He denied light or sound sensitivity, nausea, vomiting, or increased lacrimation. He was tearful on examination due to the pain. He had no meningismus and normal fundi. A neurologic examination was nonlateralizing. Laboratory tests showed a normal complete blood count but increased C-reactive protein at 113 mg/dL (normal, < 0.3 mg/dL) and an erythrocyte sedimentation rate of 88 mm/hr (normal, 0-20 mm/hr).

Magnetic resonance imaging was ordered (**FIGURES 1A** and **1B**), and Neurosurgery and Otolaryngology were consulted.

- WHAT IS YOUR DIAGNOSIS?
- HOW WOULD YOU TREAT THIS PATIENT?

FIGURE 1
MRIs of a 12-year-old boy with severe left ear pain, localized headache, and otitis media



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Dx: Acute mastoiditis with epidural abscess

The contrast-enhanced cranial MRI scan (**FIGURE 1A**) revealed a case of acute mastoiditis with fluid in the left mastoid (blue arrow) and a large epidural abscess in the left posterior fossa (green arrow). The normal right mastoid was air-filled (yellow arrow). The T2-weighted MRI scan (**FIGURE 1B**) showed mild dilatation of the lateral ventricles (blue arrow) secondary to compression on the fourth ventricle by mass effect from the epidural abscess.

Acute mastoiditis—a complication of AOM—is an inflammatory process of mastoid air cells, which are contiguous to the middle ear cleft. In one large study of 61,783 inpatient children admitted with AOM, acute mastoiditis was reported as the most common complication in 1505 (2.4%) of the cases.[1] The 2000-2012 national estimated incidence rate of pediatric mastoiditis has ranged from a high of 2.7 per 100,000 population in 2006 to a low of 1.8 per 100,000 in 2012.[2] Clinical features of mastoiditis include localized mastoid tenderness, swelling, erythema, fluctuance, protrusion of the auricle, and ear pain.[3]

The clinical presentation of epidural abscess can be subtle with fever, headache, neck pain, and changes in mental status developing over several days.[1] Focal deficits and seizures are relatively uncommon. In a review of 308 children with acute mastoiditis (3 with an epidural abscess), high-grade fever and high absolute neutrophil count and C-reactive protein levels were associated with the development of complications of mastoiditis, including hearing loss, sinus venous thrombosis, intracranial abscess, and cranial nerve palsies.[4]

Venous sinus thrombosis was part of the differential

When we were caring for this patient, the differential diagnosis included a cranial extension of AOM. Venous sinus thrombosis was also considered, given the family history of a hypercoagulable state. The patient did not have any features suggesting primary headache syndromes, such as migraine, tension type, or cluster headache.

The differential for a patient complaining of ear pain also includes postauricular lymphadenopathy, mumps, periauricular cellulitis (with and without otitis externa), perichondritis of the auricle, and tumors involving the mastoid bone.[4]

Imaging and treatment

Imaging of temporal bone is not recommended to make a diagnosis of mastoiditis in children with characteristic clinical findings. When imaging is needed, contrast-enhanced computed tomography (CT) is best to help visualize changes in temporal bone. If intracranial complications are suspected, cranial MRI with contrast or cranial CT with contrast can be ordered (depending on availability).[5]

Conservative management with intravenous antimicrobial therapy and middle ear drainage with myringotomy is indicated for a child with uncomplicated acute or subacute mastoiditis. For patients with suppurative extracranial or intracranial complications, aggressive surgical management is needed.[5]

Treatment for this patient included craniotomy, evacuation of the epidural abscess, and mastoidectomy. A culture obtained from the abscess showed *Streptococcus intermedius*. He was treated with broad-spectrum antibiotics, including ceftriaxone, vancomycin, and metronidazole. Within a week of surgery, he was discharged from the hospital and continued antibiotic treatment for 6 weeks via a peripherally inserted central catheter line. JFP

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