Case Report

Managements of Complicated Otitic Abscess

The advent of antibiotics has significantly reduced the incidence and associated morbidity of otogenic complications. Its presentation, however, has dramatically changed and appears as a masked condition despite the presence of a potentially fatal complication. Between 1998 and 2001, 3 cases of otitic abscesses, including mastoid subperiosteal abscess, zygomatic abscess, and retropharyngeal abscess, were collected retrospectively. Their clinical presentation, results of investigations, and response to treatment were reviewed. After admission, intravenous antibiotics were prescribed and early surgeries were performed for eradication of infection source. The patients exhibited excellent postoperative recovery, without facial palsy, vertigo or other complications. To be a contemporary otologist, we should not overlook such severe complications of otologic diseases. Appropriate intravenous antibiotics and adequate surgeries, as soon as possible, are recommended. Advanced magnetic resonance imaging or computed tomographic scans of the temporal bone with wider windows are necessary.

CASE REPORT

Case 1

A 44-year-old healthy male presented with a one-week history of progressing headache radiating to the left retrobulbar and parietal area. Computed tomographic (CT) scans of the temporal bone, viewed with bone window, demonstrated increased soft tissue densities over
the left middle ear, mastoid, and orifice of the Eustachian tube (Fig. 2A). With soft tissue window, one low-density soft tissue lesion with marginal enhancement in the left retropharyngeal space was identified (Fig. 2B). Magnetic resonance imaging (MRI) revealed a soft tissue in the left retropharyngeal area, with marginal enhancements, gas shadows, and encasing of the left internal carotid artery on T1W images (Fig. 3A) and high signal intensity on T2W images (Fig. 3B). Under the suspicion of a retropharyngeal abscess complicating or coinciding with chronic atelectatic otitis media with possible cholesteatoma, oral amoxicillin was prescribed and a surgery was arranged. Unfortunately, a sudden onset of high fever, conscious disturbance and nuchal rigidity developed. Spinal tap revealed elevated white cell and red cell counts, and increased levels of protein and glucose. The

| Table 1. Complicated otitic abscesses in Taipei Veterans General Hospital |
|-----------------|-----------------|-----------------|
| Type of abscess | Retropharyngeal abscess | Zygomatic abscess | Mastoid subperiosteal abscess |
| Original ear disease | Chronic atelectatic otitis media | Mastoid cholesteatoma | Acute otitis media with mastoiditis |
| Intracranial complications | Meningitis | No | Sigmoid sinus thrombophlebitis |
| Sex | Male | Female | Female |
| Age (year-old) | 44 | 15 | 3 |
| Clinical symptoms | Retrobulbar headache followed by fever, conscious disturbance, and nuchal rigidity | Progressive swelling of the right temple and otorrhea | Persistent fever, otalgia, and otorrhea followed by a tender swelling of mastoid area |
| Otoscopic findings | Intact eardrum with granulation tissues and purulent discharges | Intact eardrum with a lot of purulent discharges | Bulging and congestion of eardrum |
| Leukocyte count and differential | Leukocytosis with reactive shift | Normal | Leukocytosis with reactive shift |
| Surgery | Endaural tympanoplasty with mastoidectomy | Incision and drainage followed by endaural tympanoplasty with mastoidectomy | Myringotomy followed by postauricular cortical mastoidectomy |
| Culture | *Klebsiella pneumoniae* | *Peptostreptococcus* (anaerobic) | *Staphylococcus coagulase negative* |
| Duration of hospitalization | 16 days | 15 days | 15 days |
| Post-op sequelae | No | No | No |

Fig. 1. Clinical pictures. A (case 2): a non-erythematous swelling (asterisk) in front and above the right ear, with loss of skin creases and lateral displacement of the auricle; B (case 3): a non-erythematous, fluctuating swelling over the right postauricular area, with loss of the skin creases and foreword displacement of the auricle.
blood culture grew *Klebsiella pneumoniae*, as the previous ear culture, but the cerebrospinal fluid culture was negative. The condition of meningitis improved after intravenous antibiotic treatment. Through an endaural incision, tympanoplasty with mastoidectomy was performed, and a lot of granulation tissues and glue were subsequently removed. His headache relieved dramatically and he was discharged 16 days after admission. Three months after surgery, the repeated MRI revealed no residual abscess.

Case 2

A 15-year-old healthy girl presented with a 1-week history of progressive swelling over her right temple. The patient reported a history of right intermittent otorrhea and progressive hearing impairment, but denied fever, headache or vertigo. CT scans of the temporal bone, viewed with bone window, revealed a subcutaneous swelling of the right temporal fossa, increased soft tissue density in the right tympanic and mastoid cavities, and bony defect of superior lateral wall of the mastoid cortex, external ear.

**Fig. 2.** Computed tomographic scans of the temporal bone of case 1. A (bone window): increased soft tissue densities over the left middle ear, mastoid, and orifice of the Eustachian tube; B (soft tissue window): one low-density soft tissue lesion with marginal enhancement (arrow) in the left retropharyngeal space.

**Fig. 3.** Magnetic resonance imaging of the posterior cranial fossa of case 1. (A) a soft tissue density (arrow) in the left retropharyngeal area, with marginal enhancements, gas shadows, and encasing of the left internal carotid artery on T1W image; (B) high signal density on T2W image.
canal wall and the tegmen (Fig. 4A). With soft tissue window, the presence of zygomatic abscess was confirmed (Fig. 4B). Through an endaural incision, a lot of pus beneath the temporalis muscle pouched out. After five-day wet dressing and intravenous antibiotics, the wound became relatively clean and the right-sided tympanic membrane appeared intact. The posterior and anterior combined approach for atticomastoidectomy was subsequently performed. A huge golf-ball-like cholesteatoma was removed totally from the attic, the mastoid cavity, the mastoid tip, root of the zygoma, and the petrous apex. The aerobic culture was negative but the anaerobic culture grew *Pep tostreptococcus* sp. The patient exhibited an excellent postoperative recovery, and was discharged on the tenth day postoperatively. She has progressed well since then, clinically, with a well-epithelialized eardrum and ear canal wall.

**Case 3**

A 3-year-old, previously healthy girl presented with a 2-week history of high fever, followed by right otalgia and otorrhea. Although she had taken some antibiotics, the symptoms persisted and a tender swelling behind her right ear developed abruptly 1 day before her admission. There were no nausea, vomiting, headache or nuchal rigidity. An emergent myringotomy was performed immediately and culture of the pus grew *Staphylococcus coagulase negative* that was resistant to methicillin and second-generation cephalosporins; thus, cefixime was replaced by intravenous vancomycin. CT scans of the temporal bone, viewed with bone window, showed a subcutaneous swelling of the right postauricular area, and opacities of the right mastoid cavity (Fig. 5A). With soft tissue window, the presence of the right mastoid subperiosteal abscess and sigmoid sinus

![Fig. 4. CT scans of the temporal bone of case 2. A (bone window): a subcutaneous swelling of the right temporal fossa, increased soft tissue density in the right tympanic and mastoid cavities, and bony defect of superior lateral wall of the mastoid cortex, external ear canal wall, and the tegmen; B (soft tissue window): confirming the presence of zygomatic abscess (arrow).](image)

![Fig. 5. CT scans of the temporal bone of case 3. A (bone window): a subcutaneous swelling of the right postauricular area, and opacities of the right mastoid cavity; B (soft tissue window): confirming the presence of mastoid subperiosteal abscess and sigmoid sinus thrombophlebitis (arrow).](image)
thrombophlebitis was confirmed (Fig. 5B). Due to poor response to intravenous antibiotics and myringotomy, a cortical mastoidectomy was subsequently performed. The mastoid cavity was filled with easy-bleeding granulation tissues and pus, but the lateral surface of the mastoid cortex remained intact. The patient exhibited an excellent postoperative recovery, and was discharged on the tenth day postoperatively. She has progressed well since then, clinically, with good transparency of the tympanic membrane.

**DISCUSSION**

Afferent lymphatic drainage of the retropharyngeal space is derived from the adjacent muscles and bones, nose and paranasal sinuses, nasopharynx, pharynx, middle ear, and the Eustachian tube. Retropharyngeal abscesses are uncommon but serious deep neck infections, which are most common in very young children typically with a history of acute upper respiratory infection. In adult, however, retropharyngeal abscesses are more commonly from oropharyngeal trauma. Our patient (case 1) had atelectatic otitis media but had no history of oropharyngeal trauma or upper respiratory infection. His retropharyngeal abscess might coincide with the otitis media or result from lymphatic spread of infection from the ear. The anatomic routes by which the pus from the middle ear reaches the retropharyngeal space are devious and complicated. We performed tympanoplasty with mastoidectomy to eradicate the infection source of the middle ear, with adequate intravenous antibiotics concurrently given. His symptoms and signs relieved dramatically and the retropharyngeal abscess disappeared postoperatively. Thus, Eustachian peritubal extension of the granulation tissues and glue in the middle ear was more likely the cause for his retropharyngeal abscess. Meningitis might occur as a direct extension from the middle ear or mastoid, or result from the hematogenous spread subsequent to retropharyngeal abscesses. If the symptoms and signs persisted postoperatively, transoral or transcervical incision and drainage is needed.

Bezold described 3 types of mastoid abscesses, including the mastoid subperiosteal, Bezold’s, and zygomatic abscess. Our review in English literature found only 3 cases of zygomatic abscesses. All were relatively immunocompromised and had granulation tissue in the mastoid cavity instead of a cholesteatoma. The patient (case 2) we report here is an additional one. To the best of our knowledge, it is the first case complicating the mastoid cholesteatoma. In such a case, staged intervention should be made by treating the acute complication with abscess drainage and adequate intravenous antibiotics, and subsequently performing a mastoidectomy for the mastoid cholesteatoma as soon as possible.

Mastoid subperiosteal abscess complicating acute mastoiditis usually occurs in infants and young children. Its passage of infection may develop via a dehiscence in cribriform area, along the vascular channels, or bony erosion of the mastoid cortex. Sigmoid sinus thrombophlebitis occurs when the infection spreads via the postauricular and mastoid emissary vein or erosion of the bone overlying the sigmoid sinus. The patient (case 3) we present here revealed no bony defect of the mastoid cortex and sigmoid sinus during mastoidectomy; thus, its spread of infection might occur along the vascular channels. The typical pictures of sigmoid sinus thrombophlebitis, such as picket-fence fever, headache, anemia, and emaciation, are likely to alter with the administration of antibiotics.

In acute mastoiditis the incidences of the predominant causative agents of AOM decrease, but the incidences of *Staphylococcus aureus, Staphylococcus coagulase negative, Streptococcus pyogenes* increase a lot. The bacterial etiology of sigmoid sinus thrombosis is polymicrobial, with a predominance of Gram-negative organisms. *Staphylococcus coagulase negative* was reported among the list of the main agents causing acute mastoiditis or intracranial complications. Initial intravenous antibiotics should be selected on the basis of Gram’s stain of the pus and include a potent antistaphylococcal agent with the ability to cross the blood-brain barrier. Cefotaxime and metronidazole are the preferred antibiotics, and the possibility of anaerobic infection should not be overlooked.

The diagnosis of complicated otitic abscesses is difficult due to both infrequency of presentation and inconsistency of signs or symptoms. Laboratory evaluation is usually not helpful; most patients are afebrile and lack systemic...
complaints. Thus, a high degree of suspicion must be maintained in the management of these patients, and early radiological workup is essential. Usually, temporal CT scans are set at bone window, and intracranial or extracranial soft tissue lesions may be missed. In our cases 2 and 3, the usual temporal CT scans only demonstrated a subcutaneous swelling of the postauricular and zygomatic areas, and opacification of the mastoid and middle ear. Adjusting these CT scans to soft tissue window, the zygomatic abscess and mastoid subperiosteal abscess with sigmoid sinus thrombophlebitis were clearly identified, which prompted us to deal with the cases in a more aggressive way to avoid further complications. In our case 1, CT scans with even soft tissue window only demonstrated increased soft tissue density over the retropharyngeal space. Advanced MRI was needed to confirm the diagnosis of retropharyngeal abscess. Thus, we suggest the routine performance of temporal CT scans with bone and soft tissue windows for persistent ear diseases to demonstrate the pathology in the mastoid and adjacent parts of the cranial cavity. MRI is also excellent in the diagnosis of otitic complications, and is advocated when soft tissue lesions, such as retropharyngeal abscess and thrombophlebitis, are highly suspected.

Because antibiotics cannot be an absolute safeguard against the development of acute mastoiditis or other otitic complications, surgeries, such as myringotomy, tympanoplasty and cortical mastoidectomy, are sometimes needed. Intravenous antibiotics, myringotomy, and also needle aspiration of the abscess should be performed in patients with mastoid subperiosteal and zygomatic abscesses on admission. The need for mastoidectomy should be reassessed in patients who fail to respond in 24 to 48 hours or develop suspected intracranial or other lethal complications.

REFERENCES