Otogenic Temporal Lobe Abscess: A Mini-review

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Introduction

Temporal lobe abscess is a rare, life threatening complication of inflammation of the middle ear [1]. Signs of intracranial tension or focal neurological deficits at the time of presentation in patients with chronic or acute otitis media should raise concerns for temporal lobe abscess [2,3]. Immediate surgical intervention along with antibiotics is necessary for good outcome.

Epidemiology

Intracranial complications (ICC) of acute and chronic otitis media are a serious problem if not treated appropriately. A 10 year (1995-2005) retrospective review of 47 cases with intracranial abscess showed a decrease in the incidence of intracranial abscess from 8 per year to 5 per year, 12.8 % of cases were otogenic in origin [2]. The advent of more antibiotics compared to previous decades might be the cause for the decline in the incidence. A retrospective study by Penido et al. conducted in an emergency department in a larger inner-city tertiary care hospital looked at 51 patients (mean age 32 years) with ICC associated with otitis media over a period of 22 years [3]. ICC was reported to be more common in males and in the second decade of life. Among those, 80% of the cases were secondary to chronic otitis media, and 20% resulted from acute otitis media [3]. In this study, the definition of ICC included brain abscess and meningitis (seen in 78%), lateral sinus thrombosis, empyema and otitic hydrocephalus (13%, 8% and 1% of cases, respectively) [3]. Most of the cases of the ICC were located in the region of the petrous bone; the temporal lobe and cerebellum were involved in 62% and 38% of cases, respectively. The organisms involved in acute otitis media related ICC included pneumococcus, Haemophilus influenzae, and Staphylococcus aureus. In chronic otitis media related ICC, Proteus mirabilis, Enterococcus sp., Pseudomonas aeruginosa, Staphylococcus aureus, and extended-spectrum beta lactamase Klebsiella pneumoniae were seen [3]. The annual risk, in an adult with active chronic otitis media, of developing an abscess is about one in 10,000 with males being three times more common than females [4].

Case Presentation

A 73 year old male with no significant past medical history presented with drainage and swelling in the left ear canal concerning for left-sided otitis externa. He was prescribed antimicrobials, ofloxacin ear drops along with oral ciprofloxacin and was informed to remove his hearing aids. A few days later, he presented to the emergency department with acute word finding difficulty and remote memory loss. Magnetic Resonance Imaging (MRI) of the brain with contrast revealed a 3.3 x 2.2 x 2.3 cm peripheral enhancing mass within the left temporal lobe along with prominent central restricted diffusion, which was suspicious for an abscess (Figure 1). Prominent vasogenic edema was present along with mild mass effect on the temporal horn of the left lateral ventricle with radiological findings suggestive of mastoiditis. Following neurosurgical consultation, emergent craniotomy with drainage of the abscess was performed.

The patient was started on broad spectrum intravenous antibiotics with vancomycin and cefepime. The following day, he underwent left myringotomy and tube placement, as the left ear was the most likely source contributing to the temporal abscess. Two days later, repeat imaging of the head with a computed tomography (CT) scan showed stable left temporal abscess with mild local mass effect with no evidence of midline shift. Cultures from the abscess yielded Pseudomonas aeruginosa and 2 colony types of coagulase negative staphylococcus which were not further identified.

The patient was discharged on intravenous vancomycin and cefepime for a period of 8 weeks with improvement of his neurological symptoms during the course of his treatment. Two months later, a repeat MRI was done that showed left temporal gliosis in the region of previously drained abscess (Figure 2).

Discussion

The clinical presentation of brain abscess is determined by the stage of abscess, along with its size and location [5,6]. In the first stage (encephalitis stage), malaise, headache, fever and nausea can occur. In the second stage (latent stage), the abscess localizes and acute symptoms abate. The third stage (progressive stage) is characterized...
by increased intracranial tension and compression of specific structures in the brain. During the final stage, the abscess ruptures into the ventricle or subarachnoid space resulting in rapid decline and ultimately to death [5].

Sennaroglu et al in a study of 41 otogenic brain abscesses reported that 22 (54%) were located in the temporal lobe, 18 (44%) in the cerebellum, and 1 (2%) was in both locations [6,7]. Temporal lobe abscess commonly presents with headache in 70-75% of patients. Aphasia occurs when the dominant temporal lobe is involved. Homonymous hemianopsia can sometimes be the only presenting sign [8]. Sudden worsening of headache with new onset meningismus should raise suspicion for intraventricular rupture, associated with 85% mortality [9].

Diagnosis

In addition to complete blood count, sedimentation rate, and c-reactive protein, culture of the abscess via stereotactic CT or surgery is recommended and drainage should be sent for gram stain, aerobic and anaerobic, fungal and mycobacterial cultures [10].

CT and MRI are the most commonly used imaging modalities. CT is often the initial test because it is easy to perform. CT imaging with contrast is key to identify the size, number, and location of abscesses, and it also guides the management and follow-up care [10]. Notably, CT scan results can lag behind clinical findings [11].

MRI is more sensitive and specific than CT scan, allows for an accurate diagnosis and excellent follow-up of the lesions. An MRI is preferred over CT because of its better ability to detect cerebritis, greater contrast between cerebral edema and the brain, earlier detection of satellite lesions and the spread of inflammation into the ventricles and subarachnoid space [12].

Treatment

Management of brain abscess is multidisciplinary and should involve neuroradiologists, neurosurgeons and infectious diseases specialists [13]. Surgical excision or drainage combined with prolonged antibiotics remain the treatments of choice.

Recommended empirical antimicrobial therapy for otogenic brain abscess secondary to otitis media/mastoiditis is metronidazole combined with a third generation cephalosporin [8]. Fourth generation cephalosporins like cefepime or ceftazidime are preferred if Pseudomonas is the suspected pathogen. Appropriate antimicrobial therapy is recommended for 6 to 8 weeks [14-16]. Response to treatment is monitored by neuroimaging until resolution of the abscess [14]. Emergent surgery should be performed if a single abscess is present. Abscesses larger than 2.5 cm are excised or aspirated, while those smaller than 2.5 cm or at the cerebritis stage are aspirated for diagnostic purposes only. Availability of stereotactic techniques allows abscess drainage to be very feasible [17]. Simultaneous otologic procedure with abscess drainage has been reported to be successful in some studies [5]. This combined approach reduces the anesthetic risk, number of interventions and cost of treatment.

Complications

Long term complications such as epilepsy, diplopia, hemiparesis, cerebellar ataxia, homonymous hemianopsia, and profound deafness have also been reported with mortality ranging from 9 to 26.3% [18,19].

Prognosis

Poor Glasgow Coma Score at presentation, immunodeficiency, and presence of underlying disease are associated with poor prognosis [20].

Conclusion

Temporal lobe abscess is a rarely observed but serious complication that can develop following an episode of acute or chronic otitis media. Recognition of this complication at the time of presentation can be challenging, especially in the elderly. Patients with intracranial complications generally have a long hospital course which may lead to permanent neurological or auditory sequelae or eventually contribute to a high mortality rate.

References


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