Case Report

Management and Treatment of Otogenic Temporal Lobe Abscess Secondary to Mastoiditis: A Case Report and Review of Literature

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Abstract Temporal lobe abscess is a rare complication of mastoiditis or other otogenic infections. Signs and symptoms are caused by tissue damage or displacement, and the presentation includes fever, headache, meningeal signs, and altered mental/sensory status. In the setting of acute mastoiditis, the rate of occurrence of a cerebral abscess is very rare, and therefore poses a diagnostic challenge for the physician. Here, a case of temporal lobe abscess is presented, and radiological findings, surgical treatment, and outcome are discussed.

Keywords acute mastoiditis; temporal abscess; otogenic

1. Introduction

Temporal lobe abscess is a rare and dangerous complication secondary to mastoiditis, or an infection in the mastoid air cells [2]. Acute mastoiditis typically presents with ear pain, ear tenderness, postauricular erythema, and proptosis of the auricle. It can also occur as an exacerbation of chronic otitis media, a condition whose incidence has decreased since the introduction of antibiotics [4]. The complications of the infection manifest in different ways including facial paralysis, labyrinthitis, meningitis, temporal lobe abscess, and cerebellar abscess [3]. According to literature, incidences of acute mastoiditis and otogenic abscesses are low and present mostly in children [9]. Thus, the rarity of adult cases makes this a diagnostic challenge for the head/neck and neurosurgeon team [9].

Currently, middle ear and mastoid infections are diagnosed with the use of advanced imaging modalities and are aggressively treated with a broad range of antibiotics [1]. This has led to a reduction in the incidence of mastoiditis [1]. According to literature, mortality rates have dropped from 35% to 5.7% with the institution of antibiotics [3]. Likewise, the availability of CT scanning has helped to reduce the misdiagnosis of cerebral abscess [8]. In this case report, the authors present a rare case of acute mastoiditis with the rapid secondary development of a temporal lobe abscess.

This case including the presentation, treatment, and outcome is reviewed as well as the current literature.

2. Case report

A 24-year-old woman had 3 weeks of right-sided otalgia, otorrhea, and hearing loss. She presented to the Emergency department with altered mental status, photophobia, nuchal rigidity, and agitation. A CT scan of the head with contrast demonstrated a large parenchymal temporal lobe abscess along with cortical mastoid erosion and mastoid opacification. The patient was taken emergently to the operating room and a craniectomy was performed along with drainage of the temporal lobe abscess and debridement of nonviable tissue. The patient recovered in the hospital for 10 days before being discharged in stable condition. She underwent delayed cranioplasty and continues to do well to date.

3. Discussion

Despite the nonspecific presentation of symptoms of acute mastoiditis, diagnosis of an intracranial abscess, as well as its subsequent surgical drainage and debridement, is of great importance due to the possibility of rapid development and negative sequelae. While most cases of brain abscesses are caused by chronic infection, rare cases can develop in the acute stage of disease, as seen in our case [10]. Acute mastoiditis itself is not a rare event [7]. The onset of its negative effects, on the other hand, may be more insidious and dangerous [7]. Abscesses of otogenic origin are rare and dangerous occurrences, leading to sequelae including headache, hearing loss, herniation, epilepsy, and death [2]. The development of abscesses may occur by either the hematological spread of infection from a distal site of infection or from continuous foci of infection, as may be seen when an otogenic infection breaches from the mastoid air cells into intracranial space through a
bony structural defect [2]. It is not surprising that the microbiological agents that are found in the abscess are similar to and typical of otogenic infections [10]. According to the literature, the main microbial etiologies of otogenic abscesses include Pseudomonas aeruginosa, Staphylococcus and Streptococcus species, and Proteus mirabilis [10]. The spread of an otogenic infection in a case like this may be facilitated though an erosion of the bony architecture of the temporal bone. Cases may also present as a complication of surgical treatment, such as mastoidectomy or tympanoplasty [2, 6]. Due to the proximity of the auditory and vestibular apparatus to the areas, most otogenic brain abscesses are typically located in the temporal lobe and the cerebellum [2]. The patient also presented with meningitis, and the direct contact of the purulent material with the meninges was the etiology of the infection in our case. Although the rates of mortality and morbidity secondary to otogenic cerebral abscess have declined in the age of antibiotics, the negative outcomes make these cases emergent for diagnosis and treatment [5, 7, 10].

Regarding the use of imaging to determine the presence of an intracranial complication such as an abscess, the use of CT scanning is of key diagnostic importance [5, 7, 8]. A patient with an otogenic infection may clinically present with similar signs and symptoms regardless of the presence or absence of an otogenic temporal abscess [5]. An abscess presents on a CT scan as an area of low attenuation, signifying cerebral edema, with thin rims and smooth inner margins [7, 8]. In this case, a CT scan was used to visualize the acute mastoid infection (Figure 1) and subsequent inflammation, as well as the presence and mass effect of a temporal lobe abscess (Figure 2). As seen in Figure 2, the right temporal lobe presents with an abscess with mass and edema which is causing displacement of the lateral ventricles. The temporal lobe itself has been greatly expanded, and it is evident that the normal landmarks, such as the Sylvian fissure, have been greatly deformed and medially displaced. A midline deviation is also seen towards the left. The disruption of normal architecture by the abscesses’ mass effect puts the patient at risk for herniations; likewise, this disruption may have lead to the changes in mental status.

In conclusion, temporal lobe abscess is a rare and dangerous complication of acute mastoiditis which may develop in a silent and indolent manner. The signs and symptoms are not specific, and include pain, altered sensory/mental status, and meningitis. In the setting of a rapid onset of infection like acute mastoiditis, the caretaker is faced with the challenge of diagnosing and rapidly treating this exceedingly rare event.

**Competing interests** The authors declare that they have no competing interests.

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