

Otogenous Temporal Lobe Brain Abscess Which was Caused by *Enterococcus Faecalis*: A Case Report

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ABSTRACT

Brain abscess is a serious life threatening complication of the otitis media. We are reporting here, a case of an otogenic brain abscess which was caused by *Enterococcus faecalis* in a 10 year old male child. Computerized tomography (CT) revealed

a right temporal lobe abscess. Culture yielded a pure growth of *Enterococcus faecalis*. The patient was successfully treated with burr hole aspiration, broad spectrum intravenous antibiotic therapy and tympanomastoidectomy.

Key Words: Temporal lobe abscess, Brain abscess, *Enterococcus faecalis*, Otitis media

INTRODUCTION

Otogenic brain abscesses imply the accumulation of pus in the cerebrum or the cerebellum, which develops after encephalitis, which is caused by pyogenic microorganisms which originate from the inflammatory processes in the middle ear cavity [1]. A suppurative process in the ear has access to the central nervous system (CNS) by direct extension or through preformed pathways, developmental, traumatic or pathologic or by retrograde spread along the thrombophlebitic vein [2]. An otogenic brain abscess is usually located on the same side as the diseased ear and approximately twice more frequently in the temporal lobe than in the cerebellum [3]. 50 % of the brain abscesses in adults and 25% of those in children are otogenic in origin. The annual risk of the otogenic abscess of the brain is 1 per 1000 adults, with active chronic otitis [1].

The bacteriology of the brain abscesses is diverse and it depends on the site of origin of the abscess. In otitis media/mastoiditis, *Streptococci* (anaerobic and aerobic), *Bacteriodes fragilis* and *Enterobacteriaceae* species are the likely pathogens.

Brain scans, Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) are the important tools that enable in making an accurate diagnosis of the infections. Proper selection of an anti-microbial with good intra-cranial penetration is critical in the management of intra-cranial infections. Brain abscesses which are especially in the early phase of cerebritis, may respond to anti-microbial therapy without the need for a surgical drainage. Delay in the surgical drainage can be associated with high mortality or morbidity.

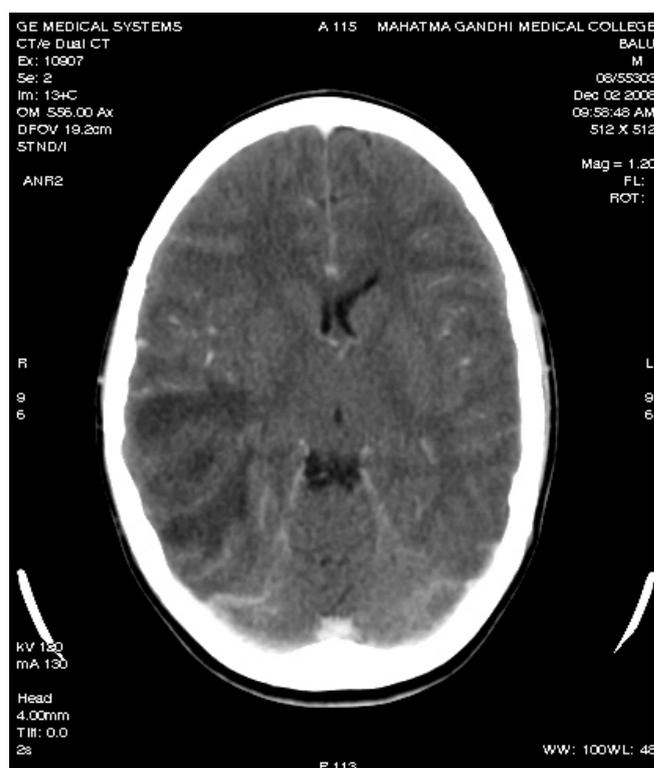
Here, we are reporting a rare case of otogenic brain abscess which was caused by *Enterococcus faecalis* in a 10 years old male child.

CASE REPORT

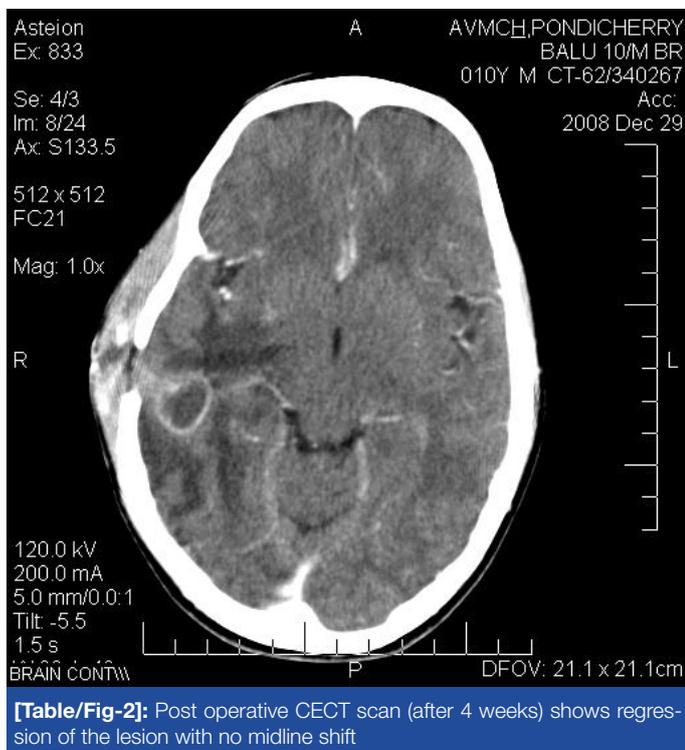
A 10-year old male child was admitted to the Neurosurgery Department on December 2008 for complaints of headache, vomiting, fever and neck stiffness since five days. His medical history was significant for recurrent middle ear infections in both the ears, which were of three years duration. There was no history of seizures, trauma or rash.

On examination, the child was found to be conscious and oriented. Both his ears were dry at the time of the examination and there was central tympanic membrane perforation in both the ears. He also had neck rigidity. His speech, tone and reflexes were normal and there were no signs of focal neurological deficit. There was no papillo-oedema on fundoscopy. His abdominal and cardiorespiratory examinations were unremarkable.

His routine laboratory investigations were all within normal limits. The child was not seropositive for the HIV antibodies. The contrast enhanced CT (CECT) scan revealed a hypodense lesion with ring enhancement in the right temperoparietal region with surrounding oedema [Table/Fig-1].



[Table/Fig-1]: Pre operative CECT scan reveals a hypodense lesion (3.1 x 2 cm) with ring enhancement seen in right temperoparietal region with surrounding oedema.



[Table/Fig-2]: Post operative CECT scan (after 4 weeks) shows regression of the lesion with no midline shift

Empirical antibiotic therapy was initiated with parenteral ceftazidime 100mg/kg in two divided doses, amikacin 15mg/kg in two divided doses and metronidazole along with ciprofloxacin ear drops. But these antibiotics have to be used with caution in case of otogenic complications. Burr hole tapping was done under general anaesthesia on the same day of the admission. About 12ml of thick pus was aspirated and it was sent for microbiological examination. Gram staining of the pus showed plenty of pleomorphic leukocytes and gram positive cocci in short chains. The Ziehl Neelsen stained smears did not reveal any acid fast bacilli. The sample was cultured on Blood agar, Chocolate agar, MacConkey's agar, Sabouraud's Dextrose agar and Lowenstein Jensen medium with and without antibiotics. The culture of the pus aspirate revealed a pure growth of *Enterococcus faecalis* which was identified by conventional biochemical tests. The organism was catalase negative, it was found to hydrolyze esculin and it grew in 6.5% NaCl. In the carbohydrate utilization tests which were performed, the organism fermented glucose, sucrose, ribose, sorbitol and mannitol. The isolate was confirmed as *E. faecalis* by the HiStrep biochemical test kit (Himedia). The strain also reacted with the Lancefield group D antisera (HiStrep™ Latex test kit).

In a standard Kirby Bauer sensitivity test, the organism was susceptible to gentamicin, ciprofloxacin, vancomycin and linezolid. The patient had high grade fever post-operatively and hence, retapping was done on the fifth post-operative day and about 10ml of thick pus was aspirated. Gram staining of the pus showed only pleomorphic leukocytes and the culture was negative. The patient was now switched over to parenteral ciprofloxacin 8 mg/kg in two divided doses. The parenteral antibiotic therapy was continued for a total of 2 weeks and it was followed by an 8 weeks course of oral ciprofloxacin. A post-operative CECT scan which was taken later, showed regression of the lesion, with no midline shift [Table/Fig-2]. The patient showed marked improvement when the last follow up was taken after two months and there was no recurrence of the symptoms. One month later, mastoidectomy with tympanoplasty was done.

DISCUSSION

Ear infections are the most common causes of brain abscesses [2]. Acute exacerbation in chronic suppurative otitis media (CSOM) usually leads to a rapid intra-cranial extension of the disease. In most of the cases with the intra-cranial complications which were caused by chronic otitis media, cholesteatoma was the commonest finding. Exoneration of the disease is very important to prevent recurrence [4]. Usually, these otogenic abscesses occur either by distant thrombophlebitis of the cerebral veins or by the direct extension of an unusual type of chronic otitis media [5]. The most common clinical presentations of a brain abscess are headache and vomiting which are caused by the increased intra-cranial pressure. Seizures have been reported in up to 50% of the cases. Focal neurological deficits which are related to the site of the abscess may be present, depending on the site of the lesion. An altered sensorium with nuchal rigidity may occur in cases with an increased mass effect [6]. Our patient presented with complaints of fever, headache, vomiting and nuchal rigidity and a past history of chronic bilateral ear discharge. There were no signs of a focal neurological deficit.

Brain scans, CT and MRI are the important tools that enable in making an accurate diagnosis of the infection. In this patient, the diagnosis of the brain abscess was established by a CT scan. The definitive microbiological diagnosis was made by the submission of the pus from the abscess for testing with aerobic and anaerobic cultures, which included tuberculous and fungal cultures [6]. Aspiration of the pus provides the best opportunity to make a microbiological diagnosis and also to report an optimal therapy.

The bacteriology of an otogenic abscess represents the microbial flora of a chronically infected ear. The isolates from the abscess include *Streptococci* (aerobic and anaerobic like *Peptostreptococcus*), *Bacteriodes fragilis*, *Enterobacteriaceae* species esp. *Proteus* species and *Actinomyces* species. In our patient, the aetiological agent was *E. faecalis* which rarely causes otogenic brain abscess. *E. faecalis* however accounts for 90% of the enterococcal infections. *E. faecalis* commonly infects the urinary tract, blood stream, endocardium, abdomen, biliary tract, burns and indwelling foreign devices. Enterococci can also infect the CNS, eye and ear this happens less frequently [7].

A recent review of the literature revealed only few cases of brain abscesses which were caused by *E. faecalis* worldwide and no cases were reported from India. Masaki et al reported a case of *E. faecalis* brain abscess in a patient with suprapharyngeal cancer [8] and another case was reported by Mashimoto et al, which was associated with enterococcal endocarditis [9]. From India, Mohanty et al reported a case of otogenic brain abscess which was caused by *E. avium* in 2005 [10] and Sonavane et al., reported a cerebellopontine angle abscess which was caused by *Enterococcus species* in a 12 year old female with a history of CSOM of both ears following a trauma in 2010 [11]. Thus, *E. faecalis* is an uncommon cause of otogenic brain abscess and its appropriate identification is required to diagnose the case, so that an early treatment can be given to prevent complications.

Antibiotics are very effective in the early and later stages of cerebritis [12]. In our patient, *E. faecalis* was susceptible to erythromycin, gentamicin, ciprofloxacin, tetracycline, vancomycin and linezolid. The ineffectiveness of antibiotics in the stage of the capsule formation is due to the acidic medium within the abscess cavity and the inability to have adequate therapeutic concentration of the antibiotic within the abscess. Therefore, a surgical intervention

is essential once the capsule is well formed [12]. For our patient, burr hole tapping was done twice and he responded markedly. Later, mastoidectomy with tympanoplasty was done. Our patient is doing well as was observed on his follow up visits, with no residual neurological deficit, with a marked improvement.

CONCLUSION

When patients present with a history of chronic otitis media, headache, nausea and vomiting, they should be assessed for a possible otogenic abscess. Even though the morbidity and mortality rates are high for patients with brain abscesses, advances in the microbial isolation methods, specificity of the anti-microbial agents, earlier diagnoses which are made by CT scans and timely intervention by surgical methods, have all contributed to an improved outcome for this dreaded disease.

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