



Original Research Article

Right Temporal Otogenic brain abscess by *Enterococcus faecalis* - A rare case report

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A B S T R A C T

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Brain abscess is a potentially fatal CNS infection. Here, we are reporting, a case of right temporal otogenic brain abscess caused by *Enterococcus faecalis* in a 12 year old male child. CT scan revealed a right temporal lobe abscess with 3mm midline shift. Microbiological diagnosis of *Enterococcus faecalis* was done by aspirated pus from brain abscess. The patient was successfully treated with burr hole aspiration and broad spectrum intravenous antibiotic therapy.

Introduction

Brain abscess is a focal, intra-cerebral infection that develops into a collection of pus surrounded by well-vascularised capsule, can evolve rapidly, causing a devastating outcome (Lee, 2007 and Lu, 2002). Despite the advent of modern neurosurgical techniques, new antibiotics and new powerful imaging technologies, brain abscess remains a potentially fatal central nervous system (CNS) infection (Lu, 2002 and Mohanty, 2005). A large number of Gram positive cocci, Gram negative aerobic bacilli, anaerobes and *Mycobacterium tuberculosis* have been reported as the causative agents of bacterial brain abscess, however brain abscess caused by *Enterococcus faecalis* is very rare (Mohanty, 2005 and Park, 2002). Most common source of microbial infection for brain abscess remains

hematogenous spread, or contiguous infection from parameningeal foci such as otogenic origin and paranasal sinusitis (Lu, 2002). Here we are reporting a rare case of right temporal brain abscess of otogenic origin by *Enterococcus faecalis* in a 12 years old male which was managed successfully with surgical drainage and antibiotics.

Case Report

A 12-year-old male presented with history of fever with chills and headache since last ten days and a history of altered sensorium and vomiting since the last one day. He had history of on and off pus discharge from the right ear since past six years and also there is decreased hearing on right ear since past 4 years. On examination the

patient was febrile, pulse of 110/minute, blood pressure of 110/70 & his Glasgow coma scale was 7 (E₂V₂M₃) i.e. Patient opens eye to painful stimulus, makes incomprehensible sound response and his motor response was abnormal flexion. Pupils were non-reactive and fixed. The findings of cardiovascular, respiratory system and per-abdomen were within normal limits. There was active mucopurulent discharge seen on examination of right ear while left ear was normal. Laboratory findings showed-white blood cell count was 19,000/cu.mm (Polymorphs 85%, Lymphocytes 13%, Eosinophils 2%), Haemoglobin 10.5 gm% and platelet count 3.6 lacs/cu.mm, blood sugar was 92 mg/dl, Na⁺ - 144 mEq/L, K⁺ - 3.4 mEq/L. LFT and KFT were within normal limits. Computerized tomography (CT) showed hypodense lesion with peripheral rim enhancement measuring approximately 4 × 3 × 3 cm in the right temporal lobe with moderate surrounding edema suggestive of a brain abscess, also right lateral and 3rd ventricles were compressed with 3mm midline shift to left side [Figure 1]. Hypodense soft tissue was seen in the right mastoid air cells suggestive of mastoiditis. Immediately abscess was drained under anesthesia by right burr hole craniostomy. The drained abscess material was processed for Gram staining, Ziehl Neelsen staining and was cultured aerobically on blood agar, chocolate agar, MacConkey agar, Sabouraud's dextrose agar and thioglycollate broth. The blood cultures collected from different sites on different occasions showed no growth in culture. The Gram stained smear showed pus cells with Gram positive oval cocci in pairs at an angle to each other suggestive of *Enterococcus species*. After overnight aerobic incubation α hemolytic colonies were observed in blood agar and pin point

sized lactose fermenting colonies were observed in MacConkey agar. The organism was catalase negative, hydrolysed bile esculin and grew in 6.5% NaCl. It fermented glucose, sucrose, ribose, sorbitol and mannitol. The isolate was identified as *Enterococcus faecalis* on the basis of biochemical reactions like it produced black colonies on tellurite medium and did not ferment arabinose. The strain also reacted with the Lancefield group D antisera. The isolate was confirmed using automated Microscan WalkAway 40plus system. On antimicrobial sensitivity testing the isolate was found sensitive to vancomycin, linezolid and piperacillin-tazobactam, while was resistant to ampicillin, high gentamicin and ciprofloxacin. Meanwhile the patient was started on Vancomycin, Ceftriaxone and Metronidazole. The patient responded well to the surgical drainage and the antibiotics, showed marked improvement in CT scan findings. The patient was discharged after receiving two weeks of intravenous antibiotics. On follow up, patient was doing well and there was no residual neurological deficit.

Discussion

Brain abscesses in humans are quite uncommon because the brain is remarkably resistant to bacterial and fungal infection. This is due to brain's abundant blood supply and the relatively impermeable blood-brain barrier formed by the capillary-endothelial tight junctions (Glen, 1997). Brain abscess develops secondary to a focus of suppuration elsewhere in the body or may develop either by a contiguous focus of infection, head trauma or hematogenous spread from a distant focus (Lu, 2002 and Mohanty, 2005). The predisposing factors include infections of the middle ear, mastoid,

Figure.1 CT scan showing hypodense lesion with peripheral rim enhancement in the right temporal lobe with surrounding edema



paranasal sinuses, orbit, face, scalp penetrating skull injury, intracranial surgery including insertion of ventriculoperitoneal shunts, but otogenic source is the commonest (Sung, 2007). In this case, the patient had a history of pus discharge and decreased hearing, suggestive of chronic suppurative otitis media which was considered as a source of infection for the brain abscess.

Otogenic brain abscess is mostly caused by *Staphylococcus aureus*, *Streptococcus pneumoniae*, *H. influenzae*, *E.coli*, *Protococcus* and *Pseudomonas* species (Lu, 2002 and Sung, 2007). *E. faecalis* is an infrequent causative agent of brain abscess, accounting for 0.3-4% of brain abscess (Kurup, 2001). This organism is usually a nosocomial pathogen, and its presence in the central nervous system (CNS), rarely if ever as a cause of meningitis, has been associated with

anatomic defects, prior neurosurgery and trauma, or high-grade bacteremia and immunodeficiency (Moellering, 2010). Very few studies have reported *E. species* as one of the causative agents of brain abscesses in India. There have been case reports by Park *et al* (Park, 2002) from Korea and from India by Mohanty *et al* (Mohanty, 2005) suggesting *Enterococcus species* as one of the causative agents of brain abscess.

CT scan and MRI are important tools that help in early diagnosis of brain abscess thereby reducing mortality and also it differentiates brain abscess from other closely resembling lesions, like tumours, infarcts, hematoma and other space occupying lesions (Lu, 2002; Sung 2007 and Mohanty, 2005). In this patient, the diagnosis of the brain abscess was established by a CT scan, while definitive microbiological diagnosis was done by pus

sent from the abscess drained. Hence, aspiration of the pus provides the best opportunity to make a microbiological diagnosis and also to report an optimal therapy.

Conservative therapy alone is recommended in selected cases, as in early stages of cerebritis, abscess less than 2 cm, surgically inaccessible or multiple abscesses and in patients who are at high surgical risk (Lu, 2002 and Sung, 2007). However, once the capsule is well formed surgical intervention is essential, due to the inability to have adequate therapeutic concentration of the antibiotic within the abscess (Latha, 2012). Hence, surgical drainage along with aggressive antibiotic therapy remains the definitive treatment for brain abscess. Our patient responded well to burr hole craniostomy and antibiotics, with no residual deficit in follow up visits.

This study suggests that a high index of suspicion, timely diagnostic support by CT scan, surgical intervention and vigorous antimicrobial therapy are crucial for better outcome. 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.

References

- Lee TH, Chang WN, et al. 2007. Clinical features and predictive factors of intraventricular rupture in patients who have bacterial brain abscesses. J Neurol Neurosurg Psychiatry. 78:303-309.
- Lu CH, Chang WN, Lin YC, et al. 2002. Bacterial brain abscess: microbiological features, epidemiological trends, therapeutic outcomes. QJM. 95: 501–9.
- Mohanty S, Dhawan B, et al. 2005. Brain abscess due to *Enterococcus avium*. Am J Med Sci. 329:161–2.
- Park SY, Min JH, Ryu JW, Ko YS. 2002. Enterococcal otogenic brain abscess. Korean J Otolaryngol Head Neck Surg. 45:1188–92.
- Glenn, E. Mathisen and Johnson, P. 1997. Brain Abscess. Clinical Infectious Diseases. 25: 763–81
- Sung DJ, Ealaan K, et al. 2007. Clinical features and surgical treatment of brain abscess. J Korean Neurosurg Soc. 41:391–6.
- Kurup A, TeeW, Loo I, Lin R. 2001. Infection of central nervous system by motile *Enterococcus*: First case report. J Clin Microbiol. 39:820-22.
- Moellering, RC, Jr. 2010. *Enterococcus* species, *Enterococcus bovis* and *Leuconstoc* species. In Mandel GL, Bennett JE, Dolin R (ed), Principles and practice of infectious diseases, 7th ed. Elsevier, Philadelphia, PA. p 2411–2420.
- Latha R., RajbhaskarR., Kavitha K., SenthilPragash D., VinodR. 2012. Otogenous Temporal Lobe Brain Abscess Which was Caused by *Enterococcus Faecalis*: A Case Report. Journal of Clinical and Diagnostic Research. June, Vol-6(5): 902-904.