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.

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].
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 susceptible to gentamicin, ciprofloxacin, vancomycin and linezolid.

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, aspiration of the pus from the abscess for testing with aerobic and anaerobic bacteria 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), Bacteroides fragilis, Enterobacteriaceae species esp. Proteus species and Actinomycosis 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 and 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 enterococcal abscesses 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 tymponaplasty 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.

REFERENCES