Case Report

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Microbiology Section

A Pneumococcal Brain Abscess: A Case Report

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ABSTRACT

A brain abscess which is caused by *Streptococcus pneumoniae* is a rare entity. Here, we have described a gentle man who presented with the signs and symptoms of a mass lesion which was localized to the temporal lobe. The clinical examination and computerized tomography revealed the diagnosis of a temporal abscess. The loculated mass was tapped and it was sent for histopathology, which confirmed the presence of an organizing abscess. A laboratory investigation of the pus revealed *Streptococcus pneumoniae*. The treatment included total excision and the administration of prolonged antibiotics, which led to a good outcome in the patient.

Key words: Brain abscess, Intracranial lesion, Mass effect, *Streptococcus pneumonia*

INTRODUCTION

Streptococcus pneumoniae are gram-positive, capsulated diplococci which belong to the family, *Streptococcaceae*. They are commensals of the throat and the nasopharynx and they most commonly cause lower respiratory tract infections viz., pneumonia. They may also cause bacteraemia and subsequent seeding of the meninges, thus causing meningitis. In the post traumatic patients, due to their habitat in the nasopharynx, they may cause meningitis by direct spread. They are also the common cause of otitis media and sinusitis and from these intracranial foci also, they may cause meningitis. The brain abscesses which are caused by *Streptococcus pneumoniae* account for less than one percent of all the brain abscesses, the commonest agents being the anaerobes and the non haemolytic streptococci [1]. The brain abscesses which are caused by *Streptococcus pneumoniae* are rare entities and they are most commonly described in immune compromised patients. However, once they are diagnosed, the outcome is good, with the use of appropriate antibiotics and with surgical interventions.

CASE REPORT

A 30-year old, male, garment factory worker from the Mandya district, Karnataka, with no history of diabetes or hypertension, presented to the Neurosurgery Department, with the complaints of fever, headache and vomiting of eight days duration and an altered sensorium of one day's duration. There was no history of seizures, weakness of the limbs, ear/nasal discharges, chronic fever, cough or trauma.

On examination, his vitals were found to be normal and his respiratory rate was 28/min. The patient had an altered sensorium, with a GCS of 9 and meningeal signs were present. No paucity in the limb movements was noted. Examinations of the respiratory and the cardiovascular systems revealed a normal picture and there was no organomegaly per abdomen. There were no significant ENT findings. The clinical suspicion was that of an intracranial lesion with a mass effect. The blood investigations revealed a total white cell count of 7,000 cells/ml^3, a platelet count of 165,000 cells/ and haemoglobin – 17.4 gm%. The blood glucose was 158 mg%, and the serum electrolytes were within the normal range. The patient was negative for the antibodies for HIV-I and HIV-II.

A cranial CT scan showed a right temporal ring enhancing lesion with perilesional oedema and a midline shift, as has been evidenced in the picture. A provisional diagnosis of a temporal abscess was made and antibiotic therapy was started, which included Cefotaxime 2g 6th hourly, Amikacin i.v 750mg o.d and metronidazole i.v 100 mg t.i.d.

On the same day, the patient underwent emergency craniotomy, the abscess was tapped through middle temporal gyrus and 30 ml of greenish yellow non-foul smelling pus was drained, which was sent for investigations. Peroperatively, the abscess had a well-formed wall with a well-defined plane of cleavage. The mass was excised and it was sent to the Neuropathology Department for examination. The histopathology report showed a well organized pyogenic abscess.

A wet mount of the sample revealed several pus cells and no fungal hyphae. Gram staining of the sample revealed gram-positive diplococci which morphologically resembled *Streptococcus pneumoniae* in a background of pus cells. The specimen was subjected to aerobic and anaerobic cultures by using conventional methods [2]. Ziehl-Neelsen staining of the sample did not reveal any acid-fast bacilli. The primary cultures were made on 5% sheep blood agar, McConkey's agar and Thioglycollate broth aerobically and on anaerobic blood agar, anaerobic chocolate agar and enriched thioglycollate medium anaerobically. In addition, the sample was also plated onto Lowenstein Jensen's medium and Sabouraud's dextrose agar. Incubation for 24 hours in 5% CO_2 at 37^0 C revealed minute α-haemolytic colonies on sheep blood agar. Gram staining of the colonies showed gram-positive cocci which were in chains and pairs. The colonies were 10% bile soluble and they fermented inulin in Hiss's medium which was supplemented with serum. Antimicrobial susceptibility tests were performed according to the recommended methods with the use of optochin disks (Hi-media, Mumbai). The isolate was identified as *Streptococcus pneumoniae* which was susceptible to penicillin and the first line drugs. Forty eight hours of incubation of the media anaerobically at 37^0 C revealed no growth. Subsequently, the blood cultures of the patient, which were sent on the same day, yielded no growth in the BacTalert system.

On communicating with the clinicians, the patient was started on Ofloxacin 400 mg b.i.d in addition to the existing drugs and the patient was managed by undertaking aggressive anti-oedema measures. The patient's condition improved, he became conscious and well oriented and he moved all his limbs, with no fresh deficits. He was discharged after nine days of hospital stay and he was referred to a general hospital for further observations and continued treatment. The patient returned after a month, for review at the out patients department. A detailed ENT examination had not revealed any pathology in the referral hospital and the source of the abscess

was not known. The patient was doing well at the time of the review. He had been advised to continue oral antibiotics for further two weeks along with the undertaking of antiepileptic measures.

DISCUSSION

A bacterial brain abscess is most commonly caused by the *Streptococcus* species. The agents which cause primary meningitis viz., *Streptococcus pneumoniae* and *Hemophilus influenzae*, may be isolated from the brain abscess pus, but they account for less than one percent of all the bacterial brain abscesses [1]. A brain abscess which is caused by *Streptococcus pneumoniae* is more commonly associated with a focus of infection viz. chronic suppurative otitis media, sinusitis, and mastoiditis, especially in the temporal lobe [3,4,5]. It could also be a sequel to meningitis [6]. In a study which was done on children with brain abscesses [7], congenital cyanotic heart disease was found to be the most common predisposing factor. It is also reported in patients with osteoma [8] and in immune-compromised patients [1]. The other causes could be trauma, which exposes the dura to infection from the nasopharynx directly [5]. Any focus of infection, especially in the lower respiratory tract, could also trigger bacteraemia, which may lead to pneumococcal brain abscesses. Multiple brain abscesses which are caused by *Streptococcus pneumoniae* have been reported, which result from the complications of lobar pneumonia [9]. A brain abscess which is caused by *Streptococcus intermedius* has been reported as a complication of the hepatopulmonary syndrome, which coexists with interstitial pneumonia [10]. Isolated group B Streptococcus (GBS) was responsible for the postpartum meningo-encephalitis and the cerebellar abscess, which were successfully treated [11]. Isolated sphenoid sinusitis has been reported with potentially devastating complications such as cranial nerve involvement, brain abscesses, and meningitis, which are caused by *Streptococcus pneumoniae* in an otherwise healthy young immuno-competent adult [12]. In a study which was conducted in Argentina, 56.25% of the patients had intracranial complications as compared to the otological complications which were caused by *Streptococcus pneumoniae* [13]. *Streptococcus pneumoniae* which caused mitral endocarditis in smokers and chronic alcoholics, was associated with pneumonia, meningitis and brain abscesses. The case was medically treated, with good results [14].

Our patient had no bacteraemia and the blood cultures showed no growth in the BacT alert system. The patient had no significant past history of intracranial infections or any extra cranial foci of infection at the time of presentation. Since there was no history of any forthcoming trauma, the possibility of a direct infection from the nasopharynx was ruled out in our case. The patient's serum was also returned with negative results for the antibodies for HIV-1 and HIV-2.

A review of the cases of brain abscesses of the past five years at our centre revealed only one other case, which was a sequel to meningitis in a 2-year old child, which also had a favourable outcome with aggressive treatment, but it was lost to follow up.

In conclusion, this is a rare case of a middle aged immunocompetent adult with no intracranial or extracranial foci of infection and no bacteraemia, who presented with an acute onset of symptoms of one week's duration, and was diagnosed to have a temporal pyogenic abscess which was caused by *Streptococcus pneumoniae*, who was managed surgically and with aggressive antibiotics and antioedema measures, who had a favourable outcome.

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