

Cerebral Abscess caused by Novel Species: *Streptococcus Pluranimalium*

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ABSTRACT

Streptococcus pluranimalium, a gram-positive aerobic coccus, has been isolated primarily from several farm animals. The pathogenicity of this species is not well characterised either in animals or humans. As per the literature, cases of *S. pluranimalium* infection in humans have been reported only a handful of times. We report the case of cerebral abscess caused by *S. pluranimalium* in a patient who presented with weakness and confusion. The diagnosis of cerebral abscess was made on imaging supported by microbiological culture. Burr hole procedure for abscess drainage followed by an antibiotic regimen based on culture and sensitivity results contributed to a successful outcome. The bacteria were identified by analytical profile index for *Streptococci* (API Strep) and VITEK 2 gram-positive cocci panel. The case was successfully treated with vancomycin.

Key Words: *Streptococcus pluranimalium*. Cerebral abscess. Vitek 2. Vancomycin.

INTRODUCTION

Streptococcus pluranimalium is a relatively new species that was first isolated from cattle in 1999, and later from other farm animals.¹ Further investigations revealed pathogenic potential of this organism and its association with endocarditis; and septicemia in adult broilers was established.² In recent years, this bacterium has been isolated from human samples as well. However, only few cases have been published in which this isolate was proved to be the causative pathogen. This is the second case of cerebral abscess caused by *S. pluranimalium* after Aryasinghe *et al.* case report,² and first in Pakistan. The organism was identified by Vitek 2 and patient was successfully treated with vancomycin.

CASE REPORT

A 48-year male, shepherd by profession, presented with weakness in the right side of body for the last 10 days. A couple of days prior to reporting to emergency department, the patient had also developed confusion. The patient underwent shunt placement 16 years ago but the indication for shunt placement was not known to the patient and his attendants. There is also history of pulmonary tuberculosis (TB) for which anti tuberculous therapy (ATT) was taken 7 years back. At the time of admission, the patient was afebrile, his Glasgow coma

scale (GCS) was 15/15 with intact motor, sensory and higher mental functions.

MRI brain with contrast was performed which showed abnormal signal intensity, well-defined, lobulated mass lesions in left parietal and right temporal lobes appearing hypointense on T1-weighted images (TIW) and hyperintense on T2-weighted images (T2W) showing perilesional vasogenic edema and mass effects with compression of sulci and adjacent ventricles (Figure 1).

The diagnosis of brain abscess was made, that necessitated neurosurgical intervention, so immediate burr-hole was done for drainage of cerebral abscess. Drained pus was sent to Department of Microbiology for bacterial culture and sensitivity (C/S) testing. Gram staining of the specimen showed heavy presence of gram-positive cocci in long chains with numerous pus cells.

Culture was applied on 5% sheep blood agar, Mc Conkey agar, chocolate agar and Wilkin's-Chalgren agar for anaerobic growth. Plates were incubated at 35 ±2°C. After 48 hours, growth of small white dry colonies were yielded with a narrow zone of hemolysis only on blood agar (Figure 2) and chocolate agar; but no growth was observed on Mc Conkey and anaerobic growth medium.

Gram staining showed gram-positive cocci in long chains. Biochemically, the isolate was catalase negative. Dual identification panels, VITEK 2 (bio Mérieux, Marcy L'Etoile, France) gram-positive cocci panel and API ID 32 Strep (bio Mérieux) were employed for bacterial identification. The isolate was identified as *S. pluranimalium*. Antimicrobial susceptibility was performed as per Clinical and Laboratory Standards Institute (CLSI) guidelines. Minimum inhibitory concentration (MIC) values suggested isolate sensitive to vancomycin (MIC ≤0.12 µg/ml), linezolid (MIC ≤2 µg/ml), clindamycin

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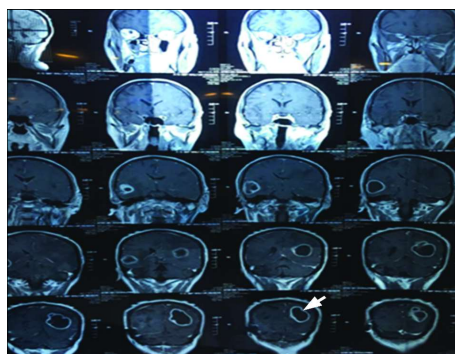


Figure 1: Post-contrast coronal MRI images showing lobulated mass lesions in left parietal and right temporal regions, measuring 4.8 cm AP x 4.1 cm MTD x 5.7 cm CC and 3.5 cm AP x 3.0 cm MTD x 3.7 cm CC, respectively. Craniotomy defect is noted in right parietal bone due to placement of VP shunt.



Figure 2: *S. pluranimalium* colonies on 5% sheep blood agar.

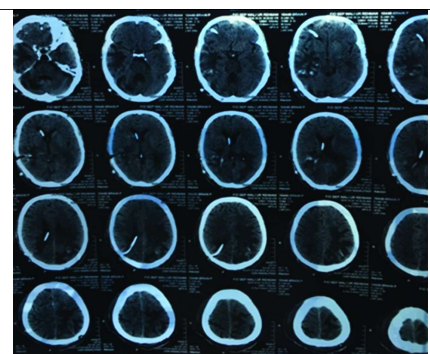


Figure 3: CT scan images showing ill-defined hypodense areas and small focal hyperdensities in left parietal lobe, right temporal lobe and cerebellar hemisphere, suggestive of post-surgical changes. No definite mass lesion is seen in these images.

(MIC ≤ 0.25 $\mu\text{g}/\text{ml}$), amoxicillin-clavulanate (MIC ≤ 0.12 $\mu\text{g}/\text{ml}$), and erythromycin (MIC ≤ 0.25 $\mu\text{g}/\text{ml}$).

Patient was started with injection vancomycin with a loading dose of 25 mg/kg body weight intravenous (IV) followed by 15 mg/kg every 12 hourly which was continued till the time patient remained in the hospital, as the previous case reports suggested better outcome of patients with the use of vancomycin.

The patient's general condition gradually improved. Neurologic examination remained non-focal, and by 5th postoperative day, he showed improvement with reduced signs of confusion and other neurological symptoms as was suggested by postoperative plain computerised tomography (CT) scan (Figure 3).

There was no established source of infection, and the only suggestive source was possibly an occupational exposure with the livestock. Unfortunately, the source was not sampled for definitive confirmation of primary source of infection. After 15 days of IV treatment, patient was switched to oral therapy of amoxicillin-clavulanate. He had an uneventful recovery and was subsequently discharged with no neurological deficit and was advised for intensive follow-up. There were no sequelae reported, and the patient recovered completely.

DISCUSSION

Brain abscess is a life-threatening clinical condition with serious consequences in case of delayed diagnosis and treatment.³ The etiology of brain abscess is predominated by a variety of organisms. Among aerobic pathogens, *Streptococci* are often identified as the causative agents of brain abscess. Majority of cases occurs between the third and fifth decades of life, with significant male predominance, male to female ratio ranging from 1.5:1 to 4.5:1.⁴

Devriese *et al.* in 1999 first described the novel species *Streptococcus pluranimalium*. The authors devised the term '*pluranimalium*' meaning 'from many animals' owing

to its isolation from a number of different animal hosts. Since its first description, this organism has been identified as a causal pathogen in farm animals.¹

An extensive search of literature revealed a single case of subdural empyema in humans caused by *Streptococcus pluranimalium*. This is the first case report of brain abscess caused by *Streptococcus pluranimalium* in Pakistan. Additionally, we could only find few clinical cases where *S. pluranimalium* was isolated in humans causing abscess, bloodstream infection, and septic arthritis.⁵⁻⁸

As per recommendations, once diagnosis of brain abscess is confirmed, immediate neurosurgical drainage with intravenous antibiotic therapy is the mainstay of treatment. Due to better exposure and a more complete evacuation of the purulent collection, either burr-hole drainage or craniotomy may be performed for removal of abscess.³ In this case, only burr-hole drainage was performed as intraoperatively, the pus was found to be very thin, non loculated, and washed out completely with gentle irrigation; and this was also confirmed on post-operative CT scanning.

Guidelines for empiric IV antibiotics from available case series include the use of oxacillin, nafcillin or vancomycin for a minimum duration of 4-6 weeks.^{2,5} On admission, our patient was started with IV antibiotics, meropenem and metronidazole, but once culture results were available, IV vancomycin was started.

S. pluranimalium has been isolated from several animal species and from different sites.⁹ Our patient had a strong history of contact with farm and domestic animals prior to hospitalisation. Occupational exposure to this pathogen seems to be the most likely source of this infection. Nonetheless, the potential of *S. pluranimalium* for zoonosis is uncertain at this point of time and requires further investigation. Additionally, variety of pathogenic factors have been recognised in *S. pluranimalium* linked with septicemia and endocarditis⁶ but the connotation of

S. pluranimalium in causing cerebral abscess has yet to be studied.

In conclusion, this study has demonstrated that *S. pluranimalium* is a novel pathogen associated with cerebral abscess and is possibly a zoonotic disease. This is the first clinical case of cerebral abscess caused by *pluranimalium* identified in Pakistan; and efforts to further identify this isolate on the genetic level are needed.

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