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Case Report

Acute pyogenic meningoencephalitis due to *Streptococcus pneumoniae* serotype 11A in a previously healthy child: a case report

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ABSTRACT

Streptococcus pneumoniae is a leading cause of bacterial meningitis in children despite the widespread use of pneumococcal conjugate vaccines (PCVs). We report a case of acute pyogenic meningoencephalitis in a 6-year-old previously healthy male child who presented with high-grade fever, vomiting, and neck stiffness. Cerebrospinal fluid (CSF) analysis revealed neutrophilic pleocytosis, elevated proteins, low glucose, and Gram-positive diplococci. CSF culture confirmed Streptococcus pneumoniae, later identified as serotype 11A - a non-vaccine serotype not covered by PCV10, PCV13, or PCV14. The child responded to intravenous ceftriaxone, vancomycin, dexamethasone, and supportive therapy. This case highlights the clinical features and management of pneumococcal meningoencephalitis due to serotype 11A, underlining the growing burden of non-vaccine serotypes and the importance of extended-serotype vaccines.

Keywords: *Streptococcus pneumoniae*, Meningoencephalitis, Non-vaccine serotype

INTRODUCTION

Acute bacterial meningitis is a medical emergency in paediatrics, with Streptococcus pneumoniae being a common etiological agent. Although widespread immunization with PCV10 and PCV13 has significantly reduced invasive pneumococcal disease (IPD), non-vaccine serotypes are increasing worldwide.[1] Serotype 11A, in particular, has been emerging globally as a cause of meningitis and other invasive infections.[2,5] Authors present a case of acute pneumococcal meningoencephalitis in a 6-year-old child caused by serotype 11A, and discuss its clinical implications, treatment, and the need for broadened vaccine coverage.[6]

CASE REPORT

A 6-year-old male child presented with fever for three days which was high grade. Dullness was noted during the inter-febrile period, not associated with chills or rigors. Vomiting occurred for one day (three non-bilious, non-bloody episodes with food particles). Neck stiffness was noticed by the mother on the day of admission. The child was developmentally normal, well-nourished, and immunized according to the National Immunization Schedule, including PCV13 through a private clinic. He had consumed outside food (beef) four days prior. Past history included chickenpox at one year of age; no other significant family or medical history.

Examination findings

At admission, the child was febrile, dull, and irritable. Neck stiffness was present; no cranial nerve involvement or focal deficits. Systemic examination was otherwise normal. Vitals were stable.

Investigations

CSF analysis showed total cells of 1276/mm³ (57% neutrophils, 43% lymphocytes), glucose 36 mg/dl (with blood glucose 123 mg/dl), and protein 67 mg/dl. Gram

stain revealed Gram-positive diplococci; culture grew Streptococcus pneumoniae. AFB smear, CBNAAT, and viral panel were negative. Blood tests showed leukocytosis and elevated CRP. MRI brain showed leptomeningeal enhancement suggestive of meningitis. Blood culture showed no growth.

Figure 1: Examination done to check for neck rigidity.

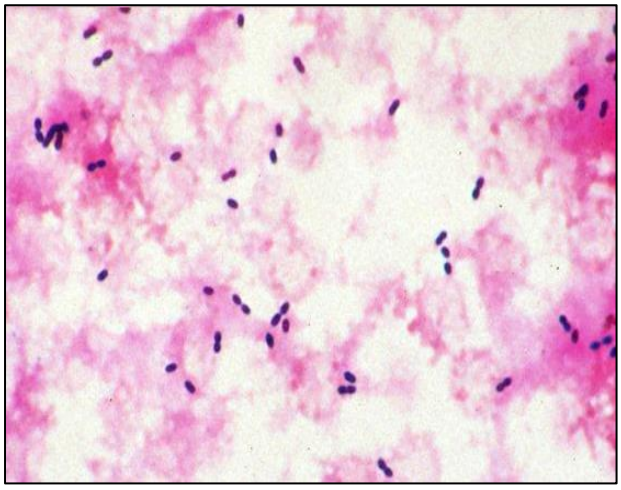

Figure 2: Gram stain revealing gram-positive diplococci (*Streptococcus pneumoniae*).

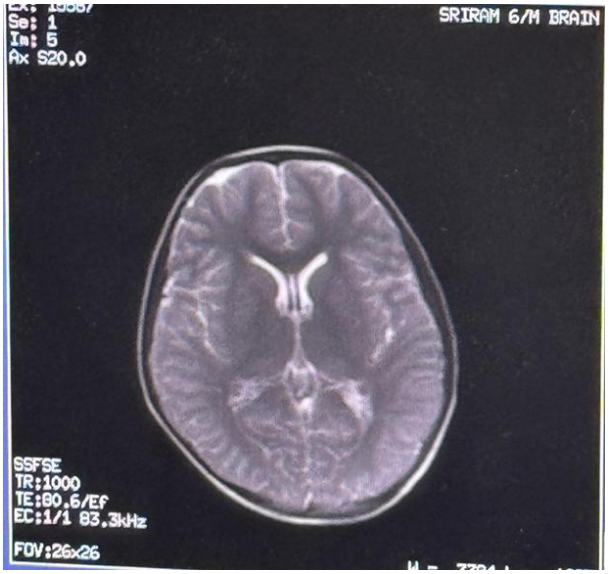

Figure 3: MRI brain showing leptomeningeal enhancement.

Treatment

The child received IV ceftriaxone and vancomycin for 14 days, IV dexamethasone for 2 days, and 3% NaCl for raised ICP. CSF sent to CMC Vellore identified serotype 11A-not covered by PCV10/13/14. The child improved and was discharged with advice for 6-monthly audiology follow-up till 2 years.

DISCUSSION

Streptococcus pneumoniae is a critical cause of meningitis in children under 5 years.[4,9] The child presented with fever, vomiting, and neck stiffness consistent with meningitis. MRI supported meningoencephalitis; CSF findings guided treatment. Despite vaccination, serotype 11A was isolated-a result of serotype replacement, now recognized globally.[2,3,5,10] This highlights the need for broader vaccine coverage such as PCV15 and PCV20 which include serotype 11A.[6,11] Treatment followed WHO and IDSA guidelines with broad-spectrum antibiotics and corticosteroids.[12] Corticosteroids have been shown to reduce neurological sequelae.[13] Hypertonic saline was used appropriately for raised ICP.[14] A study from CMC Vellore showed a significant burden of non-vaccine serotypes in Indian children, reinforcing the relevance of this case.[15]

CONCLUSION

This case of acute pneumococcal meningoencephalitis in a vaccinated child underscores the burden of non-vaccine serotypes like 11A. With serotype replacement reducing vaccine effectiveness, broader vaccines (PCV15/20) must be adopted. Clinicians should remain alert even in vaccinated patients, and long-term audiological monitoring is essential.

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