

PNEUMOCOCCAL MENINGITIS IN A 10-YEAR-OLD CHILD: A CASE REPORT

SREENIVASAN SRIRANGARAJ*, ARUNAVA KALI

Department of Microbiology, Mahatma Gandhi Medical College and Research Institute, Pondicherry - 607 402, India.

Email: rangaraj.sreenivasan@gmail.com

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ABSTRACT

Pneumococcal meningitis is a life-threatening medical emergency with high case fatality rate. It continues to be the most common causative agent of community acquired acute bacterial meningitis (CA-ABM). An early initiation of antibiotic therapy precludes mortality and development of long-term neurological sequelae. Here, we describe a case of CA-ABM caused by penicillin resistant *Streptococcus pneumoniae* in 10-year-old child. We highlight the importance of early laboratory diagnosis in the management of such cases.

Keywords: Meningitis, *Streptococcus pneumoniae*, Penicillin resistance.

INTRODUCTION

Meningitis is the inflammation of the meningeal covering of brain and spinal cord. Acute bacterial meningitis (ABM) is a potentially fatal infection in both community and hospital settings. *Streptococcus pneumoniae* accounts for most cases of meningitis in adults as well as in children [1]. Pneumococcal meningitis is a medical emergency, and successful treatment outcome depends on early diagnosis and initiation of antibiotic therapy [2]. Owing to the emergence and worldwide dissemination of penicillin resistant and multidrug-resistant strains, antibiogram is essential for selection of antibiotics for pneumococcal meningitis [3]. Here, we describe a case of penicillin resistant pneumococcal meningitis in an unvaccinated child.

CASE REPORT

A 10-year-old boy presented to the casualty of our institute with complaints of high fever for 3 days along with headache, vomiting, and altered mental status of 1 day duration. There was no history of cough, ear discharge, photophobia, and convulsion. He had no previous history of hospital admission or similar illness in the past. On examination, the patient was febrile, pale and had tachypnea (respiratory rate 24/min). Examination of the central nervous system revealed decreased level of consciousness (Glasgow coma score [GCS] of 6, E₁ V₁ M₁), signs of meningeal irritation (neck rigidity, positive Kerning's and Brudzinski's sign), bilateral extensor planter response and normal muscle tone and deep tendon reflexes. Both pupils were equal in size and reacting to light. Skin rash and hepatosplenomegaly were absent.

He was clinically diagnosed as community acquired (CA)-ABM. Cerebrospinal fluid (CSF) sample was sent for cell count, biochemical analysis, and culture. CSF was turbid in appearance and had pleocytosis (>240 leucocytes/ μ l, of which 80% were neutrophils). Biochemical analysis of CSF showed decreased glucose (20 mg/dl) and elevated protein (136 mg/dl) level. Microscopy of the gram stained smear of both uncentrifuged and centrifuged CSF showed Gram-positive lanceolate-shaped cocci, mostly in pairs, without any capsule along with numerous pus cells (Fig. 1a and b).

The sample was inoculated on to blood agar, chocolate agar, and McConkey's agar. Alpha-hemolytic nonmuroid small translucent colonies appeared on blood agar after 24 hr, which became depressed in the central portion (Draughtsman's colony appearance) on further incubation (Fig. 2). The growth on chocolate agar was surrounded by a green zone (Fig. 3).

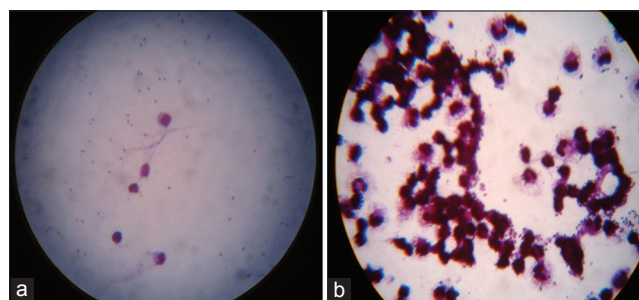


Fig. 1: (a) Gram stained smear of uncentrifuged cerebrospinal fluid shows Gram-positive diplococci with pus cells (left), (b) Gram stained smear of centrifuged deposit of cerebrospinal fluid shows Gram-positive diplococci and plenty of pus cells (right)



Fig. 2: Blood agar plate shows alpha-hemolytic translucent colonies of *Streptococcus pneumoniae*

However, the organism failed to grow on McConkey's agar. Based on biochemical tests (negative catalase test, bile solubility, optochin susceptibility, and inulin fermentation), it was identified as *S. pneumoniae*. However, serotyping could not be done due to lack of antisera. Antibiotic susceptibility testing was carried out as per Clinical Laboratory Standards Institute Guidelines [4]. The isolate was resistant



Fig. 3: Chocolate agar plate shows colonies of *Streptococcus pneumoniae* surrounded by a green zone

to penicillin and showed sensitivity to ceftriaxone, erythromycin, cotrimoxazole, chloramphenicol, tetracycline, ciprofloxacin, vancomycin, and rifampicin.

A blood culture done on 2nd day of hospital admission was sterile. The child was treated with intravenous ceftriaxone and supportive therapy. Fever decreased with improvement of GCS, and he was discharged after 10 days.

DISCUSSION

Pneumococcal meningitis accounts for 34.3% to 43.5% of Invasive Pneumococcal disease in India [5,6]. With the increasing use of Haemophilus influenzae type b conjugate vaccine *S. pneumoniae* has emerged as the most common agent of CA-AMB in children as well as in adults in several parts of the world [7]. Meningeal seeding of *S. pneumoniae* during bacteremia is usually the most common mode of meningeal involvement. Less frequently, a breach in dura associated with head injury with a skull fracture and neurosurgery can also lead to spread of *S. pneumoniae* from infected paranasal sinuses, mastoid, and middle ear [7,8]. Diminished immunity associated with extremes of age, HIV, immunosuppressive treatment, alcohol use, diabetes, cancer, cardiovascular disease, liver or lung disease, and splenectomy are well-recognized risk factors [7,9]. Pneumococcal capsule is anti-phagocytic and is the principle virulence factor. Among several antigenically distinct capsular serotypes, Type 1, 5, 7 are frequently associated with invasive infections. A recent study from South India detected serotype 1 as the predominant serotype isolated from adults without risk factors, and pneumococcal conjugated vaccines (10/13/15) had high serotype coverage [9]. In this case, the child had no history of pneumococcal vaccination. Hence, the absence of specific antibodies against prevalent serotypes of *S. pneumoniae* might be the underlying predisposing factor.

Penicillin resistance in *S. pneumoniae* emerged as a significant therapeutic concern worldwide since late 1980s [10,11]. Very high prevalence of penicillin resistant *S. pneumoniae* has been reported from Spain and South Africa, South Korea, Japan, Thailand, and Vietnam ranging from 53.4% to 73.4% [3]. The occurrence of antibiotic resistance varies in different studies from various centers in India.

In a study from a rural tertiary health care center in South India, Deva et al. reported the absence of penicillin resistant strains during 7 years period [12]. Whereas, Chawla et al. detected 14% strains of *S. pneumoniae* had reduced penicillin susceptibility [13]. Ceftriaxone or cefotaxime alone or in combination with vancomycin have been found to be useful in treating these infections [3]. This is in accordance with our finding. Treatment with an intravenous Ceftriaxone resulted in rapid clinical improvement without any neurological sequelae.

CONCLUSION

Good therapeutic outcome of *S. pneumoniae* meningitis depends on early diagnosis and initiation of appropriate antibiotic. With respect to the emergence of penicillin resistance in *S. pneumoniae*, antibiogram has a critical role in guiding antibiotic therapy in such cases.

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