Fatal SPIN- A case report

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Abstract:
Streptococcus pneumoniae infections in the neonate (SPIN) are rare but are associated with significant morbidity and mortality. Invasive SPIN is associated with prolonged rupture of membranes, maternal colonization/illness and prematurity and high mortality (50). The presentation is similar to Group B Streptococcal sepsis but Streptococcus pneumoniae has a high infection rate compared to colonization and increased morbidity and mortality. The emergence of penicillin resistant strains emphasizes early recognition and appropriate treatment of SPIN.

Keyword: Early onset sepsis, newborn, Streptococcus pneumoniae

Introduction: Streptococcus pneumoniae infections in the neonate (SPIN) are relatively unusual but are associated with substantial morbidity and mortality. Invasive SPIN is associated with prolonged rupture of membranes, maternal colonization/illness, prematurity, early-onset pneumonia presentation (<72 hours) and high mortality. This infection is relatively rare and its clinical features are variable, but often particularly severe and fulminant. Our literature search did not reveal any previous report of SPIN in the Indian literature. We report a case of fatal early onset pneumococcal meningitis in a 2 day old infant.

Case:
2800 gram male baby was born vaginally at 38 weeks gestation to a 25 year old primigravid migrant lady from Manipur. The membranes had ruptured 6 hours before delivery. There were no other risk factors for sepsis. The baby had normal transition with Apgar scores of 8 and 9 and nursed well from the mother. He developed fever of 39 °C at 24 hours of life. After performing septic work up, penicillin and gentamicin were started. The initial work up showed leucopenia (3800/µL). The chest X ray was normal. The infant developed seizures and shock at 36 hours of life was mechanically ventilated and circulation was supported with volume and inotropes. The
CSF examination revealed a turbid cellular CSF with neutrophilic predominance and abundant Gram-positive diplococci. The CSF immunochromatographic test was positive for *Streptococcus pneumoniae* (BinaxNOW Streptococcus pneumoniae Antigen Test; Binax, Inc. Scarborough, Maine, USA). The infant died at 48 hours of life due to multiorgan failure. Both the CSF and blood cultures grew *Streptococcus pneumoniae* resistant to penicillin but sensitive to cefotaxime. The mother was asymptomatic. High vaginal swab of the mother was done on the 3rd postnatal day grew Klebsiella sp and *E. coli* and was negative for pneumococci.

**Discussion:**

Previous reports suggest that *Streptococcus pneumoniae* infections in the neonate (SPIN), including sepsis, pneumonia, and meningitis, are relatively unusual events (1%–11% of neonatal sepsis cases) but are associated with considerable morbidity (13% neurological sequelae) and mortality (50%). Early onset pneumococcal sepsis presents similarly to early onset neonatal Group B Streptococcal (GBS) sepsis but with more aggressive symptoms and higher mortality. These early onset SPIN have been reported to be associated with prolonged rupture of membranes (PROM), prematurity, respiratory distress within the first day of life, leucopenia, and high Smortality rates varying from 20% to 60%. Contrary to the earlier reports, with the implementation of Intrapartum Antimicrobial Prophylaxis in the western industrialized world, Hoffman et al found pneumococcal neonatal sepsis increasingly presenting as late onset sepsis. Infection is presumed to be acquired from the mother intrapartum, either transplacentally or via ascending infection. While *S. pneumoniae* is not considered to be part of the normal vaginal flora, transient pelvic colonisation can occur. Several studies have demonstrated genital colonization with *S. pneumoniae* to be exceptionally rare (0.03%) and the difficulty in isolating *S. pneumoniae* from vaginal swabs. Pneumococci do not survive at the pH of the normal vagina but could exist at the more alkaline pH of the vagina during pregnancy. Although genital tract colonization with *S. pneumoniae* is rare it is associated with a high risk of transmission to the newborn. Subsequent infection of the fetus can occur when the membranes have ruptured or during passage through the birth canal. Pneumococci have consistently been isolated from the genital tracts of mothers of infants with pneumococcal sepsis. Simultaneous maternal pneumococcal infections, including pneumonia, meningitis, and endometritis have also been implicated with neonatal sepsis. In a review by Westh et al, 30.4% of 23 mothers of infants with early-onset pneumococcal sepsis had clinical signs of infection, 5 with endometritis and 2 with meningitis. Though maternal carriage was not demonstrated in our case, the age at presentation and progression suggest perinatal transmission. Moreover vaginal swab could be taken only on the 3rd postnatal day. The other risk factors suggested, apart from maternal vaginal colonization/infection are prolonged rupture of membranes (18h) and delivery at <37 weeks gestation. There are case reports with none of these risk factors too. Our case did not have any of these risk factors. Pneumonia is the commonest presentation in early onset pneumococcal sepsis. 2 out of the 3 infants with early SPIN had pneumonia and the other
A baby had presented with meningitis similar to our case in the review by Hoffman et al. Mortality is around 50% usually occurs within 36 hrs of presentation. Antigen detection in CSF specimens provides a useful adjunct to culture-based diagnosis. It provides rapid result than culture and permits accurate aetiological diagnosis even among patients with meningitis who have received prior antibiotic treatment. Though Latex agglutination (LA) testing is widely used, the test needs to be interpreted by an experienced reader and, therefore, is not usually considered to be a “bedside” technique. Moreover, LA kits have a relatively short shelf life, particularly in tropical climates. The NOW S. pneumoniae Antigen Test (Binax) is an in vitro rapid immunochromatographic test for detection of pneumococcal antigen in the urine of adult patients with pneumonia and in the CSF of patients of all ages with meningitis. The tool has demonstrated high sensitivity and specificity in testing CSF samples from patients with culture-confirmed meningitis and can serve as a “bedside” technique for rapid identification of S. pneumoniae meningitis. Neonatal diagnosis of S. pneumoniae sepsis would have had limited significance in the past since the infection would have been adequately treated by most empirical regimens for neonatal sepsis including penicillin. With the emergence of penicillin resistance and even third generation cephalosporin resistance, early diagnosis of pneumococcal infection and recognition of susceptibility pattern assume greater significance in the management of neonatal sepsis. The prevalence of penicillin resistance of S. pneumoniae varies from 24.2% in Europe to 21.2% in the USA and 6.7% in Australia. In India there are only few reports that show the resistance pattern in S. pneumoniae. A study done in North India has shown 2.3% and another from the peninsular India 4% penicillin resistance among the S. pneumoniae isolates. Though unusual, the presentation of early onset SPIN as fulminant infection with high mortality and the emergence of increasing penicillin resistance among pneumococci emphasize the importance of early recognition and appropriate management in our perennial struggle against newborn sepsis.

References:


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