

Salmonella typhimurium meningitis in infancy

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Abstract

We report a case of meningitis due to *Salmonella typhimurium* in a four-month-old female infant. The child was brought to the pediatric emergency department with complaints of fever, cold, and generalized convulsion. On examination, the child was febrile and was having seizures. The anterior fontanelle was not bulging. Lumbar puncture was done and *Salmonella typhimurium* was isolated from cerebrospinal fluid. Initially the infant improved clinically with appropriate management, but had a fatal outcome due to nosocomial pneumonia.

Keywords: Infant, meningitis, *Salmonella typhimurium*

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Introduction

Salmonellae are gram-negative motile bacilli, causing typhoid fever, focal septic infections, septicemia, and diarrhea. *Salmonella* meningitis is rare and is prevalent mostly among infants and young children.^[1] Meningitis due to *Salmonella* carries a higher morbidity and mortality than that caused by other bacteria.^[2] Mortality rates of 40% are reported for children due to *Salmonella* meningitis. Among survivors, common complications are seizures, hydrocephalus, subdural empyemas, and permanent disabilities such as retardation, paresis, athetosis, and visual disturbances.^[1]

We present a case of *Salmonella typhimurium* meningitis in an otherwise healthy infant, the presence of which was not suspected clinically.

Case Report

A 4-month-old female baby was brought to the pediatric emergency (ER) department of our hospital with complaints of fever and cold of two days duration, and upward deviation of eyes with tonic-clonic movements of the extremities since one hour. Past history

revealed that she was born at term by normal vaginal delivery to a primigravid mother. Her birth weight was 3.25 kg and she cried immediately after delivery with no antenatal, intranatal and postnatal complications. She was immunized and had attained milestones as per the age. There was no history of diarrhea and rash. Initial examination at the emergency showed active convulsions, fever (39°C rectally), respiratory rate 46/min, heart rate 160 beats/min, blood pressure 100/60 mm Hg, capillary refill two seconds, weight 5.3 kg, bilateral symmetrical chest movements, no organomegaly with normal bowel sounds. Central nervous system examination revealed no focal deficits. Her anterior fontanelle was flat with increased tone and exaggerated reflexes. Ultrasound of the cranium was normal.

The child was immediately intubated for airway protection and shifted to the pediatric intensive care unit (PICU). Intravenous (IV) ceftriaxone and amikacin were initially started. Lumbar puncture (LP) was done which revealed a grossly turbid cerebrospinal fluid (CSF) with a total WBC count of 14,120/mm³, of which 87% were neutrophils. CSF protein was elevated to 564 mg/dl and sugar was 10 mg/dl. CSF gram stained showed gram-negative bacilli which on culture grew *Salmonella* sp. sensitive to ampicillin, chloramphenicol, cotrimoxazole, ciprofloxacin, ceftriaxone after 48 hours of incubation. This isolate was sent to National Institute of Cholera and Enteric Diseases, (Indian Council of Medical Research) Kolkata, which was identified as *Salmonella typhimurium*. In view of this unusual isolate,

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immunological deficiency was considered and was worked up accordingly. Her chest X-ray showed a normal thymic shadow. Her serum calcium and immunoglobulin levels were within normal limits.

The initial antibiotic therapy was later revised to ceftriaxone, chloramphenicol and ciprofloxacin based on CSF culture and sensitivity reports. She was also started on antiepileptic drugs in view of refractory seizures. Other laboratory investigations revealed hemoglobin 10.4 g/dl, total leucocyte count of 14,270/mm³ (neutrophils 75%, lymphocyte 22%) and platelet count of 1,09,000/mm³. Her coagulation parameters were within normal ranges. Stool and blood cultures were negative for *Salmonella*. By day nine, when the child showed signs of neurological improvement, antiepileptic drugs were tapered and the child was extubated and eventually shifted to the ward. The baby was continued on intravenous ciprofloxacin, ceftriaxone and chloramphenicol. Computed tomography (CT) scan of brain done on day 13, showed left middle cerebral artery territory (MCA) infarct. The child developed respiratory distress and developed new infiltrates on chest X-ray. On day 25, the child was shifted back to PICU in view of worsening respiratory distress, intubated and put on mechanical ventilator. A chest X-ray showed worsening with right lung haziness suggestive of consolidation of the entire right lung and left lobe opacity. Nosocomial pneumonia was suspected. Antibiotics were further revised to inj. meropenem, polymyxin and linezolid. The organism isolated from her endotracheal aspirate was *Acinetobacter* species which was managed with appropriate antibiotics. Despite all efforts her condition continued to deteriorate secondary to nosocomial pneumonia and she died on day 38 of admission.

Discussion

Acute bacterial meningitis is considered to be a medical emergency that requires early diagnosis and aggressive therapy. Most often, treatment for bacterial meningitis has to be initiated before the etiology is known.^[3]

Meningitis due to *S. typhimurium* beyond the neonatal period is infrequent and has seldom been reported. Sporadic cases of pyogenic meningitis caused by *S. typhimurium* have been reported from infants and adults.^[4-8] In a retrospective review study by Lee *et al.*, *Salmonella enteritidis* was the commonest serotype isolated from positive CSF cultures in four-months old infants.^[9]

The possibility of *Salmonella* meningitis should be borne in mind whenever gram-negative bacteria are seen in CSF. The combination of a third-generation

cephalosporin with gentamicin, used commonly for treatment of meningitis due to gram-negative enteric bacilli, may not be appropriate when treating facultative intracellular organism, such as salmonellae. Price *et al.*, have suggested the consideration of antibiotic therapy with a combination of ciprofloxacin and ceftriaxone/cefotaxime for *Salmonella* meningitis.^[10] One study has suggested high dose of a third-generation cephalosporin for at least 4 weeks to ensure successful treatment of *Salmonella* meningitis and prevent relapse.^[11]

Salmonella infection is almost always caused by the feco-oral route. The source of infection could not be traced in our patient. There was no history of enteric fever and diarrhea in parents or other family members. The child was also on exclusive breast feeding. But despite adequate infection control protocols, we lost this immunologically normal infant to nosocomial pneumonia.

Conclusion

We report this rare case to remind clinicians that *S. typhimurium* could be considered in bacterial meningitis in infants in tropical countries making proper microbiological evaluation mandatory.

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