

A Case of Salmonella Enteritidis Meningitis in a Two Month Old Immuno Competent Infant

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Abstract

Meningitis due to Salmonella Enteritidis is very rare in children. Only a very few case reports of Salmonella Enteritidis meningitis reported in immunocompetent infants. Usually the infection will be severe and may lead to longterm morbidity and mortality. So early diagnosis and treatment is important.

Keywords: Salmonella Enteritidis; Meningitis; Complications; Infants.

Introduction

Acute bacterial meningitis in infants is a medical emergency requiring prompt diagnosis and early institution of empirical antibiotic therapy.¹ Salmonella, a gram negative motile bacilli, has been recognized to cause infectious diarrhoea, enteric fever, focal septic infections, bacteremia and rarely osteomyelitis and meningitis.² The Genus Salmonella is broadly classified into typhoidal and non-typhoidal salmonella.³ Nontyphoidal salmonella (NTS) is a major cause of uncomplicated infectious diarrhea worldwide, but NTS meningitis is extremely uncommon beyond the neonatal period with very few cases being reported in the literature.^{1,3}

We report an unusual case of infant meningitis due to Salmonella enterica Serovar Enteritidis, who was successfully treated with prolonged duration of antibiotic therapy.

Case Report

A two month old girl, was presented with complaints of high grade fever and irritability of 2 days duration. It was associated with poor feeding and decreased activity. On arrival baby also had one episode of seizure. It was of generalized tonic clonic type and lasted for 2 minutes.

Past history of child was unremarkable. She was born at term by normal vaginal delivery with a birth weight of 3.37 Kg. Baby cried immediately after birth with no antenatal, intranatal postnatal complications. She was immunized up to the age. There was no history of dyspnoea, diarrhea or jaundice.

On examination: Child was lethargic, febrile, pulse rate 162/min, regular and normal volume; respiratory rate of 70/min, blood pressure: 104/62 mm Hg, capillary refill <3 seconds, flushed AF, GCS

- 15/15, No focal neurological deficit and no features suggestive of raised intracranial pressure. Normal vesicular breath sounds in all lung fields, no organomegaly with normal bowel sounds.

Since the child presented with high grade fever and poor activity, considered the possibility of meningitis and investigated accordingly.

Her investigations revealed: Hb-9 gm%, TC-4,600/mm³, P-68, L-32, CRP positive, normal RBS, RFT,LFT and electrolytes.

Lumbar puncture was done and CSF examination was suggestive of meningitis: 30 cells (90% Polymorphs), high protein (325mg%) with hypoglycorrhachia(22mg%). Gram stain showed some pus cells with plenty of gram negative bacilli. On culture, blood agar yielded non-hemolytic grey white moist colonies and MacConkey agar showed non lactose fermenting colonies, which was catalase positive, oxidase negative and actively motile. As the isolate showed citrate utilization and hydrogen sulphide production in abundance along with other biochemical reactions which pointed towards the *Salmonella enterica* serotype Enteritidis. The isolate was confirmed by National Institute of Cholera and Enteric Diseases in Kolkata. Same organism was isolated from her blood also. Organism grown both in CSF and blood were sensitive to Ampicillin, Ceftriaxone, Ciprofloxacin, Piperacillin-Tazobactam and Meropenem.

Child was managed with intravenous ceftriaxone and ciprofloxacin based on sensitivity. On day 2 of admission, child was having signs of shock and hence electively intubated and started on adrenaline infusion. Baby improved after 2 days of treatment. Seizure at the time of admission was controlled with IV phenytoin. Later she had 2 more episodes of seizures for which leviteracetam and later phenobarbitone were loaded. Repeat LP done on day 14 of antibiotics and culture was found sterile. Baby had persistent fever spikes hence suspecting complications, MRI brain was done and found to have subdural empyema. Bilateral burrhole craniectomy was done. Child was then improved, no further fever, seizure, feeding well and no focal neurological deficits noted. She is on regular follow up, and after six months her gross neurological development is normal but had sensorineural hearing loss and hydrocephalus.

The health authorities informed about the rare infection in an otherwise normal child. Later they found that the well water from their house and two

neighboring houses were contaminated with same organisms. Two adults in neighborhood had mild diarrhea. With immense effort, we could elicit the history of intake of honey mixed with some local medicines from the mother.

Discussion

Genus *Salmonella* comes under the family Enterobacteriaceae. Other than the typhoidal salmonellae, most frequently isolated serotypes under genus *Salmonella* are *Salmonella* Typhimurium and *Salmonella* Enteritidis.⁵ The most common route of transmission for the *Salmonellae* is feco-oral transmission. The infections caused by the nontyphoidal *Salmonellae* are usually asymptomatic, but there are also reported cases of diarrhea, bacteremia and rarely focal sepsis like osteomyelitis and meningitis.⁵ *Salmonella* species an important cause of gram negative meningitis in developing countries is associated with high complication and mortality rate.^{6,7}

Breast feeding decreases the risk of sporadic salmonellosis in infants.^{8,9} Neonates are at particular risk of infection because of reduced gastric acidity and peristalsis. *Salmonella* infection may develop secondary bacteremia which leads to meningitis, osteomyelitis, endocarditis, arthritis, UTI and pneumonia.⁵ Due to the immature immune system in the neonates the disseminated pattern prevails in this age group. This baby was on breastfeed and, there was no predisposing factors noted.

Acute bacterial meningitis in infants is a medical emergency, requiring prompt treatment with early initiation of intravenous antibiotic therapy even before the exact etiology is known. The combination of a third-generation cephalosporin with gentamicin, which is the recommended treatment for meningitis due to gram-negative bacilli, may not be appropriate while treating a facultative intracellular organism like *Salmonella*. Price et al., have suggested the combination of ciprofloxacin and ceftriaxone/cefotaxime for *Salmonella* meningitis.¹¹ Current recommendation of American Academy of Pediatrics for invasive non typhoidal salmonella is third generation cephalosporin for 4-6 weeks. In the current case we continued IV ceftriaxone and ciprofloxacin for 4 weeks and repeat culture was sterile.

Salmonella meningitis in infants, is associated with high incidence of complications including long-term neurological sequelae and thereby poor

prognosis. Hence early diagnosis is very crucial in determining the outcome.^{5,6} Majority of patient will have atleast one complication during the acute phase like hydrocephalus, subdural collection, cerebral infarction, cerebritis, ventriculitis, empyema or brain abscess.¹² Long term neurological sequelae consist of motor disability, language disorders, mental delay, epilepsy, sensory neural hearing loss, visual deficits, microcephaly, and hydrocephalus.^{12,13} High mortality (20-40%) and adverse neuro-developmental sequelae among 50-70% of survivors also reported by other authors.¹⁴

Present patient developed mild hydrocephalus with subdural empyema but with the medical management she attained favorable clinical response. She was on regular follow up, and after four months of discharge her gross neurological development is normal except for a mild sensorineural hearing loss.

It is advisable to keep the possibility of a nontyphoidal salmonella meningitis even in infants with normal immunological status. As the complications are high, early diagnosis followed by appropriate treatment along with the source identification to prevent further spread of the infection are critical and life-saving. Prognosis is guarded, and even treatment with sensitive antibiotics and supportive measures, one has to expect long term complications.

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