

Salmonella Typhi Meningitis in A Two Year Old Child: A Case Report

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ABSTRACT

Salmonella Typhi causes a varied range of diseases by virtue of its site specific localization in different areas of the body. Meningitis due to *S. Typhi* is rather rare owing to inhibition by the blood-brain barrier. In immunocompromised patients and in

neonates such cases have been reported. However, *Salmonella Typhi* as a cause of meningitis in a two-year old child is unusual but underscores the importance of public health measures in the locality.

CASE REPORT

We report here a case of meningitis in a 2 year old child after obtaining consent from her parents. The patient was brought to the Paediatric Emergency of our tertiary care hospital with chief complaints of fever, cough for 4 days and decreased oral acceptance since 1 day. There was history of few episodes of complex partial seizures accompanied with fever. No history of trauma or head injury or any similar episodes in the past were reported. The baby was born by normal vaginal delivery at our institute. There was a significant past history of birth asphyxia and the baby was admitted to the neonatal ICU for 15 days.

On general physical examination, patient was conscious, well oriented but uncomfortable. Pulse rate and BP were unremarkable. The patient had developmental delay. The Anterior fontanelle tip was open and 2 cm wide. She was not able to walk without support, had grade III malnutrition and anaemia. The differential diagnosis considered were bacterial or viral meningitis, or febrile seizures.

Computed Tomography scan revealed thin subdural collection under right fronto-parietal convexity, without causing significant mass effect, mild diffuse cerebral atrophy. Other systems appeared normal, no organomegaly was found. Laboratory investigations revealed leucocytosis (18,300/ μ l), erythrocytes were hypochromic microcytic with mild anisocytosis. At admission, electrolytes were deranged with hyponatremia (126 mEq/L) and hyperkalemia (6.5 mEq/L). Examination of cerebrospinal fluid (CSF) revealed sugar 28 mg/dl and

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protein 39 mg/dl. No cells were seen in CSF. CSF culture was done by standard bacteriological procedures [1,2]. Culture revealed pure and profuse growth of a non-lactose fermenter on MacConkey agar. The isolate was subjected to standard biochemical reaction protocols. Slide agglutination test was done using commercially available anti-sera (Denka antisera). Final diagnosis of bacterial meningitis due to *Salmonella Typhi* was made. The isolate was sensitive to ampicillin, co-trimoxazole, ciprofloxacin, ofloxacin, chloramphenicol, cefotaxime and ceftriaxone but resistant to nalidixic acid by disc diffusion method as per CLSI guidelines [3].

Patient was treated with ceftriaxone for two weeks along with anti-epileptic agents and antipyretics but steroids were not given. Patient's seizures were controlled after admission; she became a febrile after seven days and was discharged after 2 weeks of hospitalization. Blood cultures were collected twice during her stay in the hospital but no growth was observed. On follow-up, the patient did not complain of fever or seizures for 3 months after discharge from the hospital.

DISCUSSION

Salmonella spp. account for about 12-13% of cases of childhood bacterial meningitis, with around 90% of the cases occurring in children less than two years [4-6]. The incidence of typhoid is high in India. In a study conducted by WHO in urban slums of Kolkata, nearly 50% of all cases of typhoid were in the 5-15 years age group while 8% among 2-4 year group [7].

S. Typhi possesses virulence factors like intracellular invasion, fimbriae, polysaccharide capsule, which may assist in mucosal colonization, intravascular survival, meningeal invasion and survival in the subarachnoid space [8]. The outcome depends on the extent to which inflammatory mechanisms in the host, complement cascade, coagulation and fibrinolytic pathways are stimulated.

The first case of *S. Typhi* meningitis was reported by Ghon in 1907 [9]. Since, then sporadic case reports mainly involving children have been reported in the literature. Only 9 cases of *S. Typhi* meningitis in adults have been documented in the English literature since 1900 and most of these were reported in the pre-antibiotic era [10]. The intracranial infections due to *S. Typhi* may present as meningitis, subdural effusion, subdural or epidural empyema or brain abscess [11]. Seizures have been reported with *Salmonella enterica* brain abscesses [12,13]; in our case also, scant subdural collection was evident on CT Scan. *Salmonella* meningitis can be rapidly fatal as has been reported by Owusu-Ofori et al., in two cases [14].

The recommended treatment of *Salmonella* meningitis is high dose of the third generation cephalosporins for 4 weeks to prevent relapses and allow complete killing of the organism since most of these bacteria are intracellular [15]. However, in the present case, treatment could be given only for two weeks. The source of infection and mode of transmission was not clear in the present case. *Salmonella* (non-typhoidal) infection is frequently associated with animal reservoir and infection usually originates from food products [16]. In case of *S. Typhi*, it is usually faeco-oral portal of entry but after invading the blood stream, it may confine itself to any other focus in the body. The patient belonged to poor socio-economic status and could have acquired this infection from contaminated food or water. From the gastrointestinal tract, it may have invaded directly into blood stream and then to the meninges or it could have been aspirated during an episode of complex partial seizure.

CONCLUSION

Salmonella enterica sero type Typhi, is an uncommon but important cause of meningitis. It must be considered in the differential diagnosis if gram negative bacilli are observed on microscopy or culture of CSF. *Salmonella* meningitis can lead to further complications especially in younger children who have more risk of associated developmental delay. Hence, a thorough cognitive and developmental assessment is essential along with appropriate treatment of the pathogen.

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