

A RARE CASE OF SALMONELLA TYPHI MENINGITIS IN AN ELEVEN MONTH OLD INFANT: A CASE REPORT

V.U. Nwadike¹, A. Fowotade², K.E. Tuta¹ and O.O. Olusanya¹

1. Dept of Medical Microbiology, University College Hospital Ibadan, Nigeria.

2. Dept of Medical Microbiology, College of Medicine, University of Ibadan.

Correspondence:

Dr. V.U. Nwadike

Department of Medical Microbiology,
University College Hospital,
Ibadan.

E-mail: victornwadike@yahoo.com

Phone: +234-8060821879

ABSTRACT

Non-typhoidal *Salmonella* are infrequent causes of childhood meningitis. Most reports of *Salmonella typhi* meningeal infections are confined to neonates. A rare instance of *S. typhi* in an otherwise healthy eleven month old infant is being reported.

Keywords: *Salmonella typhi*, meningitis, infant.

INTRODUCTION

Worldwide, it has been estimated that approximately 35million cases and 500,000 deaths occur annually from *Salmonella typhi* infection.¹

Salmonella typhi is a rare cause of purulent meningitis. Since the earliest reviews on true typhoid meningitis by Cole in 1904 and Bayne Jones in 1917, sporadic case reports, mainly involving children have appeared 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 preantibiotic era.^{2,3} Common agents of infantile meningitis include *Escherichia coli*, *Haemophilus influenza*, and *Streptococcus agalactiae*.

A wide variety of antibiotics have been used in the treatment of typhoid meningitis with varying degrees of success. Long before now, neonatal meningitis caused by *Salmonella spp* had been reported in this institution.⁴ We now describe a case of purulent *S. typhi* meningitis in an 11-month old child.

Case Presentation

The case is that of an 11-month-old female infant admitted to the Pediatric emergency unit of the University College Hospital Ibadan, with a 2-day history of passage of loose stools, a day history of seizure, poor suck and high grade fever. There was no history of cough, vomiting, jaundice, passage of dark urine, or ear discharge. She started having seizures 1-day prior to admission, seizures were localized to the upper limbs and subsequently became generalized.

Physical examination revealed a well-nourished infant with a blank, vacant look and a temperature of 38.5°C. Neurological examination revealed some neck stiffness; global hypertonia and hyperreflexia. The ears, nose and

throat were clear and the cardiovascular and respiratory systems were normal. The liver was tipped and spleen was not enlarged. She had been admitted a day earlier with gastro-enteritis and had required rehydration with intravenous fluids in an outside facility.

A lumbar puncture done showed turbid cerebrospinal fluid (CSF) with a glucose level of 48mg/dl (RPG-119mg/dl) and a total white cell count of 5cells/*pl* (mainly lymphocytes). Protein was 25mg/dl. On CSF culture on MacConkey agar and blood agar, a heavy growth of a non-lactose fermenter was obtained after 24 hours incubation at 37°C. On biochemical testing, the organism was motile, citrate positive, urease negative and indole negative. Further subculturing on *Salmonella Shigella Agar* yielded blackish pigmented colonies which were confirmed as *Salmonella typhi* with Microbact 12E (Oxoid, UK). The isolate was susceptible to ceftriaxone, amikacin, cefuroxime, ceftazidime and chloramphenicol and resistant to cefepime.

Haematological studies showed the white cell count to be 10,400/mm³ with 45% neutrophils, 43% Lymphocytes and 12% monocytes; blood culture done 2days after CSF was collected yielded no growth after 7days of incubation. No bacterial pathogen was isolated from the stool sample.

On admission the patient was commenced empirically on Ceftriaxone 400mg and amikacin, all given intravenously at 12-hourly intervals. Even though the temperature came down to 36.8°C patient Glasgow Coma Scale continued to deteriorate, she later developed hypotension and died of cardiopulmonary arrest. Possibly as a complication of the meningitis.

DISCUSSION

Salmonella meningitis accounts for a very small proportion of all bacterial meningitis. The serotypes commonly encountered include *S. typhimurium*, *S. paratyphi B* and *S. typhi*.²

Salmonella species are ubiquitous human and animal pathogens. They are motile, non-encapsulated Gram-negative bacilli of the *Enterobacteriaceae* family. Among them *S. typhimurium* belongs to sero group B. Nontyphoidal salmonellosis is reported to be common in the United States and interestingly, *S. typhimurium* is the most frequently encountered organism.⁵ In fact, the largest epidemic of *S. typhi* in history occurred in Chicago in 1984.⁵

Infection is almost always by the feco-oral route. The source of infection could not be ascertained in this infant. The finding of diarrhoea and sepsis as the predominant manifestation in this child is similar to previous observations.^{6,7} *Salmonella spp.*, after invading the blood stream, have a unique capability of disseminating to cause a suppurative foci in almost any organ, most commonly bones and meninges. Focal infections including brain abscess and empyema have been reported.⁸

S. typhi meningitis differs considerably from other cases of pyogenic meningitis in children as 50-75% of cases occur in the first four months of life. This present report however occurred much later in infancy. The disease is characterized by a high incidence of complications, especially in neonates. Acute hydrocephalus, seizures, ventriculitis, abscesses, subdural empyema and long term neurological sequelae are known to occur in most cases.⁹

It has been recommended that salmonella meningitis should be treated with a third generation cephalosporin and the therapy should be prolonged for a minimum of three weeks.¹⁰ There are several possible reasons for the high mortality and neurological damage. *Salmonella* is a facultative intracellular micro organism hence inadequate drug penetration may result in progression of infection.^{11,12}

In conclusion, *Salmonella typhi* meningitis particularly in infancy remains a devastating disease with high mortality and a high prevalence of neurological damage. *S. typhi* should be included in the differential diagnosis of Gram-negative bacillary meningitis especially in children from areas in which typhoid is endemic.⁸

REFERENCES

1. **Edelman R**, Levine MM. Summary of an International workshop on typhoid fever. *Rev. Infect. Dis.* 1986; **8**:329-349.
2. **Coovadia VM**, Ori S, Bhamjee A. *Salmonella typhi* meningitis- A case report. *S Afr Med J* 1983; **64**: 28 - 29.
3. **Khan RB**, Khan ZM. Isolation of *Salmonella typhi* from a case of meningitis. *Malaysian J. Pathology* 1978; **1**: 97-99
4. **Barclays M**. High frequency of salmonella spp as a cause of neonatal meningitis in Ibadan Nigeria. *Acta Paediatrica*. 1971; **60**(5): 540-544 .
5. **Nimir RA**, Ibrahim R, Ibrahim AI. Salmonella meningitis in a paediatric patient caused by *Salmonella enterica* serotype Houtenae. *BMJ Case Reports* 2011; **10**: 1136
6. **Anwa P**, Kallamangalath ND, Vellappillil R. Salmonella typhimurium meningitis in a five month old infant-case report. *Kuwaiti Medical journal*. 2003; **36**(1): 45-46.
7. **Totan M**. Neonatal septicaemia Salmonella typhimurium meningitis. *Ind. J Pediatr*. 2001; **68**:1079-1080
8. **Abuekteish F**, Daoud A, Massadeh H, Rawashdeh M. *Salmonella typhi* meningitis in Infants. *Indian J. Pediatrics* 1996; **33**:1037-1041
9. **Wu H M**, Huang YW, Lee LM, Yang AD, Chaou KP, Hsieh LY. Clinical features, acute complications, and outcome of Salmonella meningitis in children under one year of age in Taiwan. *BMC Infectious Diseases*. 2011; **11**:30
10. **Cooke FJ**, Ginwalla S, Hampton M.D, John W, Farrington M, Ross-Russell R and Lever A. Neonatal report of neonatal meningitis due to *Salmonella enterica* Serotype Agona and review of breast milk-associated Salmonella Infections *Clin. Microbiol*. 2009; **47**:3045.
11. **Kinsella TR**, Yoger R, Shulman ST. Treatment of salmonella meningitis and brain abscess with the new cephalosporins: Two case reports and a review of literature. *Paediatr Infect. Dis. J.* 1987; **6**: 476-480.
12. **Torrey S**, Fleisher G, Jaffa D. Incidence of Salmonella bacteremia in infants with salmonella gastroenteritis. *J. Pediatr*. 1986; **108**: 718-725.