

Content available at: <https://www.ipinnovative.com/open-access-journals>

IP International Journal of Medical Microbiology and Tropical Diseases

Journal homepage: <https://www.ijmmt.org/>

Case Report

Rare case of neonatal sepsis due to *Salmonella Typhimurium*: A case report

Kiran Subhash¹, Ashish Jitendranath^{1,*}, Ramani Bai J T¹, Moby Sara Luke¹

¹Dept. of Microbiology, Sree Gokulam Medical College and Research Foundation, Thiruvananthapuram, Kerala, India



ARTICLE INFO

Article history:

Received 22-07-2022

Accepted 30-07-2022

Available online 06-09-2022

Keywords:

Salmonella

Typhimurium

Ceftriaxone

Stool

ABSTRACT

Neonatal sepsis due to Salmonella species, though rare, can result in increased morbidity and mortality. Amongst the different species of Salmonella, *Salmonella typhimurium* most commonly presents as a case of gastroenteritis. We present a case of a newborn with *Salmonella typhimurium* sepsis, who was treated successfully and had recovered.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprint@ipinnovative.com

1. Introduction

The spectrum of diseases caused by *Salmonella* spp is vast, ranging from gastroenterocolitis to sepsis and even meningitis. Sepsis due to *Salmonella* spp is comparatively rare in paediatric populations, especially neonates. In an extensive study detailing the etiology of neonatal sepsis, there were no cases of *Salmonella* spp isolated out of 840 positive samples.¹ Though infrequently reported, it can present with serious complications. An avirulent strain of *Salmonella* spp, can cause significant morbidity in a neonate.²

Similar to Typhoidal *Salmonella*, Non Typhoidal *Salmonella* also cause significant human diseases. Most of the times, the clinical presentation is as self-limiting gastroenteritis. Invasive NTS is more commonly seen in neonates, elderly and immunocompromised patients.³ We report the case of a new born baby who had sepsis due to *Salmonella Typhimurium*.

2. Case Report

A 28 year old G3P1L1A1 female with 35 weeks of amenorrhea, spontaneously delivered a female baby by normal vaginal delivery in our tertiary care centre. The mother had been admitted one day prior, with complaints of intermittent lower abdominal pain and increased frequency of passing loose stools. Rapid Antigen Test (RAT) came out positive for the mother.

The neonate was preterm with a low birth weight of 2.28 kg. The Apgar score was 9 and 10 at 1 and 5 minutes respectively. She was admitted to the neonatal intensive care unit after having developed respiratory distress within 4 hours of post natal life, which progressed into severe tachypnea. General examination revealed the baby to be febrile, (temperature - 38 C). Respiratory rate was 78/min and heart rate was 170/min. Capillary refill time was within normal limits. There was no focus of infection. The baby was administered supportive care and oxygen by hood method. Provisional diagnosis of neonatal sepsis was made. Sepsis screening was done and parenteral amikacin was started by intravenous route after blood sample was drawn for automated blood culture and sensitivity. Total leukocyte count was elevated, CRP and electrolytes were within normal limits. Breastfeeding of baby was commenced.

* Corresponding author.

E-mail address: ashishjit11@gmail.com (A. Jitendranath).

Within 36 hours of post natal life, the condition of the baby had worsened; the skin had developed yellowish mottling, there was delayed capillary filling time along with decreased new born reflexes and poor sucking ability. Repeat blood culture sample was sent, and parenteral piperacillin tazobactam was added. Due to reduced skin turgor and tonus, she was started on intravenous fluids. Metabolic acidosis was diagnosed on performing a venous blood gas, which required a bolus of normal saline. Repeat blood counts revealed leukopenia. Sample was sent for SARS- CoV-2 RT PCR, which came out negative. Due to there being no improvement in the condition of the baby, umbilical vein catheterization was carried out and the antibiotics were changed to injection meropenem and vancomycin.

The blood cultures were processed at the Department of Microbiology by standard methods. There was no growth detected from the initial set of blood culture bottles sent. On the third day of incubation, the second blood culture bottles flagged positive and growth was identified to be *Salmonella Typhimurium* VITEK 2 as well as biochemical reactions. Antibiotic susceptibility tests were performed by both automated (broth microdilution, VITEK 2) as well as disk diffusion techniques. The isolate was sensitive to cotrimoxazole and meropenem and resistant to ceftriaxone, ciprofloxacin and piperacillin - tazobactam. Therapy was altered to remove vancomycin.

Cerebrospinal fluid was procured by performing a lumbar puncture, which yielded no growth and was suggestive of normal study.

The baby was placed in isolation according to hospital policy due to the possibility of a nosocomial infection.

By the 5th day of post natal life, the condition of the baby had improved and she had started tolerating regular feeds. Umbilical catheter was removed and blood was sent for repeat culture and sensitivity, yielding no growth. The baby was discharged after having completed 14 days of intravenous antibiotics.

The mother had given history of consuming food from a nearby restaurant 2 days prior to delivery, following which she had developed her presenting complaints. All her symptoms had subsequently subsided and was later asymptomatic. Concurrently, stool and blood samples of the mother were sent for culture and sensitivities, of which stool sample grew *Salmonella Typhimurium* with the same sensitivity pattern. Breast milk sample of the mother was sterile. The mother was referred to Internal Medicine and was advised to start oral cotrimoxazole.

After preliminary identification of the organism and antibiotic sensitivity, the strain was sent to Christian Medical College, Vellore for confirmation of sensitivity.

3. Discussion

Neonatal sepsis is one of the leading causes of neonatal mortality in India. Gram Negative bacteria are the

predominant etiological agents, with *Klebsiella pneumoniae* being the most common.⁴ Sepsis in neonates due to both typhoidal and non typhoidal salmonella have been reported.

Non typhoidal Salmonellosis in man has a varied presentation, ranging from mild to severe, including gastroenteritis, sepsis, osteomyelitis.⁵ Usually, they are localised in the alimentary canal and do not require treatment with antibiotics, however neonates are especially vulnerable to infections by this organism which can cause significant morbidity. Cases of neonatal meningitis and brain abscess have been reported with NTS as the causative agent.⁶ Neonatal septicaemia due to *Salmonella Typhimurium* have occurred as outbreaks in new born nurseries, with certain cases ending in fatality.^{7,8} Pooled breast milk has also been linked in outbreaks of sepsis due to *Salmonella Typhimurium*.⁹

The modes of transmission have been postulated to be horizontal or vertical, including faecal contamination of the birth canal. In the present case, the mother was symptomatic at the time of delivery with a history of consumption of food from external sources. Since it was an early onset sepsis in the neonate, the transmission could have been transplacentally or through the birth canal at the time of delivery.

Antibiotic resistant non typhoidal Salmonella has been gradually emerging and this case evidently reflects it. The isolate was found to be resistant to ampicillin, ceftriaxone, ciprofloxacin and piperacillin - tazobactam. The baby had recovered on treatment with meropenem, which was found to be sensitive. The increasing resistance pattern being encountered will eventually jeopardise the options for the successful treatment of Non Typhoidal Salmonella infections.

4. Conclusion

Clinical features of sepsis due to Salmonella spp do not differ much from sepsis due to other Gram negative bacteria. Identification of Non Typhoidal Salmonella septicaemia requires a high degree of suspicion. Promptly sending blood culture samples in symptomatic neonates before starting antibiotics is an absolute necessity in order to correctly diagnose and treat the case

5. Conflict of Interest

None.

6. Source of Funding

None.


References

1. Delhi Neonatal Infection Study (DeNIS) collaboration. Characterization and antimicrobial resistance of sepsis pathogens

- in neonates born in tertiary care centres in Delhi, India: a cohort study. *Lancet Glob Health*. 2016;4(10):752–60. doi:10.1016/S2214-109X(16)30148-6.
2. Jain SC, Bhakoo ON. Salmonella infection in the newborn. A review with special reference to nursery epidemics. *Indian Pediatr*. 1979;16(7):629–35.
 3. Yen YF, Wang FD, Chiou CS, Chen YY, Lin ML, Chen TL, et al. Prognostic factors and clinical features of non-typhoid Salmonella bacteraemia in adults. *J Chin Med Assoc*. 2009;72(8):408–13. doi:10.1016/S1726-4901(09)70397-1.
 4. Verma P, Berwal P, Nagaraj N, Swami S, Jivaji P, Narayan S, et al. Neonatal sepsis: epidemiology, clinical spectrum, recent antimicrobial agents and their antibiotic susceptibility pattern. *Int J Contemp Pediatr*. 2017;2(3):176–80. doi:10.18203/2349-3291.ijcp20150523.
 5. Wittler RR, Bass JW. Non-typhoidal Salmonella enterica infections and bacteraemia. *Pediatr Infect Dis J*. 1989;8(6):364–7. doi:10.1097/00006454-198906000-00008.
 6. Singhal V, Saleem EK, Rajesh SM, Coutinho A. Neonatal Salmonella typhi meningitis: a rare entity. *J Clin Diag Res*. 2012;6(8):1433–4. doi:10.7860/JCDR/2012/4305.2380.
 7. Sasidharan CK, Rajagopal KC, Panicker CK. Salmonella typhimurium epidemic in newborn nursery. *Indian J Pediatr*. 1983;50:599–605. doi:10.1007/BF02957725.
 8. Buch NA, Dhananjaya A. A nursery outbreak of multidrug resistant Salmonella typhimurium. *Indian Pediatr*. 1998;35(5):455–9.
 9. Cooke FJ, Ginwalla S, Hampton MD, Wain J, Ross-Russell R, Lever A, et al. Report of neonatal meningitis due to Salmonella enterica serotype agona and review of breast milk-associated neonatal Salmonella infections. *J Clin Microbiol*. 2009;47(9):3045–9. doi:10.1128/JCM.01064-09.

Author biography

Kiran Subhash, Assistant Professor

Ashish Jitendranath, Associate Professor  <https://orcid.org/0000-0003-2132-332X>

Ramani Bai J T, Professor and HOD

Moby Sara Luke, Post Graduate

Cite this article: Subhash K, Jitendranath A, Ramani Bai J T, Luke MS. Rare case of neonatal sepsis due to *Salmonella Typhimurium*: A case report. *IP Int J Med Microbiol Trop Dis* 2022;8(3):267-269.