Salmonella Enterica Serotype Paratyphi B - An Unusual Pathogen in Sepsis Neonatorum

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ABSTRACT

Sepsis remains a significant cause of morbidity and mortality in newborns especially in the developing countries. Salmonellosis, a global public health problem is common in tropical countries. However Salmonella enterica serotype Paratyphi B causing neonatal sepsis is rare and the survival depends on high index of suspicion and appropriate empiric therapy. We here report a case of sepsis neonatorum due to Salmonella enterica serotype Paratyphi B in a four day old baby girl. Salmonella infections should be considered in the differential diagnosis of neonatal sepsis, especially in endemic areas.

KEY WORDS

Ceftriaxone, neonatal sepsis, respiratory distress, salmonellosis

INTRODUCTION

Salmonellosis is a major cause of bacterial enteric illness. Young children especially infants are more prone to infection and are at increased risk of severe complications like septicaemia and meningitis.[1] Neonatal sepsis due to *Salmonella* species is associated with significant morbidity and mortality. Although neonatal sepsis due to various *Salmonella* species have been reported in multiple instances but *Salmonella* enterica serotype Paratyphi B causing neonatal sepsis is rare.[2,3] Even though *S.enterica* serotype Paratyphi B causes a milder form of enteric fever than *S.enterica* serotype typhi, neonatal infections are uniformly fatal unless prompt and appropriate therapy is instituted.

We here report a case of neonatal sepsis due to *S.enterica* serotype *Paratyphi B.* To our knowledge this is the first case of neonatal sepsis due to *S.enterica* serotype Paratyphi B, to be reported from Uttarakhand state, India.

CASE REPORT

A four days old baby girl was brought to our paediatric emergency department with two days history of fever, difficulty in breathing and refusal to feed. She was preterm, delivered vaginally at a primary health centre in village, the weight at birth was 1.80 kg. Parents gave history of feeding the baby with water and mishri (local made sugar cubes), a common practice in villages to administer sweet water to the newborn babies. Her apgar score was not available. Mother was a 24 years old primigravida, was anaemic (haemoglobin 7.5 gm/dl), belonged to low socioeconomic status and was labourer by profession. On examination the baby was febrile (101°F), pulse rate 180 beats/min and respiratory rate 65 breaths/min. She appeared pale and dehydrated. Rest of the systemic examination was unremarkable. A diagnosis of sepsis neonatorum was made and a full sepsis profile was requested. The baby was transferred to the neonatal intensive care unit (NICU) and was started empirically on intravenous (IV) ampicillin (50 mg/kg BD) and gentamicin (5 mg/kg OD).

Laboratory investigations revealed haemoglobin 16.2 gm/dl, total leukocyte count 19,200 cells/µl with differential count being 78% neutrophils, 13% lymphocytes, 8% monocytes and 1% eosinophils. The C-reactive protein was 182.3 mg/lt and cerebro spinal fluid examination was within normal limits. Serum electrolytes, renal function tests and liver function tests were normal. The investigations were suggestive of sepsis.

Blood collected at the time of admission was flagged positive after 12 hours by BD Bactec 9120, an automated blood culture system (Becton Dickinson, USA). A subculture from the blood culture bottle was done on 5% sheep blood agar and Mac Conkey agar (MA). After 24 hrs MA showed growth of non lactose fermenting colonies. Based on the battery of biochemical tests the isolated gram negative bacilli was identified as *S.enterica* serotype Paratyphi B which was confirmed by agglutination with specific antisera (Remel Europe Ltd). Antimicrobial susceptibility of the isolate was performed by Kirby-Bauer disc diffusion method and the strain was found sensitive to gentamicin, amikacin, ceftriaxone, cotrimoxazole and was resistant to ampicillin, augmentin, ciprofloxacin and chloramphenicol. Based on the sensitivity profile ampicillin was omitted and ceftriaxone (50 mg/kg BD) was added to the regime.

During all this time, the patient remained critical and did not show any signs of improvement. On day three of her admission she became unwell, sluggish and refused oral feeds. Baby developed respiratory distress and focal tonic convulsions. She was given IV fluids, oxygen and phenobarbitone. It was at this time, when ceftriaxone was added to the regime and within 48 hrs patient showed remarkable recovery. Post 72 hrs of therapy oxygen was discontinued and on sixth day oral feed was started. This was a case of early onset sepsis and patient responded well to ceftriaxone. Parenteral antibiotics were continued for 14 days after which the baby was discharged and was thriving well on follow up of one month. Baby's urine & stool samples and mother's blood and stool samples were also cultured but didnot yield any significant growth.

DISCUSSION

Salmonella infections may be divided into five categories – gastroenteritis, enteric fever, bacteremia, meningitis and chronic carrier state.[4] Although *Salmonella* infections are on the rise these days, but is usually not considered in differential diagnosis of neonatal sepsis.[5] *Salmonellosis* is common in tropical countries and is found worldwide, however *S.enterica* serotype Paratyphi B causing neonatal sepsis is rare. In cases of *Salmonella* sepsis neonatorum the patients have severe septicaemia, the clinical presentation is varied and non specific especially in paratyphoid infections.[6] Classical features of enteric fever such as leucopoenia, spleenomegaly, abdominal distension, bronchopneumonia, rose spots and even fever may not be present.[5,7] Infants are often anorexic, irritable and may present with jaundice, diarrhoea, dehydration and respiratory distress, while some present with hypothermia, seizures and cough. Other presentations reported in literature include brain abscess, meningitis and neonatal cholecystitis.[1,4,5,8-10]

The possible routes of acquiring neonatal salmonellosis are by vertical transmission, feco oral route, environmental transmission through contaminated top feeds, via breast milk and transplacental route.[5,9] We speculate that transmission in this case was through exogenous source, as there was history of feeding the baby with water and mishri. Gastric acidity represents the initial barrier to *Salmonella* colonization and conditions that increase gastric pH significantly increase susceptibility to infection. Neonates and infants have hypochlorhydria and rapid gastric emptying which contributes to their increased vulnerability to salmonellosis. As in this case, the infants who are orally fed fluids, the infective dose is also comparatively smaller because of faster transit through the stomach.[2,11] Moreover the patient was a preterm, low birth weight baby; the two important factors which may have contributed in the development of infection.

Salmonella infections must be considered in the differential diagnosis of sepsis neonatorum especially in *Salmonella* endemic areas. Although *Salmonella* enterica serotype Paratyphi B causes a milder form of disease as compared to *Salmonella* enterica serotype typhi, the survival depends on high index of suspicion and appropriate antimicrobial therapy. In the present case, prompt diagnosis and early institution of appropriate therapy saved the baby.

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