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Case Report

Microbiology Section

Shigella sonnei Sepsis in an Infant: A Case Report

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ABSTRACT

Shigella bacteraemia is a complication of gastroenteritis caused by *Shigella* spp. which occurs mainly in immunocompromised children. Other risk factors may include young malnourished children, patients with chronic disease, post transplant patients etc. We present a case of six-month-old infant who developed an episode of gastroenteritis caused by *Shigella sonnei* which was followed by septicaemia. The patient was managed well and he recovered. *Shigella sonnei* was isolated in both stool as well as blood culture. *S.sonnei* bacteraemia is a rare condition but we should always be vigilant. Blood cultures as well as stool cultures should be performed in patients presenting with acute febrile gastroenteritis, whether immunocompromised or not. This simple, early and prompt investigation may help in precise diagnosis, which will guide the clinician about appropriate intervention like antibiotic therapy and supportive care.

Keywords: Bacteraemia, Diarrhea, Six-month-old

CASE REPORT

A six-month-old male infant presented to our hospital with multiple episodes of watery diarrhea, vomiting, high grade fever for past 10 days. Infant belonged to low socio-economic status, was born in hospital as full term child with a birth weight of 2.4 kg and was immunized appropriately for age. The child was on bottle feed.

On physical examination, the infant weighed 4.4 kg. He was ill looking, malnourished, lethargic with distended abdomen, had sunken eyes, delayed skin pinch and other signs of severe dehydration. The heart rate was 150/min; respiratory rate 34/min had a low volume pulse and cold peripheries. BP was not recorded at that time. The infant was treated with i.v. ceftriaxone 50 mg BD, i.v. fluids (R/L 50 ml stat followed by 90 ml in next 1 hour and 210 ml over next 5 hours) and inj. ondansetron 0.6 mg SOS.

Considering septic shock and other relevant investigations were done [Table/Fig-1]. Stool culture was performed on MacConkey and Xylose Lysine Deoxycholate agar. Non-lactose fermenting colonies were subjected to further processing. Blood culture was performed using Bactec FX200. Blood culture bottle flagged positive 24 hours later. Final identification and antibiotic susceptibility testing was done by Vitek 2C. Stool as well as blood culture yielded *Shigella sonnei*. The species was confirmed by serotyping using specific antisera (Denka Seiken. Co. ltd, Tokyo, Japan.). The isolate was sensitive to ampicillin (4 µg/ml), ceftriaxone (E test-MIC 0.64 µg/ml), ciprofloxacin (E test-MIC 2 µg/ml), amoxicillin-clavulinic acid (MIC ≤2 µg/ml), piperacillin-tazobactam (≤4 µg/ml), cefepime (≤1µg/ml), imipenem (≤0.25 µg/ml), meropenem (≤0.25 µg/ml). The isolate was resistant to nalidixic acid (MIC ≥32 µg/ml), trimethoprim-sulphamethoxazole (MIC 160 µg/ml) and had intermediate susceptibility for chloramphenicol (1.5 µg/ml).

The frequency of stools decreased over next two days. Child started taking feeds orally. Signs of dehydration improved and vitals became stable by fourth day. The child recovered and was discharged.

DISCUSSION

Shigella bacteraemia is a rare condition, occurring mostly in children and immunocompromised adults [1-3]. Shigellosis still remains an important public health problem in developing countries. It is usually a self limiting disease remaining confined to the gastrointestinal tract [4-6]. The disease is transmitted by feco-oral route and has an incubation period of 12 hours to one week. The spectrum varies from mild to severe and fatal disease [6]. Blood stream invasion occurs only in 0.4% to 7.3% of cases [4,5]. Other extraintestinal sequelae include urinary tract, joints, central nervous system infections and may rarely lead to bacteraemia and septic shock [4,6].

Shigella infection is caused by *Shigella dysentriae*, *Shigella flexneri*, *Shigella boydii* and *Shigella sonnei* [3]. *Shigella* bacteraemia is mostly caused by *Shigella flexneri* and *Shigella dysenteriae* type 1. *Shigella flexneri* is known to be the most virulent species and it is also the most common isolated species in the developing countries [4,5].

Shigellosis continues to remain an important public health disease in the developing and the underdeveloped countries [4]. It is usually a self limited disease which subsides with a week or 10 days. Rarely, it may lead to fatal complications like bacteraemia. *Shigella* bacteraemia is mostly caused by *Shigella flexneri* [7]. Very few cases of *Shigella* bacteraemia caused by *Shigella sonnei* are known in literature. *Shigella* bacteraemia is seen in immunocompromised people, young or malnourished children in endemic countries [2,4]. *Shigella* infection is usually confined to the gastrointestinal tract causing diarrhoea, dysentery, abdominal cramps or fever [3-5,8].

Shigella bacteraemia is known to be a rare condition as the bacteria usually does not cross the lamina propria. However under certain conditions the lysis and opsonization of the bacteria is interrupted because of exudative loss of immunoglobuins, plasma proteins, complements etc. This process is carried out by a mixture of soluble

Investigation	Haemoglobin (gm/dl)	TLC (/mm^3)	DLC	Platelet (/mm^3)	Serum Creatinine (mg/dl)	Serum Urea (mg/dl)	Serum electrolyte Na K Cl
Result	14	16,700	P-65,L-28,E-1,M-4	5,80,000	0.9	5.7	137 7.6 99

[Table/Fig-1]: Results of laboratory investigations.

bacterial proteins encoded by a 140-MD plasmid. This may lead to bacteraemia [5].

Prognosis of *Shigella* bacteraemia is poor in children, especially in infants and children with severe malnutrition [2]. Shigellemia in adults has a better prognosis and is seen in high risk groups like diabetes mellitus, hypertension, chronic disease, autoimmune hemolytic anaemia, sickle cell anaemia, and post solid organ transplantation [1,7].

S. No.	Year	Cases	Age	Outcome	Blood culture *Shigella* spp	Reference
1	1961-1970	6	4 month-6 year	1 recovered	*S.dysenteriae* (3) *S. flexneri* (2) *S. sonnei* (1)	[9,10]
2	1971-1980	10	4 month-17 years	1 recovered, 3 died	*S. dysenteriae* (7) *S.flexneri* (3)	[11,12]
3	1981-1990	3	1-2 year	1 recovered/ 1 died/	*S.dysenteriae* (1) *S.flexneri* (2)	[13,14]
4	1991-2000	0	-	-	-	
5	2001-2010	5	2 month-3 year/44 year	1Recovered/ 3 died/1 LAMA	*S.dysenteriae* (3) *S.flexneri* (2)	[15,1]
6	2012	1	65 years	Recovered	*S.flexneri*	[16]
7	2013	1	6 month	Died	*S.flexneri*	[4]
8	2015	1	23 years	Recovered	*S.flexneri*	[5]
9	2016 (our case)	1	6 month	Recovered	*S. sonnei*	

[Table/Fig-2]: Cases of *Shigella* bacteraemia reported in paediatric population in India. LAMA-left against medical advice.

In India, around 27 cases of shigellaemia have been reported between 1945 and 2015. Appannanavar et al., have described 23 cases reported till 2002 [1]. We provide details of four more cases isolated between 2010 and 2015, all four of them being *S. flexneri* [Table/Fig-2] [1,4,5,9-16]. The majority of patients were children less than five years. Three cases were adults (23, 44 and 65 years). The most common *Shigella* spp was *S.dysenteriae* (n = 14) followed by *S. flexneri* (n = 12) and *S. sonnei* (n = 1). Out of 27 cases, 20 patients died leading to a mortality rate of 74%. As we see in the table, till 2010, the number of cases belonged more to *S.dysenteriae* and after 2010 all the cases isolated were *S.flexneri*. More of adult cases have been isolated since 2010, three out of four being adults. This may indicate a changing trend of species and cases distribution. Risk factors present in children were anaemia, marasmus, post measles, chronic disease and renal failure. Two of the adult patients had chronic kidney disease and one of which was a case of post renal transplant. Some of the cases did not have any risk factors. A point to be highlighted is that all the three adult cases recovered whereas children less than five years had a poor prognosis.

Children are at a higher risk of having fatal outcomes. Thus, active investigations and timely interventions could become life saving in such cases.

CONCLUSION

We report a case of *S.sonnei* bacteraemia associated with gastrointestinal manifestations having good prognosis. *S.sonnei* bacteraemia is a rare condition but we should always be vigilant. Blood cultures as well as stool cultures should be performed in patients presenting with acute febrile gastroenteritis, whether immunocompromised or not. This simple, early and prompt investigation may help in precise diagnosis which will guide the clinician about appropriate intervention like antibiotic therapy and supportive care.

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