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Case Report

Microbiology Section

Multidrug Resistant *Shigella Flexneri*: A Rare Case of Septicemia in an Infant

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ABSTRACT

Shigellosis is still an important public health problem in developing and under-developed countries. It may lead to rare but potentially fatal various extra intestinal complications like septicemia, involvement of CNS, urinary tract and liver especially in young malnourished children. The disease is difficult to prevent as only few bacteria are required for causing infection and there is increasing infection with multi drug resistant strains. A 6-month-old infant developed septicemia caused by multi drug resistant *Shigella flexneri* during an episode of gastrointestinal infection. The patient was managed in the emergency ward but unfortunately the infant expired. Considering septic shock, blood culture, stool culture and other relevant investigations were done. Stool as well as blood culture yielded *Shigella flexneri*. The isolates were multidrug resistant. Following is a rare case presentation of Shigella septicemia with severe shock, DIC and convulsions. The case report demonstrates how shigellosis can lead to a rare life threatening complication and hence should be considered as a possibility in septicemia associated with diarrhea and vomiting in infant and young children.

Keywords: Infant, Multidrug resistant, *Shigella flexneri*, Septicemia

CASE REPORT

A 6-month-old male infant from North Delhi area brought to Hindu Rao Hospital in December 2013, belonging to low socio-economic status presented with multiple episodes of watery diarrhea, vomiting, high grade fever, dry cough and difficulty in breathing from past one week. Infant was immunized appropriately for age and was born in hospital as a full term child with a birth weight of 2.5 kg. The child was on bottle feed along with breast feeding. On physical examination, the infant weighing 4.66 kg was ill looking, malnourished, lethargic, abdomen distended and with peripheral cyanosis. The heart rate was 160/min, respiratory rate 68/min and BP was not recordable on examination [Table/Fig-1]. On auscultation crepitations and ronchi were noticed. Infant developed seizures on the day of admission. The infant was treated in the emergency ward with mechanical ventilation, intravenous antibiotics (amikacin, amoxicillin/clavulanic acid), anticonvulsants, fluids and ionotropics. Later on vancomycin, meropenem and metronidazole was added to the treatment regime. The infant subsequently received two units of blood along with fresh frozen plasma and platelet transfusion. Blood culture was performed using BACTEC 9120 and identification and susceptibility testing was done by Vitek 2C. Considering septic shock, blood culture, stool culture and other relevant investigations were done. Stool as well as blood culture yielded *Shigella flexneri*. The isolates were resistant to cotrimoxazole (>320µg/ml), piperacillin (MIC> 128µg/ml), piperacillin-tazobactam (MIC>128µg/ml) combination, cefotaxime (MIC 32µg/ml), ceftriaxone (MIC 8µg/ml), cefepime (MIC 64µg/ml), aztreonam (MIC>64µg/ml), imipenem (MIC 4µg/ml), amikacin (MIC 16µg/ml), gentamicin (MIC 4µg/ml), tobramycin (MIC 4µg/ml), ciprofloxacin (MIC>4µg/ml), levofloxacin (MIC>8 µg/ml) and sensitive to ertapenem (MIC< 0.5µg/ml), meropenem (MIC 0.5µg/ml) and tigecycline (MIC< 0.5µg/ml). However the patient expired.

DISCUSSION

Shigellosis is mainly caused by *Shigella dysentery*, *Shigella flexneri*, Shigella boydi, and *Shigella sonnei. Shigella dysentery* type 1 and *Shigella flexneri* are among the most toxic of serotypes associated with septicemia [1,2]. Infection is transmitted through feco-oral route with incubation time of 12 hours to one week. Clinically, the infection can result into mild to severe and fatal disease. Risk factors for developing septicemia in shigellosis include young age, malnutrition and immune-suppression. There are limited reports available in India regarding Septicaemia due to Shigella species [2-6]. Shigella infection is generally restricted to the gastrointestinal tract. Bloodstream invasion is rare and is reported to occur in 0.4%-7% of patients [1,4]. Blood cultures are not routinely done in diarrhoea or dysentery patients which may account for apparently lower incidence of septicemia due to Shigella sp. Young age and malnutrition are the two most important risk factors associated with bacteremia [1]. It is locally invasive due to effect of enterotoxin on intestinal epithelial cells. Gastrointestinal infection with Shigella causes enterocolitis resulting in exudative loss of immunoglobulins, complement and various plasma proteins [1]. It minimizes lysis and opsonization of invading bacilli which may finally end up with overwhelming sepsis. Shiga toxin is also responsible for neurotoxicity associated with severe sepsis [4].

In our case, infection was caused by a multidrug resistant strain of *Shigella flexneri* which is consistent with the reports of similar previous studies [1,2,4] Yen et al.,from Taiwan also reported *Shigella flexneri* septicemia in an infant [1]. A case report from Mumbai described four cases of Shigella septicemia, three caused by *Shigella dysentery* serotype 1 and one by *Shigella flexneri* with a mortality rate of 75% [2]. All these isolates were sensitive to gentamicin, amikacin, norfloxacin and nalidixic acid while resistant to amoxicillin, chloramphanicol, tetracycline and cotrimoxazole. Vassil St. Georgiev reported septicemia caused by *Shigella sonnei* in a newborn [7]. Sharma and Arora reported an uncommon case of *Shigella flexneri* bacteremia in an adult [8] from New Delhi as also reported by a few other authors [9]. An antimicrobial resistance of 40%,33%,70% and 64% has been reported by Mache for chloramphanicol, cotrimoxazole, ampicillin and teteracycline, respectively among pediatric outpatient Shigella isolates in Southwest Ethiopia [10].

A dehydration of more than 10%, malnutrition, low serum albumin, leucopenia, prolonged and protracted diarrhoea as well as

Investigation	Hemoglobin (gm/dl)	TLC (/mm^3)	DLC	Platelet (/mm^3)	PT	CRP	Serum Creatinine (mg/dl)	Urea (mg/dl)	Serum electrolytes		
									Na+	K+	Ca+
Day 1	9	3500	P-72,L-20,E-5,M-3	170000	24.7	32	0.9	72	139	4.4	1.06
Day 2	8.9	3400	P-60,L-31,E-6,M-3	70000	21.9	38	0.9	63	140	4.4	1.11
Day 3	7.8	3700	P68,L-24,E-4, M-4	52000	25	36	0.8	60	141	3.5	0.98
Day 4	11.4	6000	P-68,L-24,E-6, M-2	35000	26	43	0.8	60	146	3.5	0.96

[Table/Fig-1]: Results of laboratory investigations *
*(as from our hospital lab)

persistent bloody stools and infection with a multidrug resistant strain are associated with poor prognosis [2,4]. The condition needs to be treated aggressively with institution of appropriate parenteral antimicrobial agents, IV fluids or blood administration for maintenance of intra vascular volume. Appropriate and timely antimicrobial therapy not only shortens the duration of fever and shedding of organisms form stools but also results in fewer complications. To prevent the emergence of multidrug resistant Shigella, it is important to evaluate the choice of antimicrobial therapy and optimal duration of treatment [11].

CONCLUSION

The present study emphasizes that Shigella infection should be considered as a differential diagnosis when encountering severe sepsis associated with diarrhoea and vomiting in infants and young children. Condition needs to be treated promptly because of its rapid course of progression. Physicians should be aware of this fact while treating such patients especially when the patient remains unresponsive even after 48 hours of empirical antibiotic treatment. An aggressive treatment with appropriate antimicrobial agents, vigilant monitoring and good supportive care could be life saving in these patients and can prevent otherwise grave outcome.

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