

Septicaemic invasion by *Shigella flexneri*

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Abstract: *Shigella* infections are usually restricted to the intestine. There are few reports of *Shigella* isolated from the blood and most of these are from children, usually in neonates and the malnourished. In the small number of adult cases of *Shigella* bacteraemia which have been reported, there appears to be some kind of association with underlying disease and immunosuppression including acquired immunodeficiency syndrome. We report a case of septicaemia due to *Shigella flexneri* in a 55 year old male.

Keywords: Bacteraemia; Shigellaemia; immunosuppression; MIC

INTRODUCTION

Shigellosis has a global distribution and is one of the important pathogens responsible for bacterial dysentery which is a common gastrointestinal disease of the developing countries. The infection is transmitted by faeco-oral route. The prevalence of the disease is highest in the developing countries with bad hygienic conditions and poor sanitation [1]. Bacteraemia is rarely documented in shigellosis. This observation might be explained by the fact that blood cultures are not taken routinely from many patients with dysentery or diarrhoea, but studies that have specifically investigated this hypothesis have shown that the rarity of shigellaemia is real. Bacteraemia appears to occur with greater frequency in neonates, malnourished children and the immunosuppressed [2].

Shigella infections are usually restricted to the intestine. The organisms are locally invasive, probably due to the effects of an enterotoxin on epithelial cells. *Shigella* bacteraemia seems to be a very rare accompaniment of shigellosis. In a review of the literature in 1964, Faucon and Ducloux found 101 cases described between 1912 and 1962 [3].

Several studies have demonstrated that when *Shigella* bacteraemia occurs in adults it is usually associated with underlying disease like malnutrition [4]. Other conditions which have been associated include: diabetes, leukaemia, sickle cell anaemia, malignancy, cirrhosis, and immunosuppression and HIV infection [5].

CASE REPORT

A 55 yr old male with a history of uncontrolled Type II diabetes for past 07 years and a known chronic smoker was admitted to this hospital with the history of

fever, breathlessness and 8-10 episodes of loose motions for last 08 days. Patient gave a history of using tap water for drinking purpose.

On examination, the patient was lethargic, pale, dehydrated, had a temperature of 100°F and pulse rate of 140/mm. His chest was clinically clear. His abdomen was found to be tender with mild umbilical pain. Pedal oedema was also present. Heart rate was 126 beats per minute, respiratory rate 25/minute and blood pressure was 83/57 mmHg.

On admission his blood, stool and urine samples were tested. Complete blood count revealed Haemoglobin 8.8 mg/dl, Total Leukocyte count: 12300/cu mm (N:61%, L:22%, M: 01%, E: 02% and B: 0%), Platelet count- 135 x 10³ /µl, ESR: 123 mm/1st hr. General blood picture showed moderate anisocytosis with few macro-ovalocytes, tear drop cells and target cells. No haemoparasite was seen. Urine on routine microscopy showed traces of protein with occasional RBCs. Liver function tests revealed total bilirubin to be 1.6 mg/dl with other parameters being normal. Renal Functions Tests were normal.

His stool as well as blood, both was sent for culture. Culture of stool was done on MacConkey agar and Deoxycholate Citrate Agar which grew non lactose fermenting colonies after incubation at 37° C for 24 hours and was identified using automated identification system (Vitek 2 compact, bioMerieux) as *Shigella flexneri*.

Culture of blood was carried out using automated method (BacT Alert 3D system, bioMerieux) which on subculture revealed pure growth of non motile Gram negative bacilli, the colonies were oxidase

negative and catalase positive. The organism was identified as *Shigella flexneri* using automated identification system (Vitek 2 compact, bioMerieux). Both the isolates i.e., from stool as well as blood were found to be sensitive by MIC (minimal inhibitory concentration) to ceftriaxone, cefepime, cefoperazone-sulbactam, colistin, ertapenem, meropenem, imipenem, piperacillin-tazobactam, tigecycline, and cotrimoxazole. This isolate was further confirmed by serotyping.

Patient responded well to aggressive treatment with antibiotics, control of blood sugar and rehydration. He recovered well and was discharged 5 days after the initiation of antimicrobials.

DISCUSSION

There is increasing evidence to suggest that when *Shigella* is isolated from the blood, a thorough search for an underlying cause of immunosuppression should be made. Invasion of the blood stream occurs in only 0.4% to 7.3% of patients and has been thought to be a rare event if there are no coexisting risk factors such as malnutrition or young age [6]. *Shigella* bacteremia is mostly caused by *S. flexneri*, which has been reported to be more virulent than other *Shigella* species, and it is the most commonly isolated species in the developing world [7]. Though an invasive disease, it usually do not reach the tissue beyond the lamina propria and hence very rarely cause bacteremia except under very special circumstances like immunocompromised status. Since the mechanism of bacteremia remains unclear, invasiveness may be associated with a mixture of soluble bacterial proteins encoded by a 140-MD plasmid and may lead to a net exudative loss of immunoglobulins, complement and other plasma proteins required for lysis and opsonization of invading bacilli, and this may pave the way for overwhelming sepsis to occur [8].

In the present case, the source of infection was found to be the contaminated drinking water. His uncontrolled diabetes might have acted as the immunocompromised situation helping the organism to invade the lamina propria and lead to septicaemia.

Shigella bacteremia is often associated with a high mortality with a case fatality rate of 46% [9]. The condition needs to be treated aggressively with institution of appropriate parenteral antimicrobial agents, IV fluids or blood administration for maintenance of intravascular volume. Appropriate and timely antimicrobial therapy not only shortens the duration of fever and shedding of organisms from stools but also results in fewer complications.

CONCLUSION

Septicaemia due to *Shigella flexneri* though rare but is not unexpected. Any case showing gastrointestinal symptoms along with features inclined towards sepsis should be thoroughly investigated so as

to treat the infection with sensitive antimicrobials. Since drug resistance has emerged as a major obstacle in treatment against a large proportion of cases not responding to empirical therapy, a targeted antibiotic would help in delaying the emergence of drug resistance.

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