Non-typhoidal salmonella sepsis with severe small bowel diarrhoea and acute kidney injury in an immunocompetent patient

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ABSTRACT

Non-typhoidal salmonella serovars mainly cause enteric infection, but it can also rarely cause invasive infections.These invasive infections are mostly seen in immunocompromised subjects. We are reporting a case of non-typhoidal salmonella sepsis in a 60 year old individual. He presented with severe small bowel diarrhoea mimicking cholera. Blood cultures grew *Salmonella enteritidis*. He had severe acute kidney injury requiring hemodialysis. The clinical course was protracted with diarrhoea subsiding only after 12 days. He was treated with two weeks of intravenous ceftriaxone.

Keywords: *Gastroenteritis, Non-typhoidal salmonella, Salmonella enteritidis, Small bowel diarrhoea.*

Salmonellae are Gram-negative motile bacilli, which belong to the family Enterobacteriaceae. They are broadly categorized as *Salmonella typhi, S. paratyphi* and non-typhoidal Salmonella [NTS]. Typhoidal serovars are known to cause systemic infections whereas non-typhoidal serovars of Salmonella are mostly associated with gastroenteritis [1]. Estimates suggest that NTS accounts for 93 million enteric infections and 155,000 associated deaths annually [1]. Though NTS organisms mainly cause enteric infection, it can rarely cause invasive infections. These invasive infections are mostly seen in immunocompromised subjects [1]. The ability of NTS to cause invasive infections in immunocompetent patients is generally overlooked.

Our case is unique as it is not only rare for NTS to cause invasive infections in immunocompetent individuals, but also to present as diarrhoea mimicking cholera and causing severe acute kidney injury.

CASE REPORT

Our patient was a 60-year-old male, gardener by occupation, with no comorbidities. He presented to the emergency department of our hospital with a history of loose stools of 2 days duration. It was large volume diarrhoea, watery with no blood or mucus, with a frequency of more than 15 episodes per day. There was no history of fever, abdominal pain or vomiting. There was no recent history of travel or consumption of food items from restaurants.

On examination, he was severely dehydrated with tachycardia of 120 per minute and blood pressure of 90/60 mm of Hg. He was anuric for the initial 6 hours. His blood investigations were suggestive of severe acute kidney injury (AKI) (Table 1).

Blood and stool cultures were sent. He was given adequate fluid resuscitation (8L in first 6 hours) guided by point of care ultrasonography and was started on intravenous ceftriaxone 2 grams once daily and oral doxycycline 300 milligrams stat dose. As stool examination by hanging drop and stool culture did not reveal evidence of *Vibrio cholera,* doxycycline was discontinued. His blood culture grew *Salmonella enteritidis*, which was sensitive to ceftriaxone and quinolones. Stool cultures did not grow any pathological organisms.

With initial management, the patient became hemodynamically stable, urine output improved and the metabolic acidosis was partially corrected. Loose stools persisted with the same severity in subsequent days. Intravenous fluids were continued. Lactated ringer and isotonic sodium bicarbonate solution were used. The mean fluid requirement per day during these four days was 6.5 ± 0.4 liters. He maintained a urine output of around 1.5 liters per day for the initial four days. As he continued to have multiple episodes of watery stools with further worsening of blood urea nitrogen (BUN) and serum creatinine, he was initiated on intermittent hemodialysis through femoral temporary dialysis catheter.

He received three sessions of hemodialysis. Stool frequency and volume reduced after 8 days of hospital stay and resolved by the 12th day. Renal function also started improving. However, he developed hypoalbuminemia (serum albumin 2.1g/dl) along with pedal edema, ascites, and pleural effusion. Dietary protein intake was increased to 1.7g/kg/day and oral furosemide was started, following which there was a gradual resolution of edema. He received 14 days of ceftriaxone and was discharged after 14 days of hospital stay. On follow-up visit after 1 week, the patient was euvolemic, serum creatinine was 1.5mg/dl and serum albumin was 3.4g/dl.

Table 1: Initial blood investigations from emergency room

Investigation	Values	Investigation	Values
Haemoglobin-g/dl	18.2	pH	7.31
WBC count-/µl	21900	Bicarbonate-mEq/L	9.2
Differential count	Neutrophils - 92%	pCO2-mm Hg	18.7
Platelet count-/µl	82,000	Lactate-mmol/L	1.7
BUN-mg/dl	71	Anion gap-mEq/L	8
Creatinine-mg/dl	8.39		
Sodium-mEq/L	126		
Potassium-mEq/L	3.25		

DISCUSSION

Non-typhoidal Salmonella mainly includes *Salmonella enteritidis*, *S. typhimurium* and *S. newport.* These are most often a foodborne infection associated with raw eggs and poorly prepared poultry. It can also be contracted from pet animals and contaminated pet food [1]. Infection with NTS most often results in gastroenteritis and the main differential diagnoses for this condition include other enteric pathogens like *E. coli and Campylobacter jejuni*. Rarely, NTS can cause severe diarrhoea mimicking cholera.

Invasive non-typhoidal salmonellosis (iNTS) has emerged as an important cause of bacteremia and significant mortality worldwide. It is endemic in sub-Saharan Africa owing to the higher incidence of immunosuppression associated with HIV and malnutrition, both in adults and children [2]. In high-income countries, NTS usually causes a self-limiting diarrhoeal illness, with a small proportion developing bacteremia and extra-intestinal focal infections. The incidence of iNTS infections in Asia appears to be escalating as the proportion of immunosuppressed patients is on the rise. However, iNTS among immunocompetent individuals is rarely reported. iNTS reported from India include musculoskeletal, central nervous system, pulmonary, cardiovascular and urinary infections [3-5].

The majority of the cases have occurred in patients at the extremes of age or who had underlying predisposing factors like sickle cell disease, immunosuppression, malignancies and immunomodulating therapy [6-8]. iNTS infections are associated with significant morbidity and mortality. A systematic review of iNTS infections revealed that though they form only a small proportion (3.6%) of total NTS infections, owing to the high case fatality rate, the number of deaths is greater than four times that of the enteric infections [9]. Fluoroquinolones and third-generation cephalosporins are appropriate antibiotic choices for the management of iNTS infections. In our patient, the organism was sensitive to both fluoroquinolones and third-generation cephalosporins and he was treated with a 2-weeks course of ceftriaxone.

Our case was unique as the patient was an immunocompetent person, and he presented with bacteremia and severe small bowel diarrhoea mimicking cholera. Usually, NTS causes only mild self-limiting diarrhoea. A severe and protracted course for diarrhoea in NTS is only rarely reported.

A case report published from the UK by Hall et al reported a severe iNTS infection in an immunocompetent 24-year-old man. He presented with lumbar back pain associated with fever and rigors, which had been preceded by diarrhoea. Blood cultures grew *Salmonella enteritidis*. Magnetic resonance imaging (MRI) of his pelvis and spine showed a small gluteal abscess and sacroiliitis. His condition subsequently deteriorated due to secondary pneumonia and respiratory failure. He was managed with 2 weeks of intravenous ceftriaxone, followed by 6 weeks of oral ciprofloxacin. Detailed investigations did not reveal any predisposing factors or evidence of immunodeficiency. Follow-up showed a complete resolution of symptoms with no long-term sequelae [10].

Another case report from Taiwan published by Mileva et al discussed the case of a 61-year-old male who presented with a 4-day history of fever up to 40°C with marked chills and shivering, malaise, and anorexia. He had hypotension, AKI (creatinine of 1.59 mg/dl), and mild elevation of liver enzymes. Blood cultures grew *S. enteritidis*. He was not responding to combination treatment with ceftriaxone and amikacin and later improved with 10 days of treatment with parenteral levofloxacin [11]. A case report published by Juma et al described a rare clinical presentation of a non-typhoidal Salmonella.sp infection presenting as acute calculus cholecystitis in an adult patient. *S. enterica* was grown from cholecystostomy fluid, and the patient subsequently underwent a laparoscopic cholecystectomy that demonstrated a necrotic gallbladder fundus [12].

CONCLUSION

Invasive non-typhoidal salmonellosis was reported previously in patients suffering from immunosuppressed conditions and chronic illnesses. However, its incidence is increasingly being reported in immunocompetent hosts from developing countries. The early detection and prompt treatment of these infections are extremely important owing to the higher rate of complications and the significant mortality associated with these infections.

REFERENCES

1. Majowicz SE, Musto J, Scallan E, Angulo FJ, Kirk M, O'Brien SJ, *et al;* International Collaboration on Enteric Disease "Burden of Illness" Studies. The global burden of nontyphoidal Salmonella gastroenteritis. Clin Infect Dis. 2010;50:882-9.
2. Morpeth SC, Ramadhani HO, Crump JA. Invasive non-typhi Salmonella disease in Africa. Clin Infect Dis. 2009;49:606-11.
3. Munigangaiah S, Khan H, Fleming P, Dolan MA. Septic arthritis of the adult ankle joint secondary to Salmonella enteritidis: a case report. J Foot & Ankle Surg. 2011;50:593-4.
4. Rodríguez M, De Diego I, Martínez N, Rodicio MR, Mendoza MC. Nontyphoidal Salmonella causing focal infections in patients admitted at a Spanish general hospital during an 11-year period (1991–2001). International journal of medical microbiology. 2006;296:211-22.
5. Samonis G, Maraki S, Kouroussis C, Mavroudis D, Georgoulias V. Salmonella enterica pneumonia in a patient with lung cancer. J Clin Microbiol. 2003;41:5820-2.
6. El-Herte RI, Haidar RK, Uthman IW, Kanj SS. Salmonella enteritidisbacteremia with septic arthritis of the sacroiliac joint in a patient

with systemic lupus erythematosus: case report and review of the literature. J Med Liban. 2011;103:1-3.
7. Stein M, Houston S, Pozniak A, Kiire C, Mason PR. HIV infection and Salmonella septic arthritis. Clin Exp Rheumatol. 1993;11:187-9.
8. Henderson RC, Rosenstein BD. Salmonella septic and aseptic arthritis in sickle-cell disease. A case report. Clin Orthop Relat Res. 1989; 248:261-4.
9. Ao TT, Feasey NA, Gordon MA, Keddy KH, Angulo FJ, Crump JA. Global burden of invasive nontyphoidal Salmonella disease, 2010. Emerging infectious diseases. 2015;21:941.
10. Hall RL, Partridge R, Venkatraman N, Wiselka M. Invasive non-typhoidal Salmonella infection with multifocal seeding in an immunocompetent host: an emerging disease in the developed world. BMJ Case Rep. 2013;2013:bcr2012008230.
11. Mileva S, Gospodinova M, Todorov I. Salmonella enteritidis primary bacteremia in previously healthy patient from Taiwan: case report. Ther Adv Infect Dis. 2016;3:128-32.
12. Juma F, Cave JJ, Gonzales H, Moore LSP. Non-typhoidal salmonellosis presenting as acute calculus cholecystitis. BMJ Case Reports CP. 2019;12:e230186.

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