Salmonella enterica, a Gram-negative, facultative intracellular human and animal pathogen, poses a major public health concern worldwide. The species S. enterica includes more than 2,600 serovars and are further classified into 6 subspecies. Non typhoidal Salmonella enterica serovars normally cause self-limited gastroenteritis associated with intestinal inflammation and diarrhea in humans. Around 5% of individuals with gastrointestinal illness caused by NTS develop bacteremia, which is serious and potentially fatal. Bacteremia is more likely to occur in immunologically compromised patients and these hosts are prone to develop focal infection (1–4).

In this paper, we present the first fatal Indian case of Salmonella Wangata diarrhea in an elderly patient with severe dehydration. A 67-year-old male with no known premorbid illnesses presented to the emergency unit with a history of 10–12 episodes of loose stools over 24 h. The stools were pale yellow and watery initially, followed by greenish color without any blood. He was seen by a local general practitioner and started on oral rehydration and other symptomatic treatment. However, as the patient started feeling very tired and was appearing drowsy, he was brought to the hospital. Just before being brought to the hospital, he was reported to be passing frequent loose stools in bed. He had no history of fever, vomiting, or respiratory symptoms.

On arrival at the hospital, he was found to be drowsy, with a Glasgow Coma Scale rating of 11, and was severely dehydrated. He had rapid irregular pulse, with a blood pressure of 100/60 mmHg. He had right hemiplegia with right extensor plantar response. An abdominal and respiratory system examination was unremarkable at this time. A bedside electrocardiography showed atrial fibrillation with fast ventricular rate. The complete blood count was normal with a leucocyte count of 9,400/mm³. He was found to have acute kidney injury with a serum creatinine level of 3.7 mg/dL, blood urea level of 136 mg/dL, and hypokalemia. He was also mildly hyperglycemic. The NT-proBNP (n-terminal brain natriuretic peptide) was 2,350 pg/mL (normal 40–125 pg/mL). An ultrasound study of the abdomen was normal and echocardiography showed normal cardiac function, except for atrial fibrillation.

A clinical diagnosis of acute gastroenteritis with dehydration, acute kidney injury, metabolic encephalopathy with atrial fibrillation, and acute stroke with right hemiplegia was made and he was admitted in the medical ICU with IV fluids, electrolyte management, and intravenous amiodarone infusion for management, of atrial fibrillation. A CT scan of the brain was not prescribed in view of his critical general condition.

A fecal sample was sent for routine culture and microscopic examination and the patient was empirically started on broad spectrum antibiotics metronidazole and piperacillin-tazobactam, suspecting sepsis due to gram negative organism.

However, diarrhea continued and he developed features of Acute Respiratory Distress Syndrome later the same day. He was intubated and mechanically ventilated and started on inotropic agents for hypotension as he did not respond to fluid management alone. The severity of diarrhea improved over the next 3 days and urine output was adequate. Atrial fibrillation reverted to sinus rhythm in about 24 h, but the neurological status did not show any recovery. There was no improvement in the overall clinical condition, and the serum creatinine gradually worsened.

The blood culture was sterile. A microscopic examination of the feces did not reveal the presence of any protozoans or helminths, while fecal culture grew a non-lactose fermenting, motile organism, which was chemically identified as belonging to the Salmonella group. This was confirmed by agglutination with Poly O & H antisera. The isolate was then sent to the National Institute of Cholera and Enteric Diseases, Kolkata (a national reference center) where it was further serotyped and identified as Salmonella enterica subspecies enterica serovar Wangata (O:1,9,12/H:z4,z23:-). The strain was subjected to antimicrobial susceptibility testing by the Kirby Bauer disc diffusion method and was susceptible to ampicillin (AMP 10 μg), cotrimoxazole (SXT 25 μg), and ciprofloxacin (CIP 5 μg), as per the current guide-
lines of the Clinical and Laboratory Standard Institute. Despite all efforts, the patient succumbed to the fatal illness with multi organ failure and sepsis.

Non typhoidal salmonellosis is an important cause of food borne infection and poses problems even in modestly compromised hosts due to bacteremic spread, focal infection, and persistence in deep or endovascular sites (3,4). Approximately 45,000 cases and 400–600 deaths have been annually reported to the Centers for Disease Control (Atlanta) over the past decade. Outbreaks of Salmonella infection have been linked to eggs, cheese, dry cereal, ice cream premix, and a variety of fresh sprouts, juice, cantaloupes, and other fresh vegetables. The risk factors for salmonellosis are extremes of age, alteration of the endogenous bowel flora of the intestine, diabetes, malignancy, rheumatic diseases, reticuloendothelial blockade (e.g., as a result of malaria, sickle-cell disease, or bartonellosis), HIV infection, and therapeutic immunosuppression of all types. Anatomical disruptions like kidney stones and other urinary tract abnormalities, gallstones, atherosclerotic endovascular lesions, schistosomiasis, and prosthetic devices, may all serve as focal points for Salmonella infection.

Approximately 5% of individuals with gastrointestinal illness caused by NTS will develop bacteremia (5,6).

Salmonella enterica serovar Wangata belongs to Group D and is rarely isolated from gastrointestinal infections worldwide. Salmonella Wangata can be frequently found in animals, especially in cattle, and is a known veterinary pathogen. The literature shows very few reports of Salmonella Wangata cases in humans. A study in England reported over 350 cases of Salmonella Wangata causing diarrhea in immigrant families from the Indian subcontinent and other persons who had eaten chicken based dishes in ethnic food restaurants (7). Another study from New Zealand during 2009 reported 9 human cases of which 3 cases had consumed tank water prior to the illness, while 1 had frequent contact with pet coastal python (8).

In the present case, the source could have been the contaminated horse gram pulse preparation that the patient was discharged from the hospital due to the gastroenteritis and resultant dehydration and reduction of cerebral blood flow in the present case with pre-existing subclinical arteriosclerosis probably would have caused the stroke – very likely a watershed zone infarction. Atrial fibrillation by itself could also lead too embolic stroke, but it is unlikely to be so fast after the onset of atrial fibrillation. Acute kidney injury due to dehydration and pre renal failure caused by Salmonella Wangata would have, in its severe form, resulted in the fatality of the patient. Repeat specimens of feces and blood could not be obtained to reconfirm the sepsis because the patient was discharged from the hospital against medical advice, due to financial constraints. The patient’s condition deteriorated and he succumbed to this fatal illness with multi organ failure and sepsis.

While most infections do result in the elevation of body temperature, there may be a failure to mount fever in some hosts, especially in the elderly. This may explain the absence of fever in our patient.

Antimicrobial therapy should be initiated for severely ill patients and for those with risk factors for extra intestinal spread of infection. A brief course of “preemptive” therapy (duration 48–72 h or until the patient is afebrile) is also commonly provided for patients above 50 years of age (9).

NTS is an alarming threat to public health and if neglected may result in high mortality and morbidity rates. Therefore, it is very important to monitor every step of food production in food processing units. It is necessary to ensure that all the cases of NTS diagnosed in the laboratories should be reported to the public health department so that they can be tracked and monitored. This will help in the identification of the sources of these sporadic outbreaks, which in turn will support the authorities in anticipating epidemics and pandemics. Currently, there are very few inter sectoral monitoring programs for Salmonella in developing countries. Additionally, the need to educate the public regarding sanitation and hygiene still remains as the main thrust area.

To the best of our knowledge and based on a PubMed search, the present case is the first fatal case of diarrhea due to Salmonella Wangata reported from India.

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Conflict of interest None to declare.

REFERENCES