Salmonella virchow bacteraemia presenting as typhoid-like illness in an immunocompetent patient and review of the literature

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Abstract

We report a typhoid-like illness with fever and altered consciousness in a 22-year-old man with growth of *Salmonella virchow* in blood and stool culture. Bacteraemia and invasive disease due to non-typhoid Salmonella (NTS) is known in severely immunocompromised patients, but has so far not been described in immunocompetent adults.
Case report

A 22-year old Caucasian man presented to our outpatient clinic two days after returning from a two-week visit to Bangkok, Thailand with a 6-day history of fever, head and neck pain, body aches, constipation, loss of appetite and nausea.

On physical examination, the patient appeared ill and sleepy with a body temperature of 39.4°C. His blood pressure was 150/80 mmHg and relative bradycardia of 80/min was found. The right lower abdomen was painful on palpation and bowel sounds were increased.

Initial laboratory results showed mild thrombocytopenia with 120,000 platelets/µl, CRP of 25.4 mg/l (normal range < 5 mg/l) and a differential WBC with 5,500 cells/µl neutrophils with 6% band cells and 1,200 cells/µl lymphocytes. All other haematological and biochemical tests were within normal limits. Urine examination and serology for hepatitis A, B, C, E, HIV, EBV, Dengue-Virus and blood smears for malaria were negative. Abdominal ultrasound and chest x-Ray were unremarkable, as was a cranial CT scan because of persisting headache.

Within a day, the patient developed continuous severe frontal headache, an altered level of consciousness and the CRP rose to 100 mg/l. Blood cultures taken on the day of admission grew gram negative rods. The German National Reference Laboratory for Salmonella and other Enteric Pathogens, Robert Koch Institute, Wernigerode, identified S. virchow from the culture by agglutination testing and lysotyping. Resistance against cefuroxim, gentamicin and tobramycin determined by MIC (minimal inhibitory concentration) was found. The patient was put on ciprofloxacin (1200 mg i.v. TID) for 10 days. The patient’s altered consciousness and, despite pain control, severe frontal headache persisted. Temperature was spiking to 39.2°C up to the fourth day of antibiotic treatment.

One week after admission, S. virchow of the same antibiotic resistance pattern grew in the stool cultures. Additional features of his illness were constipation and weight loss of 6 kilogram.
On the 6th day after hospital admission liver enzymes were found elevated with ALT of 697 U/l and AST of 401 U/l, but rapidly returned to normal values after discontinuation of paracetamol and ciprofloxacin. The patient made an uneventful recovery and continues to feel well 6 months after discharge from hospital.

Non-typhoid Salmonella (NTS) are ubiquitous gram-negative bacteria that primarily cause gastroenteritis after ingestion of contaminated food or water. In contrast to S. typhi and paratyphi, NTS have a broad vertebrate host range and are found in many food animals. The incidence of infection with NTS has increased dramatically in recent decades [12] and NTS are a major cause for morbidity and mortality in both industrialized and developing countries [3, 4].

Most patients infected with NTS have self-limiting gastroenteritis while invasive disease with bacteraemia is seen in only 3-8% of patients [8]. Risk factors for invasive and complicated NTS disease are severe immunosuppression [10] and the extremities of age. The clinical picture associated with NTS bacteraemia differs significantly between adults and children. In a study from Taiwan children were much more likely to present with diarrhoea while chills were more often observed in adults. Whereas NTS bacteraemia is associated with a favourable outcome in children, it can be life-threatening in adults [7]. Adult patients with severe immunosuppression, such as HIV and AIDS, diabetes mellitus, malignant or rheumatic diseases and transplant patients, are particularly at risk for invasive NTS [13]. In these patients NTS bacteraemia occurs mostly without gastroenteritis [9]. In our patient, no predisposing risk factor was found that could explain the course and severity of the disease.

S. virchow was first described in 1930 as a bacterium that causes gastroenteritis as well as invasive disease [5], but was considered to be one of the less invasive NTSs. Only recently its
potential became apparent in immunocompetent children presenting with a wide spectrum of clinical manifestations [1]. Unique and remarkable epidemiological features *S. virchow* were seen in Israel over the past ten years with the highest infection rates worldwide [12]. A dramatic increase in both blood and stool culture isolates was reported which were highly invasive and resistant to a wide range of antibiotics. *S. virchow* invasive disease has been reported in patients with severe immunosuppression [2] and in early childhood [10, 11]; not, however, in immunocompetent adults.

The source of infection in our case is unclear. Ingestion in Bangkok is most likely and falls into the range of the incubation period of NTS. Little is known about NTS epidemiology in Thailand. Only one recent study showed marked predominance of *Salmonella* group C as the cause for bacteraemia with up to 30% multidrug resistance and a strong association with HIV infection [6].

To the best of our knowledge this is the first case of invasive disease presenting as a typhoid-like illness due to *S. virchow* in an otherwise healthy adult.

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References


