Group D salmonella as cause of urinary tract infection

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Primary urinary tract infection caused by group-D salmonella is presented. Even though it is not a common site, it proves that under certain circumstances this enteric pathogen can cause urinary tract infection. Other reported cases are also reviewed.

Saudi Medical Journal 1997; Vol. 18 (1) 82-83.

Urinary tract infection (UTI) is one of the most common illnesses for which a patient seeks medical attention.1-2 They are caused by the enteric gram negative bacilli Salmonella and Shigella species and are encountered through a true infection of the urinary tract. Salomonella species is not thought to be a normal colonizer of the urinary tract with the majority of infections being associated with the course of enteric infection.3 The primary cause of urinary tract infection is reported in rare instances caused by group D Salmonella.

Case Report An 11 year old girl was brought to the Pediatric Emergency Room at 3:00 pm with fever and pain in the right loin. She had a fever and passing pieces of dark blood. Fever was on that day. She had been complaining of back pain for 3 days. She had no other symptoms such as diarrhea, vomiting, or hematuria. On the day of admission she had a moderate degree of fever and was complaining of back pain. There was history of frequency, urgency, and dysuria. There were no other significant symptoms. She was referred for UTI urine culture. She was noted to have clotted blood in her urine which was sent for laboratory analysis. She was referred for further evaluation which was not radiating to the back. There was no other significant history. There was a history of renal stones or calculi. On examination, the patient was afebrile with good appetite. No abnormality was detected in the central nervous system, cardio vascular system or respiratory system. Throat and left ear were congested. Her blood pressure was 110/70 mmHg, heart rate 96/min, respiration 22/min. Provisional diagnosis was made as urinary tract infection with upper respiratory tract infection. The patient was advised admission. Routine investigations were carried out including blood culture, urine culture, throat swab culture, plain x-ray abdomen and ultrasonography of the urinary tract. From next day onwards, the patient was afebrile but continued complaining of dysuria, loin pain and passage of cloudy urine. Routine urine analysis showed many RBC, pus cells and bacteria, proteinuria, with an alkaline pH. Twenty-four hour urine analysis showed area 3112 mg. creatinine 125 mg, Ca 2075 mg and a total protein of 22.5 mg. Blood examination revealed: WBC 8.9 million, RBC 4.7 million, Hb 12.1 g/dl, Hct 40.3, MCV 86, MCH 26.3, MCHC 31.1: differential count: polymorphs 48%, lymphocytes 50%, eosinophils 2%, serum calcium 9.3 mg/dl, phosphorus 4.2 mg/dl, serum C3 and C4 was 1.47 gm/L and 0.288 gm/L respectively. Blood culture showed no growth after 7 days incubation. Throat swab did not yield any bacterial pathogens. Urine culture yielded 10⁶ CFU/ml of salmonella spp. as identified using API 20E system. Identification was confirmed as group-D by agglutination with polyvalent O-antiserum A-1 and with factor 9 O-antiserum and D-antiserum. Kidney, ureter and bladder (KUB) revealed no radio-opaque calculi or abnormal soft tissue shadows or calcification.

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Received October 1995; Accepted March 1996.
Paranasal sinuses showed no abnormality. Ultrasound examination of the urinary tract showed normal kidneys. There was no evidence of any calculi or dilated ureters or any pathology in the bladder. The patient was discharged on the 4th day. The patient was given augmentin 375 mg three times daily for 10 days from day 3 after admission. She was advised to have a repeat urine culture after 2 weeks. This showed no growth. Outpatient follow-up after 4 weeks was advised.

**Discussion**

The Salmonella group of organisms (now included under a single name *S. enteridis* with different groups), cause a spectrum of illness apart from the usual septicaemia and food poisoning. These range from purulent infection of bones, various organs, meningitis, pericarditis to urinary tract infection. In the present case, Salmonella is incriminated as the primary pathogen in UTI because the symptoms and laboratory findings support the diagnosis. The presence of pus cells, RBC and bacteria in an uncentrifuged mid-stream urine sample strongly suggests the inflammation of urinary tract. A blood culture carried out simultaneously yielded no growth, emphasizing the diagnosis of UTI. Often in enteric fever, immune complex mediated glomerulonephritis is seen as an immunological reaction and is characterized by the presence of RBC and proteinuria. In this condition, the blood cultures are invariably positive for the offending microbe. The second condition, a chronic urinary carrier state is excluded by the presence of pus cells, symptoms of dysuria and right loin pain.

In one report of UTI caused by *Salmonella choleraesuis serovar bornheim*, the patient had a previous injury which predisposed to infection. This was in accordance with earlier reports. In our case, there was no previous history of trauma or any other urinary tract abnormalities, as evidenced by the radiological examinations. But just as in the above case, the complaint in this patient was also hematuria with other signs and symptoms of urinary tract infection. An interesting situation where hematuria and Salmonellae can be seen together is endemic hematuria caused by *Schistosoma hematobium*. In this chronic urinary carrier state of Salmonellosis the infected site forms a nidus for Salmonella. As *Schistosoma hematobium* infection is seen in Saudi Arabia, this fact was also thoroughly investigated. A repeat examination of urine sediment revealed no eggs of *S. hematobium*. Sickle cell anaemia is another predisposing cause for Salmonella infection. As this condition is also prevalent in Saudi Arabia, this was also investigated and the patient proved not to have sickle cell anaemia. The route of the infection might be hematogenous, though it could not be proved. A widal reaction to demonstrate the presence of O, H and Vi agglutination and c-reactive protein would have been supporting evidence either for or against Salmonella urinary tract infection. Studies by Elizabeth, et al from Christian Medical College Hospital, Vellore (CHCH), revealed that among 18 patients with *S. typhi* bacteriuria 14 cases were associated with localized abnormalities of urinary tract, kidney and systemic diseases. Four other cases were presumed to be associated with typhoid fever. Similarly, there was a report of UTI caused by another enteric pathogen *Shigella sonnei*. The same pathophysiology might be playing a role. On some occasions, salmonella and shigella spp were isolated vaginal specimens (personal observations). The possible ascending route of infection must be thought of. The possibility of enteric pathogens causing occasional primary urinary tract infections should be taken into consideration while dealing with the etiology of UTI.

**References**