

Urinary Tract Infection Due to *Salmonella* in an Otherwise Healthy Child

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Salmonella species are a rare cause of urinary tract infection in children. They are associated with a high incidence of structural abnormalities or immunosuppressive status. We report the case of a healthy 7-year-old boy with pyelonephritis due to *Salmonella* group. He did not have a history of recent gastroenteritis.

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INTRODUCTION

Urinary tract infection (UTI) has already been demonstrated to be common in hospitalized children, and different serotypes of *Escherichia coli* are the most frequent causes of urinary tract infection.¹ Urinary tract infection due to nontyphoidal strains of *Salmonella* is rare and usually develops in individuals with predisposing factors such as structural abnormalities or immune suppressive status. Urinary tract infection due to *Salmonella* is reported in children with sickle cell anemia; patients with systemic lupus erythematosus; elderly patients with underlying diseases, especially diabetes mellitus, urologic abnormalities, and immune suppression; and patients with urolithiasis.²⁻⁵ We report an otherwise healthy boy with UTI secondary to *Salmonella* serogroup C.

CASE REPORT

A 7-year-old boy presented to emergency department with a history of fever and chill and a 24-hour history of flank pain, dysuria, urinary frequency, hematuria, and secondary nocturia. He had no prior history of UTI or recent gastroenteritis. He was circumcised in the neonatal period. He was dry by day and night from 2 and 3 years of age, respectively.

The patient had normal voiding and bowel movement. He was a second child in the family and no family history of immunodeficiency. There was no history of recurrent infection. On physical examination, his temperature was 38°C;

respiratory rate, 20 per minute; heart rate, 100 per minute; and blood pressure, 90/55 mm Hg. There was tenderness in the costal vertebral angles. The examination was otherwise normal.

Laboratory data of the patient are shown in the Table. A midstream clean-catch specimen of the urine yielded a pure growth of *Salmonella* serogroup C with a colony count of 10⁵ colony-forming units. The organism was sensitive to ampicillin, cefotaxim, nalidixic acid, and ceftriaxon. Urine culture was repeated in another clinical laboratory and the result was the same. The patient was treated with 75 mg/kg of ceftriaxon for 3 days and continued with cefexim for 7 days. Renal ultrasonography was normal. A voiding cystourethrography performed 3 weeks after presentation was normal.

Laboratory Findings

Parameter	Result
Urine	
pH	8
Specific gravity	101
Blood	3+
Nitrite	Negative
Leukocyte	Many
Erythrocyte, /HPF	35 to 40
Complete blood count	
Leukocyte, × 10 ⁹ /L	137
Neutrophils, %	68
Lymphocytes, %	29
Hemoglobin, g/dL	12.5
Urea, mmol/L	2.2
Creatinine, μmol/L	43

Dimercaptosuccinic acid renal scintigraphy showed bilateral photopenic areas and bilateral decreased function.

DISCUSSION

Salmonella species are a rare cause of UTI in children. Abbott and colleagues, in a retrospective analysis of accompanying laboratory data of more than 60 cases of salmonellosis associated with urine isolates, suggested that this bacterium is a true and often unrecognized cause of UTI.⁶ *Salmonella* UTI has been associated with a higher incidence of structural abnormalities or immunosuppressive status. Study of Kapoor and colleagues showed UTI due to *Salmonella* in a patient without a predisposing condition was uncommon and accounted for only 0.65% of all *Salmonella* UTIs.⁷ Our patient had a structurally normal urinary tract and no evidence of an immunological problem.

A few cases have been reported with *Salmonella* UTI in otherwise healthy individuals who do not have a predisposing condition.^{8,9} While a significant number of *Salmonella*-associated UTIs are linked with persons with one or more comorbid conditions, sometimes bacteriuria occurs in individuals without known risk factors. An Australian investigation by Paterson and colleagues on 23 cases of *Salmonella* UTIs identified no immunocompromised patients in their study and only 3 with urologic abnormalities.¹⁰

Alexander and associates reported a healthy 4-year-old boy that developed UTI due to *Salmonella stanleyville* following an episode of gastroenteritis due to the same organism, for which an ascending route for the infection was most likely.¹¹ Our patient had no history of recent gastroenteritis. Mourani and colleagues reported a 11-year-old girl with UTI secondary to *Salmonella typhi* associated with urolithiasis.⁵ In our patient, we did not detect urolithiasis. Tena and colleagues reported 19 patients with bacteriuria caused by nontyphoid *Salmonella*, representing 0.07% of the UTI diagnosed over the same period. The mean age was 62.5 year old and 6 patients had pyelonephritis. They had chronic diseases or urologic abnormalities.⁴ Gulcan reported a case of UTI caused by *Salmonella enterica* in an elderly disabled patient with benign prostatic hyperplasia.¹²

In an analysis by Abbott and colleagues, serotypes belonging to group C and E were isolated more often from urine than stool.⁶ Urinary tract infection

in our patient was also with *Salmonella* group C. Our patient was treated without complications, but UTI caused by nontyphoid salmonellosis can cause complications. Munoz-Mahamud and coworkers reported septic arthritis of the hip caused by nontyphoid salmonellosis after urinary tract infection.¹³

In conclusion, although *Salmonella* UTI is not common, it could be more frequent than is generally believed. The diagnosis of *Salmonella* UTIs must alert one the possible existence of an occult urologic problem or immunosuppressive disease.

CONFLICT OF INTEREST

None declared.

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