

Serratia plymuthica: A community-acquired uropathogen

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ABSTRACT

There is paucity in information on *Serratia plymuthica* causing human infections. Only few case reports worldwide have documented this organism as a pathogen causing human infections till date. We describe here a case of community-acquired urinary tract infection caused by *S. plymuthica* in an elderly man. To our knowledge, this is first human case report describing *S. plymuthica* as uropathogen.

Key words: Community healthcare, *Serratia plymuthica*, urinary tract infection

INTRODUCTION

The genus *Serratia* is widely distributed in nature, especially in soil and water. The infections caused by *Serratia* species generally occur in patients receiving broad-spectrum antibiotics or undergoing extensive surgery, urinary tract catheterization, and other invasive procedures. *Serratia plymuthica* is an uncommon cause of human infection.^[1] This report describes an elderly patient with community-acquired urinary tract infection (CAUTI) caused by *S. plymuthica*.

CASE REPORT

A 70-year-old man presented to surgery outpatient department at our tertiary care center with complaints of burning micturition and increased urinary frequency. He was a diagnosed case of benign prostate hypertrophy (BPH), while no history of diabetes or any other chronic illness was elicited. The patient was febrile on examination. Microscopic examination of urine showed many pus cells and 5-10 red blood cells per high power field. Urine culture on CLED media showed pure growth of smooth, red, pigmented colonies in significant counts ($>10^5$ CFU/mL). On MacConkey agar, lactose-fermenting colonies were obtained.

The organism was catalase-positive, oxidase-negative, and reduced nitrates to nitrites. On triple sugar iron media, results were alkaline slant and acid butt with gas. Positive reactions were observed for ONPG, gelatin liquefaction test, Voges-Proskauer test, citrate utilization, arginine dihydrolase production. Acid was produced from glucose, sucrose, raffinose, xylose, arabinose, and melibiose but not from lactose, sorbitol, adonitol, and malonate. Indole, H_2S , and urease were not produced, and lysine and ornithine decarboxylase tests were negative. Based on this profile, organism was presumptively identified as *S. plymuthica*, which was later confirmed by API 20E system (rapid ID 32E biomerieux, France). Antibiotic susceptibility was determined by Kirby Bauer disc diffusion method, and the isolate was susceptible to amoxicillin-clavulanic acid, imipenem, cefotaxime, ceftazidime, gentamicin, amikacin, ciprofloxacin, nalidixic

acid, but resistant to ampicillin. The patient was administered amoxicillin-clavulanic acid (625 mg TDS for 7 days), and his urinary symptoms abated within 4 days of treatment. Urine culture was repeated after a week and was found to be sterile. His blood culture was requested, which was reported as sterile.

DISCUSSION

Serratia species have become important causes of infections, especially in debilitated patients. *Serratia marcescens* is a primary pathogenic species of genus *Serratia* and has been frequently reported to cause nosocomial infections such as UTIs, pneumonia, intravenous catheter-associated infections, osteomyelitis, and endocarditis.^[2] Rare reports have described human disease resulting from infection with *S. plymuthica*,^[1] *Serratia liquefaciens*,^[3] *Serratia rubidaea*,^[4] and *Serratia odorifera*.^[5]

S. plymuthica is a saprophytic fermentative, non-motile, gram-negative rod that produces red pigment (prodigiosin).^[6] *S. plymuthica* is found in soil and has been isolated from different types of food.^[7] The pathogenic role of this organism has not been determined. Few sporadic reports of *S. plymuthica* causing serious human infections are available in worldwide literature. It has been shown to be a significant pathogen in a case of chronic osteomyelitis,^[8] in three cases of nosocomial septicemia associated with infection of central venous catheter and a patient with facial wound due to burns.^[9-11] Carrero *et al.* reported six cases of human infection by *S. plymuthica*. Three isolates were recovered from blood cultures, two were from surgical wound exudates, and one from peritoneal fluid. All the cases, except the one which was isolated from peritoneal fluid, were nosocomial and were thought to have been acquired through contaminated water, since water is one of the reservoirs of this organism. But, the environmental source could not be substantiated in their case.^[11] A case of community-acquired bacteremia by *S. plymuthica* in a woman admitted with lower respiratory infection is reported.^[12] Pascual *et al.*, have reported *S. plymuthica* cellulitis in patient on steroids, which resolved after surgical exploration and debridement and antibiotic treatment.^[13] Isolated cases of septic pseudarthrosis, CAPD peritonitis, septic shock, and catheter-related sepsis are also reported.^[14-17]

In our case, infection was not nosocomial in origin and was acquired before presenting to the outpatient department in the hospital. Underlying conditions such as alcoholism or liver

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disease or advanced age^[10] has been suggested as risk factor for *S. plymuthica*. Our patient, besides being in advanced age, was a diagnosed case of BPH, and presence of residual urine may have served as a reservoir for *Serratia* infection. That the organism was a pathogen in our patient is supported by its isolation from urine culture in pure growth and in significant counts and rapid abating of urinary symptoms on implication of antibiotics. The organism was probably exogenous in origin, as there was no other evident focus of infection in this patient. It was susceptible to all the antibiotics tested, except ampicillin. Ampicillin resistance in *Serratia* isolates have also been reported in some studies^[10] while other reports showed susceptibility of their isolates to ampicillin but were cefazolin-resistant.^[8]

Approximately, 30-50% of patients with *Serratia* UTIs are asymptomatic, and majorities have a history of recent surgery or instrumentation of the urinary tract. Important risk factors for *Serratia* UTIs include diabetes mellitus, urinary tract obstruction, and renal failure. Studies suggest that most of the urinary isolates belonging to genus *Serratia* are *S. marcescens* with a high probability of multiple drug resistance.^[12] *S. odorifera* has also been reported as a cause of urosepsis.^[5] But, on reviewing the medical literature worldwide, no case of *S. plymuthica* causing UTIs was found. To the best of our knowledge, this is the first human case report describing *S. plymuthica* as uropathogen.

In summary, only occasionally, the strains of *S. plymuthica* have been isolated from human clinical specimens, and its significance as a pathogen remains dubious. Our report describes an elderly man with CAUTI caused by *S. plymuthica*. We emphasize serious consideration of this organism as being capable of causing significant human infections, especially in debilitated patients.

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