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Case Report / Olgu Sunumu

Serratia marcescens-associated bacteremic urinary tract infection: a case report

Serratia marcescens ilişkili bakteremik üriner sistem infeksiyonu: olgu sunumu

Şükran Sevim, Salih Cesur, Çiğdem Ataman Hatipoğlu, Şerife Altun Demircan, Esra Kaya Kılıç, Sami Kınıklı

Ankara Training and Research Hospital, Department of Infection Diseases and Clinical Microbiology, Ankara, Turkey

ABSTRACT

Serratia marcescens (*S. marcescens)* is a Gram negative bacilli in the family Enterobactericea and is an important cause of health care-related infections and intensive care outbreaks. In this article, an 82-year-old female patient admitted to bed, who was a persistent urinary tract infection due to bacteremic urinary tract infection due to *S. marcescens,* was referred to the literature. In conclusion, it should be kept in mind that *S. marcescens* and other Gram-negative bacteria may cause bacteraemia-induced urinary tract infections especially in bedridden patients who have persistent urinary incontinence, and urine culture and blood cultures should be taken in these patients.

Keywords: *Serratia marcescens*, bacteriemi, urinary tract infection

ÖZ

Serratia marcescens (S. marcescens), Enterobactericea ailesinde yer alan Gram negatif basil olup, sağlık bakımı ile ilişkili infeksiyonlar ve yoğun bakımda salgınların önemli bir etkenidir. Bu yazıda yoğun bakımda yatarken *S. marcescens*'e bağlı olarak bakteremik üriner sistem infeksiyonu gelişen kalıcı idrar sondası olan yatağa bağımlı 82 yaşında bir kadın hasta sunularak literatür gözden geçirildi. Sonuç olarak, özellikle kalıcı idrar sondası olan yatalak hastalarda *S. marcescens* ve diğer Gram nagatif bakterilerin bakteriyemi ile seyreden üriner sistem infeksiyonlarına neden olabileceği akılda tutulmalı ve bu hastalarda idrar kültürü ile birlikte kan kültürleri de alınmalıdır.

Anahtar Kelimeler: *Serratia marcescens*, bakteriyemi, üriner sistem infeksiyonu

Corresponding Author: Salih Cesur, Ankara Training and Research Hospital, Department of Infection Diseases and Clinical Microbiology, Ulucanlar Street, 06230, Ankara, Turkey

E-mail: scesur89@yahoo.com

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INTRODUCION

Serratia marcescens (S. marcescens) is a member of Klebsiellae tribe from the Enterobactericea family, an opportunistic Gram-negative bacilli, an important factor in health care-associated infections and intensive care outbreaks. *S. marcescens* are important pathogens between Serratia species. There are *S. plymuthica, S. liquefaciens, S. rubidaea* and *S. odorifera* species which are reported to infest rarely within this genus. Serratia are other species of Enterobacteriaceae family; are less likely to be located in the gastrointestinal tract, with the presence of lipase, gelatinase and DNase enzymes (1-3).

It has been reported that it is prone to nosocomial infections in the respiratory system and urinary system, especially in intensive care units (3-6).

We wanted to review the literature by presenting this case with an important bacterial infection of the urinary system which leads to bacterial infections, lower respiratory tracts, surgical wounds and serious infections in the skin and soft tissues.

CASE

Eighty-two-year-old woman presented with an urgent complaint of not being able to speak, deterioration of general condition, somnolence and swelling in her body. He was diagnosed as having Alzheimer's disease, COPD and hypertension, and urinary incontinence. The patient was admitted to the emergency intensive care unit and inhaler therapy was initiated by COPD exacerbation suspicion. On the 12th day of admission, 39°C fever was admitted to the infectious disease clinic with leukocytosis (leukocyte count 18.57 /mm^3 and CRP values greater than CRP 44 mg / L), urine and blood cultures were obtained from urinary bladder empirically, piperacillin-tazobactam treatment was initiated at a dose of 3x4.5 mg /day. *S. marcescens* was reported in urine and blood cultures on the second day of admission. The agent, which was isolated from both blood culture and urine culture as a result of the antibiogram, was susceptible to amikacin and tigecycline resistant to other antibiotics. The patient was treated with 1x1 gr iv and tigecycline 100 mg iv after 2x50 mg doses in the amikacin. Body temperature was normal on the 2nd day of the treatment. There was no proliferation in control urine and blood cultures. The leukocyte count was 7430 /mm^3, CRP was 4.5 mg /L. After completion the current treatment to 10 days, with outpatient control plan; the pation was discharged.

DISCUSSION

Serratia bacteriums consist of at least 20 species, including 8 species known to cause human disease. *S. marcescens* is the most common affect in the genus Serratia. *S. marcescens* Gram-negative bacilli within the family Enterobacteriaceae, an opportunistic pathogen that can cause healthcare-associated infections. It is an important feature of forming red pigment in the medium (1,7,8).

It is thought that the infections caused by serratia species originate from extraneous environmental sources rather than commensal flora. *S. marcescens* and other species are generally associated with the environment and have the ability, in particular, to cause health care-related infections and hospital-acquired outbreaks. *S. marcenses* infections are widely reported in the world. The environmental resources of *S. marcesces* are quite extensive. It is found in water, soil, plants, animals, and insects. People often come into contact with environmental resources and are not infected with insect bites. Outbreaks associated with S. marcescens are often associated with contact with environmental or medical devices. Outbreak sources may be tap water, disinfectants, soap, blood products, intravenous solutions. In addition, they can be carried in the hands of healthcare personnel and spread by hand. Community-acquired infections have also been reported (7,8).

Apart from environmental sources, hospital patients may also be reservoirs for infections. The gastrointestinal tract is considered to be the dominant colonization region in *S. marcescens*, as it is for most members of the Enterobacteriaceae family. In studies conducted, *S. marcescens* showed that the rates of gastrointestinal carriage are largely dependent on the population being screened. Carrier rates are low in healthy host and non-immunocompromised patients (<1% and 3%, respectively). However, more than 30% of patients infected with *S. marcescens* were reported to carry the organism in the intestines, while the carrier rate in uninfected patients was 21% in affected services. Carriages have been reported in other body regions (mouth, nose) except the intestines (8). *S. marcescens* is an important cause of healthcare-associated infections in the adult and pediatric age group and may cause outbreaks in hospitals, rarely leading to community-acquired infections (7,8).

S. marcescens can cause urinary tract infections, pneumonia, catheter-related bloodstream infections, endocarditis, surgical site infections, wound infections, necrotizing fasciitis, osteomyelitis, septic arthritis, meningitis, meningoencephalitis, conjunctivitis, keratoconjunctivitis, keratitis, contact lens-related keratitis, endophthalmitis (7-11).

Patients at risk for infection due to *S. marcescens*; bed-dependent severe illness or immunosuppressive disease, patients treated with broad-spectrum antibiotics and invasive devices in the intensive care unit.

Permanent urinary incontinence is an important risk factor for infection (13). The presence of underlying Alzheimer's disease and persistent urinary tract in our patients were risk factors for *S. marcescens* infection.

Urinary tract infections due to Gram negative bacterial strains, especially *E. coli*, are common, and bacteremia complications are frequent in these infections. It is estimated that 15% of patients with urinary prompt infection have bacteremia during infection (11,12).

Al Hasan et al. (11) reported that age-related infections have and community-acquired infections and urinary tract infections due to *E. coli* were associated with lower mortality but elderly patients have high mortality in the study of 540 patients with bacteriemic urinary tract infections. In the same study, trimethoprim-sulfamethoxazole and quinolone resistance were reported to increase linearly during the study period.

Ackermann et al. (13) in the study of 180 elderly patients with bacteriemic urinary tract infections; 61 patients were between 65-79 years of age, and 40 patients were over 80 years of age. It was determined that 64% of the patients were female and 36% of the patients were male. Gram-negative organisms constituted 80.3% of bacterial isolates and 54% of *E. coli* were found. Gram positive organisms were *Staphylococcus aureus* (13.1% and *Enterococcus species* (spp.) (5.5%). Male patients and patients with persistent urinary incontinence have been reported to have a higher incidence of Gram-positive organisms and infections due to gram-negative bacilli outside of *E. coli*. The mortality rate in the study was determined as 16%, it was reported that mortality was high in patients with chronic urinary incontinence, patients admitted to nursing homes and patients with Gram-positive proliferation and older age was not associated with mortality.

Artero et al. (14) retrospectively investigated the clinical impact of bacteremia in elderly patients with urinary tract infections requiring hospital admission. In the study, patients with elderly urinary tract infections who required hospitalization were reported to have no effect on the outcome, such as in-hospital mortality or length of stay, of bacteriemia presence or absence.

Liu et al. (9) reported a mortality rate of 5% in a study that retrospectively evaluated 329 nosocomial urinary tract infections caused by *S. marcescens*. In the study, female gender and secondary *S. marcescens* bacteremia were determined as independent prognostic factors for death. Although our patient had female gender and advanced age, the patient stayed alive.

Serratia species are intrinsically resistant to ampicillin, amoxicillin, ampicillin-sulbactam, amoxicillin-clavulanate, narrow-spectrum cephalosporins (including cefazolin), cefamycins, cefuroxime, macrolides, tetracycline, nitrofurantoin and colistin. In addition, as a result of exposure to certain antibiotics, AmpC has the potential to induce or select broad spectrum beta-lactam antibiotic resistance through beta-lactamase production (7). The production of extended-spectrum beta-lactamase (ESBL) and carbapenemases in *Serratia species* has also been described (7,16).

Yu et al. (17) reported that the MIC value of amikacin against these microorganisms was lower than that of gentamicin and tobramycin and that the response rate was 80% for 25 severe infections caused by *S. marcescens* and Pseudomonas spp.

Creven et al. (12) reported that amikacin is particularly effective against multiple-infectious strains of *S. marcescens*-associated urinary tract infections, but that some strains may limit their ability to develop resistance to amikacin, particularly in the treatment of deep tissue infections.

In the present case, *S. marcascens* strains were susceptible to amikacin and tigecycline, while other antibiotics were resistant.

S. marcescens strains isolated from the urine and blood cultures of our patients had the same resistance pattern, and ESBL, ampC beta-lactamase and carbapenemase were not reported in strains.

As a result; it should be kept in mind that S. marcescens and other Gram nagative bacteria may cause bacterial infections such as urinary tract infections in hospitalized patients, especially those who have persistent urinary incontinence and can not establish an infection center on the examination. In these patients, blood cultures must be taken with urine culture.

DECLARATION OF CONFLICTING INTERESTS

The author declared no conflicts of interest with respect to the authorship and/or publication of this article.

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