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A Rare Case of Bacteriemia Due To *Comamonas testosteroni*

Comamonas testosteroni'ye Bağlı Nadir Bir Bakteriyemi Olgusu

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Abstract

Comamonas testosteroni is a gram-negative, non-glucose fermenting, oxidase positive, motile bacillus. It is accepted as a low-virulent microorganism and rarely causes infections in humans. Survival at low nutrient conditions, ability to acquire resistance genes and already found virulence factors make *C. testosteroni* a potential candidate to be a dangerous infectious agent, especially in patients with predisposing factors. We report a rare case of a bacteriemia due to a rarely isolated microorganism, *C. testosteroni*, in a male adult patient.

Keywords *Comamonas testosteroni*; Bacteremia, Antibacterial Drug Resistance

Özet

C. testosteroni gram negatif, glikozu fermente etmeyen, oksidaz pozitif, hareketli bir basildir. Düşük virülanslı bir mikroorganizma olarak kabul edilir ve insanlarda nadiren enfeksiyona neden olur. Zorlu besin koşullarında hayatta kalma, direnç genlerini edinme yeteneği ve içerdiği virülans faktörleri, C. testosteroni'yi, özellikle predispozan faktörleri olan hastalarda, tehlikeli bir enfeksiyöz ajanı olmak için, potansiyel bir aday yapar. Bu raporda, bir erkek erişkin hastada, C. testosteroni'nin neden olduğu bakteriyemi olgusunu sunuyoruz.

Anahtar Kelimeler *Comamonas testosteroni; Bakteriyemi, Antibakteriyel İlaç Direnci*

INTRODUCTION

Comamonas testosteroni is a gram-negative, non-glucose fermenting, oxidase positive, motile bacillus. It is commonly isolated from environmental sources such as soil, plants and water sources, but it is not a member of normal human flora [1]. It produces pink pigmented colonies and can easily grow on routine agar media. It was formerly called as *Pseudomonas testestoroni* then it was regrouped into the *Comamonadaceae* after molecular homology studies. *C. testosteroni* gets its name because it can use testosterone, 4-hydroxybenzoate, acetate and lactate as a carbon source. It is one of the four members of *Comamonas genus* together with *C. terrigena, C. denitrifican* and *C. nitrativorans* [2, 3].

The first case of *C. testosteroni* was presented early as early in 1975 [4]. It was not accepted as a human pathogen until the 18 different cases of infection were presented back in 1987 [5]. Various clinical presentations such as peritonitis, bacteriemia, endocarditis, meningitis and pneumonia due to *C. testosteroni* are reported from different parts of the world [6, 7, 8, 9].

We report a case of bacteriemia in a male adult patient to draw attention to a rarely isolated microorganism.

CASE REPORT

A 51-year-old adult male patient was admitted to the nephrology clinic due to acute renal failure and hypercalcemia. He had no previous history of any disease or drug use. He was suffering chronic back pain for about four months and he had significant weight loss which was 14 kilograms in two months. Vital signs were stable and recorded as follows; temperature 37.2 ºC, heart rate 89/min and arterial blood pressure 114/67 mm-Hg, serum calcium 15.7 mg/ml, urea 68 mg/100ml, creatinine 1.81 mg/dL, white blood cell count 22400/ml, hemoglobin 11.3 gr/dl, erythrocyte sedimentation rate 65/hr, C-reactive protein 152 mg/L, glucose 353 mg/dl detected as laboratory findings. While the patient was being treated for hypercalcemia and acute renal failure, he transferred to internal medicine clinic for further evaluation and testing for probable malignancy. During follow-up, the contrast-enhanced computed tomography revealed solitary tumor at the lungs and pet-scan revealed metastatic tumor at the left iliac bone and malignant lymphadenopathies at the right supraclavicular station together with the primary focus being at the upper region of the right lung. Then the patient was diagnosed as lung cancer. On the 8th day of follow-up, the patient had no urine output. Urinary catheterization was unsuccessful and he received transurethral catheterization. The next day the patient developed fewer 39.2ºC and deteriorated. Urine and blood samples were collected. Urine culture had no microbiological growth. But both blood culture samples yielded *C. testosteroni*. After consulting patient to the infectious disease clinic, levofloxacin 500 mg/day was ordered as antimicrobial treatment. The treatment was ended at the 7th day of the treatment due to clinical improvement. As the metabolic and biochemical serum parameters were stabilized and renal functions were recovered on the 18th day of the admittance, the patient was discharged with the recommendations regarding his malignancy.

Bacteriological Methods

C. testosteroni was isolated from two blood samples. After the positive signal was received from the blood culture automatized system (BacT/Alert 3DTM, bioMérieux, Durham, NC, USA), the Gram stain of the blood culture specimens revealed Gram-negative bacilli. Typical pink pigmented colonies were observed on the 5% sheep blood agar plates after 24 hours incubation at 37ºC(Figure). Gram stain from the colonies on agar plates revealed Gram negative bacilli which were mostly in pairs. Catalase reaction was negative and oxidase reaction was positive. On wet slides, the bacteria were motile. VITEK MS® (bioMérieux, Marcy l'Etoile, France) was used for identification of the isolates and VITEK 2® system (bioMérieux, Marcy l'Etoile, France) was used for antimicrobial susceptibility testing. Both of the isolates were identified as *C. testosteroni*. They were susceptible to piperacillin, ticarcillin/cla-

vulanate, gentamicin, amikacin, imipenem, meropenem ciprofloxacin and levofloxacin according to the EUCAST criteria [10].

DISCUSSION and CONCLUSION

Most of the infection cases due to *C. testosteroni* are cases of bacteriemia and intra-abdominal infections. Most of the intra-abdominal infections are related to perforation of gastrointestinal system such as acute perforated appendix or other anatomic disturbances in the gastrointestinal tract. Some researchers suggest that bacterial translocation from gastrointestinal system may have an important role for Comomonas infections [6, 11]. Most of cases infections due to *C. testosteroni* are community-acquired infections. However, it can survive in hospital settings, since it can survive in very low nutrient conditions. It is reported that it can be isolated from wet surfaces, humidifiers, respiratory devices and intravenous catheters[1,12]. Impaired immune system, chronic liver disease, renal diseases, diabetes and senility are listed as risk factors for *C. testosteroni* infections [9]. The isolate, which caused the presented case here, is probably of nosocomial origin and undiagnosed malignancy, impaired immune system and urinary intervention are the predisposing factors for bacteriemia due to this rare microorganism.

C. testosteroni is accepted as a low-virulent microorganism and rarely causes infections in humans. But Liu et al. reported that the bacilli still have at least 24 different virulence factors. These factors are related to adherence, anti¬-phagocytosis, invasion, and secretion system and surely have functions in pathogenicity of *C. testosteroni*[3]. Most of the presented cases in the literature were treated successfully only a few were dead[6,9]. This case was also treated successfully with levofloxacin. The isolate was susceptible to all antibiotics that were tested. In the literature, most of the isolates are reported as susceptible to piperacillin, piperacillin/tazobactam, trimethoprim/sulfametaxazole, aminoglycosides, fluroquinolones and cephalosporins and carbapenems[7]. Since *C. testosteroni* is susceptible to most antimicrobials, antimicrobial treatment is usually effective but there is an increasing concern about that it can gain resistance to antimicrobial drugs. Moreover, Wang et al. conducted a study that *C. testosteroni* can acquire a gene containing blaNDM-1, in turn, it can hydrolyze carbapenems[13].

It is very likely that most isolates of *Comamonas spp*. were misidentified in the previous years and again it is very likely that advances in diagnostic tools and devices (such as automated systems and molecular methods) in microbiology laboratories will enable identification of *Comamonas spp*. more easily and accurately together with other rare microorganisms[14].

Survival at low nutrient conditions, ability to acquire resistance genes and already found virulence factors make *C. testosteroni* a potential candidate to be a dangerous infectious agent, especially in patients with predisposing factors. Due to increased use of interventional procedures and catheters, prolonged hospitalization periods, immunocompromised patients, it can be expected that isolation of this bacilli will increase over the years. Microbiologist and bacteriology laboratory workers should be aware of such rare microorganisms and proper susceptibility testing should be carried out for appropriate antimicrobial treatment.

Conflict of interest

We attest that we have herein disclosed any and all financial or other relationships that could be construed as a conflict of interest and that all sources of financial support for this study have been disclosed and are indicated in the acknowledgments. All authors of this report declare no conflict of interest.

Ethical Committee Approval

Not needed

Informed Consent

Written informed consent was received from the patient.

We declare that the contents of this manuscript are our original work and have not been published, in whole or in part, prior to or simultaneous with our submission of the manuscript to the journal. The manuscript has been read and approved for submission by all authors. All persons listed as authors have contributed to preparing the manuscript and/or that International Committee of Medical Journal Editors (IC- MJE) criteria for authorship have been met, and that no person(s) other than the authors listed have contributed significantly to its preparation.

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