

A Case of *Pseudomonas stutzeri* Bacteremia in a Patient with Hematologic Malignancy

Hematolojik Maligniteli Bir Hastada *Pseudomonas stutzeri* Bakteremisi

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SUMMARY

Pseudomonas stutzeri is a gram-negative bacterium, ubiquitous in the environment, and it also causes opportunistic infections in humans. We describe a case with hematologic malignancy, peripheral T-cell lymphoma. The patient was hospitalized for antineoplastic chemotherapy. In the course of treatment, the patient acquired *P. stutzeri*, most probably from the hospital environment and bacteremia of *P. stutzeri* and then pneumonia developed. The bacteria were identified based on conventional microbiological identification techniques. Even though *P. stutzeri* is ubiquitous in the environment and a rare human pathogen, it should always be considered as a bacterial agent for opportunistic infections in hospitalized patients, especially immune depressed patients.

Anahtar Kelimeler: *Pseudomonas stutzeri*, Hematologic neoplasms, Bacteremia

ÖZET

Hematolojik Maligniteli Bir Hastada *Pseudomonas stutzeri* Bakteremisi

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Pseudomonas stutzeri doğada yaygın olarak bulunan ve aynı zamanda insanda fırsatçı infeksiyonlar yapan gram-negatif bir bakteridir. Bu çalışmada, periferik T hücre lenfomalı bir olgu sunulmuştur. Antineoplastik kemoterapi için hastaneye yatırılan olguda tedavi sırasında büyük bir olasılıkla hastane ortamından almış olduğu *P. stutzeri* nedeniyle bakteremi ve daha sonra pnömoni gelişti. Bakteri geleneksel mikrobiyolojik tanı teknikleri ile tanımlandı. *P. stutzeri* her ne kadar doğada yaygın bulunan ve insanda nadir infeksiyon yapan bir bakteri olsa da hastanede yatan özellikle immün sistemi baskılanmış hastalarda fırsatçı bir patojen olarak her zaman dikkate alınmalıdır.

Key Words: *Pseudomonas stutzeri*, Hematolojik neoplazmlar, Bakteremi

INTRODUCTION

As an opportunistic pathogen in humans, *Pseudomonas stutzeri* is a nonfluorescent denitrifying bacterium distributed in the environment. The species has particular metabolic properties, such as using some carbon compounds that are seldom consumed regularly by other pseudomonas (e.g., starch, maltose, ethylene glycol). Bacterial cells typically are gram-negative, rod-shaped and have a single polar flagellum. Bacteria may have one or two lateral flagella in certain conditions. The bacteria also have phenotypic traits as positive catalase and oxidase tests, strict respiratory metabolism except in nitrate-containing media, which permit the bacteria to grow anaerobically^[1,2]. Typically, freshly isolated colonies are adherent and have a wrinkled appearance. *P. stutzeri* is ubiquitous in soil and water and has been recovered from humus, manure, straw, sewage, stagnant water, baby formula, hospital equipment, eye cosmetics, and various clinical specimens. The bacteria have only rarely been associated with human infections, such as conjunctivitis, otitis media, septicemia/bacteremia, meningitides, pneumonia, septic arthritis, endocarditis, osteomyelitis, infections of synthetic vascular grafts, and infection of traumatic wound^[1,3]. We report herein a *P. stutzeri* bacteremia case-a 14-years-old girl diagnosed as peripheral T-cell lymphoma.

CASE REPORT

A 14-years-old girl applied to the pediatric clinic in August 2007 with symptoms of icter on scleras, lack of appetite, vomiting, and abdominal bloating. The physical examination revealed hepatomegaly (7 cm extended from the midclavicular line on costal border), splenomegaly (10 cm extended from the costal border) and widespread eruption. Laboratory examination results demonstrated leukocyte count: 32.500/mm³, Hb: 11.2 g/dL and platelet count: 39.000/mm³; liver and kidney function tests and serum electrolyte levels were found normal. Hepatomegaly, splenomegaly, and enlargement and conglomeration of lymph nodes on para-aortic and mesenteric regions were observed by abdominal ultrasonography and computerized tomography. Cytopathological examination of these lymph nodes could not be done. Bone marrow biopsy samples were taken and the microscopic examination of the samples led to

the diagnosis of peripheral T-cell lymphoma. The patient received NLH-BFM 90 chemotherapy protocol in September 2007. The protocol was then changed to continuation chemotherapy protocol in June 2008. Bone marrow relapsed during the course of continuation chemotherapy protocol, and then ALL REZ BFM 2002 chemotherapy protocol was administered. The patient suffered tachypnea after the 4th cure of the block R1 chemotherapy protocol, which was applied in February 2009. The X-ray graphs of the patient showed the pulmonary infiltration. Blood samples from peripheral veins and sputum samples were taken for culture, and the patient received meropenem and trimethoprim/sulfamethoxazole according to the protocol of empirical infection treatment carried out in the hematology clinic at that time. The results of the blood and sputum samples culture revealed the infection agent as *P. stutzeri*, confirmed by conventional microbiological identification techniques and API 20 NE System. The antimicrobial susceptibility results of *P. stutzeri* were found as sensitive to ceftazidime, tobramycin, piperacillin, amikacin, piperacillin/tazobactam, cefepime, imipenem, and meropenem according to Clinical Laboratory Standards Institute (CLSI) guidelines^[4]. In view of the sensitivity to the antimicrobials used for this patient, the protocol of antimicrobial chemotherapy was not changed. Colitis progressed in the course of therapy, so nasogastric catheter was applied for decompression. Aminoglycosides and metronidazole were also added to the antimicrobial chemotherapy. With the onset of respiratory distress, mechanical ventilation was applied, but the patient died due to pulmonary hemorrhage on the fifth day of pneumonia.

DISCUSSION

Burri and Stutzer first described *P. stutzeri* in 1895, van Niel and Allen precisely defined its phenotypic characteristics, and Lehmann and Neumann designated it as *P. stutzeri* in 1952. The legitimacy of the inclusion of *P. stutzeri* in the genus was made by DNA-rRNA hybridization and the sequence similarities of the rRNAs. The strains of *P. stutzeri* and most other recognized *Pseudomonas* spp. can grow in basic media, and the bacteria use nitrate and ammonium ions as carbon and energy source. Additional growth factors are generally not required^[1,2]. *Pseudomonas* species have a range of different ad-

hesins that function during initial attachment to substratum. For colonization of biotic and abiotic surfaces in the initial formation of microcolonies, flagella and pili are of importance for *Pseudomonas* species. *P. stutzeri* has both flagella and pili. Type IV pili confer twitching motility and are partly responsible for colonization^[1,5]. Many studies have been performed about the prevalence of *P. stutzeri* in hospitals. Based on the results of these studies, scientists have concluded that *P. stutzeri* is also ubiquitous in the hospital environment and that the bacteria could be considered an opportunistic but rare human pathogen. These studies have also revealed that the bacteria demonstrate sensitivity to many more antibiotics than *Pseudomonas aeruginosa*. This condition has been explained by its reduced occurrence in clinical environments and due to the lower exposure to antibiotics^[1]. In our case, we observed the sensitivity rate of antibiotics as very high. In addition to first- and second-generation cephalosporins, almost all beta-lactams and aminoglycosides have antimicrobial effectiveness. During the last two decades, several clinical reports have described the isolation of *P. stutzeri* from microbiological materials and patients' samples. These reports have been associated with septicemia/bacteremia, bone and joint infections, eye infections, endocarditis, skin infections, urinary tract infections, meningitides, and pneumonia^[1,6-10]. Because the majority of these cases recovered and only two died, the researchers concluded that *P. stutzeri* has a relatively low degree of virulence. Researchers have also observed that it is questionable as to whether the deaths were due to *P. stutzeri* infection or the severe malfunctions caused by the underlying conditions. In the presented case, the same circumstances may be kept in mind; however, the death most probably was due to the bacteremia acquired from the hospital environment and the subsequent bacterial invasion of the lungs.

We concluded that *P. stutzeri* is a rare human pathogen, but it nevertheless should always be considered as an opportunistic pathogen especially in hospitalized and immune suppressed patients such as ours.

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