



Pseudomonas stutzeri-Induced CNS Infection in a Patient with a History of NHL and Diabetes and a Recent Hospitalization for Pancreatoenteric Fistula

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Abstract

Introduction: *Pseudomonas stutzeri* is a gram negative bacterium that it is widely distributed in the environment. It is perceived as an opportunistic pathogen that has rarely been described in the literature, but may cause detrimental infections. This rod-shaped, motile, single polar-flagellated, soil bacterium was initially isolated from human spinal fluid.

Case Presentation: Herein, we present an 85 year-old man with a history of Non-Hodgkin Lymphoma and diabetes mellitus, who presented to the emergency department with fever and chills and was diagnosed with CNS infection caused by *Pseudomonas stutzeri*.

Conclusion: To our knowledge, this is the fourth case of *P. stutzeri* CNS infection reported in the literature. Immunosuppression should prompt clinicians to take into consideration the possibility of an opportunistic infection, thus, guiding appropriately the antimicrobial treatment.

Keywords: *Pseudomonas stutzeri*; Central nervous system infection; Diabetes mellitus; Non-Hodgkin Lymphoma

Introduction

Pseudomonas stutzeri belongs to *Pseudomonas* spp. and it is an aerobic, non-fermenting, active, gram-negative oxidase-positive bacterium. The fact that is not producing fluorescent pigments distinguishes it from the other species of this category [1]. Otherwise, this member of *Pseudomonas* spp. is described as rod shaped, 1 µm to 3 µm in length and 0.5 µm in width, and has a single polar flagellum. It is predominantly found in soil and water and this bacterium has rarely implicated in human infectious diseases [2]. Indeed, subjects suffering from *P. stutzeri* infection usually have a history of immunosuppression or have recently undergone a surgery procedure. The microorganism is mostly isolated from blood cultures, respiratory or urinary tract as well as from surgical wounds. As it has been reported, antimicrobial therapy is effective for most of the cases and this is based on the low virulence of the microorganism [3]. Nonetheless there are a few presentations, which showed that *P. stutzeri* may result in unfavorable outcomes [4].

This case report displays the clinical presentation and detrimental course of CNS infection provoked by *P. stutzeri* in a patient with a history of Non-Hodgkin Lymphoma and a recent hospitalization for pancreatic pseudocyst and pancreatoenteric fistula.

Case Presentation

An 85-year-old male presented to the emergency department due to fever (as high as 38.5°C) and non-productive cough for the past four days. According to his past medical history the patient had a diagnosis of Non-Hodgkin Lymphoma with a metastasis at the right orbital area. On his medical records it was stated that he had received appropriate number of chemotherapies, while his oncologist's notes affirmed that he was free of the disease for almost a year. In addition, the previous six months he had several recurrent episodes of pancreatitis, with the last one being complicated by a pancreatic pseudocyst and pancreatoenteric fistula; literally two months prior to his current presentation. Other medical problems included hypothyroidism, diabetes mellitus type 2, arterial hypertension and benign prostatic hyperplasia. His medications included metformin, metoprolol, combination of irbesartan and hydrochlorothiazide and alfuzosin.

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In the ED, the patient had a temperature of 38°C, while oxygen saturation was 84% on room temperature; thus, the patient was placed on 4 liters of nasal cannula. His blood pressure was 140 over 80 mmHg and his heart rate was 105 bpm. On cardiac auscultation no murmurs, rubs or gallops were noted, while in the lungs there were mild crackles at the level of the bases bilaterally. The abdomen was soft, without tenderness and distention. He had no head trauma, and his pupils were equal, round and reactive to light and accommodation. He was lethargic, but on awaking was oriented to place and time and he responded well to commands. Nuchal rigidity was present. Laboratory tests were notable for leukocytosis with a White Blood Cell count (WBC) of 19,510 cells/mm³ and 87% neutrophils, C-reactive protein of 397 mg/L and serum creatinine of 1.4 mg/dL. Chest X-Ray showed small pleural effusions bilaterally, while abdominal X-Ray displayed no pathological findings. Electrocardiogram revealed sinus arrhythmia. Head computed tomography showed no hemorrhagic findings as well as no ischemic lesions. Two sets of blood cultures as well as urine cultures were taken. Empiric treatment with intravenous antibiotics, ceftriaxone and vancomycin, was initiated. Upon admission, his mental status deteriorated significantly, with the patient being dramatically confused and irritated. Hence, lumbar puncture was immediately performed. The results of spinal fluid demonstrated 4,500 cells with PMNs predominant, glucose level was 5.16 mmol/L (plasma glucose level 8.32 mmol/L) and protein level was 0.56 g/L. A couple of hours later the patient became extremely irritable and confused, hence he was intubated for airway protection. Vasopressors were administered in a low dose; nonetheless, the day after, he became hypotensive and succumbed to his illness and passed away. Blood cultures came positive for *Pseudomonas stutzeri*, a few days later, while CSF culture revealed a gram negative microorganism, *Pseudomonas stutzeri*, too.

Discussion

It is of the utmost importance for the clinical diagnosis as well as for the patients' clinical outcome to early identify the cause of an infectious process and thus combat it with the appropriate antimicrobial therapy. Nonetheless, this battle cannot always be won. There have been reports of numerous opportunistic bacteria that lead to deleterious infections; *Pseudomonas stutzeri* is one of them. It has been implicated in infectious processes, such as endocarditis, osteomyelitis, peritonitis in peritoneal dialysis patients as well as in diverticulitis cases [1,5].

As it has already been reported, *Pseudomonas stutzeri* is a gram-negative rod and was first isolated from the human spinal fluid; however it is widespread present in the environment. It is distinguished for its denitrifying ability as well as its unique colony structure. When it is isolated from non-sterile sites, it does not indicate pathogenicity and thus in the absence of signs and symptoms, no specific therapy is required [3].

Due to its low virulent ability, this organism cannot precipitate an infectious process in an immunocompetent host. It can lead to unfavorable results, though, if it affects subjects who suffer a state of immunosuppression, such as malignancy. Patients with a number of comorbidities, recent history of surgery, trauma or even skin infection are also at increased risk. Bacteremia, pneumonia, osteomyelitis, endocarditis and arthritis due to *P. stutzeri* have been documented. Our case is the fourth in the literature, which identifies *P. stutzeri* as the cause of CNS infection. The microorganism was identified in all sets of blood culture and cerebrospinal fluid culture [1,5].

It has been postulated that excluding ceftazidime, third and fourth generation cephalosporins are not optimal therapies for *P. stutzeri* infections with a coverage rate ranging from 50% to 70%. Studies have exhibited that the microorganism is susceptible to aminoglycosides, quinolones, antipseudomonal penicillins, carbapenems and trimethoprim-sulfamethoxazole [4]. The patient herein was treated with a third-generation cephalosporin and vancomycin before obtaining our cultures' results and hence in a very little time period got into septic shock that could not be reversed with intravenous fluids, antibiotics and high doses of vasopressors.

Conclusion

Subjects with a past medical history of immunosuppression, should alert clinicians to take into consideration the possibility of an opportunistic infection; thus, guiding appropriately the antimicrobial treatment.

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