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Case Report

Pantoea Agglomerans Bacteremia: A Real Pathogen? A Case Report and Review of the Literature

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Introduction

Pantoea agglomerans is a facultative anaerobic Gram-negative bacillus that can rarely cause opportunistic infections in humans, mainly due to wound infection with plant material or to hospital-acquired infections mostly in immune-compromised individuals. The clinical findings are extremely variable and reports of such an infection have been published mainly in premature infants or in oncologic individuals [1, 2]. Its role as real human pathogen is still controversial due to infrequent reports of spontaneously occurring *Pantoea agglomerans* infections and uncertain in taxonomic identification [3, 4]. We report here a case of *Pantoea agglomerans* bacteriemia in a subject with a Buerger's disease.

Case presentation

A 66 years-old man was admitted to our emergency department for fever up to 40°C after administration of intravenous prostaglandin analogs as therapy for Buerger's disease. He was carrier of a peripherally inserted catheter central (PICC) and affected by diabetes mellitus and chronic kidney failure. Serum level of CRP was 8,40 mg/dl (normal value < 2 mg/dL) and procalcitonine was 31 ng/ml (normal value < 0,5 ng/ml). White blood cells were moderate augmented (12000/mmc, normal values 4000-11000/mmc); renal and liver tests were normal, except for creatinine that was slightly increased (1,4 mg/dL, normale values < 1,2 mg/dL). Chest X-ray was normal, as were two nasopharyngeal swabs for COVID-19 infection in two consecutive days. Blood cultures were promptly done and empiric antibiotic treatment with vancomycin was started due to the high risk of bacteremia due to *meticillin-resistant Staphylococcus aureus*. PICC was removed at the first day of hospitalization, supposing to be the possible source of infection. The patients had only a partial clinical and biochemical improvement after initial antibiotic treatment, with CRP 6,3 mg/dL at the second day of hospitalization. Abdomen ultrasound was normal and echocardiogram did not show findings compatible with endocarditis. On the third day after hospitalization, blood cultures resulted positive for *Pantoea agglomerans*; based on antibiogram, vancomycin was substituted with levofloxacin 750 mg. After further questioning, the patient revealed that he had recently done some garden works and had minor injuries to the legs that were not considered at the time of admission. Fever disappeared after 24 hours, and inflammatory parameters normalized after 72 hours. Patient was discharged after additional 5 days with a prescription of oral levofloxacin; levofloxacin was continued for a total of 14 days. After 2 months of follow-up no other febrile episodes recurred, and the patient maintains asymptomatic.

Discussion

Pantoea agglomerans, previously named *Enterobacter agglomerans* or *Erwinia herbicola*, is a non-capsulated, non-spore-forming anaerobic Gram-negative bacillus, usually associated with plants but rarely affecting humans and vertebrate animals. Approximately 20 species belong to this group of bacteria, and *Pantoea agglomerans* is the most prominent species in humans [5]. Clinical findings of patients infected by *Pantoea agglomerans* are very different, including bone and joints infections, osteomyelitis and synovitis [6]; uncommon presentation included endocarditis and endophtalmitis [7, 8]. Usually, cutaneous infections occur as a wound super-infection, with the bacteria entering the skin when penetrating trauma occurs. From the skin, the infection can subsequently extend deep into the bones, causing septic arthritis, spondylodiscitis or osteomyelitis, theoretically leading to peritonitis or sepsis [9]. Other than wound infection with plant material, also exposure to contaminated fluids or medical equipment may lead to infection outbreaks [10, 11]. However, sporadically *Pantoea agglomerans* can cause spontaneous bacteremia. The association between this finding and the gastroesophageal reflux disease or the receipt of antacids has been hypothesized, maybe due to gastrointestinal translocation following ingestion of bacteria with vegetables or fruits [12]. Finally, bloodstream infections by *Pantoea agglomerans* have been associated with occupational exposure to organic dust [13]. Overall, spontaneous bacteremia has been associated with several underlying pathologies like active malignancies, diabetes mellitus, chronic viral hepatitis, congestive heart failure, autoimmune or connettive diseases, cerebrovascular accidents, chronic pulmonary obstructive diseases and end-stage kidney diseases. The diagnosis of *Pantoea agglomerans* infection is usually made with positive cultures from different specimens including blood, pus, urine or tracheal aspirate. Regarding the effective antibiotic treatment, antimicrobial susceptibility was studied in a cohort of adult individuals developing a spontaneous bacteremia due to *Pantoea agglomerans* [12]. All the isolates were susceptible to ciprofloxacin, gentamicin, amikacin, piperacillin/tazobactam, cefotaxime, ceftazidime and imipenem; 61% were susceptible to cefazolin, 56% to ampicillin and 33% to fosfomycin. In our patient, levofloxacin treatment showed to be highly effective in a very short time, leading to a rapid recovery. As a consequence, the

use of appropriate antibiotic treatment, driven by the susceptibility tests *in vitro*, also in immune-compromised individuals, is usually associated with a therapeutic success.

The possible cause of *Pantoea agglomerans* bacteremia in our patient was a wound superinfection; further he had several underlying clinical conditions such as a vasculitis like Buerger's disease, diabetes mellitus and chronic kidney failure that overall can have exacerbate the symptoms, contributing to the development of spontaneous bacteremia. However, the clinical course was well controlled by antibiotic treatment and no complications were observed in a medium-time.

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