A rare cause of urinary tract infection: *Pantoea agglomerans*

Nadir bir üriner sistem enfeksiyonu etkeni: *Pantoea agglomerans*

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ABSTRACT

Pantoea agglomerans is a gram-negative bacterium and a member of the Enterobacteriaceae family. It is commonly isolated from environmental samples, though it rarely causes infections in humans. Human infections have been reported following plant injuries and the use of contaminated medical products. We present a case of urinary tract infection caused by *P. agglomerans* in a 50-year-old immunocompetent male patient with a community-acquired infection. The patient presented with fever and dysuria but had no urethral discharge, pruritus, or other associated symptoms. Physical examination revealed no significant findings. Routine urinalysis showed a pH of 6.0, specific gravity of 1026, and positive results for both nitrites and leukocyte esterase. Urinary system ultrasonography revealed no abnormalities. Urine culture grew *P. agglomerans* at a concentration of >10^5 cfu/mL. Identification was performed using conventional microbiological techniques and the BD PhoenixTM (Becton Dickinson, USA) automated system. The isolated organism was found to be susceptible to all tested antibiotics. Antimicrobial susceptibility testing was conducted using the BD PhoenixTM (Becton Dickinson, USA) device, and

ÖZET

Pantoea agglomerans, Enterobacteriaceae ailesi üyesi gram negatif bir basildir. Sıklıkla çevresel örneklerden izole edilen *P. agglomerans* nadiren insanlarda hastalığa neden olur. İnsanlarda bitki yaralanmaları sonrası ve kontamine tıbbi ürünler kaynaklı enfeksiyon olguları bildirilmiştir. Toplum kökenli ve immünkompetan 50 yaşında erkek bir hastada *P. agglomerans*'ın neden olduğu üriner sistem enfeksiyonunu bildirdik. Hasta ateş ve idrarda yanma şikayeti ile başvurdu. Üretral akıntı, kaşıntı ya da başka bir şikayeti saptanmadı. Fizik muayenesinde bir bulgu yoktu. Tam idrar testinde pH 6.0, dansite 1026, nitrit pozitif ve lökosit esteraz pozitif olarak raporlandı. Üriner sistem ultrasonografisinde patoloji saptanmadı. İdrar kültüründe >10^5 cfu/mL *P. agglomerans* üremesi oldu. Tanımlama konvansiyonel mikrobiyolojik yöntemler ve BD PhoenixTM (Becton Dickinson, ABD) otomatize sistemi ile gerçekleştirildi. İzole edilen tür çalışılan tüm antibiyotiklere duyarlı bulundu. Antimikrobiyal duyarlılık testleri BD PhoenixTM (Becton Dickinson, ABD) cihazı kullanılarak ve minimum inhibitör konsantrasyon

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the minimum inhibitory concentration (MIC) values were determined. Results were interpreted according to the criteria set by the European Committee on Antimicrobial Susceptibility Testing (EUCAST). The patient exhibited no signs of systemic infection. Empiric treatment with trimethoprim/sulfamethoxazole (160 mg/800 mg) 2x1 tablet was initiated, followed by a switch to cefixime 400 mg 1x1 tablet due to the potential hepatotoxicity associated with trimethoprim/sulfamethoxazole. The patient was successfully treated over a course of 14 days. The isolated species was fully susceptible to all antibiotics tested, which is thought to be attributed to the patient's lack of immunosuppression and the community-acquired nature of the infection. However, resistant strains are more likely to be encountered in patients with underlying conditions or in hospitalized individuals. The rare nature of the pathogen in this case, along with the absence of typical features and the successful outpatient management, is noteworthy. Through this report, we aim to highlight the rare and atypical clinical presentations of this bacterium and contribute to the management of similar cases.

Anahtar Kelimeler: *Pantoea agglomerans*, urinary tract infection, community-acquired

(MIC) değerleri belirlenerek yapıldı. Duyarlılık test sonuçları European Committee on Antimicrobial Susceptibility Testing (EUCAST) kriterlerine göre değerlendirildi. Hastada sistemik enfeksiyon bulguları yoktu. Komplike üriner sistem enfeksiyonu tanısıyla trimetoprim/sulfametoksazol (160 mg/800 mg) 2x1 tablet tedavisi ve bu antibiyotiğin olası hepatotoksisitesi nedeniyle geçilen sefiksim 400 mg 1x1 tablet tedavisi ile toplam 14 günde başarılı bir şekilde tedavi edildi. İzole ettiğimiz tür çalışılan tüm antibiyotiklere duyarlı bulunmuştur. Bu durumun hastanın immünsupresyonunun bulunmaması ve toplum kökenli olmasına bağlı olduğu düşünülmüştür. Altta yatan hastalığı olanlarda ve hastanede yatan hastalarda dirençli suşlar ile karşılaşmak mümkündür. Olgumuzun nadir bir etkenle tipik özellikler gözlenmeden enfekte olması ve ayaktan tedavi edilebilmesi ilgi çekicidir. Çalışmamızla bu bakterinin nadir atipik klinik sunumlarına dikkat çekmeyi ve vaka yönetimine katkı sunmayı düşünüyoruz.

Key Words: *Pantoea agglomerans*, üriner sistem enfeksiyonu, toplum kökenli

INTRODUCTION

Pantoea agglomerans is a Gram-negative bacillus belonging to the family *Enterobacteriaceae*. It was previously known as *Enterobacter agglomerans* and Erwinia herbicola (1). *P. agglomerans* is frequently isolated from environmental sources but only rarely causes disease in humans (2,3). Human infections typically occur in neonates and immunocompromised individuals (3). Cases have also been described following plant-related injuries and exposure to contaminated medical products (4).

Here, we report a case of community-acquired urinary tract infection caused by *P. agglomerans* in a 50-year-old immunocompetent male. By presenting this case, we aim to highlight the atypical and uncommon clinical manifestations associated with this organism and contribute to the clinical management of such rare infections.

CASE REPORT

A 50-year-old male presented to our Infectious Diseases and Clinical Microbiology outpatient clinic

with complaints of fever and dysuria. He denied urethral discharge, pruritus, or any additional symptoms. His chronic medications included acetylsalicylic acid, metoprolol, fenofibrate, and rabeprazole. He had no history of hospitalization other than a varicocelectomy performed approximately 20 years earlier. On presentation, his vital signs were as follows: body temperature, 36.3°C; pulse rate, 62/min; respiratory rate, 17/min; and blood pressure, 110/80 mmHg. Physical examination was unremarkable.

Routine blood tests showed a leukocyte count of 11.9×10^9/L, neutrophil count of 10.5×10^9/L, neutrophil percentage of 88%, C-reactive protein (CRP) of 64 mg/L (reference: 0–10 mg/L), blood urea nitrogen of 20.5 mg/dL, creatinine of 1.0 mg/dL, alanine aminotransferase (ALT) of 33 U/L, and aspartate aminotransferase (AST) of 32 U/L. Urinalysis revealed a pH of 6.0, a specific gravity of 1026, and positive results for nitrite and leukocyte esterase. No pathological findings were detected on urinary system ultrasonography.

Following urine culture collection, the patient was diagnosed with a urinary tract infection and empirically started on trimethoprim–sulfamethoxazole (160 mg/800 mg) twice daily. The urine culture subsequently yielded *P. agglomerans* at $>10^5$ CFU/mL. Identification was performed using conventional microbiological methods in conjunction with the BD Phoenix™ (Becton Dickinson, USA) automated system. Antimicrobial susceptibility testing was carried out using the BD Phoenix™ system, and minimum inhibitory concentration (MIC) values were obtained. The results were interpreted according to the European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidelines (5).

On the sixth day of treatment, the patient was asymptomatic, his physical examination remained unremarkable, and his CRP level had decreased to 14 mg/L. However, biochemical analysis revealed elevated levels of AST (248 U/L), ALT (277 U/L), and gamma-glutamyl transferase (GGT) (106 U/L). Hepatobiliary ultrasonography showed only grade 1 hepatosteatosis without any additional abnormalities. These findings were considered suggestive of possible trimethoprim-sulfamethoxazole-induced hepatotoxicity (6). Consequently, the patient's antibiotic therapy was switched to cefixime 400 mg once daily. In addition, based on recommendations from the internal medicine team, N-acetylcysteine effervescent tablets and adequate hydration therapy were initiated.

By the tenth day of treatment, the patient's ALT, AST, GGT, and CRP levels had returned to within normal limits. Urinalysis demonstrated negative leukocyte esterase and nitrite results, and the follow-up urine culture was sterile. As the patient's symptoms had fully resolved, antibiotic therapy was continued for a total duration of 14 days and subsequently discontinued.

Since it is a case report, ethics committee approval is not required; Written consent of the patient was obtained for the presentation of the case.

DISCUSSION

Pantoea species are considered rare opportunistic pathogens. In a study investigating the epidemiology and antimicrobial resistance patterns of *Pantoea* species, hospitalized patients were found to be approximately 1.5 times more commonly affected than outpatients. In that study, *Pantoea* isolates were most frequently recovered from blood cultures, abscesses, and surgical specimens, whereas only 3 of the 70 isolates were obtained from urine samples of patients with indwelling urinary catheters (7). In contrast, our patient was an immunocompetent, community-acquired case without a urinary catheter. This highlights that even in such individuals, this uncommon pathogen should be recognized as a potential cause of infection.

P. agglomerans typically causes localized infections in immunocompetent individuals, whereas systemic infections are more commonly observed

in immunosuppressed patients and neonates (8,9). Consistent with this pattern, no signs of systemic infection were identified in our immunocompetent patient, who was successfully managed with oral antibiotic therapy in the outpatient setting.

Olmos-Alpiste et al. reported a case of a 58-year-old woman who developed a *Pantoea agglomerans* skin infection following a penetrating plant injury (10). The patient did not respond to empirical therapy with amoxicillin-clavulanic acid, cloxacillin, and clindamycin. Clinical improvement was achieved after the pathogen was isolated from skin biopsy cultures and the treatment was switched to trimethoprim-sulfamethoxazole (10). This case is notable for demonstrating the pathogenic potential of *P. agglomerans* in immunocompetent adults. In our case, there was no history of plant exposure; however, similarly successful outcomes were obtained with trimethoprim-sulfamethoxazole therapy. These findings highlight that this pathogen should be considered even in the absence of clear environmental exposure.

Septic arthritis is most commonly caused by staphylococci and streptococci. Koutserimpas et al. described a case of septic arthritis due to *P. agglomerans* in a 67-year-old man, representing one of only a few such cases reported in the literatüre (11).

Both the existing literature and our case demonstrate that *P. agglomerans* can act as an etiological agent in atypical patient profiles, including immunocompetent adults with community-acquired infections. Therefore, thorough microbiological evaluation is essential, as it can identify unusual pathogens that may not be adequately covered by empirical therapy.

The vast majority of urinary tract infections are caused by *Escherichia coli* (12,13). Other implicated pathogens include *Klebsiella*, *Proteus*, *Pseudomonas*, and *Enterobacter* species, as well as enterococci and staphylococci. Trimethoprim-sulfamethoxazole, fluoroquinolones, and beta-lactams are commonly used as first-line treatment options (12). Our patient was empirically initiated on oral trimethoprim-sulfamethoxazole for presumed complicated urinary tract infection. After *P. agglomerans* was isolated from the urine culture and confirmed to be susceptible, the initial therapy was continued. Despite clinical and laboratory improvement, the antibiotic regimen was switched to cefixime due to elevations in hepatic enzyme levels. Under cefixime therapy, both acute-phase reactants and liver function tests normalized. No bacterial growth was detected in follow-up urine cultures. As the patient's symptoms had resolved and physical examination remained unremarkable, a total 14-day course of antibiotic therapy was completed. The patient achieved full clinical recovery.

In the study by Gajdács, all *Pantoea* species isolates obtained from various clinical specimens were reported to be susceptible to amikacin and meropenem, with a 94.3% susceptibility rate to trimethoprim-sulfamethoxazole. Higher resistance rates were observed for amoxicillin-clavulanate and ampicillin (7). Another study investigating the resistance profiles of *P. agglomerans* isolates causing bacteremia reported very low resistance levels (14). Consistent with these findings, the isolate recovered from our patient's urine culture was susceptible to all tested antibiotics (Table 1). In contrast, Büyükçam et al. reported carbapenem resistance in 21.4% of *P. agglomerans* isolates (1). The authors attributed this observation to the small sample size, the presence of severe comorbidities in affected patients, and the potential impact of coexisting pathogens (1). Although the isolate in our case demonstrated broad susceptibility, it should be emphasized that resistant strains may be encountered in hospital-acquired infections, particularly among patients with significant comorbid conditions.

Tablo 1. Antimicrobial susceptibility results of Pantoea agglomerans isolated from urine culture

Antibiotic	MIC	Susceptibility
Ampicillin oral (uncomplicated UTI)	≤8	Susceptible
Amoxicillin-Clavulanate oral (uncomplicated UTI)	≤2	Susceptible
Piperacillin-Tazobactam	4	Susceptible
Cefixime (uncomplicated UTI)	0.5	Susceptible
Ceftriaxone	≤1	Susceptible
Ciprofloxacin	≤0.25	Susceptible
Levofloxacin	≤0.5	Susceptible
Amikacin	≤8	Susceptible
Gentamicin	≤2	Susceptible
Tobramycin	≤2	Susceptible
Ertapenem	0.5	Susceptible
Meropenem	0.25	Susceptible
Trimethoprim-Sulfamethoxazole	≤2	Susceptible

UTI: Urinary Tract Infection

In conclusion, clinicians should be aware that *P. agglomerans* can cause urinary tract infections even in immunocompetent, community-acquired individuals. Additionally, microbiological evaluation is of utmost importance, as it can reveal such unusual organisms.

ETHICS COMMITTEE APPROVAL

* Since it is a case report, ethics committee approval is not required; Written consent of the patient was obtained for the presentation of the case.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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