

# A Rare Case of Nosocomial Urosepsis in an Elderly Patient: *Sphingomonas Paucimobilis*

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## ABSTRACT

*Sphingomonas paucimobilis* is an aerobic, non-fermentative, non-spore-forming, yellow-pigmented, very slow-moving, Gram-negative bacillus. *Sphingomonas paucimobilis* can cause bacteremia, pneumonia, catheter-related bloodstream infections, meningitis, peritonitis, osteomyelitis, septic arthritis, postoperative endophthalmitis, lung and spleen abscesses, and urinary and biliary system infections. It can lead to infections in healthy and immunocompromised individuals through a variety of mechanisms. This report describes a rare case of urosepsis due to *Sphingomonas paucimobilis*.

## INTRODUCTION

*Sphingomonas paucimobilis* was described by Yabuuchi et al.<sup>[1]</sup> in 1990. It is an aerobic, non-fermentative, non-spore-forming, yellow-pigmented, very slow-moving Gram-negative bacillus. It is also oxidase- and catalase-positive.<sup>[2]</sup> *Sphingomonas paucimobilis*, formerly known as *Pseudomonas paucimobilis*, was first reported as a human pathogen in 1979.<sup>[3]</sup> More than 20 species have been classified within this genus. Although it rarely causes serious, life-threatening infections, in recent years, it has been reported as a cause of nosocomial infection.<sup>[4]</sup> *Sphingomonas paucimobilis* can cause infections in healthy and immunocompromised individuals. Outbreaks have been reported due to colonization of hospital water systems, among other mechanisms.<sup>[5]</sup> It has also been found in hemodialysis fluid and drug solutions intended to be sterile.

*Sphingomonas paucimobilis* can cause bacteremia, pneumonia, catheter-related bloodstream infections, meningitis, peritonitis, osteomyelitis, septic arthritis, postoperative endophthalmitis, lung and spleen abscesses, and urinary and biliary system infections.<sup>[3]</sup> This report describes a

case of *Sphingomonas paucimobilis*-induced catheter-related urinary tract infection and secondary bacteremia in the intensive care unit.

## CASE REPORT

An 85-year-old male patient presented at the emergency department with fever, shivering, and chills. The patient was diagnosed with hypertension, stroke, and dementia. His complaints had been ongoing for 2 days before admission to the hospital. The medical history was unremarkable except for the use of ciprofloxacin due to a diagnosis of urinary infection 1 month earlier. When the patient was physically examined in the emergency department, his body temperature was 39.1°C, his heart rate was 120 beats/minute, his arterial blood pressure was 100/700 mm Hg, and a costovertebral angle tenderness test was positive. According to the laboratory test results, the white blood cell count was 16,900/mm<sup>3</sup>, the hemoglobin level was 12.1 g/dL, the platelet count was 312,000/mm<sup>3</sup>, the blood urea nitrogen level was 78 g/dL, the creatinine level was 1.3 mg/dL, the sodium level was 159 mmol/L, the

chlorine level was 117 mmol/L, and the C-reactive protein (CRP) level was 194 mg/L (normal range: 0–5 mg/L). Other biochemical parameters were normal. A complete urinalysis revealed 116 leukocytes and the results were positive for leukocyte esterase, nitrite, and bacteria. Blood and urine cultures were obtained from the patient samples and the patient was taken into the intensive care unit with a diagnosis of urosepsis.

The patient had recently been diagnosed with a urinary tract infection and ertapenem was administered (1x1 g/day/IV). At the 48<sup>th</sup> hour of treatment, the patient's body temperature decreased. The CRP level was determined to be 164 mg/L. *Klebsiella pneumoniae* was present in 2 sets of blood cultures and a urine culture obtained at admission to the emergency department. On the fourth day of hospitalization, treatment with ceftriaxone was initiated (2x1 g/day/IV) and ertapenem treatment was discontinued.

On the fifth day of hospitalization, control urine and blood cultures were obtained. The leukocyturia had decreased in the complete urinalysis, and no growth was observed in the patient's blood cultures, however, ampicillin-resistant *Enterococcus faecium*-growth was observed in the urine culture. The patient's body temperature and CRP level had decreased and he was evaluated in terms of colonization with no change in treatment. Fever and hypotension recurred the 12<sup>th</sup> day of hospitalization. Blood and urine cultures were requested again. Treatment with meropenem (3x1 g/day/IV) and daptomycin (1x500 mg/day/IV) was implemented for the potential effect on *Enterococcus faecium* growing in the urine. A complete urinalysis revealed 191 leukocytes and leukocyte esterase-positivity with no nitrite presence. *Sphingomonas paucimobilis* was found in the blood and urine cultures. The infectious agent was susceptible to amikacin ( $\leq 2$ ), imipenem (0.5), meropenem (1), while it was moderately susceptible to gentamicin. The treatment was continued due to the susceptibility of the growing agent to meropenem. The patient died on the 17<sup>th</sup> day of hospitalization.

## DISCUSSION

*Sphingomonas paucimobilis* was first isolated in 1979 from the wound culture of a sailor who had a leg ulcer. It was reported to be a cause of infection in humans. At the time, it was known as *Pseudomonas paucimobilis*.<sup>[6]</sup>

The bacteria can be widely found in soil and water sources, as well as on surfaces, including medical equipment. They have the ability to survive in chlorinated water and form biofilms.<sup>[7]</sup> They can, therefore, cause community- and hospital-acquired infections.

*Sphingomonas paucimobilis* is a less virulent bacterial organism compared with other non-fermentative bacteria.<sup>[3]</sup> The lower virulence is thought to be due to the absence of lipopolysaccharide A in the cell wall of this species. *Sphingomonas paucimobilis* rarely causes life-threatening infections. However, it can cause serious infections in patients with chronic lung disease, excessive alcohol use, intrave-

nous drug use, or steroid or immunosuppressive therapy. Although the source generally cannot be determined in these patients, it is thought to originate from endogenous flora.<sup>[2]</sup> If not treated properly, it may cause septic shock. In our case, the long-term hospitalization, prior antibiotic use, and advanced age were considered facilitating factors; the precise source of transmission could not be determined.

A small number of cases of *Sphingomonas paucimobilis* have been reported in the literature, however, a search of PubMed and Google Scholar indicated that urosepsis due to *Sphingomonas paucimobilis* is rare in non-immunosuppressed, elderly patients. Therefore, the present case is noteworthy.

Numerous studies have found that *Sphingomonas paucimobilis* is susceptible to ampicillin, carbenicillin, cefrisoxime, cefotaxime, quinolones, and trimethoprim sulfamethoxazole in in vitro susceptibility tests. This bacterial organism is generally resistant to piperacillin, first-generation cephalosporins, cefmetazole, and cefoperazone.<sup>[8,9]</sup> Antibiotic resistance mechanisms have not yet been clarified. Quinolones, third-generation cephalosporins, and carbapenems are recommended as the first choice for treatment.<sup>[10,11]</sup> Removal of the infected catheter or foreign body is recommended. Unfortunately, in this case, the patient died, despite initiation of meropenem therapy.

In conclusion, the fact that the rate of sporadic cases of infections caused by *Sphingomonas paucimobilis* has increased in recent years should be kept in mind as a possible cause of hospital- and community-acquired infection. Treatment should be administered according to antibiotic susceptibility tests.

### Informed Consent

Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

### Peer-review

Internally peer-reviewed.

### Authorship Contributions

Concept: A.S.K., F.K.; Design: F.K.; Supervision: K.D.Ö.; Fundings: A.S.K.; Data: A.S.K., F.K.; Analysis: K.D.Ö.; Literature search: K.D.Ö., A.S.K.; Writing: A.S.K., F.K.; Critical revision: K.D.Ö., F.K.

### Conflict of Interest

None declared.

## REFERENCES

1. Başoğlu M, Ece G, Adanır T. The clinical and microbiological evaluation of *Sphingomonas paucimobilis* strains isolated at our hospital. [Article in Turkish]. *Turk Hij Den Biyol Derg* 2013;70:181–4. [CrossRef]
2. Bulut C, Yetkin MA, Koruk ST, Erdiç FS, Karakoç EA. A rare cause of nosocomial bacteremia: *Sphingomonas paucimobilis*. [Article in Turkish]. *Mikrobiyol Bul* 2008;42:685–8.
3. Lin NJ, Lai HC, Chen HY, Lin LH, Huang CK, Chen WF, et al.

- Sphingomonas paucimobilis* bacteremia in humans: 16 case reports and a literature review. *J Microbiol Immunol Infect* 2010;43:35–42. [CrossRef]
4. Turhanoglu M, Bilman F. *Sphingomonas paucimobilis* Infection over an eight-year period. [Article in Turkish]. *Flora* 2013;18:113–8.
  5. İlic A, Senses Z, Kurekci AE. Nozocomial outbreak of *sphingomonas paucimobilis* bacteraemia in a hemato/oncology unit. *Jpn J Infect Dis*;2007;60:394–6.
  6. Walayat S, Malik A, Hussain N, Lynch T. *Sphingomonas paucimobilis* presenting as acute phlebitis: A case report. *ID cases* 2018;11:6–8.
  7. Deveci N, Gürkan N, Belet N, Baysal SU. *Sphingomonas paucimobilis*: an uncommon cause of meningitis. [Article in Turkish]. *J Ped Inf f* 2017;11:140–4. [CrossRef]
  8. Martino R, Martinez C, Pericas R, Salazar R, Sola C, Sierra J, et al. Bacteremia due to glucose non-fermenting gram-negative bacilli in patients with hematological neoplasias and solid tumors. *Eur J Clin Microbiol Infect Dis* 1996;15:610–5. [CrossRef]
  9. Yabuuchi E, Yano I, Oyaizu H, Hashimoto Y, Ezaki T, Yamamoto H. Proposals of *Sphingomonas paucimobilis* gen. nov. and comb. nov., *Sphingomonas parapaucimobilis* sp. nov., *Sphingomonas yanoikuyae* sp. nov., *Sphingomonas adhaesiva* sp. nov., *Sphingomonas capsulata* comb. nov., and two genospecies of the genus *Sphingomonas*. *Microbiol Immunol* 1990;34:99–119. [CrossRef]
  10. Angelakis E, Roux V, Raoult D. *Sphingomonas mucosissima* bacteremia in patient with sickle cell disease. *Emerg Infect Dis*. 2009;15:133–4. [CrossRef]
  11. Maragakis LL, Chaiwarith R, Srinivasan A, Torriani FJ, Avdic E, Lee A, et al. *Sphingomonas paucimobilis* bloodstream infections associated with contaminated intravenous fentanyl. *Emerg Infect Dis* 2009;15:12–8. [CrossRef]

### Yaşlı Bir Hastada Nadir Görülen Hastane Kaynaklı Ürosepsis Etkeni: *Sphingomonas Paucimobilis*

*Sphingomonas paucimobilis* aerop, non-fermantatif, spor oluşturmeyan, sarı pigmentli, çok yavaş hareketli gram negatif bir basildir. Bakteriye-mi, pnömoni, kateter ilişkili kan dolaşımı enfeksiyonları, menenjit, peritonit, osteomyelit, septik artrit, ameliyat sonrası endoftalmit, akciğer ve dalak apseleri, üriner ve biliyer sistem enfeksiyonlarına neden olabilmektedir. Sağlıklı ve immün sistemi baskılanmış kişilerde enfeksiyonlara yol açabilmektedir. Hastane su sistemine kolonizasyonu nedeni ile bildirilen salgınlar mevcuttur. Ayrıca hastanelerde hemodiyaliz ve steril ilaç solüsyonlarında bulunabilmektedir. Bu olgu, literatürde immüsuprese olmayan yaşlı hastalarda *Sphingomonas paucimobilis*'e bağlı gelişen ürosepsis olgularına nadir rastlandığı için sunulmuştur.

**Anahtar Sözcükler:** *Sphingomonas paucimobilis*; ürosepsis; yaşlı hasta.