**CASE REPORT**

*Sphingomonas paucimobilis* Bacteremia in an Immunocompetent Patient: A Case Report and Review of Literature

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**ABSTRACT**

**Introduction:** *Sphingomonas paucimobilis* (*S. paucimobilis*) is a non-fermenting, gram-negative bacillus with very low pathogenic potential. These bacilli are found to inhabit the soil and aquatic milieu and are usually transmitted in the hospital environment by means of contaminated drugs, equipment, and water.1,2 They are usually transmitted in the hospital environment by means of contaminated drugs, equipment, and water.3,4 These bacilli are also capable of causing bacteremia in immunocompetent individuals.3,5 Awareness among physicians about this rare pathogen can promote early treatment with appropriate antibiotics.

**Case description:** We present a case of a 26-year-old immunocompetent patient suffering from dengue hemorrhagic fever followed by secondary bacteremia with *S. paucimobilis* which was isolated from peripheral blood and bone marrow samples.

**Conclusion:** A microorganism with low pathogenic potential like *S. paucimobilis* is also capable of causing bacteremia in immunocompetent individuals. Awareness among physicians about this rare pathogen can promote early treatment with appropriate antibiotics.

**Keywords:** Bacteremia, Bacillus, Case report, Dengue, Soil, *Sphingomonas paucimobilis*, Water.

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**INTRODUCTION**

*Sphingomonas paucimobilis* (*S. paucimobilis*) is a non-fermenting, gram-negative bacillus with very low pathogenicity; it is capable of causing infections mostly in patients with chronic respiratory disease, chronic kidney disease, liver cirrhosis, type 2 diabetes mellitus, or severe immunosuppression.1,2 Infections caused by it include endocarditis, sepsis, abscesses, and meningitis in immunocompromised individuals,1,2 and it is rarely identified as a causative agent of infections in immunocompetent individuals.3,4 These bacilli are found to inhabit the soil and aquatic milieu and are usually transmitted in the hospital environment by means of contaminated drugs, equipment, and water.4 We present a case of an immunocompetent patient suffering from dengue hemorrhagic fever followed by secondary bacteremia with *S. paucimobilis*.

**CASE DESCRIPTION**

A 26-year-old female with no known comorbidities presented to the emergency department of a tertiary care center with the chief complaints of fever for the past 8 days, multiple episodes of vomiting accompanied by abdominal pain, gross ascites for the past 6 days, and episodes of palpitations for the past 4 days. On admission, the patient was conscious and oriented to the time, place, and person. On examination, her pulse rate was 107 beats/minute, and she had a normal blood pressure of 120/84 mm of mercury. Her respiratory rate was found to be 22 breaths/minute with bilateral air entry, and no crests or wheezes were noticed. Her cardiovascular, central nervous system, and gastrointestinal system were within normal limits. Her temperature was 97.7°F on admission, with cold and clammy hands. On routine blood examination, her hemoglobin was 11.3 gm/dl, her total leukocyte count was 13,900 cells/cubic mm with 79% neutrophils, 15% lymphocytes, 2% eosinophils, and 4% monocytes, while her platelet counts were found to be 68,000/μL and procalcitonin was 1.92 ng/mL on admission. In view of low platelet counts, she was advised for a nonstructural protein 1 antigen test along with a dengue immunoglobulin (Ig) G and IgM test, all of which came positive. She developed acute respiratory distress along with mid-cycle bleeding from an apparently bulky uterus. She was immediately transferred from the emergency to the intensive care unit in the Department of Critical Care Medicine and further intubated and put on mechanical ventilation as she developed progressive breathlessness leading to respiratory distress. After one unit of fresh frozen plasma infusion, intravenous (IV) fluid replacement, along with continuous blood pressure monitoring, her condition was stable. She was afebrile for 2 days, following which she again developed a fever of 102°C and a pair of BD BACTEC aerobic and anaerobic blood culture bottles was sent to the bacteriology section of the Department of Microbiology, suspecting secondary bacteremia. The aerobic blood culture bottle flagged positively within 48 hours of incubation. A direct blood culture smear was prepared on which gram-negative bacilli were observed. A subculture of the blood...
Sphingomonas paucimobilis Bacteremia in an Immunocompetent Patient

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~40–50% with no evidence of an increase in blasts, granulomas, or hemoparasites. The aerobic bottle flagged positive after 24 hours of incubation, and the same organism was identified, which confirmed bacteremia due to this rare pathogen. The patient was started on IV meropenem and levofloxacin; after 4 days of antibiotic treatment, the patient became afebrile and, after 1 week of IV antibiotics, was stepped down to oral medications. The total leukocyte count had decreased to 12,200 cells/cubic mm, and procalcitonin was 0.253 ng/mL. The patient is still admitted to the critical care medicine ward in stable condition and undergoing treatment in view of a lower respiratory tract infection.

**DISCUSSION**

*Sphingomonas paucimobilis* (*S. paucimobilis*) is a nonfermentative, motile, catalase and oxidase-producing, yellow-pigmented, gram-negative bacilli. This microorganism is present ubiquitously in the environment and usually isolated from soil to aquatic milieu and, as a consequence, can be present as a contaminant in the hospital environment. *Sphingomonas* species can contaminate sterile fluids and healthcare equipment, which involve respiratory and hemodialysis devices. Infections caused by the bacteria are either community-acquired or nosocomially acquired, especially in immunocompromised patients with type 2 diabetes mellitus and other comorbidities.

The infections caused by *S. paucimobilis* reported in literature commonly include meningitis, bacteremia, sepsis, septic shock, isolated cases of osteomyelitis, septic arthritis, peritonitis associated with peritoneal catheterization, cases of splenic abscess, postoperative conditions like endophthalmitis, and skin and soft tissue infections. A total of 16 cases of *S. paucimobilis* bacteremia were reported by Lin et al. in Taiwan from 2004 to 2008. Taking into consideration the study by Lin et al., men (57.1%) were predominantly affected with a median age of 48.5 years in their study cohort. Liver cirrhosis was associated with *Sphingomonas* bacteremia in 9.5% of cases, and 69% of cases were associated with healthcare-associated infections; of these, 33.3% of cases were associated with the presence of a central venous catheter. All patients (including three patients suffering from septic shock) in the study by Lin et al. recovered on appropriate treatment, thus demonstrating the low virulence of the microorganism. Some studies report resistance to penicillins and first-generation

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**Fig. 1:** Yellow-colored colonies of *S. paucimobilis* seen on blood agar

**Figs 2A and B:** (A) Antibiotic sensitivity testing (AST) performed on cation-adjusted Muller-Hinton agar (MHA) using Kirby-Bauer disk diffusion method using antibiotic disks; (B) AST performed on cation-adjusted MHA using Kirby-Bauer disk diffusion method using Epsilometric test strip.
Sphingomonas paucimobilis Bacteremia in an Immunocompetent Patient

Table 1: Review of cases of S. paucimobilis bacteremia and septicemia with unknown source of infection published in the literature in the past 10 years (N = 5)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Authors</th>
<th>Infection</th>
<th>Source of infection</th>
<th>No. of patients</th>
<th>Country</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yozgat et al.</td>
<td>Bacteremia</td>
<td>N/A</td>
<td>1</td>
<td>Turkey</td>
<td>2014</td>
</tr>
<tr>
<td>2</td>
<td>Lugito et al.</td>
<td>Septicemia</td>
<td>N/A</td>
<td>1</td>
<td>Indonesia</td>
<td>2016</td>
</tr>
<tr>
<td>3</td>
<td>Chowdhary et al.</td>
<td>Septicemia</td>
<td>N/A</td>
<td>1</td>
<td>India</td>
<td>2016</td>
</tr>
<tr>
<td>4</td>
<td>Alkhatib et al.</td>
<td>Septicemia</td>
<td>N/A</td>
<td>1</td>
<td>United States of America</td>
<td>2022</td>
</tr>
<tr>
<td>5</td>
<td>This case</td>
<td>Bacteremia</td>
<td>N/A</td>
<td>1</td>
<td>India</td>
<td>2022</td>
</tr>
</tbody>
</table>

cephalosporins due to chromosomally acquired β-lactamase activity of the microorganism. Thus, no definite guidelines for sensitivity testing of the microorganisms were proposed, and infected patients were treated with individual antibiotics tested for susceptibility.

**CONCLUSION**

*Sphingomonas paucimobilis* (S. paucimobilis), a low-virulence pathogen causing community-acquired or nosocomial infections, is not only in patients with chronic conditions or immunocompromised patients but seldom in immunocompetent patients. This report documents the case of secondary S. paucimobilis bacteremia in immunocompetent individuals recovering from dengue hemorrhagic fever.

The case presented by us is an immunocompetent patient with an IV central venous catheter who was suffering from dengue hemorrhagic fever with secondary bacteremia caused by S. paucimobilis.

A study conducted by Perola et al.6 denotes 16 cases of S. paucimobilis bacteremia outbreak from water contamination in a hematology unit with patients suffering from leukemia. We describe known cases of S. paucimobilis bacteremia with unknown sources of infection in the literature in Table 1.

Antibiotic susceptibility is generally performed to check the susceptibility of the microorganism to aminoglycosides, β-lactam–β-lactamase inhibitor combinations, carbapenems, third-generation cephalosporins, and fluoroquinolones. The isolate identified from blood culture bottles was susceptible to ceftazidime, chloramphenicol, cotrimoxazole, levofloxacin, meropenem, and minocycline. The sensitive pattern of drug resistance was reported, and on the administration of appropriate treatment, the patient’s symptoms resolved within 4 days, thus preventing septic shock.

**REFERENCES**


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