

A Rare Case of *Sphingomonas paucimobilis* Meningitis and Bacteremia in a Postpartum Patient

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How to cite this paper: Subhi, A., Alshamsi, S., and Assadi, R. (2025) A Rare Case of *Sphingomonas paucimobilis* Meningitis and Bacteremia in a Postpartum Patient. *Advances in Infectious Diseases*, 15, 572-577.

<https://doi.org/10.4236/aid.2025.153043>

Received: August 18, 2025

Accepted: September 21, 2025

Published: September 24, 2025

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Abstract

Sphingomonas paucimobilis is a rare opportunistic, gram-negative bacterium involved in various community- and hospital-acquired infections. Although its pathogenicity is relatively low, it can lead to severe diseases such as meningitis, especially in vulnerable populations. We report a postpartum patient who developed meningitis and bacteremia due to *Sphingomonas paucimobilis*. The notable aspect of this case was the occurrence of meningitis during the postpartum period, complicated by misleading diagnostic findings and severe neurological complications. This review summarizes existing literature on the epidemiology, pathophysiology, diagnostic challenges, management approaches, and preventive strategies for infections, while providing context for the presented case. *Sphingomonas paucimobilis* is a rare opportunistic, gram-negative bacterium that can be involved in various infections acquired in both community and hospital settings. Although its pathogenicity is relatively low, it has the potential to cause severe diseases, such as meningitis, especially in vulnerable populations.

Keywords

Sphingomonas paucimobilis, Meningitis, Bacteremia, Postpartum Infection

1. Introduction

Sphingomonas paucimobilis is usually isolated from soil, water, and hospital environments and is an aerobic, oxidase-positive, non-fermentative, gram-negative bacillus. Despite having decreased pathogenicity, the organism has been associated with opportunistic infections, including bacteremia, pneumonia, osteomyelitis, and meningitis. Meningitis caused by *Sphingomonas paucimobilis* is particularly un-

usual, with only a handful of cases documented in the literature [1]-[4].

Here, we present a postpartum patient, who developed meningitis and bacteraemia, highlighting the clinical presentation, diagnostic challenges, and therapeutic considerations.

2. Epidemiology

Sphingomonas paucimobilis has been reported worldwide in both immunocompromised and immunocompetent patients. Nosocomial outbreaks have been linked to contaminated water systems, medical devices, and disinfectants. Although rare, meningitis due to *Sphingomonas paucimobilis* has been reported in neonates [3], immunocompromised patients [5] [6], and postoperative cases. The incidence in postpartum women is extremely rare, with the present case adding to the limited literature.

3. Pathophysiology and Risk Factors

The pathogenicity of *Sphingomonas paucimobilis* is due to its unique sphingoglycolipid-containing cell wall. This may explain its typically indolent course. However, severe infections occur in cases of hematogenous spread, especially when host defences are compromised. Risk factors include immunosuppression, indwelling catheters, prolonged hospitalization, and surgical interventions. In the postpartum state, physiological stress, altered immunity, and potential exposure to nosocomial sources may act as transient risk factors.

4. Case Report

A 27-year-old postpartum female with no known comorbid conditions presented with fever, headache, and vomiting that developed three days after an otherwise uneventful vaginal delivery. She was initially managed conservatively; however, her condition deteriorated on the sixth day post-delivery with the development of altered sensorium and possible seizures, prompting intubation and ICU admission.

A lumbar puncture was performed, and Cerebrospinal Fluid (CSF) analysis was sent for microbiological and biochemical testing, including tuberculosis Polymerase Chain Reaction (PCR). Given her epidemiological background as a young female from Pakistan in the presence of abnormal CSF findings—including lymphocyte predominance and vascular complications—there was an initial suspicion of tuberculous meningitis and she was started empirically on anti-tuberculosis treatment, including pyrazinamide, isoniazid, rifampicin, and moxifloxacin, with adjunct steroid therapy to manage vasculitis and inflammation.

Linezolid was added for Gram-positive coverage along with Acyclovir to address the possibility of viral meningoencephalitis.

TB PCR and HSV PCR in the CSF were subsequently noted to be negative; therefore, anti-tuberculous treatment was discontinued. However, the High Vaginal Swab (HVS) culture revealed moderate growth of *Listeria*, and antibiotics were adjusted to include Ampicillin.

Over the next few days, the patient remained ventilated in the ICU with persistent low-grade fever but without significant leukocytosis or left shift. The initial chest X-ray showed accentuated bilateral hilar markings, but lung fields remained clear. CSF and blood cultures grew *Sphingomonas paucimobilis*, leading to a revision of the treatment plan.

5. Microbiological Findings

- Blood Culture (Collected 18/02/2025): *Sphingomonas paucimobilis* isolated, verified on 23/02/2025 (Figure 1), leading to a revision of the treatment plan.
- CSF Culture (Collected 17/02/2025): *Sphingomonas paucimobilis* isolated, verified on 24/02/2025 (Figure 2), leading to a revision of the treatment plan.
- The organism was identified and demonstrated susceptibility to trimethoprim-sulfamethoxazole (TMP/SMX), with variable sensitivity to beta-lactams and aminoglycosides.

Drug	Sphingomonas paucimobilis	
	MIC Interp	MIC Dilutn
Amikacin	S	4
Cefazolin	S	<=4
Cefepime	I	16
Ceftazidime	R	>=64
Ceftriaxone	R	>=64
Ciprofloxacin	S	1
Gentamicin	S	<=1
Imipenem	S	<=0.5
Meropenem	S	<=0.25
Piperacillin/Tazobactam	S	<=4
Trimethoprim/Sulfamethoxazole	S	<=20

Figure 1. The blood culture result that was collected on 18/2/2025 and finalized on 23/2/2025.

Drug	Sphingomonas paucimobilis	
	MIC Interp	MIC Dilutn
Amikacin	S	4
Cefazolin	S	<=4
Cefepime	I	16
Ceftazidime	R	>=64
Ceftriaxone	I	32
Ciprofloxacin	S	1
Gentamicin	S	<=1
Imipenem	S	<=0.5
Meropenem	S	<=0.25
Piperacillin/Tazobactam	S	<=4
Trimethoprim/Sulfamethoxazole	S	<=20

Figure 2. The CSF culture result that was collected on 17/2/2025 and finalized on 22/2/2025.

6. Neuroimaging Findings

An MRI of the brain demonstrated diffuse meningeal enhancement, which was consistent with infectious meningitis. There was also evidence of cerebral edema and early hydrocephalus, which correlated with the patient's clinical deterioration. These findings supported the microbiological results and reinforced the diagnosis of meningitis due to *Sphingomonas paucimobilis* (Figure 3).

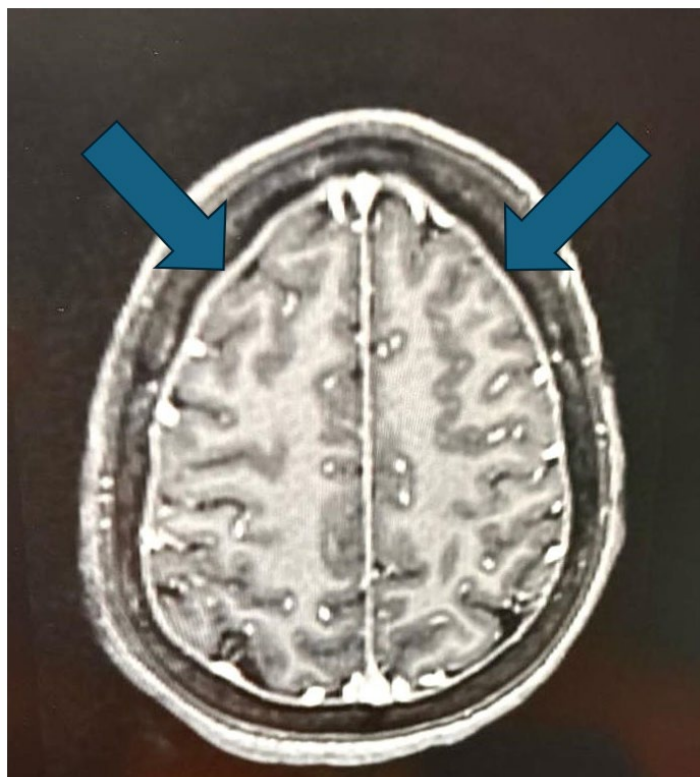


Figure 3. MRI Brain showing increased meningeal enhancement.

7. Management and Outcome

Upon confirmation of *Sphingomonas paucimobilis*, the treatment plan was modified:

- Gentamicin was initiated but later discontinued upon confirmation of TMP/SMX susceptibility.
- TMP/SMX was initiated for a planned course of 14 days.
- The patient remained on ventilatory support with 35% FiO₂ and continued hemodynamic monitoring.
- Serial blood cultures were scheduled to confirm bacteremia clearance.
- The patient was eventually weaned off ventilatory support but tracheostomized and required supplemental Oxygen.
- Her initial Electroencephalogram showed focal epilepsy, and a repeated test showed encephalopathy changes.
- She eventually developed Hydrocephalus with diffuse brain edema. The Neu-

rosurgical team was consulted, and she had been planned for CSF diversion; however, the family preferred to leave and continue treatment in her home country.

8. Preventive Strategies

Prevention of *Sphingomonas paucimobilis* infections requires strict infection control practices, including proper sterilization of medical devices, water system monitoring, and aseptic precautions during delivery and postpartum care. Awareness of the organism as a potential nosocomial pathogen is critical for clinicians managing postpartum and ICU patients.

Author/Year	Patient Demographics	Risk Factors	Treatment	Outcome
Hajiroussou, 1979	Adult male	None identified	Antibiotics (unspecified)	Recovered
Tai & Velayuthan 2012	Farmer with leg wound	Soil exposure	Antibiotics	Recovered
Rajni <i>et al.</i> , 2024	Post-liver transplant	Transplant, indwelling devices	Levofloxacin 14 days	Recovered
Present case	27F, postpartum	Postpartum state	TMP/SMX 14 days	Complicated course; incomplete follow-up

9. Discussion

Sphingomonas paucimobilis is an uncommon cause of meningitis and bacteremia, often linked to nosocomial exposure, indwelling medical devices, or immunosuppressive states [1].

The first known incidence of Sphingomonas Meningitis was reported by Hajiroussou *et al.*, dating back to 1979. The case report discussed a patient who had presented with a seizure and headache and was diagnosed with meningitis. *Sphingomonas paucimobilis* was eventually isolated from CSF [2].

The second report available in the literature was that by Tai and Velayuthan. In their report, they discussed the case of a farmer who received the microorganism through an open wound on his leg. The patient developed bacteremia and subsequently meningitis, which led to the suggestion that the organism may be soil-borne [5] [7].

Sphingomonas bacteremia was recently noted in a patient who underwent an otherwise uneventful donor liver transplant in India in 2024. On the second day postoperatively, the patient began showing signs of sepsis along with a need for inotropic support. As part of the workup for sepsis, blood cultures were sent which revealed the growth of *Sphingomonas paucimobilis*. The source of the organism was postulated to be either endogenous (resulting from previous colonization) or environmental (via his various indwelling devices). He was successfully treated with Levofloxacin for 14 days and eventually discharged in a stable condition [6].

Unlike the previously reported cases, our patient was postpartum and had no predisposing immunosuppressive condition. The source of the infection also remains unclear, but the presence of the organism in both CSF and blood cultures

suggests hematogenous dissemination.

The optimal antimicrobial regimen for *Sphingomonas paucimobilis* infections remains undefined. However, it has been consistently reported to be susceptible to TMP/SMX, aminoglycosides, and carbapenems IV [5]. While penicillins and cephalosporins demonstrate variable efficacy, TMP/SMX has been selected as the drug of choice in many cases, as seen in our patient's management.

This case underscores the importance of considering *Sphingomonas paucimobilis* in cases of culture-positive meningitis with an atypical clinical course, particularly in postpartum or ICU patients. Early targeted therapy based on culture and susceptibility results significantly impacts patient outcomes.

10. Conclusion

This report focuses on a rare case of *Sphingomonas paucimobilis* meningitis and bacteremia in a postpartum patient, emphasizing the need for increased awareness of this unusual pathogen. A high index of suspicion, timely culture-based diagnosis, and appropriate antibiotic selection are essential in ensuring favorable clinical outcomes. Further studies are needed to establish standardized treatment guidelines for *Sphingomonas paucimobilis* infections.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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