

Rare isolation of *Pseudomonas mendocina* from a postoperative wound in a diabetic patient: A case report

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Submitted: July 2025

Accepted: August 2025

Published: November 2025

ABSTRACT

Pseudomonas mendocina is a rare, Gram-negative, environmental organism that infrequently causes human infections, usually acting as an opportunistic pathogen in immunocompromised hosts. We present the case of a 47-year-old man with type 2 diabetes mellitus who developed a postoperative wound infection following surgical fixation of a distal tibial and fibular fracture. After an initially uneventful recovery, he presented on the eighth postoperative day with signs of localized infection. Microbiological examination of the purulent discharge identified *P. mendocina* using the VITEK2 automated system and confirmed the result with MALDI-TOF MS. The isolate was susceptible to a range of antibiotics, including cefepime, gentamicin, and ciprofloxacin. Targeted antimicrobial therapy combined with surgical debridement and musculocutaneous flap coverage resulted in complete clinical resolution. This case highlights the clinical significance of *P. mendocina* as an opportunistic pathogen in orthopaedic surgical site infections, especially in immunocompromised patients. Timely and accurate microbiological identification, along with appropriate targeted therapy, is crucial for favourable outcomes. Increased clinical awareness of rare environmental pathogens is vital when dealing with persistent postoperative infections, particularly in diabetic patients with open or contaminated wounds.

Keywords: diabetes mellitus, type 2, *pseudomonas* infections, *Pseudomonas mendocina*, surgical wound infection, India

Introduction

Pseudomonas mendocina is a motile, aerobic, Gram-negative bacillus rarely implicated in human disease. Typically isolated from soil and water, it has emerged as an opportunistic pathogen, with approximately 22 human infections reported worldwide since the first case in Argentina in 1992.^[1,2] Clinical presentations include endocarditis, meningitis, bacteraemia, and soft tissue infections, primarily in immunocompromised individuals.^[1] Unlike *P. aeruginosa*, *P. mendocina* often exhibits susceptibility to third-generation cephalosporins.^[2] We report a rare case of *P. mendocina* isolated from a postoperative wound in a diabetic patient,

Citation: Karnaker et al. Rare isolation of *Pseudomonas mendocina* from a postoperative wound in a diabetic patient: A case report. South Sudan Medical Journal, 2025;18(4):228-232 © 2025 The Author (s) **License:** This is an open access article under [CC BY-NC](#) DOI: <https://dx.doi.org/10.4314/ssmj.v18i4.14>

emphasizing accurate microbiological identification and its therapeutic implications in musculoskeletal infections.

Case Presentation

Presentation

A 47-year-old male presented to Justice K.S. Hegde Charitable Hospital, Mangalore, India, with pain, an open wound, and visible deformity over the left lower limb following a road traffic accident. The pain was acute, sharp, localized, non-progressive, and non-radiating, worsening with movement and relieved by immobilization and analgesics. The patient was haemodynamically stable and well-oriented, with no systemic abnormalities on examination. He had a known history of type 2 diabetes mellitus, managed with oral hypoglycaemic agents. Local examination revealed a 3 × 1 cm laceration over the medial aspect of the left ankle, with diffuse swelling, active bleeding, and exposed bone. Palpation confirmed tenderness over the anterior joint line, crepitus, and abnormal bony mobility, indicating a fracture. Range of motion at the ankle was severely limited due to pain. A neurovascular assessment confirmed intact distal pulses and preserved sensation, suggesting no immediate vascular or neural compromise.

Laboratory and imaging investigations

Initial laboratory investigations indicated leucocytosis, with a white blood cell (WBC) count of 12,250 cells/mm³. Differential leucocyte counts revealed neutrophilia (80.3%), with lymphocytes at 16.0%, monocytes at 3.6%, eosinophils at 0.0%, and basophils at 0.1%. The erythrocyte sedimentation rate (ESR) was elevated at 18 mm/hour. Based on clinical and radiological findings, the patient had a comminuted fracture of the distal one-third of the left tibial shaft, classified as a Gustilo-Anderson Type III B open fracture.

Surgical management

The patient underwent surgical management under spinal anaesthesia, with open reduction and internal fixation (ORIF) of the left distal fibula. Postoperative radiographs confirmed satisfactory anatomical alignment of fracture fragments with appropriate implant placement (Figure 1). The procedure was well tolerated, and the immediate postoperative period was uneventful. Wound evaluations were performed on postoperative days (POD) 3, 6, and 8. The patient received intravenous ceftriaxone 1 g twice daily, metronidazole 500mg (in 100 mL) thrice daily, and

gentamicin 80 mg twice daily for five days postoperatively. Antibiotics were then discontinued. However, by POD 8, the surgical site showed signs of inflammation, including erythema, swelling, and seropurulent discharge. Considering the purulent nature of the wound and the patient's comorbid diabetes, blood cultures were obtained to rule out systemic involvement. The negative blood culture results indicated a localized infection. A deep pus sample was collected aseptically from within the wound cavity using sterile aspiration, avoiding superficial contamination, and sent for microbiological culture and antibiotic susceptibility testing. However, we appreciate that additional confirmation of the pathogen might have been obtained if multiple intraoperative deep tissue samples had been taken during wound debridement and musculocutaneous flap coverage.

Microbiological evaluation

Pus samples were collected aseptically and inoculated onto 5% sheep blood agar, MacConkey agar, and nutrient agar (HiMedia, Mumbai, India) using the streak plate method. The plates were incubated at 37 °C for 24 to 48 hours. On blood agar, non-haemolytic colonies appeared grayish to white. MacConkey agar showed pale, irregular, non-lactose fermenting colonies, while nutrient agar revealed smooth, grayish, non-pigmented colonies without diffusible

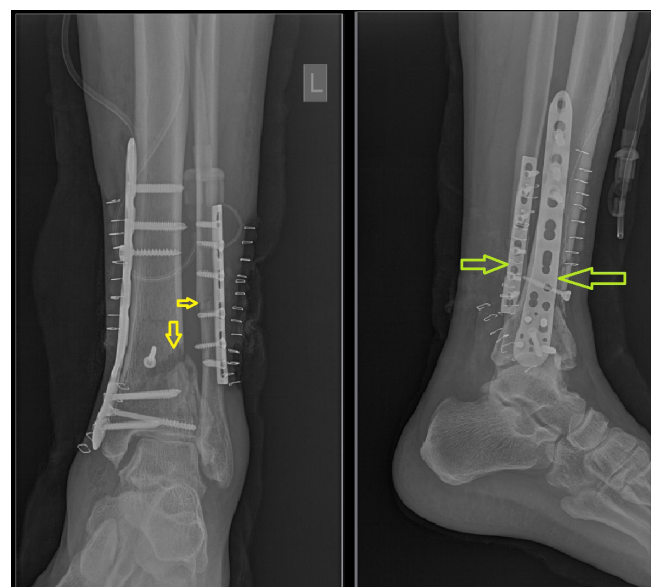


Figure 1. Anteroposterior and lateral radiographs of the left ankle demonstrating a comminuted fracture of the distal one-third shafts of the tibia and fibula, along with the postoperative status following open reduction and internal fixation (ORIF) of the distal fibula, showing satisfactory anatomical alignment and proper implant placement.



Figure 2. On 5% sheep blood agar [A], the colonies were non-haemolytic and ranged from grayish to white in colour; MacConkey agar [B] demonstrated the growth of pale, irregular, non-lactose fermenting colonies; and nutrient agar [C] showed smooth, grayish, non-pigmented colonies without any diffusible pigment.

pigment (Figure 2). Gram staining showed gram-negative bacilli. Preliminary biochemical tests were catalase and oxidase-positive. The isolate hydrolysed arginine but did not decarboxylate lysine or ornithine.

The organism was identified as *P. mendocina* using both the VITEK2 Compact System (BioMérieux, Marcy L'Étoile, France) with the Gram-negative identification card and the Matrix-Assisted Laser Desorption/Ionization-Time of Flight Mass Spectrometry (MALDI-TOF MS; BioMérieux, France). Antimicrobial susceptibility testing was performed using the VITEK2 system, and the minimum inhibitory concentrations (MICs) were interpreted according to the Clinical and Laboratory Standards Institute (CLSI) guidelines.^[3] The isolate was found to be sensitive to the following antibiotics, with corresponding MIC values: piperacillin/tazobactam (≤ 4 µg/ml), ceftazidime (2 µg/mL), cefoperazone/sulbactam (≤ 8 µg/ml), cefepime (0.5 µg/ml), imipenem (1 µg/ml), meropenem (≤ 0.25 µg/ml), amikacin (2 µg/ml), gentamicin (≤ 1 µg/ml), ciprofloxacin (≤ 0.06 µg/ml), levofloxacin (≤ 0.12 µg/ml), trimethoprim/sulfamethoxazole (≤ 20 µg/ml).

The clinical presentation of an open, contaminated Gustilo–Anderson Type III B fracture with purulent discharge and delayed signs of infection required consideration of several potential pathogens and clinical scenarios. Common organisms implicated in post-orthopaedic surgical site infections, such as *Staphylococcus aureus* (including MRSA), coagulase-negative staphylococci, and Enterococcus species, were considered. In Gram-negative infections, organisms like *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Enterobacter* species were

highly likely candidates.^[4] The possibility of polymicrobial infections and, in rare instances, the contribution of anaerobes (e.g., *Clostridium*, *Bacteroides* species) was kept in mind due to the open nature of the fracture.^[5] Fungal infections were also a consideration, especially in immunocompromised patients with delayed or atypical clinical courses.^[6] Ultimately, targeted microbiological culture and sensitivity testing confirmed *Pseudomonas mendocina* as the causative pathogen, facilitating targeted therapy and reinforcing the importance of thorough microbiological evaluation for optimal clinical outcomes.

Antibiotic and Surgical Management with Clinical Outcome

In view of the microbiological findings and based on the antibiotic susceptibility profile, the patient underwent left ankle wound debridement followed by musculocutaneous flap coverage. Intravenous cefepime 1 g twice daily and gentamicin 80 mg twice daily were initiated. Daily inspection of the wound and flap site was performed on postoperative days 3, 6, and 8, revealing progressive wound healing. The patient demonstrated steady symptomatic improvement, and the intravenous antibiotics were discontinued after 10 days of administration. Upon discharge, the patient was prescribed oral ciprofloxacin 500 mg twice daily for 14 days and advised to follow up in the outpatient department (OPD) after one week. At the follow-up visit, the patient exhibited no clinical signs of wound site infection, and the surgical site was clean with no discharge, indicating successful postoperative wound healing. No further long-term follow-up was performed as

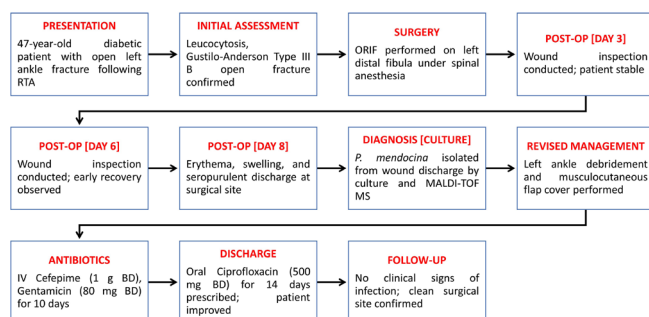


Figure 3. Timeline of clinical milestones, interventions, and outcomes in a patient with *Pseudomonas mendocina* post-operative wound infection.

the patient did not return for subsequent scheduled visits. Given the retained metal-work, prolonged antibiotic therapy was considered before discharge to reduce the risk of recurrence, as is generally recommended. The clinical timeline of diagnosis, interventions, and outcomes is summarized in Figure 3.

Discussion

This case contributes to the limited but growing evidence of *P. mendocina* as an opportunistic pathogen capable of causing human infections, especially in trauma-exposed patients.^[7] Traditionally regarded as an environmental organism with low pathogenic potential, *P. mendocina* has increasingly been implicated in severe clinical syndromes, including soft tissue and musculoskeletal infections.^[8] This case is particularly notable as it reports *P. mendocina* from a deep surgical site infection (SSI) following an open distal tibial fracture—a setting where *Pseudomonas aeruginosa* is more commonly encountered.^[9] A deep pus sample was collected aseptically from within the wound cavity before debridement, avoiding superficial contamination. However, it would have been advisable to have taken multiple intraoperative deep tissue samples during wound debridement and musculocutaneous flap coverage. The patient's type 2 diabetes mellitus and environmental exposure after trauma likely facilitated microbial entry and persistence, consistent with similar infections caused by soil- and water-borne pseudomonads.^[1,10]

Accurate identification of rare, non-fermenting Gram-negative bacilli is crucial to prevent misclassification. Conventional phenotypic methods often fail to differentiate *P. mendocina* from closely related pseudomonads. The combined use of automated systems such as VITEK2 and MALDI-TOF MS enabled precise species-level

identification and guided early, targeted treatment, in line with modern diagnostic recommendations for orthopaedic infections.^[11] Antimicrobial susceptibility testing revealed sensitivity to cephalosporins, aminoglycosides, and fluoroquinolones, consistent with recent reports highlighting the generally favourable susceptibility profile of *P. mendocina*, which contrasts with the multidrug resistance often seen in *P. aeruginosa*.^[2]

Open fractures are particularly susceptible to SSIs due to direct environmental contamination, soft tissue damage, and the presence of implants. The isolation of *P. mendocina* in this context underscores the relevance of atypical environmental pathogens in post-traumatic infections. Studies have emphasized the role of microbial burden in infection severity and healing outcomes, even in immunocompetent hosts.^[12,13] Biofilm formation, common among non-fermenting Gram-negative rods, likely contributes to infection persistence and highlights the need for timely surgical and antimicrobial intervention.^[14,15]

The emerging role of *P. mendocina* in orthopaedic SSIs—especially in open fractures with environmental exposure and comorbidities—demands greater clinical awareness. Its distinct susceptibility profile requires accurate species identification for effective management. Continued documentation and surveillance of *P. mendocina* infections are essential to elucidate resistance trends and optimize patient outcomes in this evolving clinical landscape. No further long-term follow-up was possible due to patient's failure to attend for review visits. Prolonged antibiotic therapy is frequently recommended where orthopaedic metal implants remain and to help reduce the risk of late recurrence.

Conclusion

This case highlights *P. mendocina* as a rare but emerging pathogen in post-traumatic musculoskeletal infections. Its detection in an open fracture surgical site emphasizes the need to consider environmental organisms in high-risk orthopaedic patients. Prompt diagnosis and targeted therapy are vital for optimal outcomes and preventing complications.

Ethical approval: Written informed consent for publication was obtained from the patient. This case report was conducted in accordance with the ethical guidelines of K S Hegde Medical Academy, Nitte (Deemed to be University) and was determined by the K S Hegde Medical Academy Institutional Ethics Committee (IEC) to not require full IEC review.

Authors contributions: A.A.A and V.K.K contributed to the study's conception and design. Material preparation, data collection, analysis, interpretation, validation, literature search, and manuscript writing were performed by A.A.A, B.J. The first draft of the manuscript was written, edited, and reviewed by A.A.A, V.K.K. All authors contributed to the article and approved the submitted version.

Conflicts of interests: None

Funding: None

Consent to participate and publish: Informed consent was obtained from all individual participants included in the study. Any potentially identifying information has been anonymized to protect participant confidentiality.

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