

From angina to atypical infection: a rare case of *Pseudomonas oryzihabitans* bloodstream infection after percutaneous coronary intervention

Moiz Ahmed Khan MBBS, Hina Abbasi BS, MSc, Ajaz Aly BS, Wajid Ali Khan BS

ABSTRACT

Pseudomonas oryzihabitans is an infrequent, yellow-pigmented non-fermenting Gram-negative bacillus often linked to device-related infections. We report a rare case of a 73-year-old man with diabetes mellitus, chronic kidney disease and recent non-ST-elevation myocardial infarction (NSTEMI) who underwent three-vessel percutaneous coronary intervention. A left internal jugular central venous catheter was inserted for peri-procedural management. Seventy-two hours later he developed fever (38.3°C) without localizing signs. Paired peripheral and catheter blood cultures flagged positive after 48 hours. Gram stain showed slender Gram-negative rods and empirical antibiotic therapy with piperacillin–tazobactam was started. Subculture yielded non-lactose-fermenting; oxidase-positive colonies identified as *Pseudomonas oryzihabitans*. Antimicrobial susceptibility testing demonstrated sensitivity only to minocycline; piperacillin/tazobactam and carbapenems were intermediate; amikacin and meropenem resistant. A diagnosis of central-line-associated bloodstream infection (CLABSI) was made and the catheter was removed in accordance with Infectious Diseases Society of America (IDSA) guidelines and intravenous minocycline initiated. The patient became afebrile within 48 hours and completed five days of therapy with full recovery, being discharged on day eight. This case underscores the need to recognize rare non-fermenters as potential CLABSI pathogens in cardiology units, highlights their distinct antimicrobial profile and reinforces guideline-based catheter removal coupled with targeted therapy for optimal outcomes.

Keywords: *Pseudomonas oryzihabitans*, Diabetes mellitus, Chronic kidney disease, NSTEMI, PCI, CLABSI

INTRODUCTION

Central-line-associated bloodstream infections (CLABSIs) remain a significant nosocomial hazard, particularly in patients with cardiovascular comorbidities requiring invasive monitoring.¹ While *Staphylococcus aureus* and *Candida spp* predominate, non-fermenting Gram-negative bacilli such as *Pseudomonas oryzihabitans* are emerging opportunistic organisms, typically in immunocompromised or device-dependent hosts.^{2,3}

Owing to its rarity and unpredictable susceptibility profile, timely identification is critical to guide therapy. We present a rare case which, according to the best of our knowledge, is the first reported case of *P. oryzihabitans* CLABSI following percutaneous coronary intervention (PCI) in a patient with chronic kidney disease (CKD), and we discuss diagnostic and therapeutic implications for cardiology and infectious disease practice.

CASE PRESENTATION

A 73-year-old man with type 2 diabetes mellitus, hypertension (blood pressure 150/92 mmHg on admission) and CKD stage 4 (baseline eGFR 28 mL/min/1.73 m²) presented with crescendo angina and was

Corresponding author: Moiz Ahmed Khan
Contact Information: Moiz_online@yahoo.com
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Figure 1. Colony morphology of *Pseudomonas oryzihabitans* on chocolate, 5% sheep blood and MacConkey agars (standard illumination, no magnification).

diagnosed with high-risk non-ST-elevation acute coronary syndrome. Past history included a non-ST-elevation myocardial infarction (NSTEMI) eight months earlier for which he had refused left heart catheterization. Initial laboratory workup revealed hemoglobin 8.9 g/dL, creatinine 3.1 mg/dL, potassium 5.6 mmol/L and metabolic acidosis. Emergency PCI with three drug-eluting stents was performed via radial access. A triple-lumen central venous catheter (CVC) was inserted in the left internal jugular vein for hemodynamic support and nephrotoxic-sparing drug administration.

On post-procedure day 3 the patient developed fever 101°F (38.3°C), chills and mild tachycardia; the CVC site was clean. Two sets of blood cultures, one peripheral and one from the CVC, were obtained before empirical piperacillin/tazobactam (4.5 g q8h, renally adjusted) was started. Both cultures became positive after 48 hours. Gram stain demonstrated slender Gram-negative rods; subculture on chocolate, 5% sheep blood and MacConkey agars showed round, grey-white, slightly wrinkled, non-lactose-fermenting colonies within 48 hours that were oxidase positive (Figure 1). Identification using API® ID strips and APIWEB™ database (bioMérieux) confirmed *Pseudomonas oryzihabitans*.

Kirby Bauer disk diffusion testing interpreted in accordance with the European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidelines (Clinical Breakpoint Tables v. 15.0), showed

susceptibility to minocycline whereas, levofloxacin, ceftazidime, ciprofloxacin, imipenem and piperacillin-tazobactam were intermediate, and amikacin and meropenem were resistant.⁴ After excluding other potential causes of bloodstream infection, a diagnosis of CLABSI was made. The infected CVC was removed immediately in accordance with Infectious Diseases Society of America (IDSA) guidelines for catheter-related infection.⁵ Therapy was switched to intravenous minocycline 100 mg loading then 100 mg daily for five days, after which the patient was afebrile for >48 hours and follow-up blood cultures were sterile. Renal function returned to baseline; he was discharged on day 8 with outpatient follow-up.

DISCUSSION

P. oryzihabitans is an environmental, non-fermenting Gram-negative bacillus first linked to human disease (a case of peritonitis) in 1977.^{2,6} Catheter-related infections account for the majority of cases, reflecting the organism's affinity for moist surfaces and its ability to form biofilm on indwelling devices.^{3,7} Host risk factors are similar to those seen in other opportunistic infections and include diabetes mellitus, renal failure, malignancy and recent surgery.^{8,9} Our patient's comorbidities and clinical history viz. CKD, recent PCI and CVC placement created a favorable scenario for the present infection to occur.

Central line-associated bloodstream infections pose a significant challenge in healthcare settings worldwide, particularly in resource-constrained environments where adherence to strict aseptic protocols and availability of advanced diagnostic tools may be limited.^{1,5} In patients undergoing invasive cardiovascular procedures, the combination of intrinsic patient risk factors (e.g., CKD, diabetes mellitus) and extrinsic procedural factors increases CLABSI susceptibility. This underscores the necessity of cost-effective, universally applicable preventive strategies, such as meticulous hand hygiene, maximal sterile barriers during insertion, and daily review of catheter necessity, which are critical components of CLABSI prevention bundles regardless of setting.^{1,5}

Definitive CLABSI diagnosis requires concordant growth from catheter and peripheral cultures or differential time-to-positivity of ≥ 2 hours.⁵ In our case, differential time-to-positivity of ≥ 2 hours was noted between the central and peripheral line cultures which fulfilled the criteria of CLABSI. Clinicians should suspect unusual Gram-negative rods when colonies are pigmented, oxidase positive yet non-lactose fermenting. In this regard, automated identification systems and, where available, molecular sequencing can enhance accuracy of results.⁸

In contrast to *P. aeruginosa*, *P. oryzihabitans* often remains susceptible to third-generation cephalosporins, quinolones and aminoglycosides.⁶ However, resistance patterns are shifting, with multidrug-resistant strains increasingly reported.^{3,7} Uniform susceptibility to minocycline across pseudomonads has been observed since early studies, which was also observed in our isolate.¹⁰ Given intermediate activity of β -lactams and carbapenems, minocycline represented the most predictable narrow-spectrum option, allowing renal-dose adjustment and avoidance of nephrotoxicity in the present case.

While minocycline was selected based on susceptibility and renal safety, other reported therapeutic options for *P. oryzihabitans* include third-generation cephalosporins, fluoroquinolones, and trimethoprim-sulfamethoxazole, though susceptibility is variable.^{6,8} In cardiac and critical care contexts, where drug interactions (e.g., QT interval prolongation) and renal impairment

are common, antibiotic choice must be guided by local susceptibility patterns and patient-specific factors. The consistent activity of minocycline against pseudomonads, as observed historically and in our isolate, makes it a viable narrow-spectrum alternative when broader agents demonstrate intermediate resistance.¹⁰

IDSA guidelines advocate prompt removal of short-term CVCs when CLABSI with Gram-negative bacilli is documented, which is associated with reduced mortality and prompt microbiological clearance.^{5,11} The early detection of CLABSI in our patient likely contributed to rapid defervescence and short treatment duration.

Invasive cardiac procedures frequently necessitate central venous access and administration of high-dose antiplatelets or anticoagulants. Awareness of atypical pathogens is therefore pertinent in such scenarios, particularly when patients have additional risk factors for infection. Moreover, minocycline's favorable cardiovascular safety profile and lack of QT interval prolongation make it suitable when other antibiotics are intermediate or resistant. Hence, clinical laboratories should be requested to perform full susceptibility panels to ensure various antimicrobial options, when *P. oryzihabitans* is isolated.

This case underscores the ongoing need for stringent adherence to catheter insertion and maintenance bundles, including hand hygiene, maximal barrier precautions and environmental cleaning protocols within catheterization laboratory settings. Cardiologists must also cultivate a multidisciplinary approach involving infectious disease specialists and microbiologists to promptly recognize and address unusual pathogens. Furthermore, the case highlights the importance of maintaining vigilance for atypical infections in high-risk groups, such as patients with CKD undergoing invasive cardiovascular procedures, to improve clinical outcomes and avoid nephrotoxic therapies where possible. This need for vigilance is echoed in reports of other iatrogenic complications, such as migration of intravascular devices, which similarly underscore the critical importance of meticulous technique, infection prevention, and multidisciplinary management in preventing procedure-related morbidity.¹²

To prevent recurrence, we reinforced strict adherence to hand hygiene, environmental cleaning

protocols and CLABSI prevention bundles. Regular in-service training and audit-feedback cycles were instituted for catheterization laboratory staff. All CVC insertions now require documented pre-procedure timeout checks for aseptic technique, and povidone iodine-impregnated dressings are used routinely. These efforts are integral to a hospital-wide quality-improvement framework, where regular CLABSI surveillance, audit-feedback cycles, and structured staff training on infection prevention bundles have been shown to significantly reduce device-related infection rates.^{1,5}

CONCLUSION

This case highlights *P. oryzihabitans* as a rare but important etiology of CLABSI in cardiology patients with central lines. Critical management principles include a high index of suspicion, early catheter removal, and tailored therapy guided by comprehensive susceptibility testing. The case reinforces the importance of ongoing microbiological surveillance and antibiotic stewardship in tertiary cardiology centers, given emerging resistance among non-fermenting Gram-negative bacilli. Vigilance for uncommon pathogens and strict adherence to infection control bundles remain cornerstone strategies to minimize CLABSI burden.

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From: Tabbha Heart Institute, Karachi, Pakistan (MAK, HA, AA, WAK)

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