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Unexpected encounter of *Pandoraea* species in urine sample: A case report

Kshitiz Parajuli[1], **Aron Neupane**,[1] **Aakash Khatiwada**,[1] **Randhir Kumar Singh**[2]

[1]MBBS student, Birat Medical College Teaching Hospital, Biratnagar, Nepal
[2]Assistant Professor, Department of Microbiology, Birat Medical College Teaching Hospital, Biratnagar, Nepal

ABSTRACT

Isolation of Pandoraea species from urine specimen in Nepal is a rare microbiological discovery. A 21-year-old female presented with episiotomy site pain and lower-limb edema five days postpartum. The urine culture grew non-lactose-fermenting, Gram-negative bacilli, which, on VITEK-2 analysis, were identified as Pandoraea species with a probability of 94%. The extensive antimicrobial susceptibility profile obtained showed susceptibility to very few antimicrobials. The microorganism's resistance to multiple antibiotics indicates potential issues with proper microbial identification. To our knowledge, this is the first isolation of Pandoraea species from Nepal.

Keywords: Cystic Fibrosis, Multidrug-resistant, Urine

INTRODUCTION

Pandoraea, a genus of aerobic, non-spore-forming, non-nitrate-reducing, non-lactose-fermenting, gram-negative rod with variable oxidase and catalase activity, was first identified in 2000 by Coenye et al.[1] These bacteria can be isolated from various clinical samples like wounds, blood, lung tissue, and urine and share similarities with bacterial genera like *Burkholderia* and *Ralstonia*, leading to misidentification. *Pandoraea* species have been rarely reported in urine, with only one previous case documented in the literature.[2] We present a case of isolation of *Pandoraea* species in the urine sample of a young postpartum female.

CASE PRESENTATION

A 21-year-old woman came to the outpatient department of Birat Medical College and Teaching Hospital, Nepal, complaining of dull pain at the episiotomy site for 5 days, along with bilateral lower limb swelling. Five days prior, she had given birth via vacuum-assisted vaginal delivery, which required an episiotomy for breech presentation of the fetus in the same institution. She had no history of vaginal bleeding, fever, or burning micturition. No history of any chronic diseases or past surgeries. On examination, she was well-looking and had bilateral pitting edema. Her vital signs were normal, but the episiotomy site was found to be dehisced with foul-smelling lochia discharge. The uterus was 18 weeks in size, bilateral fornices were free, and there was no cervical motion tenderness. She was admitted to the gynecology ward. Swab culture, ultrasound of the abdomen and pelvis, complete blood count, random blood sugar, routine urine examination, prothrombin time with International Normalized Ratio (INR), and Pregnancy-Induced Hypertension (PIH) profile were sent, along with advice for perineal care and sitz baths twice a day. She was initially managed with Glucose capsules, Non-steroidal Anti-inflammatory Drugs, Hyoscine butylbromide, and Esomeprazole.

Ultrasound showed a bulky post-partum uterus measuring 17.0cm x 8.4cm x 7.4cm. The biochemical report showed an Alkaline Phosphatase level of 173 IU/L and an albumin level of 2.23 g/dL. Investigations revealed anemia, leukocytosis, proteinuria, and pyuria. The midstream urine sample, collected for routine examination, culture, and sensitivity testing, showed 6-7 pus cells/high-power field (hpf) and 2-3 epithelial cells/hpf. Urine culture on CLED medium isolated non-lactose fermenting, gram-negative bacilli after incubation for 48 hours, further confirmed as the *Pandoraea* species by VITEK-2 with 94% probability.

The wound swab culture and sensitivity came back sterile. The provisional diagnosis of– '*Episiotomy site infection on 6th postpartum day following vacuum-assisted vaginal delivery*' was made and managed accordingly. The *Pandoraea* encounter was not taken seriously and was thought of as a contaminant. Antibiotic sensitivity testing (AST) was performed on the isolated bacilli. The isolated *Pandoraea* species was resistant to amoxicillin and clavulanic acid, aztreonam, cefepime, cefixime, cefotaxime, ceftriaxone, ciprofloxacin, levofloxacin, ofloxacin, and oxacillin but was sensitive to imipenem, amikacin, chloramphenicol, gentamicin, piperacillin/tazobactam, and tigecycline. Another culture was requested on the same day as the isolation of Pandoraea species, but it proved sterile after 48 hours of incubation. The patient was treated conservatively with a sitz bath, analgesics, and intravenous antibiotics. The patient was discharged after 7 days with improvement of symptoms. A follow-up appointment was scheduled in 15 days, with the option for earlier medical attention if needed. The patient did not follow up and lost communication.

DISCUSSION

Pandoraea species is a novel gram-negative bacillus, aerobes or facultative anaerobes, non-spore forming, non–lactose fermenting, o-nitrophenyl-β-D-galactopyranoside(ONPG) negative, and motile through flagella.[1] Majority of the species were mainly isolated from cystic fibrosis patients but have also been found in other samples, including blood, wound site, lung tissue, urine, and bile .[2,3] By 2022, 19 different species were identified from clinical samples altogether.[4] Europe, Australia, and China have reported the occurrence of Pandoraea in various clinical specimens, but in the nearest geographical context, Pandoraea species have on several occasions been identified in association with co-infection in COVID-19-positive patients in India.[4,5]

In some cases, no apparent signs or symptoms were present in the patient and thus could be classified as colonization. Sepsis has been reported only after some solid organ transplantation, in cancer patients, after multiple trauma, and in patients with a previous history of surgical interventions.[4] A patient in Portugal with new-onset fever after a

Corresponding Author:
Mr. Aron Neupane
Email: aronneupanene@gmail.com

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prolonged hospitalization and multiple courses of antibiotics had his blood cultures taken from the central venous catheter, and the catheter tip showed Pandoraea species.[6] This is similar to our case, which suggests colonization in the urinary tract, but it was not catheter-associated. Since the wound culture was negative, it is unlikely that the organism was seeded from the episiotomy site. Instances have been documented in individuals without apparent immune system deficiencies, resulting from nosocomial pneumonia, COVID-19, as well as localized infections of hemodialysis catheters, prosthetic valve endocarditis, and osteomyelitis of the skull base.[4]

Acquisition in healthcare settings and prior antimicrobial treatment appear to be common factors among those affected. *Pandoraea* species belongs to the B-subclass of proteobacteria, closely resembling the two Gram-negative rods of the genera *Burkholderia* and *Ralstonia.* Accurate genus- and species-level identification by routine biochemistry is difficult, and differentiation from *Burkholderia cepacia* complex organisms may be especially problematic. Molecular methods have been recommended.[1,7] In our case, the isolation of *Pandoraea* was done by using VITEK-2, which showed 94% probability, providing the identification only up to the genus level.[7] MALDI-TOF-MS has been reported to yield accurate results, but this method was not performed due to a resource-limited medical laboratory.[8] *Pandoraea* species was isolated for the first time in Nepal, and only for the second time from a urine specimen from our literature review.[1]

Pandoraea species exhibited variable resistance to carbapenems, i.e., Meropenem and Imipenem.[9,10] Although we did not use the findings of our AST, imipenem seems to be the working modality in early detection.[9] In this patient, it is possible that *Pandoraea* was a contaminant or an incidental finding. Given the lack of obvious signs of systemic infection and the absence of Pandoraea species in the wound culture, it was not considered the causative agent of the episiotomy site infection. The overall clinical management, including sitz baths, antibiotics, and supportive care, resulted in a favorable outcome. However, the findings cannot be ignored, and further studies are required to establish the pattern of such occurrences.

CONCLUSION

This case highlights the challenge of identifying rare organisms like *Pandoraea* species, especially in resource-limited settings where molecular diagnostic methods may not be readily available. The resistance patterns observed, particularly to carbapenems, suggest that antibiotic resistance is a significant problem when the pathogenesis of such rare organisms is poorly understood. While infections with *Pandoraea* species are uncommon, awareness of their potential to cause nosocomial infections and of their antimicrobial resistance patterns is important for future reference.

DECLARATION

Author contribution

RKS reviewed the literature and conceptualized the case report; KP, AN, and AK collected the data; KP, AN, and AK drafted the manuscript; and all authors reviewed the manuscript and approved the final version.

Conflict of interest

All authors declare that they have no potential conflicts of interest.

Consent of the study

Informed written consent was obtained from all the patients for the publication of the case report.

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