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Case report

# Latent melioidosis activation presenting with urinary tract infection and bacteremia

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ABSTRACT

We report a rare case of latent melioidosis activation in a patient with a distant travel history to an endemic region. Melioidosis is an infection caused by *Burkholderia pseudomallei* which is highly endemic in Southeast Asia and northern Australia. The patient exhibited common clinical risk factors, presenting with urinary tract infection and bacteremia. The treatment course was complicated by the adverse effect of trimethoprim/sulfamethoxazole. This case underscores the importance of early detection and appropriate treatment of melioidosis, particularly given its expanding global distribution.

## Introduction

*Burkholderia pseudomallei* is a Gram-negative bacterium that causes melioidosis through direct contact with contaminated soil and water. Highly endemic in Southeast Asia and northern Australia it is rare in the United States [1]. However, its recognition has increased due to expanding global distribution and new endemicity in the Southern United States [1–3]. We report a case of melioidosis presenting with urinary tract infection (UTI) and bacteremia in a patient with a remote travel history to the endemic area, likely indicating activation from latent infection.

## Case

A 68-year-old woman with a history of insulin-dependent Diabetes Mellitus, chronic kidney disease, atrial fibrillation, and congestive heart failure presented to the emergency department (ED) with fatigue and fever for a day.

Twelve days before this ED visit, she presented with fever and altered mental status and was admitted for sepsis secondary to UTI, with a urine culture positive for *Escherichia coli* and a blood culture showing gram-negative rods (GNR) in 1 out of 4 bottles. This GNR was assumed to be *Escherichia coli*. She was treated with ceftriaxone for 5 days while in the hospital, followed by cefpodoxime on discharge to complete a total 10-day course of antibiotics. However, four days prior to the current presentation, the blood cultures resulted in *Burkholderia* species.

At this presentation, she had a fever of 103.9°F, with a pulse at 106/min and blood pressure at 161/79 mmHg. Physical examination showed no abnormal lung sounds or costovertebral tenderness. Laboratory work-up showed leukocytes 6.40 × $10^3$/μL and creatinine 1.76 mg/dL at her baseline. Urinalysis was significant for 3 + leukocyte esterase, 2 + blood, and 2 + bacteria, but negative nitrites.

Regarding her social and exposure history, she immigrated from Cambodia 8 years ago, with her last visit to Cambodia 6 months ago. She reported contact with wet soil, compost, heavy rainfall, and animals such as goats while staying at a farm. She had never visited Gulf Coast states. According to her medical chart review, since immigrating, she had not had a history of recurrent UTIs or previous positive cultures of *Burkholderia* species before this presentation.

A chest computerized tomography (CT) scan revealed mild diffuse ground-glass opacities, a small pericardial effusion, and trace pleural effusions, but no consolidation [Fig. 1]. An abdomen and pelvis CT showed an 8-mm heterogeneous hypo-enhancing cystic space in the left kidney which could represent pyelonephritis, focal abscess, or a cystic renal mass [Fig. 2].

Given the blood culture from her previous admission, Ceftazidime 2 g every 12 hours, dosage adjusted based on renal function, was initiated. On the following day after admission, it confirmed *Burkholderia pseudomallei*. Additionally, the urine culture from this admission showed GNR, which was finalized as *Burkholderia pseudomallei* as well after discharge. Blood cultures from this admission were negative.

A treatment plan of ceftazidime for 14 days, followed by

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trimethoprim-sulfamethoxazole (TMP-SMX) double strength dose (160 mg trimethoprim and 800 mg sulfamethoxazole) twice daily for 3 months was established. It was decided to treat the renal cystic lesion with antibiotics alone, without drainage. The patient had been afebrile since admission day 1, showed improvement in symptoms, and was eventually discharged after 5 days of admission. Unfortunately, a month after taking TMP-SMX, the patient developed pancytopenia and eventually was changed to doxycycline 100 mg twice daily, maintaining the same treatment duration.

## Discussion

Melioidosis, caused by *Burkholderia pseudomallei,* primarily spreads to humans through exposure to contaminated soil and water. Known modes of transmission include subcutaneous inoculation, inhalation, and ingestion [1]. Severe weather events such as typhoons and heavy rainfall have been linked to increased incidence in endemic regions [2]. Although person-to-person transmission has been reported, it remains extremely rare [4,5].

In a large 30-year prospective observational study conducted in northern Australia, the major risk factors for patients diagnosed with melioidosis were identified as diabetes mellitus, hazardous alcohol use, chronic lung disease, and chronic kidney disease [6]. Another prospective multi-center study in northeast Thailand revealed a high prevalence of diabetes, with 70 % of patients with culture-confirmed melioidosis being affected [7]. Mortality rates range from under 10 % to higher than 40 %, correlating with clinical risk factors and limited resources available for accurate diagnosis, treatment, and intensive care support [1].

Melioidosis presents with a broad spectrum of clinical manifestations, predominantly as pneumonia. Other presentations include genitourinary, skin, musculoskeletal, central nervous system infections, and visceral abscesses [1,6,7]. Bacteremia is commonly found, accounting for 56 % of positive cultures in the Australian cohort study. In the same study, genitourinary infection was relatively less common, accounting for 12 %, but notably, 74 % of these cases were males with prostatic abscesses [6].

Genitourinary infections and urinary tract abscesses due to melioidosis have been uncommonly documented in other literature [8,9]. In a study from India, a total of 20 patients with genitourinary melioidosis were identified, all of whom were male. Mst patients (90 %) had chronic disease (duration $>$ 2 months), and 55 % were bacteremic. The prostate was the most commonly involved organ, followed by the kidney, which accounted for 50 % of cases, including pyelonephritis and renal abscesses [9]. In our case, genitourinary melioidosis in a woman is rare, but her CT findings are consistent with common manifestations of the disease.

While most cases of melioidosis present acutely, chronic infection (symptoms persisting for $\geq$ 2 months) and reactivation from latency have been reported, accounting for 9 % and 3 % respectively [6]. In this instance, the patient immigrated from Cambodia 8 years ago and had a recent visit there 6 months ago. She had not presented infectious

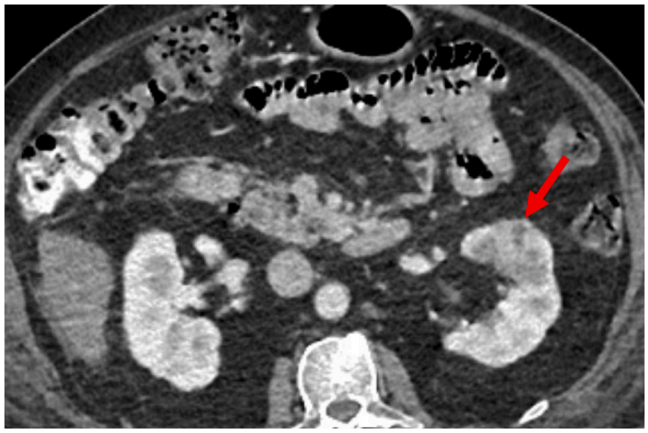

**Fig. 2.** A computerized tomography of the abdomen showing a hypoechoic lesion in left anterior kidney (arrow).

symptoms until this presentation and had no prior positive microbiology results for *Burkholderia pseudomallei*. Her presentations suggest reactivation from latency, although the exact latency period is unclear. A similar reported case supports this idea, involving a patient with a remote travel history to India who presented with pyelonephritis and bacteremia [10].

The current treatment regimen for melioidosis consists of two phases: an intravenous intensive phase followed by an oral eradication phase. International guidelines recommend at least 2 weeks of intravenous antibiotics with ceftazidime or carbapenems for the intensive phase, followed by at least 12 weeks for the eradication phase, usually with TMP-SMX [11]. Resistance to TMP-SMX is extremely rare, with one study reporting susceptibility rates of 99.2 % and 100 % among isolates from Laos and Cambodia respectively [12]. However, due to the high incidence of adverse effects from TMP-SMX, dose reduction or switching to an alternative is often necessary [13]. Historically, doxycycline monotherapy was considered inadequate for eradication [14], but recent study suggests it as a preferred second-line agent on the condition after prolonged intravenous therapy [13].

Melioidosis is a rare infection in the United States and has been reported in 12 cases annually, typically associated with travel to endemic areas [15]. However, in 2021, 4 non-travel-associated cases were reported from multiple states, and genome sequencing revealed the same strain from all four patients and aroma spray imported from India [16]. From 2020 to 2023, 3 cases from the same county along the Mississippi Gulf Coast were reported. All of them were non-travel-associated and shared genome sequences, comprising a new strain [3].

According to the Centers for Disease Control and Prevention (CDC), melioidosis is classified as a bioterrorism agent/disease category B [17] and is also a notifiable disease under the CDC's National Notifiable Disease Surveillance System (NNDSS), requiring clinicians to report cases to local public health departments for surveillance [18].

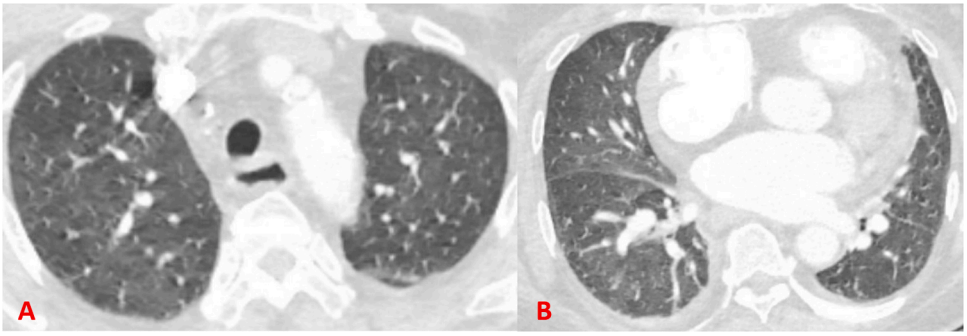


**Fig. 1.** A computerized tomography scan of the chest showing (A) mild diffuse ground-glass opacities and (B) small pericardial effusion and trace pleural effusions.

In conclusion, our case highlights melioidosis associated with travel to the endemic region, likely reactivation from latency, with common risk factors and presentations. The treatment course was complicated by intolerance to TMP-SMX and was changed to doxycycline in the middle of the course. This case emphasizes the awareness of clinicians for timely diagnosis and management of melioidosis, especially considering the growing prevalence of this infection worldwide.

## Ethical approval

Our institution does not require ethical approval for reporting individual case reports. Written informed consent was obtained from the patient for the publication of the case details and any accompanying images.

## Disclosure

This case was previously presented at the Fifteenth Massachusetts Medical Society (MMS) Research Poster Symposium on March 22nd, 2024.

## Consent

Written informed consent was obtained from the patient for publication of this case report.

## Conflict of Interest Statement

All the authors of this manuscript have no conflict of interest.

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## CRediT authorship contribution statement

**Seohyeon Im:** Writing – original draft, Investigation, Conceptualization. **Ariane Paz y Mino:** Writing – review & editing. **Estefany Garces:** Writing – review & editing. **Sarah Altamimi:** Supervision.

## Declaration of Competing Interest

All authors do not have any conflicts of interest to disclosure.

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