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CASE REPORT

Case Series of *Burkholderia Pseudomallei* Infections in Critically Ill Patients: Unveiling Key Challenges

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Abstract

Melioidosis remains a diagnostic challenge in tropical regions due to its broad clinical spectrum. This series presents seven diabetic individuals from an endemic area with diverse forms of the disease, including pulmonary, visceral, soft tissue and lymph node involvement. Laboratory confirmation was achieved through culture and nested polymerase chain reaction (PCR). Most patients improved with appropriate intravenous therapy followed by oral antibiotics; one experienced recurrence. The varied presentations often resemble other endemic infections, delaying diagnosis. Prompt clinical recognition and early use of molecular tools are vital for initiating targeted treatment and improving outcomes in vulnerable populations.

Key words: Melioidosis; *Burkholderia pseudomallei*; Polymerase chain reaction, nested; Infections; Tropical diseases, neglected.

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Introduction

Melioidosis is a serious infection caused by *Burkholderia pseudomallei*, found in soil and water in tropical areas, especially in Southeast Asia, northern Australia and the Indian subcontinent.[1]

Individuals with comorbidities such as diabetes mellitus, chronic renal disease or immunosuppression are particularly susceptible to infection, likely due to impaired innate immunity. Transmission commonly occurs via percutaneous inoculation, inhalation, or ingestion of contaminated water or soil, making agricultural and rural occupational exposure a significant risk factor.[2]

The aim of this case series is to highlight the diverse clinical manifestations of melioidosis, emphasise the diagnostic value of nested polymerase chain reaction (PCR), and underscore the importance of early recognition in endemic settings.

Case history 1

Pulmonary melioidosis with septic shock and multi-organ dysfunction syndrome (MODS)

A 44-year-old male farmer with poorly controlled type 2 diabetes mellitus presented with high-grade fever, productive cough and worsening dyspnoea. On admission, he was hypotensive and hypoxic, necessitating vasopressors and invasive mechanical ventilation. He was diagnosed with severe sepsis and MODS.

A high-resolution computed tomography (HRCT) of the chest revealed multiple thick-walled cavitary lesions (Figure 1A), initially suggestive of necrotising pneumonia or a fungal process. Despite empirical broad-spectrum antimicrobials, there was no clinical improvement. Bronchoalveolar lavage (BAL) was performed and nested PCR confirmed *Burkholderia pseudomallei*.

History in retrospect that the patient resorted to naturopathy care and mud bath for weight loss therapy. The patient experienced a cardiac arrest during admission but was successfully resuscitated after five cycles of cardiopulmonary resuscitation (CPR). Prolonged ventilator dependence warranted tracheostomy. Once stable, he was transferred to a rehabilitation facility.

Case history 2

Pulmonary melioidosis with severe sepsis in a diabetic farmer

A 44-year-old male farmer with type 2 diabetes presented with septic shock and MODS, presumed to be of pulmonary origin. HRCT chest revealed multiple cavitary lesions. Bronchoalveolar lavage (BAL) performed on day two of admission tested positive for *Burkholderia pseudomallei* on nested PCR, confirming pulmonary melioidosis.

The patient developed acute kidney injury requiring continuous renal replacement therapy (CRRT). Blood cultures showed delayed growth of *B pseudomallei* on day four. Appropriate antimicrobial therapy was adjusted according to sensitivity pattern and the patient showed gradual clinical recovery.

Case history 3

Disseminated melioidosis with osteomyelitis and soft tissue involvement

A 31-year-old male farmer with recently diagnosed diabetes mellitus presented with fever, non-productive cough, back pain and multiple swellings over the scalp and gluteal region. He was in septic shock upon presentation.

Magnetic resonance imaging (MRI) of pelvis revealed bilateral iliac bone osteomyelitis and a femoral intramedullary abscess (Figure 1B). MRI brain demonstrated a temporal scalp abscess. Both lesions were surgically drained. Culture of pus from the scalp abscess grew *B pseudomallei*, establishing a diagnosis of disseminated melioidosis involving bone and soft tissues. He was treated with intravenous meropenem followed by oral cotrimoxazole during the eradication phase.

Case history 4

Visceral melioidosis with splenic abscess requiring splenectomy

A 58-year-old female gardener with diabetes, hypertension and a congenital atrial septal de-

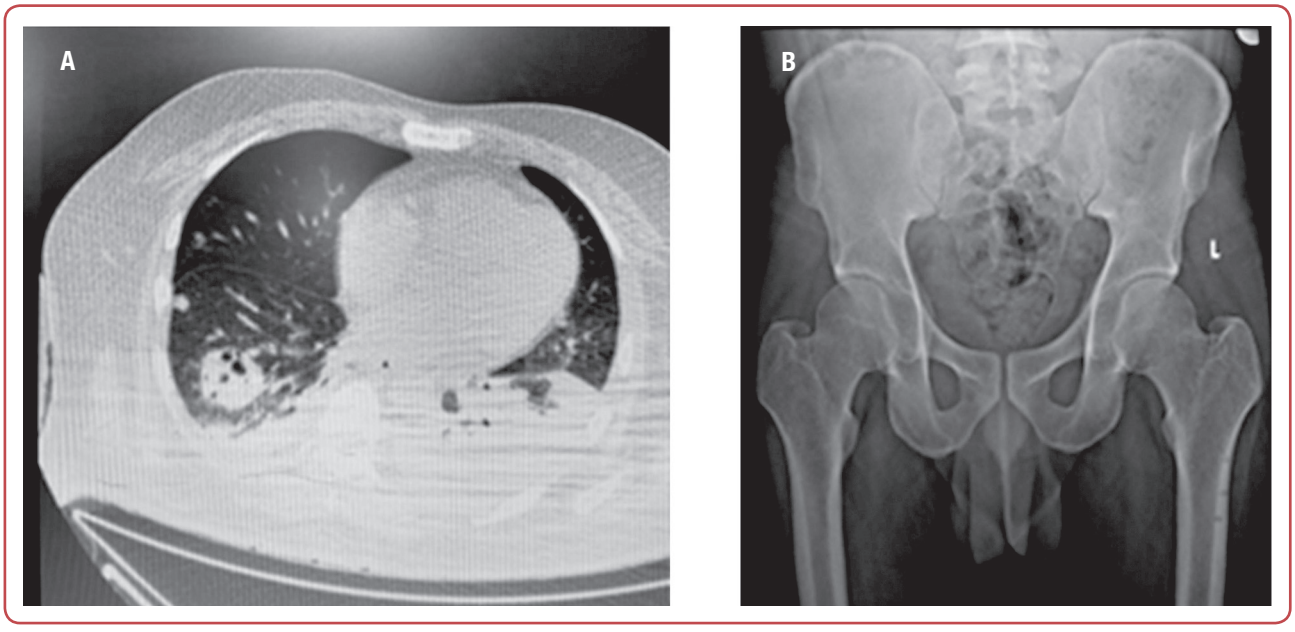

Figure 1: A: Case 1 - pulmonary melioidosis with septic shock and multi-organ dysfunction syndrome (MODS); B: Case 3 - disseminated melioidosis with osteomyelitis and soft tissue involvement

fect presented with chronic intermittent fever, abdominal discomfort and anorexia. Examination revealed tender splenomegaly. Contrast-enhanced computed tomography (CT) scan of the abdomen showed multiple multiloculated collections within the spleen, with features suggestive of impending rupture, along with enlarged abdominal lymph nodes. Tuberculosis and brucellosis were considered but excluded through appropriate microbiological and serological testing.

In view of high risk of rupture, splenectomy was performed. Culture of splenic pus (Figure 2A) confirmed *Burkholderia pseudomallei*. Postoperative recovery was uneventful and she was discharged with a course of oral eradication therapy.

Case history 5

Recurrent disseminated melioidosis with pulmonary and splenic involvement

A 52-year-old male with longstanding type 2 diabetes presented with prolonged fever, productive cough and general malaise. The patient was evaluated for pyrexia of unknown origin; however, the source of infection could not initially be identified. Ultrasonography of the abdomen subsequently revealed a splenic abscess.

In view of high clinical suspicion, BAL was performed tested positive for *B pseudomallei* by nested PCR technique. Blood cultures, initially sterile, later grew B pseudomallei on day five. On day 14, the patient developed hypotension and hypoxia requiring mechanical ventilation and vasopressors. Subsequent endotracheal aspirate grew multidrug-resistant organisms consistent with ventilator-associated pneumonia and antibiotics were escalated accordingly.

Following clinical stabilisation and discharge on oral trimethoprim/sulfamethoxazole (TMP-SMX), the patient was readmitted within a week with signs of recurrent sepsis. Repeat blood cultures again isolated *B pseudomallei*. A positron emission tomography–computed tomography (PET-CT) scan revealed fluorodeoxyglucose (FDG)-avid lesions in the lung, liver, spleen and lymph nodes. He was restarted on intensive therapy for 52 days, followed by oral TMP-SMX. He responded well and was discharged with close outpatient follow-up.

Case history 6

Cervical lymphadenopathy due to melioidosis

A 49-year-old female agriculturist with type 2 diabetes presented with a painless left cervical swelling for three months. She had been empirically treated with anti-tubercular therapy (ATT) for suspected extrapulmonary tuberculosis without improvement.

Neck CT showed a lesion suggestive of a tubercular or pyogenic abscess. A fine needle aspiration cytology (FNAC) revealed suppurative lymphadenitis without granulomas. Incision and drainage were performed on day four. Gram stain showed bipolar-staining gram-negative bacilli, later identified as *B pseudomallei* on culture and confirmed by nested PCR.

ATT was discontinued and she was managed with intravenous ceftazidime for two weeks, followed by oral cotrimoxazole for six months. She recovered completely.

Case history 7

Soft tissue melioidosis with right knee involvement

A 52-year-old diabetic male presented with pain, swelling and restricted mobility of the right knee, along with low-grade fever for one week. On admission, he was hypotensive and hypoxic, requiring vasopressors and non-invasive ventilatory support.

Laboratory evaluation revealed leucocytosis with neutrophilic predominance and elevated inflammatory markers. Ultrasound demonstrated a large hypoechoic collection (Figure 2B) and MRI of the knee revealed joint effusion with multiple periarticular abscesses in the suprapatellar and popliteal regions.

Aspiration of joint fluid grew *B pseudomallei,* while blood cultures remained negative. He underwent surgical arthrotomy with drainage and was initially started on intravenous ceftazidime, later escalated to meropenem. Following clinical improvement, he was transitioned to oral cotrimoxazole for six months. At follow-up, he remained asymptomatic and compliant.

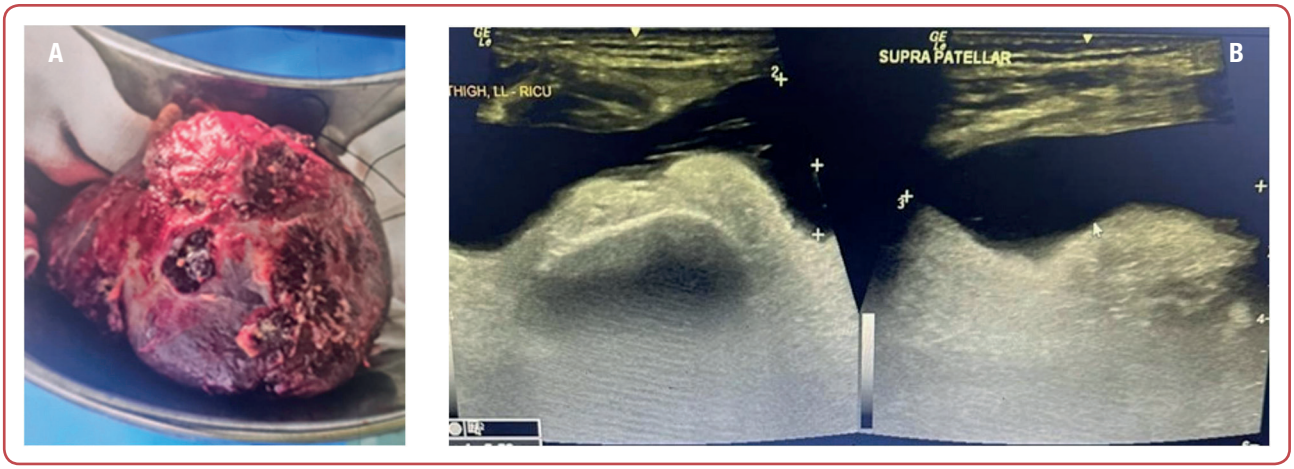

Figure 2: A: Case 4 - visceral melioidosis with splenic abscess requiring splenectomy; B: Case 7 - soft tissue melioidosis with right knee involvement

Discussion

Melioidosis remains a clinically challenging disease due to its wide spectrum of manifestations, ranging from localised cutaneous lesions and lymphadenopathy to fulminant septicaemia and multi-organ dysfunction. This clinical heterogeneity contributes significantly to its underdiagnosis, especially in tropical regions where it closely mimics tuberculosis, fungal infections or brucellosis.[1–3]

This diagnostic variability is echoed in the literature. For instance, Vidyalakshmi et al described diverse clinical phenotypes including pneumonia, splenic abscesses and soft tissue infections in southern India.[4] Saravu et al reported presentations ranging from pneumonia to deep organ abscesses, with diabetes being a prominent comorbidity.[3] Similarly, published reviews from Thailand and Australia have highlighted melioidosis as presenting with septic arthritis, parotid abscesses and chronic osteomyelitis.[5, 6]

In the present series, diabetes mellitus was a consistent predisposing factor across all cases, aligning with other studies that report diabetes in 50–80 % of melioidosis patients.[4] Additional factors such as environmental exposure and immunosuppression likely contribute to disease susceptibility and severity.

Microbiological confirmation was achieved via culture in several patients, but nested PCR targeting *B pseudomallei* played a crucial role in early detection, especially in cases with delayed culture positivity. In Cases 1 and 2, nested PCR on BAL fluid provided rapid confirmation when initial empirical therapy failed. Although culture remains the cornerstone of diagnosis, Nested and PCR-based assays targeting ribosomal regions, including the 16S rRNA gene and the 16S–23S spacer region, have been described for rapid identification of *Burkholderia pseudomallei*.[7, 8] Other molecular assays have targeted the type III secretion system 1 (TTS1) orf2 region for rapid and specific detection of *B pseudomallei*.[9, 0]

Wuthiekanun et al also described rapid immunofluorescence microscopy as a useful adjunct for early detection of *B pseudomallei* from clinical specimens. Although culture remains the gold standard, such rapid methods may support earlier diagnosis in endemic settings.[10]

Despite the severity of illness, including septic shock, disseminated disease and MODS, six out of seven patients in the present series recovered with appropriate intensive-phase antibiotics followed by oral eradication therapy. Only Case 5 had a relapsing course, which may be attributed to inadequate duration or premature discontinuation of therapy. This underscores the importance of strict adherence to long-term treatment protocols to reduce relapse risk.[2]

Given the potential for high morbidity, mortality and relapse, melioidosis must be considered

in the differential diagnosis of patients from endemic areas who present with sepsis, soft tissue abscesses, lymphadenopathy, or pulmonary symptoms, particularly in the presence of risk factors like diabetes. Molecular diagnostics such as nested PCR should be advocated early in the diagnostic workflow in such settings to enable timely initiation of effective therapy.

Conclusion

Early diagnosis, especially through *Burkholderia*-specific nested PCR, is sometimes key for accurate detection and timely treatment. Since *Burkholderia pseudomallei* can take up to five days to grow in blood cultures, it's important to work closely with the microbiology lab to extend incubation period and retaining samples for a longer duration. Presented findings emphasise the need for greater awareness of melioidosis and better diagnostic tools in areas where it is common. Early detection and treatment can greatly reduce the risk of this often-missed infection.

Ethics

This study was a secondary analysis based on the currently existing data and did not directly involve with human participants or experimental animals. Therefore, the ethics approval was not required in this paper.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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