Case Report

A Peculiar Case of Disseminated Melioidosis with Atypical Features Likely Linked to Bong/Water Pipe Use

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Abstract

Melioidosis, caused by *Burkholderia pseudomallei*, is a challenging infectious disease with global implications, primarily affecting Southeast Asia. We present the case of a 24-year-old male with a curious history of tobacco use, presenting with fevers, weight loss, and genitourinary symptoms. Diagnostic challenges arose as symptoms mimicked other diseases. Disseminated melioidosis was confirmed via Gram staining and positron emission tomography scan findings, emphasizing the disease's diverse clinical manifestations. Treatment with ceftazidime and cotrimoxazole led to prompt recovery. Notably, the patient's tobacco use linked to contaminated water highlights a unique transmission route. This case underscores the need for heightened awareness and preventive measures in endemic regions.

Keywords: *Burkholderia pseudomallei*, genitourinary infections, melioidosis, positron emission tomography scan

Introduction

Melioidosis, a potentially fatal infectious disease caused by the bacterium *Burkholderia pseudomallei*, is a compelling and intricate medical topic that demands attention and understanding. This emerging disease primarily affects individuals residing in Southeast Asia, Northern Australia, and other tropical regions, but its global implications make it a subject of growing concern in the field of infectious diseases.[1] The causative agent, *B. pseudomallei*, possesses remarkable adaptability, thriving in diverse environments ranging from soil to water. Understanding its transmission, clinical manifestations, and treatment modalities is essential for health-care professionals, researchers, and policymakers alike. Melioidosis can manifest as a spectrum of symptoms, from mild skin infections to severe pneumonia and septicemia, posing diagnostic challenges for health-care providers. Moreover, its potential to mimic other diseases complicates accurate and timely identification.[2] We describe the case of a young male with an intriguing medical history, presenting with an acute febrile illness with urinary symptoms and a noteworthy diagnosis.

Case Report

A 24-year-old Southeast Asian student, a permanent resident from eastern India, with no known comorbidity, presented with intermittent high-grade fevers (temperature: 100°C–104°C) lasting for 3 weeks. He also experienced a decrease in appetite and a weight loss of 6 kg during this period. In addition, for the past 2 weeks, he had dysuria, increased urinary frequency, and a feeling of incomplete evacuation. He initially sought medical attention from a local physician in his hometown, where a complete fever work-up was conducted. The evaluations revealed leukocytosis, an enlarged spleen, an enlarged prostate with a hypoechoic lesion measuring 2 cm × 2 cm, and significant postvoid residual urine on an abdominal ultrasound. He was treated with empirical intravenous (IV) antibiotics for 1 week, which provided symptomatic relief but did not resolve the intermittent fevers. Consequently, he sought further evaluation. Historically, the patient had no cough, sore throat, hematuria, abdominal pain, nausea, vomiting, abdominal distension, or loin pain. He did not have any rashes, joint pain, or oral ulcers. Furthermore, he had not traveled or engaged in hiking activities. He was a smoker, consuming 4–5 cigarettes per day for the past 5 years. A detailed history revealed the use of tobacco over the

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last 3 years. A detailed history revealed the use of tobacco over the last 3 years initially as hand rolled joints and subsequently using Bongs/water pipes [Figure 1].[3] Upon admission to our center, he was conscious and oriented. He continued to experience intermittent fever but remained hemodynamically stable, so no antibiotics were continued. Clinically, he had mild splenomegaly and mild enlargement and tenderness of the prostate on a per rectal examination.

His investigations revealed a hemoglobin level of 12.5 g/dl, total leukocyte count of 7600/mm^3, neutrophil count of 70%, lymphocyte count of 16%, eosinophil count of 6%, and platelet count of 220,000/mm^3. His renal and liver function tests were normal, and his glycated hemoglobin was 5.8%. The urine routine and microscopy showed 5 red blood cells/high-power field (HPF), 8 white blood cells/HPF, protein present, and absent nitrite/glucose. His human immunodeficiency virus (HIV) enzyme-linked immunoassay, hepatitis B antigen, and anti-hepatitis C virus tests were negative. The serum interferon-gamma release assay was negative. Inflammatory markers such as C-reactive protein and erythrocyte sedimentation rate were elevated, with values of 15.4 mg/dl and 89 mm at the 1st h. A repeat ultrasound showed an enlarged prostate measuring 5.4 cm × 4 cm × 4.5 cm (volume 50 cc). A transrectal ultrasound was performed, and 10 ml of pus was aspirated and sent for Gram staining and culture. At this point, the differential diagnosis included bacterial prostatitis with a prostatic abscess and genitourinary tuberculosis. The Gram staining revealed Gram-negative nonfermenters, which were later identified as *B. Pseudomallei* confirmed on blood culture done on MacConkey agar. As the patient did not have diabetes and was immunocompetent, a positron emission tomography (PET) scan was performed to assess the extent of the infection. The PET scan showed subpleural nodules in the right lung apex, patchy consolidation in the left lung apex, ill-defined focal lesions in the right kidney, ill-defined focal lesions in the prostate, and focal lesions in the spleen [Figures 2-4].

The patient was diagnosed with disseminated melioidosis and was treated with IV Ceftazidime 2 g Q6H for 2 weeks, followed by oral tablet Cotrimoxazole ds(double strength) 2 tablet TID for 4 months. The drug sensitivity test revealed Ceftazidime minimum inhibitory concentration (MIC) at 1.0, MIC of Imipenem at 0.38 µg/ml, MIC of Doxycycline at 1.0 µg/ml, and MIC of Cotrimoxazole at 0.75 µg/ml.

The patient became asymptomatic within a week of receiving treatment. He later had a follow-up appointment with us after 4 months, and detailed investigations revealed complete clearance of the infection.

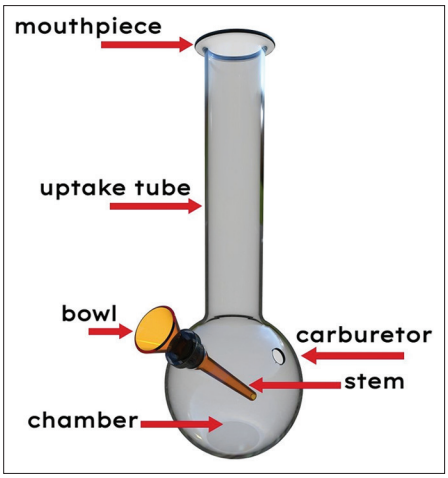

Figure 1: Pictorial representation of a water pipe/bong[3]

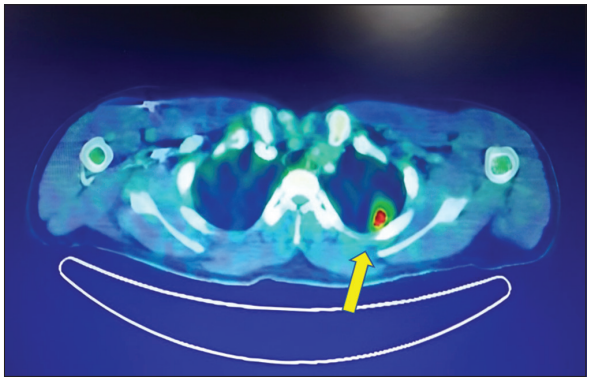

Figure 2: Positron emission tomography–computed tomography chest showing increased fluorodeoxyglucose uptake in the left lung

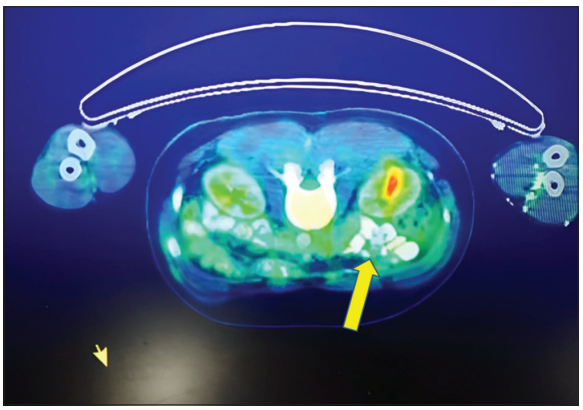

Figure 3: Positron emission tomography–computed tomography abdomen showing increased fluorodeoxyglucose uptake, right kidney

Discussion

B. pseudomallei is an environmental bacterium that causes melioidosis. Approximately 44% of the global disease burden is in South Asia, with the disease being endemic in Bangladesh and Sri Lanka. There is also an increasing number of reported melioidosis cases from India due to improved diagnostics.[4] Human infection by the bacteria occurs through inhalation, ingestion, or skin inoculation. The bacteria are commonly found in soil. Melioidosis has a wide range of clinical presentations, including bacteremia with septic shock, melioidosis pneumonia, genitourinary infections (mainly affecting the prostate, urinary tract, and kidneys), cellulitis and soft-tissue infections, bone and joint infections, brain infections, solid organ infections (such as liver and spleen abscesses), and multifocal melioidosis.[5] In a tropical country like India, the clinical presentation of

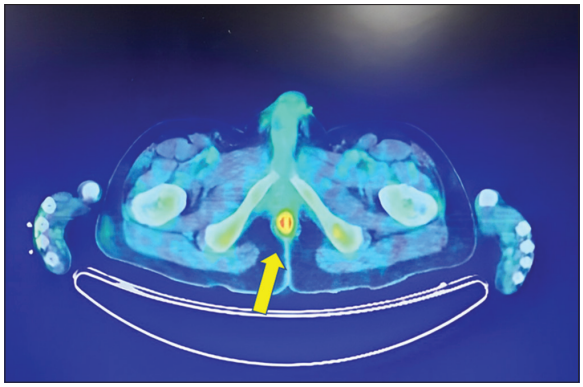

Figure 4: Positron emission tomography–computed tomography pelvis showing increased fluorodeoxyglucose uptake in the prostate

melioidosis is similar to many common tropical diseases, which often leads to a significant delay in diagnosis and management. The organism is frequently misidentified as *Pseudomonas* species in microbiology laboratories and may be disregarded as a common laboratory contaminant. The poor diagnostic sensitivity of blood culture also contributes to missed diagnoses. As a result, both clinical ignorance and missed laboratory diagnoses have led to the misrepresentation of melioidosis as a rare disease.[6] The major risk factors for developing melioidosis are uncontrolled diabetes, excessive alcohol use, chronic lung disease, chronic renal disease, thalassemia, malignancy, or other non-HIV-related immune suppression.[7] Our patient was a young, apparently healthy individual with no known comorbidities. The fact that he contracted melioidosis raised more questions than answers. A more detailed history was obtained from him, during which he revealed that he had used tobacco over the past 3 years. Initially, he rolled and smoked tobacco like a joint. Subsequently, he used a bong/water pipe [Figure 1] to smoke the tobacco, and the water used in the pipe was primarily well water. It is well known and documented that contaminated water can cause *B. pseudomallei* infection.[8] Therefore, it is possible that the contaminated well water he used in the pipe could have infected his lungs, and the disease subsequently spread to his spleen, prostate, and kidneys. There was no history of prolonged contact with soil or unfiltered water given by the patient, limiting the source of infection to the water used in the water bong or the tobacco used, which also corroborates with the timeline of 21 days as the incubation period for *B. pseudomallei*. A similar case report by Brosh-Nissimov *et al*. described an Israeli tourist who contracted *B. pseudomallei* infection after smoking cannabis for over a month.[9] The disease manifested as chronic cavitatory pneumonia once he returned home. Use of water bong or hukkah (vernacular name) is common in the Indian subcontinent as a filtration device to smoke tobacco. The use of water used in bongs is often from unhygienic sources, and the setup is often not cleaned regularly with only the water being changed. This creates a niche for various pathogens to harbor and cause illness. This is the second reported case of water bong associated with melioidosis. The authors were unable to conduct an epidemiological survey in view of administrative and financial constraints.

Conclusion

The key takeaway from this case is the importance of raising awareness about the disease among both treating physicians and microbiologists. Preventive measures include avoiding contact with loose and muddy soils in endemic areas and providing safe drinking water. A thorough history often forms the key to a successful diagnosis and treatment.

Research quality and ethics statement

The authors followed applicable EQUATOR Network (http://www.equator-network.org/) guidelines, notably the CARE guideline, during the conduct of this report. We also certify that none of the authors is a member of the editorial board of the JGID.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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