CASE REPORT

Burkholderia pseudomallei: Three cases in 6 months in Central Travancore

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ABSTRACT

Melioidosis caused by *Burkholderia pseudomallei* has been reported from various parts of the country and from northern Kerala. This is the first series of documented cases from Central Travancore, Kerala. The most common predisposing factor in all these three cases was diabetes mellitus followed by chronic alcoholism. Early clinical suspicion and correct microbiologic diagnosis, which help in institution of appropriate therapy, remain the key factors in reducing the mortality associated with this disease.

Key words: *Burkholderia pseudomallei*, Central Travancore, Melioidosis

INTRODUCTION

Melioidosis is a potentially fatal infection caused by the gram-negative bacillus, *Burkholderia pseudomallei*, following an encounter with contaminated soil or surface water. Its treatment combines the urgency of treating rapidly fatal Gram-negative septicemia with the need for eradication of long-term persistent disease in pulmonary, soft tissue, skeletal, and other organ systems. *B. pseudomallei* is endemic to South East Asia (Vietnam, Thailand) and Australia. It is now recognized as an emerging infectious disease in India [1] Cases reported from the Indian subcontinent varied from serious manifestations like septicemia,[2,3] septic arthritis,[4,5] and pneumonia[5] to soft tissue infections like scalp abscess, psoas abscess, gluteal abscess,[5] etc. The situation can be further complicated by the reactivation of a latent focus of infection acquired many years ago, as has been seen in American soldiers who returned from the Vietnam War,[6,7] hence earning the nickname "Vietnamese time bomb."

Like other environmental bacteria, *B. pseudomallei* are highly resistant to many antibiotics. Moreover, the empirical antibiotics usually used for the first-line treatment of Gram-negative septicemia (e.g., piperacillin-tazobactam, aminoglycosides, ceftriaxone) are ineffective in the treatment of melioidosis. As the decision to treat and the choice of antimicrobial agent by the clinician is much before any laboratory results are available, this disease should be considered in the differential diagnosis of septicemia in patients living in endemic areas or in travelers to these areas.

Access this article online

Quick Response Code:

Website: www.jacmjournal.org

DOI: 10.4103/0972-1282.116096

CASE REPORTS

Case 1

A 52-year-old male patient, an auto rickshaw driver by profession, hailing from Central Travancore, was brought to the emergency department on 31st October 2011, with a history of jaundice 2 weeks back and decreased responsiveness not responding to verbal commands for the last 24 h. On examination, the patient was febrile and jaundiced. His relatives gave history of a road traffic accident 2 months back, with a non-healing ulcer in the lower sternum. No history of oliguria, headache, vomiting, other bleeding manifestations, and myalgia was present. The patient was a chronic alcoholic, smoker, and a known type II diabetic with hypertension.

Blood examination revealed the following: hemoglobin: 10.1 gm/dl, total count 11,900 cells/mm^3, polymorphs 78%, lymphocytes 20%, eosinophils 2%, thrombocytopenia, increased prothrombin time and activated partial thromboplastin time (APTT) levels.

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Liver function tests and renal function tests showed elevated values.

Chest X-ray showed pleural reaction and right lower lobe consolidation. Ultrasound of the abdomen showed marked hepatomegaly with fatty changes and mild splenic enlargement with an ill-defined area of heterogeneous opacity in the superior aspect of spleen. A provisional diagnosis of pneumonia with sepsis and multi-organ dysfunction and was made. The patient was empirically started on Piperacillin-tazobactam and Levofloxacin.

Sputum was sent for culture and sensitivity and Ziehl–Neelsen staining. No acid-fast bacilli were detected. Blood cultures were sent for conventional testing on the day of admission. Serology for hepatitis, *Leptospira*, and dengue was negative.

The blood culture and sputum culture grew *B. pseudomallei*, identified by automated Vitek 2 system (BioMerieux, France). The patient was discharged on request. Despite repeated attempts, further follow-up of the patient could not be obtained.

Case 2

A 39-year-old male patient, a non-resident Indian from Central Travancore, working in the Middle East, was admitted to the hospital on 16th February 2012 with high-grade fever and breathlessness of 1 week duration, forcing him to return home to seek treatment. On examination, ankle and elbow joints were red, swollen, and fluctuant. The patient was a known alcoholic and type II diabetic with hypertension. He gave a history of exposure to soil and dust while drilling for a well.

Blood examination revealed the following: hemoglobin 12.1 gm/dl, total count of 14,400 cells/mm^3, and thrombocytopenia. Liver function tests and renal function tests showed elevated values.

Ultrasound of the abdomen revealed hepatomegaly with grade I fatty changes.

A preliminary diagnosis of type I respiratory failure and septic arthritis was made. The patient was started on Piperacillin-tazobactam. Joint aspirate and blood cultures revealed the growth of *B. pseudomallei.*

Meanwhile, the patient was discharged on request, but the report was dispatched immediately to the doctor he was consulting. He was started on Meropenem for 4 weeks and put on maintenance phase of Cotrimoxazole and Doxycycline for another 4 weeks. The patient responded well to treatment and had resumed his work in the Middle East, after follow-up.

Case 3

A 63-year-old male, a farmer working in rubber plantations and a resident of Central Travancore, was admitted to the hospital on 15th April 2012 with anuria, high-grade fever, and breathlessness for one day with progressively increasing pedal oedema and oliguria for the past one week. The patient was a known case of type II diabetes and chronic renal failure with hypertension.

Blood examination revealed-Haemoglobin: 8 gm/dl, Total total count of 17,200 cells/mm^3, and elevated renal serum parameters; the X-ray chest revealed homogenous opacities.

An initial diagnosis of Acute Respiratory Distress Syndrome (ARDS) with sepsis and acute-on-chronic renal failure was made and the patient was started empirically on Ceftriaxone and Levofloxacin.

B. pseudomallei was isolated in blood. The patient was started on Ceftazidime for 4 weeks. He responded well and his blood culture became negative within 1 week. He was discharged on a maintenance phase of Cotrimoxazole and Doxycycline.

DISCUSSION

The infection by *B. pseudomallei* can spread either by inhalation of contaminated debris or by direct inoculation from contaminated soil and water through damaged skin or mucosa.[8] Inoculation is now considered the major mode of acquisition.[8] Minor wounds to the feet of rice farmers are common during the planting and harvesting seasons, when farmers spend most of the working day wading in mud and surface water. Two of our patients may have acquired the infection through inoculation, while one may have acquired it through inhalation during the dispersal of soil while drilling. The incubation period can vary from days to years. Acute localized suppurative infection can rapidly progress to a fatal septicemic form. All three of our patients were type II diabetics, while two of them were known alcoholics and one had a history of chronic renal failure. Diabetes has been found to be the single most common predisposing factor in a review by Cheng *et al.* in 2005.[9]

B. pseudomallei is overlooked in many cases due to low index of suspicion and awareness among the microbiologists and clinicians. Dance noted that

published case reports and series are likely to represent only the "tip of the iceberg," as culture facilities are not available in most of the rural tropics where the infection is likely to be prevalent.[9] Correct identification of *B. pseudomallei* is essential as the infection requires intensive and prolonged treatment. Our laboratory was alerted for the presence of this organism by the typical cultural characteristics of this bacterium and resistance to polymyxin B (300 Units). Moreover, the organism is resistant to aminoglycosides, quinolones, and even most beta lactams including the third-generation cephalosporins which often are used as the empiric first-line antibiotics for treatment of such cases. All our patients were on one or more of these antibiotics, hence inaccurate identification of the bacterium would have proven fatal.

The recommended antibiotics used to treat melioidosis fall into two distinct categories:[10] (a) those suitable for the treatment of the acute septicemia phase of disease (phase 1) and (b) those used in the subsequent eradication phase of therapy, previously known as "maintenance" therapy (phase 2). The principal choice of agents used in the first phase comprises Ceftazidime, or Meropenem intravenously combined with Cotrimoxazole orally for 3-4 weeks. Phase 2 eradication needs careful supervision because this is the point at which some patients are at risk of septicemic relapse. It is common practice to briefly overlap initial intravenous and eradication antibiotic therapy in order to assess tolerance of the oral eradication agents. Cotrimoxazole with Doxycycline is a suitable combination therapy for eradication for a period of 12-20 weeks. All our isolates were found to be sensitive to Ceftazidime, carbapenems, Cotrimoxazole, and Tetracycline.

B. pseudomallei identification requires a great deal of alertness by the clinicians as well as the medical microbiologist, as these isolates are often reported as *Pseudomonas* spp. Correct identification of the etiologic agent and testing the appropriate antibiotics is usually delayed by days using conventional culture and identification techniques. Considering the high mortality associated with this illness, emphasis on earlier clinical and microbiological diagnosis allows for early appropriate treatment and better clinical outcome.

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How to cite this article: Oommen S, Nair S, Nair K, Viswanathan P, Sivan Pillai PM. *Burkholderia pseudomallei*: Three cases in 6 months in Central Travancore. J Acad Clin Microbiol 2013;15:19-21.

Source of Support: Nil. **Conflict of Interest:** None declared.