

## Melioidosis: Case Report of Confirmed *Burkholderia pseudomallei* in Saudi Arabia

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### ABSTRACT

Melioidosis is an infectious disease of tropical climates. The disease is caused by the bacterium *Burkholderia pseudomallei*. Most cases are diagnosed in south east Asia and northern Australia. Some imported cases diagnosed in returning tourist, soldiers and immigrants from endemic areas. It caught a lot of attention since the Centers for Disease Control and Prevention (CDC) designated *B. pseudomallei* as an agent for biological warfare and terrorism. We describe two cases of a 26-year-old Saudi woman who had fulminant sepsis soon after returning from Thailand & 48-year-old woman with a long history of fever. *B. pseudomallei* was isolated from both patient's blood cultures and they had different consequences. A confirmed case of melioidosis was not reported before in Saudi Arabia.

### CASE-1

A 26-year-old Saudi woman, with no prior history of chronic illnesses, was admitted to King Abdulaziz Medical City-Riyadh with fever and shortness of breath. Her symptoms started a week prior to presentation with diarrhoea followed by high-grade fever for 3 days. She did not report any Upper respiratory tract symptoms or cough. She sought medical attention in private hospitals where management was mainly supportive [1].

She was recently returned from a honeymoon in Thailand three weeks ago where she stayed in a resort in Phuket without major outdoor activities except short walks on the beach. Her husband did not report any symptoms [2].

On arrival to ED She was tachycardic (150 B/min), tachypnic of (48 breath /min) & febrile (39.5°C). She was immediately intubated and admitted to the Intensive Care Unit with respiratory failure.

Chest examination revealed bilateral crepitation, other examinations were unremarkable. Her initial complete blood counts (CBC) showed white blood cells of  $0.3 \times 10^9/L$ , platelet of  $29 \times 10^9/L$ , and haemoglobin level of 102 gm/L. Erythrocyte

sedimentation rate (ESR) and C-reactive protein (CRP) were 16 mm/hr and 463 mg/L, respectively. Her renal function was impaired, and coagulopathy started to develop. Chest X-ray showed multiple bilateral air space disease, with no consolidation [3].

She received Piperacillin-Tazobactam, Azithromycin, Vancomycin, and Oseltamivir upon arrival. Afterward, antibiotics were reevaluated and changed to Meropenem, Doxycycline, and Gentamicin after infectious diseases service evaluation [4].

She developed multi-organ failure and required higher ventilator settings. Her vasopressors requirement increased and started on continuous renal replacement therapy (CRRT). Within 36 hours, she had her first cardiac arrest, she was revived after 14 minutes of resuscitation and put on extracorporeal membrane oxygenation (ECMO) machine.

The chest X-ray showed progressive worsening. Blood and respiratory cultures first identified after 30 hours. Gram's stain revealed faintly bipolar stained gram-negative bacilli non-lactose

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fermenters in the MacConkey agar with positive oxidase reaction [5].

Further identification, using the VITEK® MS (MALDI-TOF/MS) V2.3.3 was not able to identify the organism as it is Not included in the database.

We used VITEK® 2 V 8.01: which report *Burkholderia pseudomallei* with 99% Probability. It was susceptible to Meropenem MIC 0.38 ug/ml & Ceftazidime MIC 0.75 ug/ml

Despite maximum ICU support and antibiotics treatment she had persistent hypotension with severe hypothermia and lactic acidosis. On her third day she developed ventricular fibrillation, arrested, and died [6].

## CASE-2

A 48-year-old Saudi woman who is not known to have any chronic illness. She presented in August to ED with a history of fever, it started when she was in India 3 weeks back.

The fever was associated with rigors and fatigability and followed with lower dull abdominal pain and dysuria. She spent ten days in a coastal city. where had visited the sea several times during her stay in India and ate seafood. Though her family shared with her the activities & food, none of them were reported ill [7-9].

She was stable upon arrival to the ED. Her examination was unremarkable apart from mild unspecific lower abdominal tenderness with no rebound tenderness and otherwise soft abdomen and normal bowel sound [10].

CBC showed white blood cells of  $5.9 \times 10^9/L$ , platelet of  $529 \times 10^9/L$  and haemoglobin level of 97 gm/L. ESR and CRP were 93 mm/hr and 59 mg/L, respectively. Her renal and liver functions were within normal. Abdominal ultrasound was unremarkable. She was started empirically on Piperacillin-Tazobactam [11].

After 36 h blood cultures showed gram-negative Bacilli which later identified by the automated machine VITEK® 2 as *Burkholderia pseudomallei*. It was susceptible to Ceftazidime, Meropenem, and Trimethoprim/Sulfa. The patient's antibiotic was then changed to Meropenem and continued for 14 days. Repeated blood cultures showed no further growth and the patient significantly improved. She was discharged to continue her therapy as an outpatient [12].

## DISCUSSION

Melioidosis is a serious, sometimes fatal infection. It is relatively unknown to public and health care workers in nonendemic area. Melioidosis caused by *Burkholderia pseudomallei* which is gram-negative bacillus found naturally in soil and stagnant water [13].

Most cases diagnosed in South East Asia and northern Australia. Thailand was known to have the greatest numbers of cases with 2,000-3,000 cases diagnosed with melioidosis each year. Imported cases seen in immigrants or soldiers returned from an endemic area and reported in tourists. Acquiring infection can be through percutaneous inoculation, inhalation, or ingestion of *B. pseudomallei* present in

contaminated drinking water, or rarely person to person transmission [14].

Melioidosis cases mostly present in rainfall season. In fatal cases an identified risk factor usually found, the most important of which are diabetes, alcoholism, and chronic renal disease [5,6]. No predisposing risk factors identified in 20-36% of melioidosis cases. The patients we presented were not known to have chronic illness or other factors that can put them at higher risk.

The incubation period is variable, in some case reports it was 1-21 days [7]. In other reported cases it extended to months or years. The patient in the first case presented after three weeks of asymptomatic period.

*B. pseudomallei* can grow in, MacConkey, or cystine-lactose-electrolyte deficient agars. Using Ashdown's medium, a gentamicin-containing liquid transport broth will increase the likelihood of successful culture from sputum, throat swabs [8]. Working on samples should be carried out in a biosafety level 3 practices equipped microbiology lab. The lab should be notified when *B. pseudomallei* is suspected as the organism may be labelled as an environmental contaminant and discarded.

Other means of identification like IHA is useful in supporting the possibility of melioidosis, but a positive culture is still required for definitive diagnosis [9].

*B. pseudomallei* is resistant to many antibiotics' physicians tend to use empirically such as penicillin, ampicillin, first and second generation cephalosporins, macrolides, rifampicin, and aminoglycosides. Thinking of melioidosis when such differential applies is essential in choosing the appropriate antibiotic. Studies showed it is susceptible to cefotaxime, ceftriaxone, ceftazidime, imipenem, meropenem, piperacillin and amoxicillin/clavulanate [10].

In a randomized trial, ceftazidime was associated with a 50% lower mortality in severe melioidosis compared with "conventional treatment. Carbapenems have the lowest MIC against *B. pseudomallei* and imipenem shown to be as effective as ceftazidime [12,13]. After the initial intensive therapy, eradication therapy using Co-trimoxazole and Doxycycline should be started and continued for at least 3 months [14]. Patients with septicemic melioidosis remain to have a high mortality rate.

Our first case was treated with Piperacillin-Tazobactam as empirical therapy then switched to Meropenem. despite that her condition continued to deteriorate and her sepsis was beyond control.

In conclusion, melioidosis might be underdiagnosed by physicians in non-endemic areas. Having an extremely low threshold of suspicion in returning travellers from an endemic area, communication between physicians and microbiologists remains the golden key to help reach the diagnosis and guide appropriate treatment.

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## COMPTING INTERESTS

Author(s) disclose no potential conflicts of interest.

## DISCLOSURES AND ETHICS

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## DATA AVAILABILITY STATEMENT

The Microbiological data used to support the findings of this case Reports are available from the corresponding author upon official request for researchers who meet the criteria for access to confidential data and after approval of the co-authors.

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