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***Burkholderia pseudomallei* - an unusual cause of septic embolism**

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## **Abstract**

Melioidosis is an infection caused by the Gram-negative bacterium *Burkholderia pseudomallei*. It is endemic in many regions, including Southeast Asia, Northern Australia, South Asia (including India), and China. The presentation of melioidosis varies from localized infection to systemic sepsis. The most common causes of septic emboli are *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Escherichia coli*, and the Salmonella group, but here we reported a case of pulmonary septic emboli, necrotizing pneumonia, and septic arthritis in case of systemic melioidosis infection.

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## Introduction

*Burkholderia pseudomallei* is a Gram-negative saprophyte that causes melioidosis. Even though it is common in endemic areas like Southeast Asia, Northern Australia, and South Asia, it is also reported in other areas. In melioidosis, mortality and morbidity are high due to systemic involvement, and it has intrinsic resistance to many antibiotics.<sup>1</sup> Melioidosis has varied presentations like pneumonia, septicemia, abscesses mainly in the spleen, liver, and brain, and arthritis; hence, early diagnosis is needed to prevent mortality and morbidity.<sup>2</sup> It will spread most commonly by percutaneous inoculation but also through inhalation and aspiration. It can present as an acute or chronic infection depending upon the mode of transmission, inoculation dose, virulence property, and host risk factors. Here, we described a case of melioidosis presenting as a septic embolus with septic arthritis in systemic involvement.

## Case Report

A 20-year-old male patient, who is a vehicle mechanic with no known comorbidities and no addiction, presented with complaints of fever for 15 days, which was intermittent, associated with evening rise of temperature, chills, and rigor. He had bilateral knee, ankle, and left elbow joint pain and swelling not associated with skin rashes. He also had a cough with whitish expectoration. He did not have a history of loss of appetite and weight. He had trauma 6 months back. He did not have a history of pulmonary tuberculosis or anti-tuberculous drug intake.

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On examination, the patient was febrile, and the bilateral knee, ankle, and elbow were tender. Oxygen saturation was 99% on room air, blood pressure was 110/70 mmHg, respiratory rate-22/minute, and heart rate-112/minute. On chest auscultation, bilateral normal vesicular breath sounds were heard with left infra-axillary area, and fine crepitations were heard.

Chest X-ray showed left lung lower zone non-homogenous opacity with air-fluid level, suggestive of necrotizing pneumonia (Figure 1). Contrast-Enhanced Pulmonary Angiogram (CTPA) with resolution computed tomography of the thorax showed peripheral wedge-shaped consolidation with internal areas of breakdown noted in the lateral basal segment of the left lower lobe; multiple solid and cavitating nodules are scattered in both lungs, suggestive of septic emboli (Figure 2a,b).

Ultrasound examination of the left knee showed a 5mm thick anechoic suprapatellar effusion with no internal moving echoes noted. The left elbow showed a 15 mm thick hypoechoic effusion, and internal septations were noted. Hence, a left elbow arthrotomy with lavage was done. The left knee effusion was aspirated. Immediately after taking a blood culture, the patient was started on piperacillin, tazobactam, and vancomycin. In view of suspecting septic emboli, an ultrasound was done to rule out liver, spleen, and renal involvement, which was normal, arterial and venous Doppler showed evidence of thrombus. The patient had on-and-off headaches during the hospital course. Non-Contrast Computed Tomography (NCCT) of the brain was taken, which was normal.

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Blood culture provisional report suggestive of *Burkholderia pseudomallei* (Figure 3); hence piperacillin-tazobactam was changed to meropenem. Procalcitonin was 52 ng/mL. *Burkholderia pseudomallei* grew in blood culture, bronchial alveolar lavage from left lung lower lobe, and aspirate from a joint culture, which was sensitive to ceftazidime, doxycycline, septran, meropenem, and imipenem. Hence, meropenem continued. Septran was added in view of joint involvement.

However, the patient developed a sudden onset of breathlessness and tachycardia, and room air saturation was 48% on room air; the patient was put on noninvasive ventilation. Arterial blood gas was suggestive of metabolic acidosis; hence, intravenous fluids were given. Still, the patient's oxygen saturation declined over a period of time; hence, the patient was intubated, but even after resuscitation, the patient did not survive and was declared dead.

## Discussion

Melioidosis is an endemic infectious disease mainly in Thailand, Northern Australia, Malaysia, Myanmar, Singapore, and Vietnam. It was noted sporadically in South India. Our patient worked as a mechanical worker; hence, skin abrasion may have been the route of spread from the environment. The incubation period may vary from days to years. Clinical presentation of *Burkholderia* infection depends upon climate change because of the saprophytic organisms.<sup>3</sup> *Burkholderia pseudomallei* infection has a varied spectrum of disease outcomes, like

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asymptomatic seroconversion, acute or chronic disease, or latent infection. In our case, the patient was an adolescent boy from South India. Melioidosis is common in patients with underlying risk factors like diabetes, alcohol use, chronic kidney disease, and chronic lung disease, but this patient did not have any risk factors.<sup>4</sup> Our patient presented with bilateral knee and left elbow aseptic arthritis and left side necrotizing pneumonia with bilateral all lung lobes cavitating nodules; hence, more common organisms like staphylococcus were suspected for septic emboli, and the patient was empirically started on vancomycin, piperacillin-tazobactam. But, surprisingly, *Burkholderia pseudomallei* grew in blood and joint aspirate.

Usually, in chest imaging, melioidosis will present like consolidation, cavity, lung abscess, and rarely pleural effusion, but in our patient, the imaging was suggestive of septic emboli, which can be due to fulminant septicemia.<sup>5</sup> Respiratory system involvement, especially of the upper lobe, is a common site; hence tuberculosis should be ruled out. In our case, the patient presented with left lung lower necrotizing pneumonia, with bilateral scattered cavitating nodules. In melioidosis, the most common joint involvement is of the knee, followed by the ankle, but, in this case, the left elbow was mainly affected, followed by the bilateral knee.

Diagnosis is most commonly obtained from sputum, blood, abscess fluid, urine, and throat swabs. This patient was diagnosed by blood culture and joint aspirate culture.<sup>6</sup> Melioidosis is difficult to treat, and response to treatment is often not satisfactory, so increased numbers in mortality were noted in melioidosis.<sup>5</sup> Early diagnosis and treatment are mandatory to decrease

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mortality. Even though melioidosis is such a common infection in our country, it is still underdiagnosed due to the wide spectrum of manifestations and disease entities.

Moorthy *et al.* (2020) reported a case of septic arthritis due to melioidosis, without other system involvement and septicemia.<sup>7</sup>

## **Conclusions**

Even though melioidosis is not endemic in India, in case of septic embolism, we have to suspect *Burkholderia pseudomallei* beyond common staphylococcal infection. Burkholderia infection is difficult to diagnose because of the wide spectrum of presentations, from asymptomatic to fulminant sepsis. Melioidosis not only occurs in patients with underlying risk factors but also without risk factors. Even though mortality is high in the case of fulminant sepsis, early diagnosis and early administration of combined antimicrobial therapy are important to prevent mortality.

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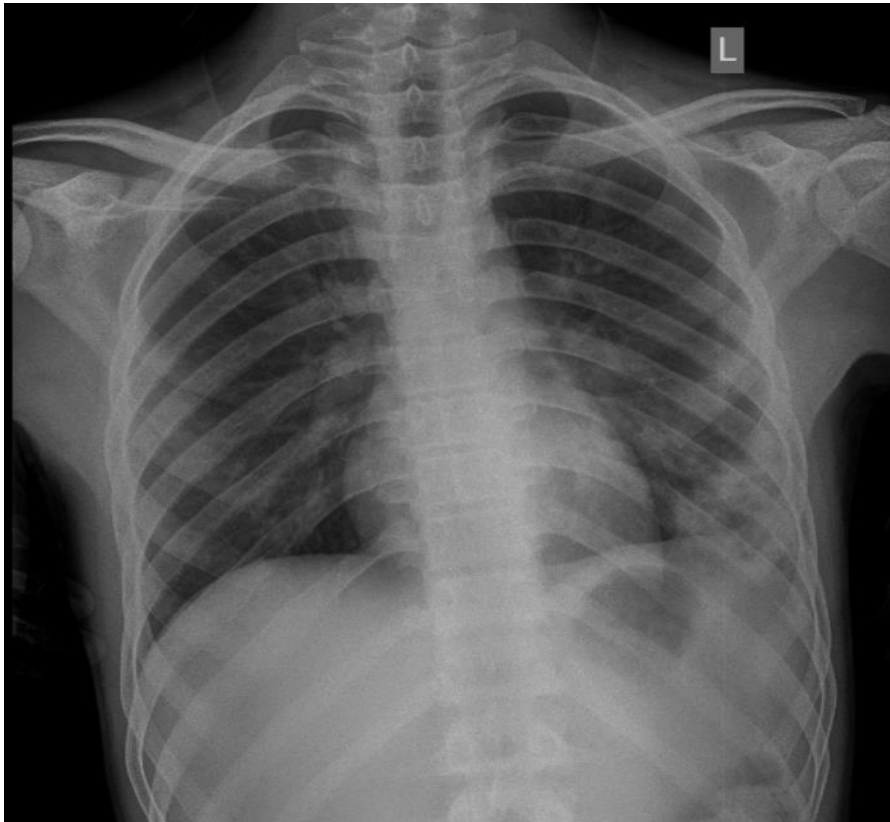
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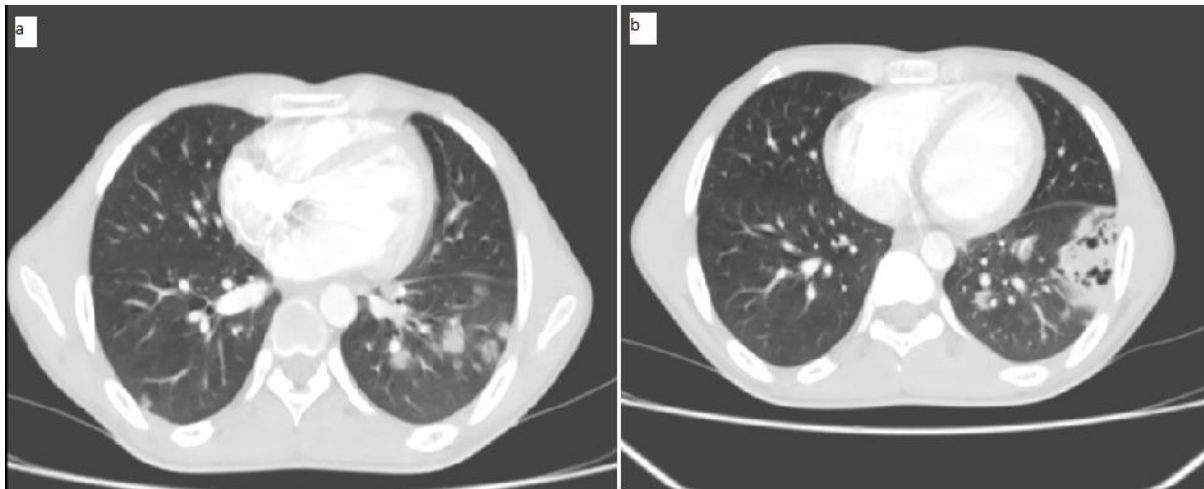


**Figure 1.** Chest X-ray Posterior-Anterior (PA) view - left lung lower zone non-homogenous opacity.

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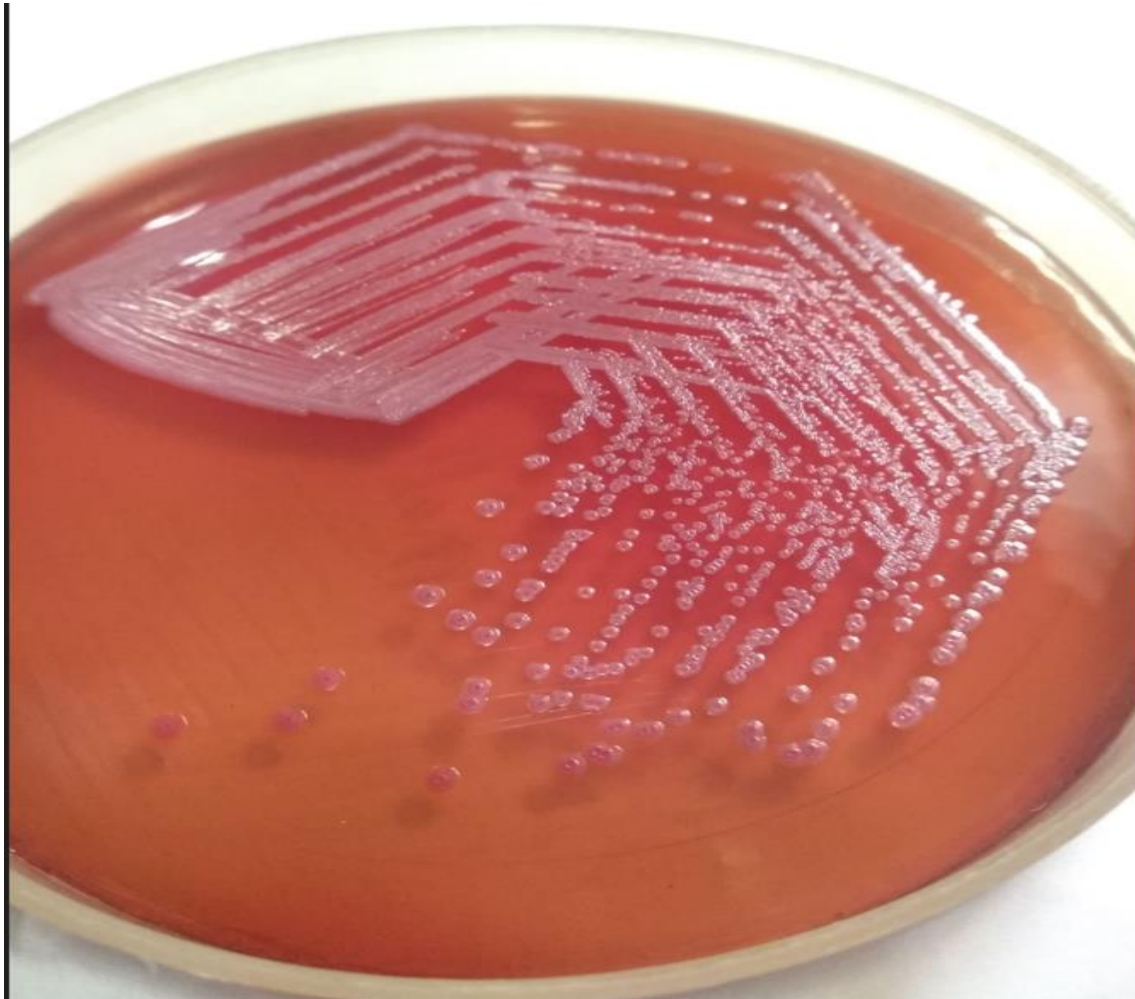


**Figure 2.** a) Contrast-Enhanced Pulmonary Angiogram (CTPA) - multiple solid and cavitating nodules with feeding vessels; b) left lung lower lobe peripheral necrotizing consolidation.

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**Figure 3.** Blood Culture (Macconkey Agar- *Burkholderia pseudomallei* grown).

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