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Melioidosis septic arthritis with systemic dissemination: A case report

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Melioidosis is an infection caused by *Burkholderia pseudomallei* known to be endemic in large portions of Asia, Sub-Sahara, and North Australia. Despite its endemicity in Malaysia, prompt diagnosis and subsequent treatment remain elusive especially in the more peripheral medical centres. This coupled with increasing risk to the population because of worsening climate crises renders early recognition and treatment more justifiable than ever. Here we present a case of melioidosis septic arthritis with systemic dissemination and discuss the factors involved in disease contraction, worsening prevalence, and diagnostic methods.

Keywords: *Melioidosis, B.pseudomallei, septic arthritis, systemic dissemination.*

Introduction

Melioidosis is an infectious disease caused by *Burkholderia pseudomallei*; an environmental Gram-negative bacillus found in contaminated soil and water[1] which can infect humans and animals through inhalation, ingestion, and inoculation, first described in Burma (now Myanmar) in 1912,[2] then Malaya in 1925.[3] It has since been considered endemic in at least 45 countries, predominantly in Asia, Sub-Sahara, and Northern Australia regions.[4-7]Additionally, case importation into non-endemic countries is fast gaining ground.[4,5]

The infection is estimated to affect 5.0 per 100,000 population per year in endemic countries.[4] In Malaysia, actual numbers are not readily known because melioidosis is not required by law to be notifiable under the Preventable and Control of Communicable Diseases Act 1988 (Act 342)[8,9] although Pahang, a particularly endemic state within Peninsular Malaysia, did report an incidence of 6.1 per 100,000 population in 2003.[9] The disease is endemic in the Northern states as well.[8] Clinical presentation is highly varied, earning this infection the monicker, "the great imitator": from localized to systemic and disseminated disease. Here, we describe a patient who contracted melioidosis septic arthritis of the knee joint with subsequent systemic dissemination.

Case report

A 30-year-old male with newly diagnosed type 2 diabetes mellitus was referred to Hospital Tuanku Jaafar Seremban, a tertiary hospital in Negeri Sembilan, Malaysia, from a district hospital after presenting to their emergency department with complaints of intermittent high-grade fever, breathlessness and worsening right knee pain and swelling for the past one month. He had initially been treated twice as an outpatient with oral non-steroidal analgesics for "non-specific arthritis". Associated symptoms included lethargy, chills and rigor, anorexia, and diarrhoea. He denied any trauma, nor any other significant social history. The patient had worked in a variety of odd jobs since stopping school at age 13, one of which being involved in palm oil agriculture for ten years until he was 24.

Clinically, the patient was tachypnoeic with respiratory rate of 30 breaths/min, SpO2 93% at room air, and febrile (39.2°C). He was tachycardic with a heart rate of 111 beats/minute, blood pressure 116/67 mmHg, and a random blood glucose of 16.0mmol/L. The right knee was swollen and erythematous, warm to touch with severe tenderness and effusion on palpation, and limited range of motion. A summary of preliminary laboratory findings is given in Table I.

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Table I. Summary of relevant preliminary laboratory findings

LABORATORY TESTS	RESULTS	REFERENCE VALUES
White cell count	12.4 x 10^3/µL Monocyte 1.2 x 10^3/µL Neutrophil 10.5 x 10^3/µL	4 – 10 x 10^3/µL 0.2 – 0.8 x 10^3/µL 2 – 8 x10^3/µL
Haemoglobin	11.2g/dL	13 – 17g/dL
Platelet	100 x 10^3/µL	150 – 400 x 10^3/µL
Aspartate transaminase	98U/L	5 – 30U/L
Bilirubin	3.4µmol/L	0 – 6µmol/L
C-reactive protein	189.56mg/L	< 5mg/L
Leptospirosis IgM	Negative	Negative
Dengue NS1. IgM and IgG	Negative	Negative
Covid-19 rapid test	Negative	Negative
Serology for HIV Hepatitis	Negative	Negative
Anti-cyclic citrullinated peptides (anti-CCP)	Negative	Negative
Rheumatoid factor	Negative	Negative

X-ray of right knee joint showed soft tissue swelling and possible effusion (Figure I). Ultrasound of the abdomen revealed hepatosplenomegaly, with liver span of 18.6cm and spleen measuring 16.2cm. Chest X-ray revealed bilateral consolidation of perihilar region, more prominent on the right. Computed tomography (CT) pulmonary angiogram revealed scattered patchy consolidation in both lungs with minimal right pleural effusion.

The patient underwent multiple arthrotomies on days 1, 7, and 13 along with washout and wound debridement. Blood, tissue and synovial fluid samples from the first two surgeries were taken for culture and sensitivity (C&S) using routine blood agar and MacConkey agar. All reported positive for *B.pseudomallei* sensitive to Amoxicillin-clavulanate, Ceftazidime, Doxycycline and Trimethoprim-Sulfamethoxazole. The total white cell count in knee synovial joint fluid was >1000x10^3/µL. These findings confirmed a diagnosis of melioidosis manifesting as right knee septic arthritis. Considering the systemic findings, a case of disseminated melioidosis was considered. The patient was started on IV Ceftazidime 2g QID and Tab. Sulfamethoxazole-Trimethoprim 400/80mg 4 tablets BD. Sinus pockets were found during the third procedure (D13) but culture from tissue samples showed no further bacterial growth. His surgical wounds were dressed in negative pressure wound therapy followed by povidone gauze packing. The patient improved clinically with complete remission of fever.

Our patient was admitted for a total of six weeks, the first week of which was in the acute intensive care unit for his breathlessness likely due to melioidosis dissemination to his lungs. His antibiotic regime was continued upon discharge with oral Sulfamethoxazole-Trimethoprim 4 tabs BD for the following 3 months.

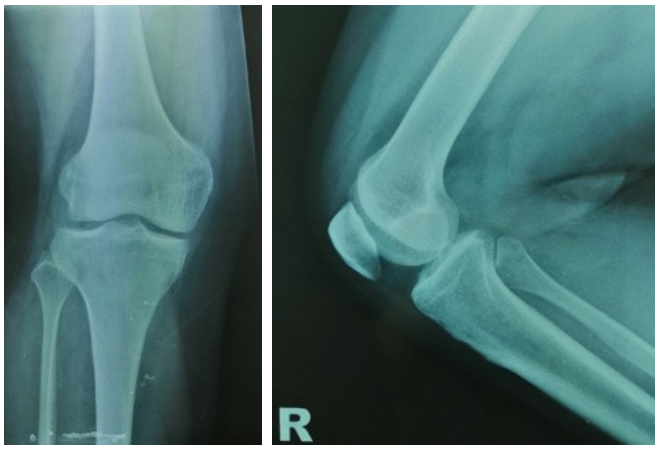

Figure I: Anteroposterior (left) and lateral (right) view of the right knee on the day of admission. Extensive soft tissue swelling was noted with effusion.

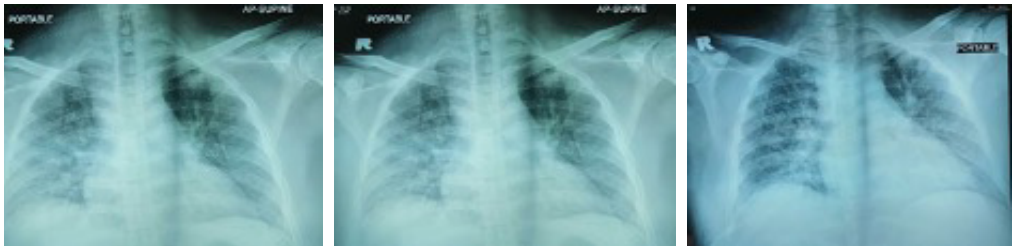

Figure II: Sequential portable supine chest radiographs on Day 1(left), Day 3 (centre), and Day 7 (right) of admission. Progressive increased interstitial and hilar markings were noted.

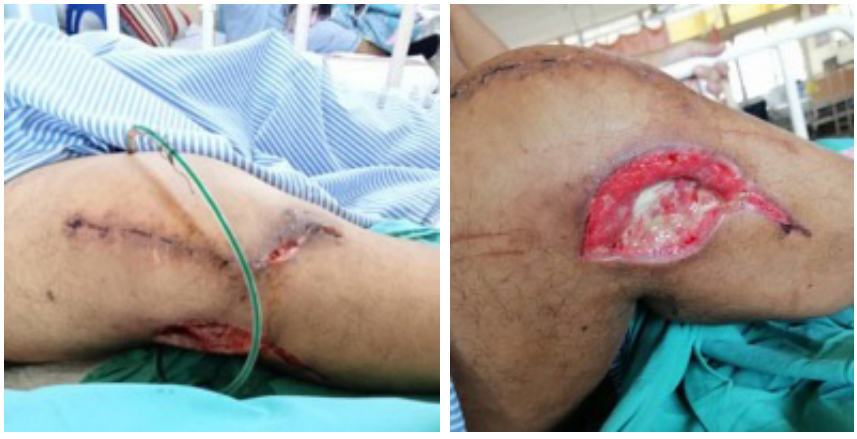

Figure III: Wound condition on Day 16 of admission after three arthrotomies (left). Wound condition on Day 28 of admission. Slough and pus discharge were much reduced (right).

Discussion

Melioidosis carries a high mortality rate unless recognized and managed promptly. Septic arthritis due to melioidosis is a rare but well-recognised manifestation of melioidosis. We encountered reports mentioning musculoskeletal manifestation ranging from 4.6% - 13.2%[7,8,10,11] of patients presenting with *B.pseudomallei* infection.

Our patient exhibited several risk factors for disease contraction. He previously worked in a palm oil plantation, the soil of which was typically sandy and/or silty clay, which drained poorly. This is prime grounds for *B.pseudomallei* habitation[4] and patient contact. With an incubation period of 1-21 days,[12] the organism is fastidious enough to remain latent in the body for up to 26 years.[1] The patient might have acquired the infection years prior, remaining silent until the patient inadvertently became diabetic three months prior to admission – thus, "activating" the disease onset.

Diabetes is a clear risk factor in melioidosis[1,6-11,13] with some authors placing this predisposing factor as occurring in 48% of patients with *B.pseudomallei* bacteraemia[14] and others estimating an increased risk of 100-fold.[7]

Our patient underwent multiple arthrotomy procedures and wound debridement before the progression was arrested. Multiple procedures were required as the wound for the knee joint continued to drain persistently. It is unlikely that antibiotics alone and/or wound dressings would have resolved such a deep-seated infection. We suspected the patient initially presented with localized melioidosis confined to the right knee joint, but the delay in treatment led to subsequent systemic dissemination and multi-organ involvement. He received the appropriate antibiotic treatment as suggested by multiple reports[1,9-12,15,16] with strong advice for compliance to prevent relapse.

Our intentions of highlighting this case are multi-fold: Firstly, despite the infection being endemic in Malaysia, there is still a lack of clear guidelines for diagnosis. The delay encountered in this patient is a testament to this. Clearly, greater efforts ought to be taken in both patient and healthcare professional education. Secondly, the return of eco-tourism since the lifting of COVID-19 restrictions places foreign and local tourists alike in danger of disease contraction, particularly in endemic countries such as Malaysia. Thirdly, climate change has made local rainy and monsoon seasons far more unpredictable and violent,[17] leading to flash floods and aerosolized bacteria,[7,11] placing susceptible persons at risk of inhalation, inoculation, or ingestion of the organism. Consequently, rescue workers during flood relief efforts are at risk as indicated by reports of melioidosis-related deaths.[9,10] Finally, co-infection with Leptospirosis and scrub typhus is a particular problem in areas with *B.pseudomallei* endemicity[9] and appropriate prophylaxis and personal protective equipment ought to be mandatory.[8,9,16]

The gold standard in diagnosis remains the isolation of the organisms from adequately and appropriately collected specimens. However, isolation and identification of *B.pseudomallei* may take up to several days, perhaps more if crucial specimen handling techniques are not observed[1,18] leading to diagnostic and treatment delays. One way of overcoming this limitation is with serology. Despite the possibility of cross reactivity, it is particularly useful for culture-negative cases.[11,16,18] However, serology for *B.pseudomallei* is currently only available to certain tertiary centres in Malaysia. More extensive availability of this diagnostic tool coupled with increased awareness of disease manifestation amongst medical personnel is required to combat this hardy organism.

Conclusion

A case of melioidosis septic arthritis leading to disseminated disease deserves mention because it highlights the necessity of due diligence in disease recognition and prompt treatment. The endemicity of *B.pseudomallei* in Malaysia and other Southeast Asia countries will most probably rise due to ongoing climate change which has led to more frequent and deadly floodings and aerosolized bacteria, placing the public, rescue workers and other ancillary personnel at risk. The availability of bacterial culture, serological test and increased awareness in more peripheral health facilities will help control this endemic infection.

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