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Melioidosis Bacteremia: A Post Flood Disaster Case Report

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Abstract

Melioidosis caused by *Burkholderia pseudomallei*, a gram negative soil saprophyte was first described by Whitmore and Krishnaswami in 1912. The term melioidosis was coined in 1921 by Stanton and Fletcher and is derived from the Greek word "melis" meaning "a distemper of assess" and "eidos", resemblance. This was because the disease clinically and pathophysiologically resembled glanders, a chronic and debilitating disease of equines caused by *Pseudomonas mallei*.

Keywords: Melioidosis; Bacteremia; Post flood disaster; *Burkholderia pseudomallei*

Case Report

A 33 year- old - Malay gentleman was presented to our emergency department in May 2015 with a chief complaint of on and off low grade fever of 3 weeks duration. It was associated with 2 weeks history of lethargy and poor oral intake, nausea, vomiting, diarrhea and 1 week history of abdominal pain. He was initially treated as acute pharyngitis at an outpatient clinic and was given oral amoxicillin. He went again to a local clinic and noted that during this visit his capillary blood sugar was high (27 mmol/L). He was advised to go to the hospital but he refused. His condition worsened on the day of admission as the patient became more lethargic and thus brought to the hospital by his family members [1,2].

Further history from family members revealed that patient had been having polydipsia and polyuria for some time before. He has no known previous medical illness. There were no dengue cases in his living area. There were no history of recent jungle trekking, swimming in the river and lakes or travelling. Upon admission, the patient was drowsy with Glasgow coma scale of 10/15 (E3V2M5).

He was dehydrated. His temperature was 40.50C, blood pressure was 115/60 and tachycardic. His capillary blood sugar was 25.6 mmol/L. Physical examination revealed bronchial breathing and coarse crackles over right lung on auscultation. His respiratory rate was 18 breaths/min. There were no hepatosplenomegaly. There was no neck stiffness. Other physical examinations were unremarkable.

Initial blood investigation revealed bicytopenia with normal total white count. There was compensated metabolic acidosis with respiratory alkalosis. Blood ketone was 4.9 mmol/L. Renal function test revealed raised urea and creatinine level. Liver function test results showed transaminitis with normal ALP level, raised LDH and hyperbilirubinemia, predominantly conjugated bilirubin. Creatine kinase was elevated (10831 u/L). Leptospira IgM was negative. HbA1C taken on admission was 12.5%. Chest radiograph showed heterogenous opacity over right lung field (Figure 1).

Preliminary diagnosis was of diabetic ketoacidosis precipitated by sepsis with possible source from partially treated community acquired pneumonia. Our differential diagnosis was leptospirosis complicated by septic encephalopathy, acute kidney injury and transaminitis. Patient was started on insulin infusion as per local protocol and IV ceftriaxone 2 gm OD.

On day 2 of admission, patient deteriorated further. He developed respiratory failure with hypotension. The patient was then intubated for airway protection and was on inotropic support. IV meropenem and C-penicillin was started. Shortly afterwards, he developed cardiac arrest. Cardiopulmonary resuscitation was commenced. The patient succumbed after 30 minutes of active resuscitation. Cause of death was decided as septicemic shock with multiple organ failure. Blood culture taken on admission revealed *Burkholderia pseudomallei*.

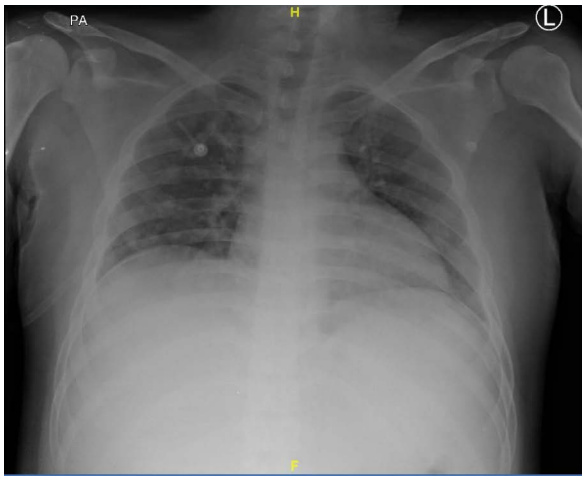

Figure 1: Chest radiograph.

Discussion

Melioidosis is caused by the gram-negative bacillus, *Burkholderia pseudomallei*. It is endemic in Malaysia, Thailand, Singapore and Australia. A study in Pahang, Malaysia has shown the incidence of this infection is comparable with that in northern Thailand which is 6.1 per 100,000 populations per year [3]. It is a disease which involves all age groups but commonly occurring in people between ages of 40 to 60 years and is related to farming. In Malaysia and Singapore, melioidosis commonly occurs in patient with diabetes mellitus. In our patient diabetes was an incidental finding during the course of investigation. Vidyalaxmi et al. [4] found a correlation of 76% of diabetes with Melioidosis. Two commonest modes of transmission are inhalation

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of contaminated dust and direct entry of the organism into blood stream via very minor wounds or skin abrasions [4]. Other modes of transmission are aspiration and ingestion of contaminated water. Incubation period is usually 1 to 21 days but can be as long as months and even years. It is important to note that the state of Kelantan faced the worst flood disaster in history

during late December 2014 [5]. Thus, there is increased possibility of exposure to the microbe in this particular case as this environmental soil saprophyte can be carried by flood water from endemic rural region to urban living areas. It has been recognized that *B. pseudomallei* behaves as an opportunistic pathogen. Exposure to the organism is widespread yet disease is not that common. Predisposing conditions or diseases include diabetes mellitus (most common), chronic lung disease, chronic renal failure and liver disease, corticosteroid therapy, thalassemia, HIV, SLE, malignancy and alcoholism. Clinical presentation can be variable, ranging from acute presentation with rapid progression and death to a chronic and relapsing course. Among clinical presentations, pneumonia is the commonest. Other presentations include septicemia, pyrexia of unknown origin and musculoskeletal melioidosis. Rare presentations include pyopericardium, mycotic aneurysm, psoas abscess and periorbital cellulitis.

A definitive diagnosis is made by culturing the organism from any clinical sample. Attention should be paid to history of travel to endemic areas in returned travelers. A complete screen should be performed on all patients with suspected melioidosis which includes blood, sputum, urine, throat swab and aspirated pus. Culture is done using blood agar as well as Ashdown's medium. Ashdown's medium, a selective medium containing gentamicin, may be

required for cultures taken from non-sterile sites. Serology investigation include indirect fluorescence antibody titre (IFAT) for IgM antibody with positive titre equal or more than 1:80. However, for patients from endemic who are asymptomatic, titre as high as 1:160 may not be significant. Nevertheless, it is recommended to follow up and monitor these patients. Necessary imaging includes chest radiography, ultrasound abdomen (to rule out intraabdominal abscess) and CT brain (in neurological involvement). Abdominal CT scan should be considered to rule out miliary or micro abscesses which is not easily evident on ultrasound imaging. Treatment involves 2 phases [6]. The first phase is intensive/induction phase which include IV meropenem (25 mg/kg/dose, usual adult dose 1 g TDS, 2 gm TDS for CNS infection) or IV imipenem (50 mg/kg/day, usual adult dose 1 g TDS) in life threatening melioidosis; IV ceftazidime 100 – 200 mg/kg/day (usual adult dose 2 g TDS) in non-life threatening melioidosis.

Bactrim with folic acid should be considered as adjunct antibiotic for patients with severe infection and deep focal infection (bone, joint, prostate and neurologic involvement). Total duration of intensive therapy is at least 2 weeks. Deep infection extends the intensive therapy from 4 to 6 weeks. The second stage is the eradication phase. Preferred antibiotics are oral Bactrim (3-4 tab BD) plus oral doxycycline 100 mg BD. In patients intolerant to Bactrim or doxycycline or in pregnancy, oral amoxicillin/clavulanic acid (2 tabs of 500/125 mg TDS) can be used although the relapse rate is high. Folic acid 5 mg daily should be given to patients on Bactrim. Total duration of eradication phase is 5 months. Mortality due to melioidosis is extremely high especially in bacteraemic form. The overall mortality of bacteraemic melioidosis approaches 100% if untreated, but it can be reduced to 37 – 54% with optimal management and aggressive intensive care. Localised melioidosis has much lower mortality rate (4 -5%) [3]. Our patient presented with pneumonia, which was the commonest clinical presentation of meliodosis and yet, he succumbed because of delay in initiating the targeted antibiotic. Relapse and recurrent infections are not uncommon in melioidosis, especially in hosts who are immunocompromised, and occur in spite of appropriate and prolonged antimicrobial therapy. In Malaysia, the rate of relapse and recurrence was found to be approximately 13% Over a period of 5 years, an underestimate due to cases being lost to follow up [7]. Factors that influence the likelihood of relapse and recurrence include clinical severity at original presentation and the type and length of parenteral and oral antimicrobial treatment. Patients with severe infections have an overall higher risk of relapse than those with localized infections. The most important factor is non-compliance to eradication oral antimicrobial therapy.

Conclusion

Melioidosis is an important cause of sepsis in the tropics. Early recognition and initial empirical treatment for suspected cases reduce the rate of mortality of this often deadly illness. The disease remains greatly underdiagnosed in the tropics and hence to there is a need for greater awareness among healthcare providers and improved diagnostic microbiology services, which will enable early and rapid diagnosis and treatment to overcome the high mortality rates. This case was probably missed due to lack of clinical awareness and correct microbiological diagnosis. A high index of suspicion is needed for diagnosis due to its varied clinical presentations. More work is needed in identifying the distribution and incidence of melioidosis in Malaysia.

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