Liver Abscess Harbors Melioidosis: A Case Report on this Rare Finding in A Potentially Endemic Community

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Abstract

Introduction: Melioidosis among Filipinos may be underreported. The causative agent, *Burkholderia pseudomallei,* thrives in soil and water in tropical regions. Because our country thrives on agriculture as a source of livelihood, occupational exposure through farming needs to be recognized.

Case Presentation: We report a case of a 40-year-old male complaining of intermittent fever, progressive weight loss and jaundice for three weeks prompting consult. Whole abdominal ultrasound showed presence of a hepatic mass. Further evaluation using CT scan of the whole abdomen with contrast revealed multiple cystic hepatic nodules with wall/septal enhancement. He was admitted and was initially managed as sepsis secondary to a complicated intra-abdominal infection (liver abscess, pyogenic or amebic). Ciprofloxacin and metronidazole were started. Aspiration of the hepatic abscess showed many pus cells. Culture of the aspirate grew *Burkholderia pseudomallei,* sensitive to ceftazidime. Antibiotics were shifted accordingly. Defervescence ensued. Patient was discharged improved after two weeks of ceftazidime wo grams every eight hours given intravenously followed by a three-month oral course of cotrimoxazole 160mg/800mg tablet, two tablets every 12 hours and doxycycline 150mg capsule every 12 hours. On follow-up after three months, he had no recurrence of symptoms and was able to resume his usual work.

Discussion: Melioidosis is a disease of humans and animals that is geographically restricted to tropical countries since the organism thrives in soil and water. Symptom onset may be delayed due to the ability of the organism to produce latent infection. Isolation of *B. pseudomallei* from clinical specimens sent for culture and sensitivity testing is the diagnostic gold standard.

Conclusion: Melioidosis may present as an intraabdominal infection. A high clinical index of suspicion among those with occupational exposure to contaminated soil and water is important to promptly recognize and treat this infection.

Keywords: meliodosis, burkholderia pseudomallei, hepatic mass, case report

Introduction

Melioidosis is caused by a gram-negative, motile, aerobic, non-spore forming bacillus called *Burkholderia pseudomallei*. The disease is endemic in Southeast Asia and Australia, but has also been reported in the Middle East, India, and China. Both humans and susceptible animals contract the disease through direct contact with contaminated soil and surface waters particularly among those with skin abrasions.[1-4] Infection can also be acquired by inhalation of contaminated dust or water droplets and ingestion of contaminated water.[3-4] Health-related factors which increase the probability of acquiring the disease include impaired cellular immunity, leukemia/lymphoma, renal/liver disorders, alcoholism, parenteral drug abuse, trauma/surgical history, and hemoglobinopathies.[2]

The organism is resilient and capable of surviving hostile environmental conditions. The association between surface water and melioidosis is supported by the strong association with monsoonal rains and with exposure to surface water and mud, particularly with flooding of rice paddies and planting at the commencement of the monsoonal season.[3] Occupational exposure to contaminated soil and water has been reported as the number one risk factor[2,4] which puts farmers working in fields at risk to have melioidosis. Without a heightened index of suspicion, this disease may potentially be missed. Patients may be initially asymptomatic, or present with findings similar to pulmonary tuberculosis such as chronic cough, fever, hemoptysis, night swears, and cavitary lung disease.[6] This can also present as a skin ulceration with associated lymphangitis and regional lymphadenopathy.[6]

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Furthermore, this organism is a potential bioterrorism weapon. The United States Centers for Disease Control has included *Burkholderia pseudomallei* as a Category B agent,[5,7] which is a classification for organisms that are moderately easy to disseminate. Its intrinsic antibiotic resistance, wide host range and potential to cause high mortality have been cited in one clinical microbiology review.[3]

Case Presentation

We report a case of a 40-year-old male, known insulin-requiring diabetic, poultry owner who presented with a three weeks history of intermittent fever, progressive weight loss and subcutaneous nodules each on the forehead, bilateral thighs and left leg. Unrecalled antibiotics were given with a slight decrease in size of the nodules with eschar formation. Persistence of symptoms associated with jaundice a week prior to admission prompted consult with a physician. Abdominal ultrasound showed a hepatic mass at segment 6 with unremarkable sonogram of the other organs. An abdominal CT scan showed fairly large clusters of multiple hepatic cystic nodules at segments 5/6 with septal/wall enhancement without enlarged lymph nodes. Patient was referred to our institution for further management.

On admission, patient was conscious, coherent and tired-looking. He had intermittent, moderate grade fever (Tmax 39°C). Blood pressure was 100/60 mmHg, heart rate was 100 beats/minute and respiratory rate was 25 breaths per minute. He had generalized jaundice and his abdomen was slightly distended and non-tender. The liver edge was smooth with a palpable edge approximately 2.5 cm below the right costal margin. Cardiovascular and pulmonary findings were normal on physical examination. Non-tender nodules on the right thigh and left leg, and an eschar each on the left thigh and forehead were noted.

He had no history of abdominal pain or discomfort. Abdominal ultrasound showed hepatomegaly with intact hepatic outlines, a complex predominantly cystic focus in segment 5/6 of the right liver lobe ~10.9x10.9cm and minimal ascites. Abdominal CT revealed hepatomegaly with ill-defined mixed attenuating complex mass (predominantly cystic) in segment 5/6 ~9.4x10.0x13.2 (Figure 1 and 2). Complete blood count showed leukocytosis (24,070/mm^3) and neutrophilia (84%). Alkaline phosphatase, total bilirubin and direct bilirubin were elevated. Liver enzymes, protime, partial thromboplastin time, hepatitis panel, Alpha-fetoprotein, aspergillus galactomanan antigen, and chest x-ray were normal. He was managed as sepsis secondary to complicated intra-abdominal infection (liver abscess, pyogenic versus amebic) with ciprofloxacin 400mg every 12 hours intravenously and metronidazole 500mg every six hours intravenously. Ciprofloxacin was shifted to cefepime one gram every eight hours intravenously due to remittent high

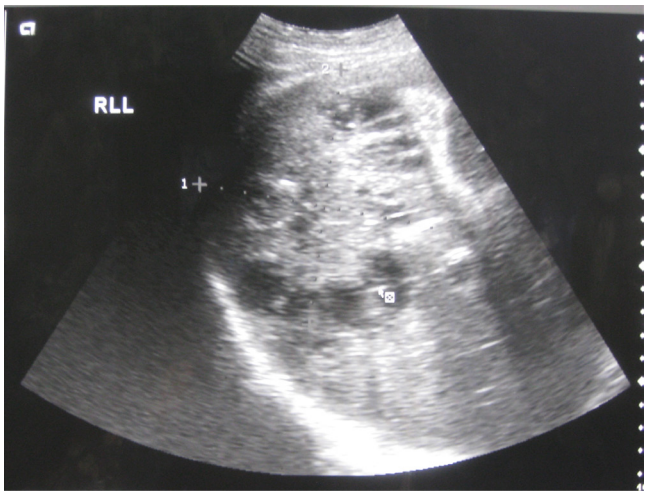

Figure 1. Ultrasound of the right hepatic abscess

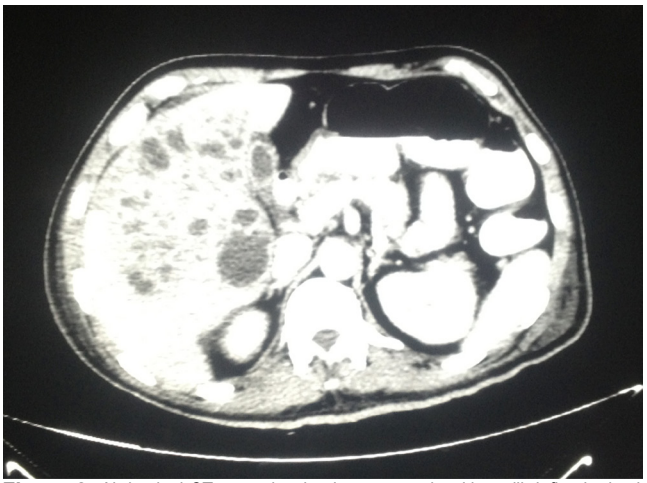

Figure 2. Abdominal CT scan showing hepatomegaly with an ill-defined mixed attenuating complex mass, predominantly cystic, on the right lobe of the liver

grade fever and increasing jaundice. Despite the findings on abdominal exam, patient never complained of abodminla pain.

Aspiration of hepatic abscess produced purulent material. Gram stain showed many pus cells but no organisms. Wet mount showed few RBC, moderate WBC, and no amoeba. AFB and TB PCR were negative. No fungal elements were seen. Cytology confirmed abscess formation. There was a decrease in the white blood cell count. (24.07mm^3→15.79 mm^3). However, patient continued to be persistently febrile (Tmax 40°C) prompting the attending physicians to shift the intravenous antibiotics to a more wider spectrum: imipenem 500mg every six hours and vancomycin one gram every 12 hours intravenously. On the fifth hospital day, culture grew *Burkholderia pseudomallei*, sensitive to ceftazidime and cotrimoxazole. Vancomycin was discontinued. Imipenem was shifted to ceftazidime two grams every eight hours intravenously. Alkaline phosphatase, bilirubin levels decreased and white blood cell count further decreased. Repeat ultrasound showed a thick-walled,

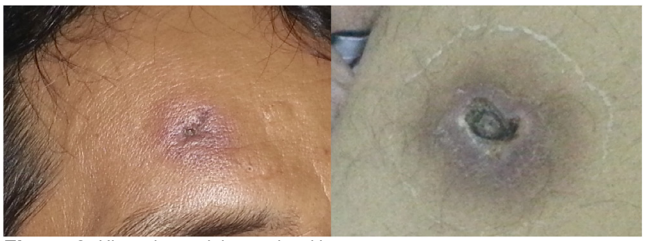

Figure 2. Ulcerating nodules on the skin

multi-septated hepatic abscess. Purulent viscious fluid was aspirated via pigtail catheter. Defervescence ensued. Eruption of the nodules on the forehead and thigh with ulcer formation was noted (Figure 3). He was discharged improved. A 14-day course of Ceftazidime was completed, followed by a three-month course of trimethoprim/sulfamethoxazole (cotrimoxazole) 160mg/800mg tablet, two tablets every 12 hours orally and doxycycline 150mg capsule every 12 hours orally. Patient followed up after three months with completed resolution of the nodules.

Discussion

Burkholderia pseudomallei is the causative agent of melioidosis, a disease of humans and animals that is geographically restricted to Southeast Asia and Northern Australia, with occasional cases in countries such as India and China.[1-5] Symptoms may be delayed due to the organism's ability to cause latent infections.[6-7] Incubation period ranges from as short as one to 21 days (mean of nine days) to as long as 62 years.[8-9] *B. pseudomallei* is known to thrive in soil and water of tropical regions. In the Philippines, the agricultural sector employs close to 32% of the country's total labor force of around 40.42 million[5], who are at risk due to potential exposure to the organisms in contaminated soil and water. Since our patient was a poultry owner in a farmland, we surmised inhalation with contaminated dust or droplets or contact with contaminated soil as the mode of transmission.

Isolation of *B. pseudomallei* from clinical specimenssent for culture and sensitivity testing is the diagnostic gold standard.[10] However, this has a low diagnostic yield and a heightened index of suspicion supported by ancillary tests is more useful to avoid late diagnosis. Complete blood counts may show anemia and leukocytosis. Coagulopathy and hepatic and renal insufficiency may be seen. Transaminitis may be suggestive of the presence of a hepatic abscess.

Treatment of melioidosis requires two stages. An intensive therapy with intravenous ceftazidime (50mg/kg/day up to two grams/day every six hours), meropenem (25mg/kg up to one gram every eight hours and imipenem (25mg/kg up to one gram every six hours) for at least 14 days continues to be recommended.[6,11] This is then followed by an eradication phase with oral trimethroprim-sulfamethoxazole (cotrimoxazole) or amoxicillin-clavulanic acid (if with allergy or contraindications to cotrimoxazole) to prevent relapse.[6,11]

Doxycline added to cotrimoxazole was previously recommended as what was given to our patient.[11] A randomized multi-center controlled trial in Thailand did not confirm the superiority of the addition of doxycline to cotrimoxazole.[12] Cotrimoxazole, without doxycycline, is now recommended on the basis of patient safety and tolerance.[12]

In our case, a major risk factor was diabetes mellitus. Poultry raising in agricultural farmland was a likely exposure since the patient reported sustaining abrasions while taking care of hispoultry which were raised in his farm. Though direct skin contact with contaminated soil can transmit the organism to humans, the abrasions increased the probability of entry of the organism. The ulcerated nodules and subcutanoues nodules were most likely from local infection of *B. pseudomallei*. Although cultures were not taken from these sites, these may have started as a localized form of melioidosis which progressed to a chronic form, eventually affecting the liver. Management after a positive culture followed standard of care as earlier mentioned.

The incidence of melioidosis in the Philippines is still not known. As of this writing, there has been one published case of melioidosis presenting as liver abscess on a Filipino.[13] This was on a 44-year-old malefarmer who had diabetes and complained of abdominal pain and fever for two weeks.[13] Since *B. pseudomalei* is known to thrive in tropical climates[1], the authors believe that there are several other underreported or unrecognised cases of melioidosis among Filipinos. By raising awareness of this condition and encouraging reporting of cases, the true incidence of melioidosis can then be determined.

Conclusion

Although uncommon, melioidosis may present as an intraabdominal infection. Since isolation of *B. pseudomallei* is not possible all the time, a thorough clinical and occupational history involving the patient's work or exposure in the agricultural sector is important, as the organism is transmitted through direct skin contact with contaminated soil or water, or by inhalation of dust contaminated with the organism. A complete medical history and physical examination, together with ancillary tests, are imperative to be able to promptly recognize and treat the infection to prevent morbidity or mortality.

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