

SUBDURAL EMPYEMA DUE TO *BURKHOLDERIA PSEUDOMALLEI*

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Burkholderia pseudomallei, the causative agent of melioidosis, is widely distributed in the soil and water within endemic areas, primarily in Southeast Asia and northern Australia.¹ It is a major cause of human morbidity and mortality in these areas.² In Northeastern Thailand, *Burkholderia pseudomallei* is one of the most common causative organisms of community-acquired septicemia.³ The clinical manifestations of melioidosis are protean, ranging from localized, benign infection to fulminant septicemia.³ Septicemic melioidosis occurs mostly in patients with underlying diseases, including renal failure, diabetes mellitus, steroid-treated systemic lupus erythematosus, and antineoplastic therapy.² Organ involvement in patients with septicemic melioidosis includes lungs, liver, spleen, joints, brain, skin, and soft tissues.² Intracranial involvement in patients with septicemic melioidosis is rare, and includes meningitis, encephalitis, and brain abscess.^{1,4} Subdural empyema as a manifestation of septicemic melioidosis has not been previously reported. We report a case of *Burkholderia pseudomallei* subdural empyema in a patient with septicemic melioidosis.

Case Report

A 45-year-old Indian male patient was admitted to Hamad General Hospital in September 1997, with fever, rigor and dry cough of four days' duration. The symptoms started a few days after returning from leave in India. His past history was unremarkable, apart from diabetes mellitus, for which he was taking oral hypoglycemic agents. Physical examination revealed an ill-looking patient, with a temperature of 39.5°C, pulse rate of 90 per minute, and blood pressure of 110/75 mm Hg. Otherwise his examination, including the central nervous system, was unremarkable. Laboratory investigations showed hemoglobin of 10.1 g/dL, white blood cell count 3200/mm³, and platelet 230,000/mm³. Blood film for malaria, HIV ELISA test, and blood culture were all negative. Random blood sugar was 24.3 mmol/L and chest radiograph on admission was normal. A presumptive diagnosis of enteric fever was made and

the patient was started on oral ciprofloxacin 500 mg every 12 hours. His diabetes mellitus was also controlled with insulin, but he continued to be febrile and sick.

Bone marrow examination revealed a hypercellular bone marrow, but there was no granuloma or evidence of malignancy. Bone marrow aspirate inoculated on two blood culture bottles, aerobic and anaerobic (BacT Alert-Organon Technica), grew gram-negative bacilli after 48 hours, which were oxidase positive, with tiny colonies which were identified by the Vitek machine (bioMerieux-France) as *Pasteurella haemolytica*. Five days later, the patient started to have focal seizure involving his left arm. Magnetic resonance scanning of the head was normal. He was given phenytoin and carbamazepine, which partially controlled his seizures. Later on, he developed generalized convulsion, confusion, disorientation, and tachypnea, so he was intubated and put on ventilator. His chest radiograph revealed bilateral lung infiltrates. Antibiotics were changed to amikacin, ceftriaxone, and vancomycin. Bronchial wash and bronchoalveolar lavage as well as blood culture grew *Pasteurella haemolytica*. As this organism is a rare human pathogen, a repeat identification by Vitek and by API 20NE (bioMerieux) was tried. The Vitek gave an unidentified organism, while API 20NE identified the organism as *Burkholderia pseudomallei*. All the isolates were sent to Uni Lab in U.K., which confirmed it to be *Burkholderia pseudomallei*, which was sensitive to co-trimoxazole, ceftriaxone, and gentamicin, but was resistant to ciprofloxacin, ampicillin, and amoxicillin-clavulanate.

Previous antibiotics were discontinued and the patient was started on ceftazidime. He continued to be confused, and developed left-sided hemiparesis. Repeat CT scan of the head revealed subdural collection in the right fronto-parietal region (Figure 1). Surgical evacuation yielded pus, which grew *Burkholderia pseudomallei*. Trimethoprim sulfamethoxazole was added. The patient had a prolonged hospital course with gradual improvement in his condition, and was discharged home after 70 days of hospitalization on oral trimethoprim-sulfamethoxazole and cefuroxime, which were given for another four months.

Discussion

This study illustrates many important features of melioidosis. The first feature is the marked variability in the presentation of melioidosis, for which it has been termed

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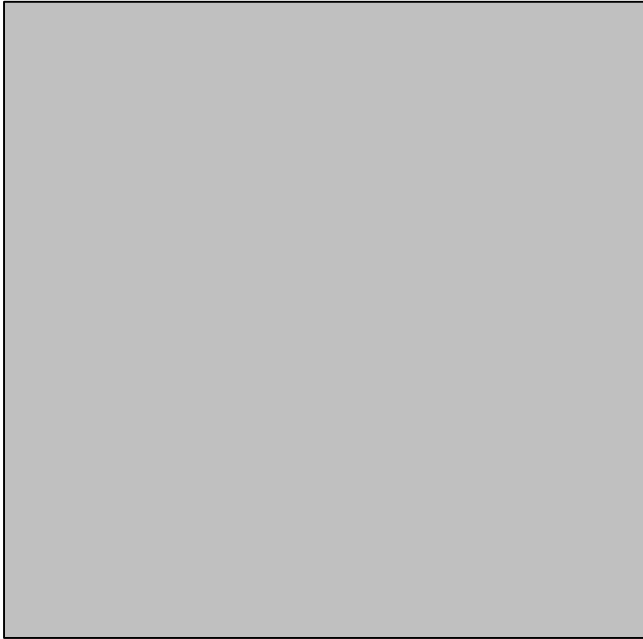


FIGURE 1. CT scan of head showing subdural collection in the right frontoparietal region (arrow).

“the great imitator” of every infectious disease, as every organ can be affected. Melioidosis is an important cause of fever of unknown origin.¹ Our patient presented initially as a case of fever of unknown origin, which then progressed to septicemia with multisystem involvement. Second is the importance of diabetes mellitus as a predisposing factor for melioidosis, a factor which has been documented in many studies²⁻⁴ and was demonstrated in our patient. Third is the frequently encountered difficulty in identification of *Burkholderia pseudomallei*, the causative agent of melioidosis. The organism may be overlooked or reported as *Pseudomonas* species, *Haemophilus* species, or other gram-negative organisms.^{1,5} The reason for this difficulty is the unfamiliarity of many laboratory personnel with the organism, and the inability of many of the commercially available test kits to identify *B. pseudomallei* accurately. Good techniques of specimen collection, awareness by the clinician, and clear communication with the microbiologist are essential for proper identification.¹ The organism was identified initially in our patient as *Pasteurella* species, however, it was confirmed later to be *Burkholderia pseudomallei*.

An interesting feature in our patient was the development of subdural empyema, from which *Burkholderia pseudomallei* was isolated. Although central nervous system involvement in patients with melioidosis has been reported, it is a rare occurrence, and includes meningitis, brain abscess, and encephalitis.^{1,4} To our knowledge, subdural empyema due to *Burkholderia pseudomallei* has never been reported before, therefore, our patient represents the first case report. Subdural empyema is a suppurative process in the subdural space. The infection gains entry to the subdural space from

the paranasal sinuses, or less often from the middle ear and mastoids,² and in 5% of cases the infection is metastatic.² We believe that the source of infection in our patient was metastatic spread from the lung.

The clinical features in patients with subdural empyema include headache, fever, vomiting, and altered sensorium. Late findings include focal seizures and hemiplegia. Diagnosis is established by demonstrating the empyema by the use of CT scan or magnetic resonance imaging of the head. Treatment requires both drainage of the pus and intravenous antibiotics guided by culture and sensitivity results.²

Septicemic melioidosis is associated with a very high mortality of about 90%.² Luckily, the outcome in our patient was good despite the early deterioration with multisystem involvement, and development of right-sided hemiparesis. This was probably related to the use of appropriate antibiotics and surgical drainage of the subdural empyema. Although *Burkholderia pseudomallei* is usually sensitive *in vitro* to many antibiotics, including tetracyclines, chloramphenicol, third-generation cephalosporins, imipenem, and trimethoprim sulfamethoxazole,^{6,7} the choice of antibiotics should be directed by sensitivity testing. Antibiotics are given initially parenterally for two weeks, followed by oral treatment for six months.² Whether the presence of subdural empyema changes the duration of treatment is not known, since there is no literature on this. In our patient we chose to give antibiotics for a total of six months.

The fact that this is the first case of melioidosis seen in the last 17 years in our hospital, which is the only hospital in Qatar, despite the large number of expatriates from the Indian subcontinent and Southeast Asia, raises some concern. Since melioidosis involving the lungs can easily be confused with pulmonary tuberculosis, which is a very common disease in Qatar, it may be that some cases of melioidosis are being missed and are being treated as tuberculosis. This issue has to be looked into in the future.

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