ORIGINAL ARTICLE

Epidemiology and clinical presentation of patients with melioidoisis at the District General Hospital, Chilaw

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Abstract

Background:
Melioidosis is emerging in Sri Lanka. Clinical presentation is variable. Underlying risk factors include diabetes.

Objective:
To describe the epidemiology of patients with culture confirmed melioidosis presenting to the District General Hospital, Chilaw between 2014-2017.

Method:
Melioidosis was diagnosed in the microbiology laboratory by culture of *Burkholderiapseudomallei*from patients' specimens. Isolates were confirmed by polymerase chain reaction (PCR). Antibodies were detected using the indirect haemagglutination assay (IHA). Epidemiological data were collected from patients using a questionnaire.

Results:
Culture positive melioidosis was found in 15 patients. Melioidosis was more common in males and in adults. Clinical presentation was variable. Diabetes was the most important underlying risk factor. The case fatality rate was 40%.

Conclusions:
This case series demonstrates that melioidosis is endemic in the North Western Province and is an important cause of community acquired infection.

Introduction

Melioidosis is a potentially fatal infection caused by the **Gram negative, non-fermentative,soil** bacterium,*Burkholderiapseudomallei*. *B. pseudomallei*isan important cause of community acquired sepsis in Southeast Asia and Northern Australia [1]. Infection is acquired by inoculation of soil via breaches in the skin, inhalation of aerosolized soil or water or ingestion of natural sources of water containing the bacterium [2]. People with occupational exposure to soil, such as rice farmers, are at highest risk. However, any person exposed to soil and water containing the bacterium can be infected. Infection is morecommon in males, probably due to greater contact with soil. The commonest underlying risk factors for acquiring infection are diabetes mellitus and chronic kidney disease in adults and thalassaemia in children. Clinical presentation is variable, leading to difficulty in establishing the diagnosis. Relapses may be seen, months to years after initial infection and follow up is mandatory [3]. Melioidosis has emerged as an important infection in Sri Lanka in the recent past [4]. The District General Hospital (DGH) Chilaw is situated in the North Western Province (NWP) of Sri Lanka where the majority of the population is engaged in agriculture and fisheries.

Case series

The Department of Microbiology, District General Hospital Chilaw, isolated *B. pseudomallei*from clinical specimens from 15 patients between May 2014 and December 2017. Nine isolates were identified from blood and six were identified from pus. The isolates were identified by their characteristic colony appearance on routine culture media, bipolar or "safety pin" appearance on Gram stain (Gram negative bacilli with densely staining ends and a pale centre), late oxidase positivity and unique antibiotic sensitivity pattern [5]. The colony appearance of isolates was variable, ranging from smooth to dry on blood agar and non-lactose fermenting to lactose fermenting on MacConkey agar. The earthy smell of colonies was prominent in some isolates. The identity of the isolates was confirmed by polymerase chain reaction (PCR) at the Department of Microbiology, Faculty of Medicine, Colombo [6].

Results

The age range of the patients was wide, ranging from one year and four months to 67 years. The majority of patients (n=10) were middle aged (between 45-65 years) while three were children (Table 1). Out of the 12 adult patients, eight were male. Nine had diabetes mellitus while other underlying risk factors included chronic obstructive pulmonary disease, chronic kidney disease, chronic liver cell disease and pathological alcohol use. None of the children had any underlying risk condition. There were no farmers in this case series but two housewives gave a history of soil exposure through gardening. One patient was exposed to soil and water when he fell into a drain. One gave a history of tooth extraction prior to contracting parotitis. No specific exposure to soil or natural sources of water could be elicited in the other cases.

Clinical presentations ranged from septicaemia (n=3) and lung infection (n=2) with a high mortality to localized abscess with good prognosis (n=7). Four patients presented with salivary gland abscesses and two with cervical lymphadenitis. Other presentations included liver abscess, splenic abscess, cellulitis, osteomyelitis and septic arthritis. The overall case fatality rate in this series was 40% (6/15).

All the patients were from the NWP (Figure 1), with the majority residing in the Puttalum District. Patients presented throughout the year and there was no seasonal preponderance.

Melioidosis antibody titers in blood, estimated using the indirect haemagglutination assay (IHA) [7], ranged from 1280 to >10,240.

Discussion

This case series demonstrates that melioidosis is endemic in the NWP and is a cause of community acquired infection, ranging from severe sepsis to localized abscess formation. The varying clinical presentations of melioidosis require that the clinician has a high index of suspicion and includes melioidosis in the differential diagnosis of a wide variety of community acquired infections in children and adults.

Although rice farming is the most prominent high risk occupation for acquisition of melioidosis, this case series shows that melioidosis may infect other persons, such as housewives, fishermen and even toddlers. A tradition of walking barefooted and drinking water from natural, untreated sources such as wells may contribute to increased risk.

Confirmation of the diagnosis necessitates bacterial culture of patient specimens or detection of high antibody levels. It is vital that patient specimens are submitted to the clinical microbiology laboratory early in the acute phase of the infection. It is likely that many cases of melioidosis remain undiagnosed due to failure to submit specimens for microbiology. This is particularly true in relation to suppurative lymphadenitis where biopsy specimens are often sent only for histology and not for bacterial culture.

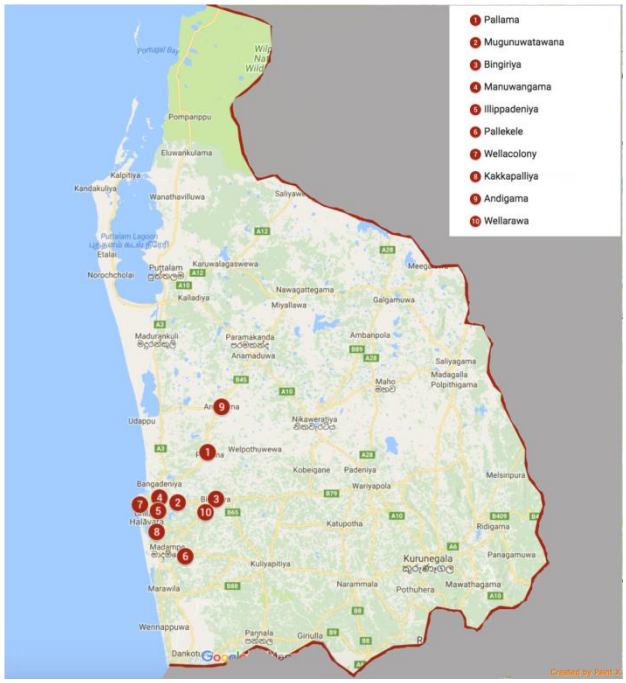
Rapid diagnosis is the key to early, effective therapy, which may reduce the high case fatality rate seen in this case series. The majority of patients, however, had a favorable outcome when treated appropriately (intravenous ceftazidime or meropenem for 2-6 weeks, with or without cotrimoxazole, followed by long term oral antibiotics during the eradication phase) [8]. Follow up to ensure compliance with the eradication phase and to detect relapses is recommended.

Similar to most studies, the most prominent underlying risk factor in this case series was diabetes. Effective, community-based diabetes detection and control may reduce the incidence and severity of melioidosis.

Table 1. Patients with melioidosis at DGH Chilaw between May 2014 and December 2017

Date of admission	Patient'slocation	Specimen	Age & Sex	Occupation, Risk factors and/ or Exposure	Clinical presentation	Outcome
May 2014	Bingirya	Pus from submandibular abscess	6y Male	Schoolboy	Submandibular abscess	Lost to follow up
May 2014	Wellarawa	Pus from chest wall abscess	65y Female	Housewife Diabetes	Chest abscess	Survived
June 2104	Pallama	Pus from cervical lymphadenitis	13y Male	Schoolboy	Cervical lymphadenitis	Survived
July 2014	Andigama	Pus from submandibular abscess	46y Female	Housewife Diabetes	Submandibular abscess	Survived
January 2015	Andigama	Blood	55y Male	Chronic Obstructive Pulmonary Disease, Fallen into a drain	Pneumonia	Death
December 2015	Kakkapalliya	Blood	49y Male	Diabetes	Lung abscess	Death
June 2016	WellaColony	Blood	59y Male	Fisherman Diabetes, Chronic kidney disease, Chronic liver disease	Osteomyelitis, Liver and splenic abscess	Survived
June 2016	Mugunuwatawana	Blood /Joint aspirate	67y Male	Retired Clerk Diabetes	Septic arthritis of ankle	Survived
July 2016	Pallama	Blood	65y Male	Diabetes	Fever for 7 days	Death after transfer to tertiary care hospital
July 2016	Pallekale	Blood	47y Male	Diabetes, Liver disease	Fever for 6 weeks Cellulitis of the lower limb, liver abscess, splenic abscess	Death
August 2016	WellaColony	Pus from submandibular abscess	33y Male	Fisherman Alcoholic	Submandibular abscess	Survived
August 2016	Pallama	Blood	63y Male	Liver disease, COPD	Septic shock	Death
April 2017	Bingiriya	Blood	1y 4m Female	Toddler	Fever for 10 daysAbdominal pain	Death 5 hrs after admission
September 2017	Manuwangama	Blood	53y Female	Housewife, Diabetes Gardening, tooth extraction	Parotitis	Survived
October 2017	Ilippadeniya	Pus	38y Female	Housewife,Diabetes,Gardening	Neck abscess	Survived

Figure 1. Geographic location of melioidosis patients from Puttalam District presenting to DGH Chilaw



Conclusion

It appears that melioidosis affects a broad range of the population of the NWP which is compatible with the rural, agricultural nature of the local lifestyle. It is recommended that information on melioidosis is disseminated to physicians, surgeons and paediatricians working in this high risk area.

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