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CLINICAL PROFILE OF MELIOIDOSIS IN A TERTIARY CARE HOSPITAL IN KERALA

General Medicine

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ABSTRACT

Background: Melioidosis also known as Whitmore's disease is an underreported infectious disease that is endemic to Thailand and parts of Australia. It is caused by the gram-negative bacterium Burkholderia psuedomallei and it has a varied clinical manifestation that can mimic common infections like Tuberculosis. **Aims and Objectives:** To analyze the clinical presentation, laboratory parameters and the treatment outcomes of all cases of Melioidosis presenting to a tertiary care hospital. **Methodology:** A descriptive cross-sectional study was conducted using the medical records of all culture proven patients of Melioidosis over a seven-year period from January 2016 to December 2022 **Results:** There were 14 males and 3 females in the series. All the patients had diabetes as a comorbidity, while 3 patients had chronic liver disease and 2 had chronic kidney disease. Majority of the patients presented as an acute febrile illness with either pulmonary involvement or abscess formation at different sites. **Conclusion:** Melioidosis is an underdiagnosed emerging infectious disease in South Asia that can have a varied clinical presentation. It should be suspected in patients with acute febrile illness with either pulmonary involvement or abscess formation especially with a background history of diabetes mellitus.

KEYWORDS

Melioidosis, Burkholderia psuedomallei

INTRODUCTION

Melioidosis is an infectious disease that is caused by the environmental gram-negative bacterium *Burkholderia psuedomallei* [1]. Also known as Whitmore's disease this infection was first recognized in 1911 by A. Whitmore in Rangoon [2]. Subsequently this infection has been reported from many tropical regions. Although this disease is endemic to Thailand and parts of Australia, it is believed to be widely underreported in other parts of the world [3]. The presentation of melioidosis is varied, involving multiple organ systems. Left untreated, it can result in a high morbidity and mortality.

AIMS AND OBJECTIVES OF THE STUDY:

To study the clinical profile, demographic profile, laboratory parameters and treatment outcome of all cases of Melioidosis in a tertiary care hospital

METHODOLOGY:

This was a cross-sectional descriptive study conducted in Believers Church Medical College Hospital, Thiruvalla, Kerala after getting approval from the Institutional Ethics Committee. All culture proven cases of Melioidosis between January 2017 and December 2022 were taken for the study. The data for the study was retrieved from the electronic medical records of the hospital.

The data which included the demographic, clinical, laboratory and treatment parameters were entered into an excel sheet. Descriptive statistical methods were used in evaluating the data. For continuous data, mean and standard deviation was calculated while for categorical variables, proportions were used.

RESULTS:

A total of 17 culture proven cases of Melioidosis from a seven-year period (2016 to 2022) were reviewed. 14 of these patients were male while 3 were female. The mean age of presentation was 54.11 years (standard deviation ± 9.7). The month of September had the maximum number of five cases while the rest of the cases were spread out over the other months of the year.

The presentation of each case is shown in table 1. Acute onset of fever was the presenting complaint in 11 cases of which 6 had evidence of sepsis and multiorgan dysfunction. 6 cases presented with pulmonary involvement characterized by cough and breathlessness with pulmonary infiltrates on imaging. 10 cases presented with abscess formation at different sites. Of these, 2 patients had abscess formation in the prostate (figure 1), 2 had abscesses in the neck (figure 2), 2 patients had multiple superficial abscesses, 1 patient was detected to have multiple abscesses in the liver and spleen (figure 3), 1 patient had bilateral psoas abscesses, 1 patient had acute paronychia of thumb with ascending abscess and 1 patient had an abdominal wall abscess at the site of insulin injection. Two patients had osteomyelitis of which one had non-healing osteomyelitis persisting for 20 months following a road traffic accident. 1 patient presented with culture positive urinary tract infection with sepsis.

All 17 patients had diabetes mellites. 3 patients had chronic liver disease while 2 patients had chronic kidney disease. 1 patient had reactive arthritis and autoimmune hemolytic anemia on treatment with steroids while 1 patient had a history of splenectomy.

The blood counts and inflammatory markers like CRP and ESR were reviewed. 6 patients had a total leucocyte count above 11,000/microliter. All patients had a differential neutrophil count above 70%. The platelet count was less than 1 lakh in 4 patients. Of these 3 patients had documented Chronic liver disease. The inflammatory markers were significantly raised in 14 patients.

The diagnosis of Melioidosis was established by cultures in all patients. The dry and wrinkled colonies in MacConkey agar (figure 4) is characteristic of *B. pseudomallei*. The identification and antibiotic sensitivity were performed in Vitek 2 systems. Blood culture was the lone source of diagnosis in 8 patients.

Two patients had *B. psuedomallei* growing from a site in addition to blood culture. One of these patients who had presented with urinary tract infection had positive culture from the urine while the other grew the bacteria from pus culture. In the remaining 7 patients the bacteria were isolated from pus cultures alone. All the strains were sensitive to meropenem, ceftazidime and cotrimoxazole. Sporadic cultures demonstrated resistance quinolones like levofloxacin and ciprofloxacin.

Of the 17 patients, 11 patients were initiated on treatment with Injection Ceftazidime while 4 patients were initiated on Injection Meropenem. Intravenous antibiotics were given for 2 – 4 weeks and followed by oral Cotrimoxazole for 1 to 5 months. Of the 2 remaining patients who had presented with abscess formation, 1 was treated with Amoxycillin – clavulanate while the other was treated with only oral cotrimoxazole along with the drainage of abscess.

12 of the 17 patients improved on treatment. 4 patients were discharged against medical advice while 1 patient expired from the illness.

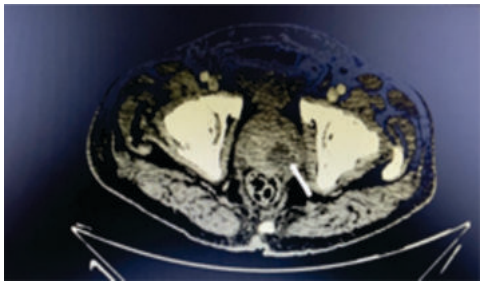

Fig 1: CECT abdomen showing enlarged prostate with a multiloculated cystic lesion with peripheral enhancement.

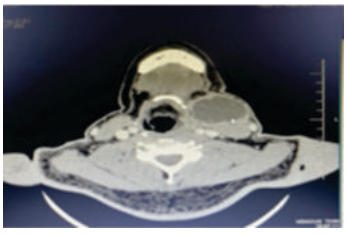

Fig 2: CT Neck showing a well-defined hypodense peripherally enhancing lesion in the left side of the neck, anterior to carotid, jugular vessels and sternocleidomastoid muscle.

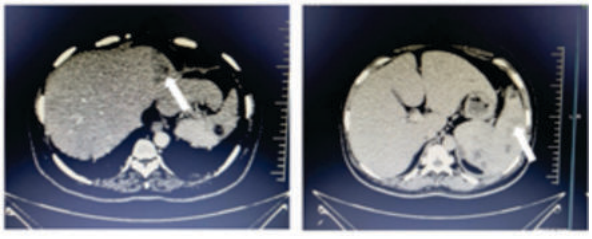

Fig 3: Contrast enhanced CT Abdomen showing hepatosplenomegaly with multiple hypoenhancing lesions suggestive of abscess formation.

Table 1: Showing the demographic distribution of the cases with the presentation and risk factors

No	Sex	Age	Presentation	Risk factors
1	M	43	Fever, Prostatic abscess	DM,AL
2	M	57	B/L Psoas abscess	DM
3	M	44	Fever with chills	DM,CLD
4	F	61	Multiple abscesses thigh, arm and back	DM
5	M	59	Neck abscess	DM,CLD
6	M	67	Fever, prostatic abscess	DM
7	F	55	Disseminated – Respiratory nodule, diffuse osteomyelitis, lower limb abscess	DM, RA, AIHA
8	F	35	Non-healing chronic osteomyelitis	DM
9	M	57	Abdominal wall abscess – injection use	DM,CKD
10	M	34	Neck Abscess	DM
11	M	59	Fever, cough, breathlessness, pneumonia, sepsis	DM
12	M	61	Breathlessness, fever, chills	DM,CKD
13	M	56	fever , dysuria	DM
14	M	51	Fever, cough, hepatic & splenic abscesses	DM,CLD
15	M	67	Fever, breathlessness, pneumonia	DM
16	M	59	Fever, cough, pneumonia	DM
17	M	55	Acute paronychia with ascending abscess	DM

(DM- Diabetes Mellitus, AL – Alcohol misuse, CLD – Chronic liver disease, RA – Reactive arthritis, AIHA -Autoimmune hemolytic anemia, CKD – chronic kidney disease)

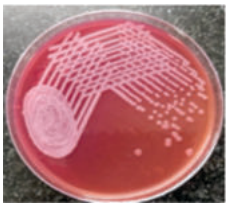

Fig 4: Dry wrinkled colonies (with metallic sheen) of *B. pseudomallei* in MacConkey agar.

DISCUSSION:

Melioidosis is an infectious disease that is caused by *Burkholderia pseudomallei*, an aerobic, non-spore forming, nonfermenting gram negative, saprophytic bacilli that is found in the rhizosphere, moist soil, and both surface water and groundwater[1]. Thailand and Australia have the highest reported rates of melioidosis worldwide. However, it is likely that the true global incidence of Melioidosis is grossly underreported especially in rural tropical regions that lack the awareness, resources and skills to rightly diagnose Melioidosis[4]. A modelling study conducted in 2015 estimated that there were 165,000 cases of melioidosis that would have resulted in 89,000 deaths worldwide that year. Further, this study claimed that the Indian Subcontinent accounted for 44% of the overall burden, because of large populations living in areas contaminated with *B. pseudomallei*[5].

Although Melioidosis has been reported in children, the peak incidence is between 40 and 60 years of age [6]. Our study also had a mean age of 54 years and a median incidence age of 57 years. Melioidosis has reported to present mostly in and around rainy season. In our study, 5 of the 17 cases presented in the month of September which in Kerala corresponds to the latter part of the monsoon rainy season. However, the remaining cases were distributed throughout the year. This may be due to the high frequency of intermittent rains that occurs throughout the year in this part of India.

Infection can result from one the following three modes. The first is from percutaneous inoculation (penetrating injury or open wound), the second is by inhalation (adverse weather or bioterrorism) and the third is through ingestion (contaminated food and water)[7]. In our case series two patients had a history that was suggestive of percutaneous inoculation as the mode of infection. The first had developed nonhealing osteomyelitis after a road traffic accident while the second had developed an abdominal wall abscess at the site of insulin injection. Six patients had pulmonary involvement suggestive of inhalation as the possible mode of infection.

Melioidosis is often referred to as 'the great mimicker' as its presentation is similar to many other common infections including tuberculosis [8]. In a 20- year prospective study from Australia, majority of the cases of melioidosis (85%) resulted in acute infections possibly from a recent bacterial exposure. In that study, majority of patients with acute melioidosis presented with sepsis with or without pneumonia, or localized abscesses, regardless of the route of infection, while chronic melioidosis (defined as a symptomatic infection that lasts >2 months), occurred in 11% of infected individuals [9]. In our case series, the presentation of Melioidosis varied from acute life threatening sepsis to indolent, chronic osteomyelitis. Majority of the patients (68.75%) presented as an acute febrile illness. Out of these, 6 patients had evidence of sepsis and multiorgan dysfunction.

Melioidosis was diagnosed by culture. The most common site from which *Burkholderia psuedomallei* was isolated was from the blood. However, in patients who presented with abscess formation the organism was isolated from pus cultures. In one patient with urinary tract infection and sepsis, the organism was isolated from the urine.

Ceftazidime has been the preferred antimicrobial agent in the treatment of Melioidosis since the late 1980s [10]. However, carbapenems like meropenem and imipenem have also been recommended in the initial treatment of acute severe Melioidosis [11]. In a 24-year review of severe Melioidosis in a tertiary care hospital in Darwin, Australia, a significant reduction of mortality rates was attributed to the availability of Meropenem and improved levels of ICU care [12]. In our case series, 12 of the 17 cases were initiated on treatment with Ceftazidime while 4 patients were initiated on Meropenem. All the cultures were exhibited invitro sensitivity to Ceftazidime, Meropenem and Cotrimoxazole.

Only 1 patient who had severe melioidosis with sepsis expired. However, 4 patients were discharged against medical advice for personal reasons. This may reflect on the financial implications of managing Melioidosis especially in resource poor settings.

CONCLUSSION:

Melioidosis is an emerging infection that has been estimated to be heavily under diagnosed in South Asia. It requires specific antibiotics like ceftazidime or meropenem that needs to be given for an extended period. Furthermore, failure to identify and treat Melioidosis in time

can prove fatal. Hence, Melioidosis should be considered in the differential diagnosis of fever with pulmonary involvement or abscess formation especially in a background of diabetes, chronic liver disease, chronic kidney disease and chronic steroid use. Considering the challenges in diagnosing and treating Melioidosis in developing countries due to laboratory and financial limitations emphasis should be given to prevention strategies.

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