

## Melioidosis: An emerging infection in India

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### Abstract

**Introduction:** Melioidosis is caused by *Burkholderia pseudomallei* which is endemic in South East Asia. Lack of proper microbiological services in many countries results in under-reporting of cases and the global burden of infection remains underestimated. This is a study to analyse the clinical presentation and risk factors for melioidosis in India.

**Materials and Method:** A retrospective study was carried out on ten culture proven cases of melioidosis in a tertiary care hospital in South India between January 2009 and December 2014.

**Result:** Ten cases were studied in five years of which nine were males. They had varying clinical presentations like loss of weight and loss of appetite(10%), fever(60%), headache(10%), abdominal pain(20%), joint pain(10%), weakness of limbs(10%), swelling of thigh(20%) and faecal and urinary incontinence(10%). The risk factors included diabetes mellitus (100%), alcohol consumption(90%)and tuberculosis(30%). All the isolates were sensitive to Ceftazidime, Piperacillin-tazobactam, Imipenem, Cotrimoxazole, Amoxicillin-clavulanate and Meropenem while only 80% were sensitive to Ciprofloxacin. Of the 10 cases, two expired and the rest responded to treatment.

**Conclusion:** Melioidosis is an emerging infection in India especially in males and diabetes and alcoholism are identified as the commonest risk factors. Control of the disease requires close monitoring, improved clinical laboratory standards and aggressive therapy.

**Keywords:** Melioidosis, *Burkholderia pseudomallei*, Diabetes mellitus, Fever, Alcoholism, Ceftazidime

### Introduction

Melioidosis is caused by *Burkholderia pseudomallei* which manifests as an asymptomatic infection, localized skin ulcer or abscess, chronic pneumonia mimicking tuberculosis or fulminant septic shock with abscess in multiple internal organs.<sup>(1)</sup> The organism is widely distributed in soil and stagnant waters of endemic areas like South East Asia and northern Australia.<sup>(1,2,3)</sup> Only sporadic cases of melioidosis from various parts of South India and coastal India have been reported, and there is a lack of awareness about the disease.<sup>(4)</sup> The first report of melioidosis from India was by Raghavan et al from Mumbai in 1991. Melioidosis is now increasingly recognized and is an emerging infectious disease in India.<sup>(4,5,6)</sup>

### Materials and Method

Patients with culture proven melioidosis between January 2009 and December 2014 were traced retrospectively. Clinical specimens such as pus, CSF, bone marrow and knee joint aspirate from suspected sites of infection were received in the Microbiology laboratory for culture and antibiotic sensitivity testing. CSF, pus and knee joint aspirate were processed by

inoculating them on Blood agar, Chocolate agar and MacConkey agar and incubating at 37°C for two days aerobically. Bone marrow sample was inoculated on Brain Heart infusion broth and subcultures were done on blood agar and MacConkey agar after six hours of incubation and on alternate days thereafter for 6 days. *B.pseudomallei* was identified by conventional bacteriological methods like dry and wrinkled colonies on blood agar, dry wrinkled violet coloured colonies on Ashdowns media, gram negative rods with bipolar staining, oxidase positivity, neutral alkaline reaction on TSI and resistance to Polymyxin B 300 units. Antimicrobial susceptibility testing was performed on Mueller Hinton agar according to CLSI guidelines. CLSI does not validate susceptibility testing for *B.pseudomallei* by disc diffusion method and interpretation of zone sizes have never been established. The interpretation of results of zone sizes was based on CLSI guidelines for zone sizes used for non-Enterobacteriaceae. The antibiotic discs tested included Gentamicin, Amikacin, Ciprofloxacin, Cotrimoxazole, Piperacillin-tazobactam, Ceftazidime, Imipenem, Meropenem, Amoxicillin-clavulanate and Polymyxin B(300units).

### Results

The summary of melioidosis of 10 cases from January 2009 to December 2014 is given in Table 1.

**Table 1: Summary of Melioidosis cases in a tertiary care hospital in Kerala from January 2010 to December 2014**

No:	Age	Gender	Occupation	Presentation	Organ involvement	Associated illness	Specimen	Antibiotic therapy	Outcome
2010									
1.	33	Male	Autodriver	Fever, loss of weight, loss of appetite-3 months.	Liver, spleen(abscess)	Diabetes mellitus	Pus from abscess	Ceftazidime	Expired
2.	45	Male	Manual labourer	Fever-2 months	Liver(abscess)	Diabetes mellitus	Pus from abscess	Ceftazidime	Recovered
2011									
1.	57	Male	Manual labourer	Fever, loss of appetite, faecal and urinary incontinence-1 month	Spleen, prostate(abscess)	Diabetes mellitus, TB	Bone marrow	Ceftazidime	Recovered
2.	44	Male	Autodriver	Fever, pain and swelling knee joint-1 month	Knee joint	Diabetes mellitus	Knee joint aspirate	Ceftazidime	Recovered
3.	38	Female	Housewife	Pain and weakness of lower limbs-2 months	Spine(multiple abscess)	Diabetes mellitus	CSF	Imipenem	Expired
4.	47	Male	Manual labourer	Fever, abdominal pain-1 month	Spleen(abscess)	Diabetes mellitus, TB	Pus from abscess	Ceftazidime	Recovered
2012									
1.	45	Male	Manual labourer	Left sided chest pain, abdominal pain-1 month	Spleen(abscess)	Diabetes mellitus, TB	Pus from abscess	Ceftazidime	Recovered
2.	51	Male	Gardener	Swelling left thigh	Thigh(abscess)	Diabetes mellitus	Pus from abscess	Ceftazidime	Recovered
2013									
1.	54	Male	Manual labourer	Swelling left thigh	Thigh(abscess)	Diabetes mellitus	Pus from abscess	Ceftazidime	Recovered
2014									
1.	44	Male	Manual labourer	Fever, headache-1 month	Brain(subdural abscess)	Diabetes mellitus	Pus from abscess	Ceftazidime	Recovered

The source of *B. pseudomallei* isolates is shown in Table 2. Seven of the isolates were obtained from pus(70%) and one each from knee joint aspirate(10%), bone marrow(10%) and CSF(10%).

**Table 2: Source of *Burkholderia pseudomallei* isolates**

Source	Number	Percentage
Pus	7	70
Knee joint aspirate	1	10
Bone marrow	1	10
CSF	1	10
	10	100

Table 3 shows the involvement of various organs. *B.pseudomallei* was isolated from abscesses in intraabdominal organs like liver, spleen and prostate(50%), knee joint (10%), multiple abscesses in

the spine(10%), subdural abscess(10%) and abscess in the thigh(20%).

**Table 3: Organ involvement in patients with melioidosis**

Organ	Number	percentage
1.Intraabdominal	2	20
1.Splenic abscess		
2.Splenic and liver abscess	1	10
3.Splenic and prostatic abscess	1	10
4.Liver abscess	1	10
2.Knee joint	1	10
3.Spine	1	10
4.Brain	1	10
5.Soft tissue	2	20
	10	100

Table 4 shows the demographic details of the patients with melioidosis. 90% of the patients were males. All of them had diabetes mellitus as an underlying risk factor. 90% were alcoholic and 30% had TB as a risk factor.

**Table 4: Demographic details of patients with melioidosis**

Characteristics	No. of Patients
Males	9
Underlying risk factors	
1. Diabetes mellitus	10(100%)
2. Alcohol consumption	9(90%)
3. TB	3(30%)

The clinical presentation of the patients with melioidosis is shown in Table 5. 60% of the patients had fever as the presenting symptom. The other symptoms included weight loss and loss of appetite(10%), joint pain(10%), faecal and urinary incontinence(10%), abdominal pain(20%), pain and swelling of thigh(20%), headache(10%) and weakness of lower limbs(10%).

**Table 5: Clinical presentation of patients with melioidosis**

Symptoms	Number	Percentage
Fever	6	60
Weight loss and loss of appetite	1	10
Joint pain	1	10
Faecal and urinary incontinence	1	10
Abdominal pain	2	20
Pain and swelling thigh	2	20
Headache	1	10
Weakness of lower limbs	1	10

Table 6 shows the antibiotic sensitivity pattern of the isolates. All the isolates were sensitive to Ceftazidime, Piperacillin-tazobactam, Imipenem, Cotrimoxazole, Amoxicillin-clavulanic acid and Meropenem. Only 80% of the isolates were sensitive to Ciprofloxacin. Out of 10 patients, eight patients survived and two expired (one in 2010 and one in 2011).

**Table 6: Antibiotic sensitivity pattern of *Burkholderia pseudomallei***

Antibiotic	Sensitive isolates(No.)	Percentage
Gentamicin	0	0
Amikacin	0	0
Ciprofloxacin	8	80
Ceftazidime	10	100
Piperacillin-Tazobactam	10	100

Imipenem	10	100
Cotrimoxazole	10	100
Amoxycillin-clavulanate	10	100
Meropenem	10	100

## Discussion

No specific age is considered as having a predisposition for melioidosis. In the present study the age ranges from 33-57 years. However, the male to female ratio seems to be extremely high in this study at 9:1. This may be due to the frequent exposure of males to soil and water or greater incidence of alcoholism.<sup>(7)</sup> We also found that the occupation of patients were not necessarily related to soil. Only one patient was a gardener. This is in contrast with a previous study in Thailand that found that more than half of melioidosis patients were paddy farmers.<sup>(8,9)</sup> All the patients in this study had an underlying risk factor namely diabetes mellitus which is similar to the findings in other studies.<sup>(10,11)</sup> Underlying diabetes mellitus is a major predisposing factor for melioidosis. The relative risk of melioidosis in diabetic patients in northeast Thailand has been estimated to vary between 7.5 and 100.1, depending on age and sex.<sup>(12)</sup> Alcoholism was the second commonest risk factor(90%). The importance of excessive intake of alcohol as a risk factor for melioidosis was recognised in an earlier study from the Northern Territory of Australia and also in a study from north Queensland.<sup>(13)</sup> The most common predisposing factor in all these three cases was diabetes mellitus followed by chronic alcoholism.<sup>(14)</sup> Fever was the most common clinical presentation. But absence of fever during presentation was observed in four patients. Other presentations included loss of weight and loss of appetite, faecal and urinary incontinence, swelling knee joint, weakness of lower limbs, abdominal pain, chest pain and swelling in the thigh. This wide diversity of clinical syndromes are known phenomena in melioidosis.<sup>(15)</sup> In this series, we found two cases of liver abscess, three cases of splenic abscess and one case each of abscess in the spine and brain. Despite disseminated disease in more than half of patients, 80% of the patients were treated successfully, in contrast to other studies which reported high mortality.<sup>(16,17,18)</sup> In the present study, all the strains of *B. pseudomallei* were sensitive to Cotrimoxazole, Ceftazidime, Piperacillin-tazobactam, Amoxicillin-clavulanate and Carbapenems. *Burkholderia pseudomallei* is intrinsically resistant to many antibiotics.<sup>(19,20)</sup> Overall mortality in this study was 20%. In a study done in Australia the mortality was very low(9%) than that reported elsewhere.<sup>(21)</sup>

## Conclusion

Melioidosis is an emerging infection in India which can be treated. It has to be considered in the differential diagnosis of sepsis and focal abscesses, especially in

diabetics. To facilitate diagnosis, all non-fermenting gram negative bacilli grown in clinical specimens should be speciated. A combination of a high index of suspicion, culture confirmation and prompt therapy can result in an excellent outcome in most of the patients.

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