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Original Research Article

Meliodosis: A new emerging infection in West Coastal Maharashtra

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ABSTRACT

Background/Objective: Meliodosis is a zoonotic infectious disease caused by a gram-negative bacterium *Burkholderia pseudomallei*. It is an endemic disease in Southeast Asia and Northern Australia, but under reported from India. This study was conducted to determine the geographical epidemiology, risk factors, clinical presentations associated with meliodosis.

Materials and Methods: It is retrospective study of six culture proven cases of Meliodosis from a tertiary care hospital.

Results: The six cases of meliodosis were from same geographical location from western coast of Maharashtra. The age group ranged from 3 years to 55 years but more predominant group was within 30-to-50-years. All were males (100%), no female patient was affected. Majority of cases were presented to the hospital in rainy season, from June to September, coincides with season of heavy rainfall. Alcoholism (83.33%) and diabetes mellitus (66.66%) were major risk factors involved. Fever (100%) was most common presenting symptoms. The organ space abscess (50%) involving lymph node, liver and spleen were common followed by disseminated disease and pulmonary meliodosis. All patients were treated with β-lactam antibiotics as intensive therapy followed by oral cotrimoxazole as eradication therapy.

Conclusion: Meliodosis is an emerging infection in India specially in the coastal region with very heavy rainfalls. Male gender is prone to develop the infection with diabetes and alcoholism are additional risk factors. The clinical presentation may vary from localised organ space abscess to septic shock with high mortality. The accurate diagnosis and prompt treatment play key role in managing meliodosis.

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1. Introduction

Meliodosis or Whitmore disease is a zoonotic infectious disease caused by *Burkholderia pseudomallei*.¹ It is a gram-negative bacterium with a natural habitat of soil and

surface water in tropics and subtropics. It is ubiquitous present in rice farming areas.² Worldwide Meliodosis is endemic disease in Southeast Asian countries like Thailand, Vietnam, Cambodia, Singapore, Malaysia, and Northern Australia.^{3,4} However recent data suggest emergence of disease in other geographical parts of world including India. In India it has been reported within the coastal

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region of Maharashtra, Karnataka, Kerala, and Tamil Nādu.⁵ The infection is usually acquired after bacterial inoculation, ingestion, or inhalation. The incubation period ranges for 1 to 21 days for acute disease and for chronic presentations it may be in years.^{6,7} Sporadic cases of laboratory acquired infections has been documented but person to person spread and zoonotic infection are rare. The disease has wide clinical presentation from asymptomatic infection, localized cutaneous ulcers, chronic abscesses, musculoskeletal infection, subacute pneumonia to fulminant multi organ failure with high mortality, therefore it is considered as a great imitator. Most of patients with melioidosis are usually asymptomatic but severe infection can occur with underlying risk factors like diabetes, alcoholism, chronic renal failure, malignancy and immunocompromised status.^{7–11} Diagnostic confirmation of melioidosis relies on positive blood culture of the organism or culture of pus or tissue sample from the organ involved. Ultrasonography and CT scan may show multiple abscesses and this finding can be helpful for diagnosis.^{7–10} The treatment of melioidosis consist of giving antibiotics especially intravenous ceftazidime or meropenem as intensive phase followed by an eradication phase with oral drugs like amoxicillin -clavulanate or co-trimoxazole.^{6,12}

We represent a case series of six melioidosis cases of from west coast Maharashtra. This study highlights the epidemiology, risk factors, the various clinical symptoms related to the disease, early diagnosis and prompt treatment are the key factors to save lives.

2. Materials and Methods

The study was conducted in a 250-bed tertiary care referral hospital situated in Western Maharashtra, to which many patients from costal part of Maharashtra are referred. This is a retrospective study conducted over a period for one and half year, from April 2021 to September 2022. In this study period, we got six culture proven cases of melioidosis. We followed these cases and performed a retrospective analysis based on their medical records. These six patient's records were reviewed for with respect to age, gender, area of residence, the probable suspected risk factors for melioidosis, clinical features, organ of involvement, sample(s) positive for *B. pseudomallei*, results of laboratory and radiological investigations, antimicrobial treatment, outcome at hospital discharge and details of follow-up. Sites of infection were established based on history and examination findings in the medical notes together with investigation reports and procedure notes.

2.1. Microbiological identification

For identification of *B. pseudomallei*, blood (at least 8-10 ml) was collected for blood culture, aseptically and

inoculated into BacT ALERT (Biomérieux, Inc. Durham, NC27704) blood culture bottles and incubated in the BacT Alert automated blood culture system. Pus and tissue were directly plated on blood and MacConkey agar media. *B.pseudomallei* was identified by growth of silver white creamy colonies on blood agar. On MacConkey agar the colonies are pinkish but lactose nonfermenting with a metallic sheen and rugose appearance after ≥ 48 hours.^{13–16} The organism is a motile gram-negative, safety pin appearance (bipolar staining) on gram stain, oxidase positive bacterium that produces a neutral- alkaline reaction on triple sugar iron, grows at 42⁰C and is colistin and gentamicin resistant.^{14,15} Isolate identification was confirmed by Vitek 2 Compact AST Machine (Bio Merieux, France). Out of 6 samples we sent two cultures to Manipal Hospital for confirmation by PCR and found to be positive by PCR also.

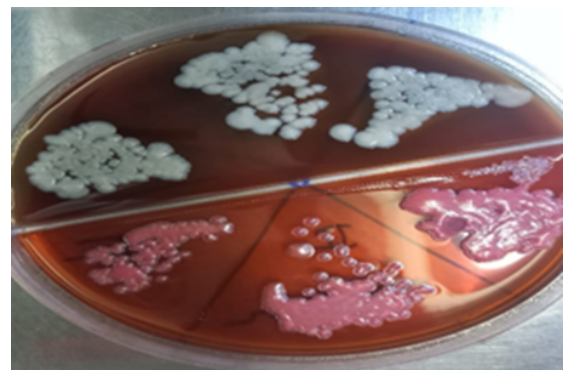


Figure 1: *B.pseudomallei* growth on Blood and MacConkey agar

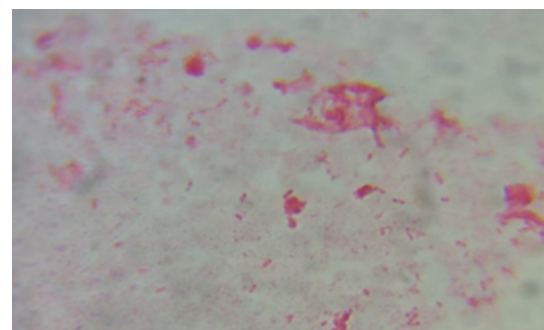


Figure 2: Safety pin appearance (bipolar staining) on gram stain

3. Results

Total six culture proven melioidosis cases were identified in the given study period. All the cases were identified from a common geographical area Ratnagiri District Maharashtra. Demographic data and risk factors were discussed in Table No.1. In our study melioidosis cases were observed only in male patients and no female patient was identified. The

age group was ranging from 30 years to 60 years with an exception a 3-year male child getting infected with melioidosis. Fever (100%) was a common symptom in all the patients, and which was a high grade and persist for more than 10-15 days in every case. Next common symptom was generalized weakness (100%) with nausea and vomiting. Few cases have additional symptom of loose stool (50%) for 3 to 4 days. On examination all cases showed mild to moderate hepatosplenomegaly (100%).

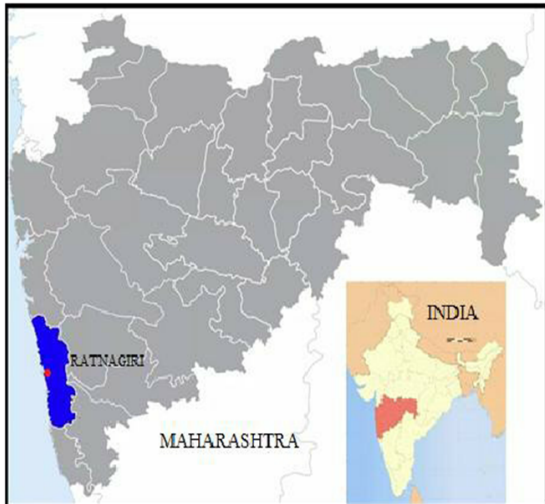


Figure 3:

Out of these 6 cases, two were blood culture positive and have disseminated *B. pseudomallei* infection. Other four cases have localized disease limited to one system. Two patients presented with hepatic and splenic abscess, one patient presented with cervical lymph node abscess and one patient presented with extensive bilateral pneumonia.

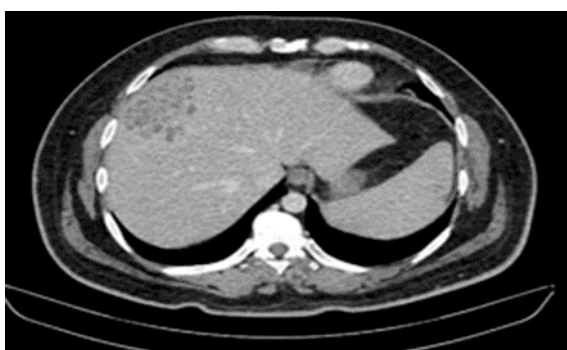


Figure 4: Multi-loculated liver abscess with honeycomb appearance

4. Discussion

Our study highlights the presence of Melioidosis in Ratnagiri District, Konkan, West Coastal part of

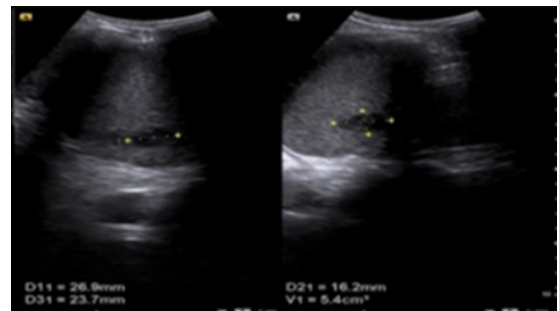


Figure 5: Multi-loculated Splenic abscess

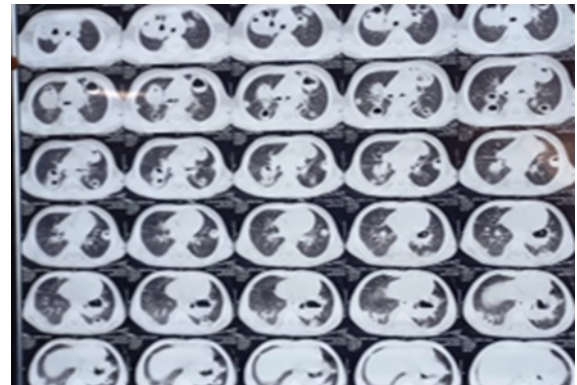


Figure 6: Extensive bilateral cavitory fluid filled lung lesions

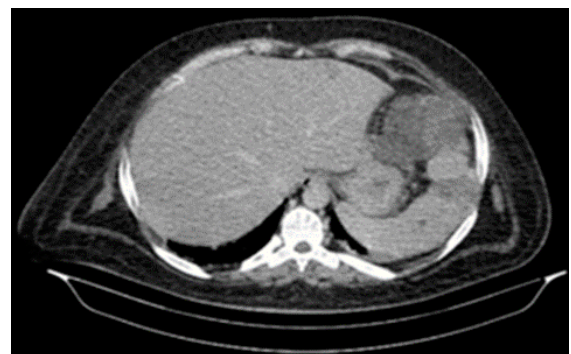


Figure 7: Splenic abscess with partial splenic vein thrombosis

Maharashtra. We got all the culture proven melioidosis cases (100%) from same geographical area. Melioidosis is an endemic disease in Southeast Asia, northern Australia, and North-eastern Thailand.¹⁷ In India, various studies reported cases of melioidosis from Karnataka, Kerala, Tamil Nadu, Maharashtra, Tripura, Assam, West Bengal, and Orissa.¹⁷ Some studies also reported that there is a higher incidence of cases from west coast compared to east coast and in our study, all the patients were from the west coast. Maharashtra state has reported very few sporadic cases from Mumbai and other part. Probably our study will be the maximum melioidosis cases reported study from

Table 1: Demography

Case No	Age (Y)	Sex	Address	Occupation	Risk Factor	Outcome
1	36	M	Ratnagiri	Storekeeper	DM , Alcoholic	Discharged
2	55	M	Dapoli Ratnagiri	Doctor	DM , Alcoholic	Discharged
3	42	M	Ratnagiri	Textile Business Worker	Alcoholic	Discharged
4	36	M	Ratnagiri	Farmer	DM , Alcoholic	Death
5	46	M	Ratnagiri	Farmer	DM , Alcoholic	Death
6	3	M	Ratnagiri	–	—	Discharged

Table 2:

S.No.	<i>Burkholderia Pseudomallei</i> Grown From	Numbers
1	Blood	2
2	Pus (Liver abscess, Splenic abscess, Lymph node abscess)	3
3	Bronchoalveolar lavage	1

Maharashtra.

In west Coast Maharashtra, there is a very heavy rainfall in the month of June to September every year. The association between rainfall intensity and melioidosis is well documented from different studies, with 75% and 85% of cases presenting during the rainy season in northeast Thailand and northern Australia, respectively.^{18,19} In our study also majority of patients (91.66%) were presented to hospital in the month of heavy rainfall between June 2021 to September 2022. The intensity of rainfall has been shown to be an independent risk factor for melioidosis pneumonia, septic shock, and death. It proves there is a strong association between disease presentation to climate.¹⁸

A higher percentage of males were found to be affected by melioidosis. Males' predominance has been documented in many studies from endemic region. The studies from Australia, Malaysia, and Thailand showed 69%, 75.2%, and 61.8% of male patient's predominance, respectively.^{20–22} In our study, all the patient's infected were males (100%). This can be explained as males have a high risk of exposure to outdoor activities, for occupational or recreational purpose than females.

Diabetes and alcoholism are important risk factors for melioidosis infection.^{21,22} In our study 4 out of 6 (66.66%) patients were diabetic and 5 out of 6 (83.33%) patients were alcoholic. An Indian study mentions similar percentage diabetes patients developed melioidosis.

Clinically Melioidosis can present with wide range of clinical signs and symptoms, resulting in frequent misdiagnosis of the condition. *B. pseudomallei* is very popularly known as 'the great mimicker'. In our study, high Fever was most common symptom present in all patients. The duration of fever was more than 7 to 10 days in all cases. Many studies mention pulmonary involvement is the most common type of clinical presentation followed by hepato-splenic abscess.^{23–25} We have only one case (16.66%) of bilateral extensive cavitary pneumonia. Two cases (33.33%) presented with hepato-splenic abscess which is second most

common presentation in many studies for melioidosis. One case (16.66%) presented with cervical lymphadenopathy. *B. pseudomallei* septicemia were present in two cases (33.33%) and mortality was observed in both cases.

B. pseudomallei has unusual antimicrobial susceptibility pattern. It is intrinsically resistant to many antibiotics which includes penicillins, first and second-generation cephalosporins, macrolides, aminoglycosides and colistin.²⁶ Antibiotic treatment is given in two phases, initial an intensive phase and eradication phase. The intensive phase is given to achieve stabilization, resolution of fever with significant improvement in raised inflammatory markers. The drug of choices for intensive phase are parenteral ceftazidime or carbapenems. The duration of intensive phase is usually 2 to 4 weeks according to system involvement. After that the eradication phase is continued for next 20 to 24 weeks to prevent relapse. For the eradication phase, cotrimoxazole, doxycycline and co-amoxiclav are recommended.^{25–27}

In our study, all the patients received parenteral ceftazidime for 2 weeks and then shifted to oral cotrimoxazole for next 24 weeks. In pediatric case we started with oral amoxicillin clavulanate instead of cotrimoxazole to prevent relapse. In sepsis patient we have given meropenem additionally. In a regular follow up of four survived cases are doing well, and no relapse is observed in any of them.

5. Conclusion

Melioidosis is an emerging infection in India specially in the coastal region with very heavy rainfalls. Male gender is prone to develop the infection with diabetes and alcoholism are additional risk factors. The clinical presentation may vary from localised organ space abscess to septic shock with high mortality. The accurate diagnosis and prompt treatment play key role in managing melioidosis.

6. Source of Funding

None.

7. Conflict of Interest

None.

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