ABSTRACT
We describe a case series of seven culture proven melioidosis patients presenting during 2014 to 2016 in Madurai, south Tamilnadu. Skin, soft tissue, bone and joint infections were common. All of them were middle aged men except one case. All the cases were reported during the monsoon season. Predisposing factors include diabetes and alcoholism. Despite many case reports and studies from South India, melioidosis still remains undiagnosed, hence under reported from many centers. Delayed diagnosis leads way to sepsis and other complications. Awareness about the preventive measures, earlier clinical and laboratory identification and appropriate management of severe sepsis are required to reduce the burden of this disease.

Keywords: Abscess, Diabetes, Melioidosis

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INTRODUCTION
Melioidosis is an emerging infectious disease of major public health concern in southeast Asia. Many cases have been reported from different regions of India but represent only tip of the iceberg as they are mostly reported from few large medical centers, where identification is possible1-4. In this report, we describe a case series of melioidosis patients presented during 2014 to 2016 in Tamil Nadu.

CASE SERIES
All of them were middle aged men except one case. They were presented with skin, soft tissue, bone and joint infections. All the cases were reported during the monsoon season. Predisposing factors include diabetes and alcoholism. In all the cases, pus culture grew Burkholderia pseudomallei. Gram staining of the pus showed Gram-negative bacilli with bipolar staining. The pus culture showed lactose fermenting pink colonies in MacConkey’s agar on 1st day which turned dry and wrinkled on day 2 (Figure 1). Blood agar showed dry and wrinkled colonies on day 2. The organism was confirmed to be B. pseudomallei by the above mentioned culture characteristics and standard biochemical methods (positive oxidase and nitrate reduction test, nonfermenting reaction with triple sugar iron agar, hydrolyse arginine, oxidise glucose and lactose). All the isolates were sensitive to cotrimoxazole, doxycycline, ceftazidime, piperacillin tazobactam and meropenem. Bacteremia was confirmed in three cases. Acute renal injury was the most common organ dysfunction found in all the patients. Three patients died of sepsis due to delayed diagnosis and inappropriate management (Table 1).

DISCUSSION
B. pseudomallei is an environmental Gram-negative bacterium and etiological agent of melioidosis. It is generally less virulent in healthy hosts but patients with diabetes mellitus, in particular type 2 diabetes, show a high incidence of melioidosis. In Type 1 diabetes mellitus, use of m-cresol (a preservative) with insulin has an inhibitory effect on the organism5. This can be attributed for the high incidence in Type 2 diabetes.

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Melioidosis—Series of Seven Cases from Madurai, Tamil Nadu, India

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in tuberculosis, there is a possibility of dormant state of melioidosis in macrophages as there are reported relapses after apparently successful treatment. So, cell mediated immunity plays a prime role in the control of this organism.

B. pseudomallei exhibits resistance to penicillins, aminoglycosides and relatively insensitive to macrolides and fluoroquinolones. So, treatment options are limited. Ceftriaxone and cefotaxime use is associated with a higher failure rate among patients with melioidosis. Ceftriaxone and carbapenems remain the drugs of choice during the intensive phase therapy. Use of meropenem especially in severe sepsis is advocated. This is supported by a retrospective study of meropenem use in Australia, in which statistically significant decrease in mortality was seen in meropenem-treated patients with severe sepsis compared with use of ceftriaxone only, despite confounding factors like use of Granulocyte colony stimulating factor. Cotrimoxazole with or without doxycycline is used for the prolonged eradication phase. Doxycycline should not be used as monotherapy as drug resistance is expected. Adherence to therapy (24-week course of therapy) is the major factor that prevents relapse.

**Conclusion**

To diagnose melioidosis promptly, a high index of suspicion in certain clinical settings cannot be overemphasized. Delayed diagnosis leads way to sepsis and other complications. Awareness

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**Table 1: Demographic details, risk factors and outcome of the cases**

| Cases | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------|---|---|---|---|---|---|---|
| Age   | 52 | 47 | 31 | 65 | 31 | 46 | 67 |
| Sex   | M  | M  | F  | M  | M  | M  | M  |
| Presenting month | December | January | January | December | November | September | October |
| Risk factor | DM | DM | DM | DM, alcoholism | DM | Osteomyelitis with intramuscular abscess | Pyelonephritis, sepsis, knee arthritis | Cellulitis leg, sepsis |
| Clinical presentation | Elbow and knee arthritis | Foot cellulitis | Gluteal abscess | Multiple metastatic pyogenic abscess | Osteomyelitis with intramuscular abscess | Pyelonephritis, sepsis, knee arthritis | Cellulitis leg, sepsis |
| Blood sugar | Recurrent hypoglycemia | 116 | 395 | 214 | 216 | 458 | 372 |
| Hb    | 8  | 12.2 | 12.2 | 11.6 | 10 | 10.5 | 9.6 |
| TC    | 10,900 | 19,300 | 12,200 | 17,200 | 23,500 | 13,300 | 2200 |
| ESR   | 83 | 22 | 55 | 36 | 21 | 33 | 39 |
| Antibiotic sensitivity | S to CAZ, IMI, CIP, COT, CFS | S to CAZ, IMI, CIP, COT, CFS | S to CAZ, IMI, CIP, COT, CFS | S to CAZ, MER, IMI, CIP, COT, CFS | S to CAZ, PIT, IMI, CIP, COT | S to CAZ, CIP, IMI, PIT | S to CAZ, CIP, IMI, PIT |
| Bacteremia | Absent | Absent | S to CAZ, IMI, CIP, COT, CFS | Absent | Absent | Absent | Absent |
| Organ dysfunction | Acute renal injury, hypoxic ischemic encephalopathy | Renal and hepatic dysfunction | Renal and hepatic dysfunction | Renal and hepatic dysfunction | Renal and hepatic dysfunction | Renal and hepatic dysfunction | Acute renal injury |
| Renal dysfunction | Raised renal parameters | Nil | IMI, I & D of inguinal abscess, splenectomy and drainage of liver abscess | I & D of intramuscular abscess | Imipenem for 2 weeks | Imipenem for 2 weeks | Imipenem started |
| Treatment | MER, CAZ | I & D, CAZ | I & D, PIT | Amoxycillin | - | - | - |
| Maintenance phase | DOX | - | - | - | - | - | - |
| Outcome | Died | Recovered | Recovered | Died | Died | Recovered | Lost to followup |

CAZ: Ceftriaxone, IMI: Imipenem, CIP: Ciprofloxacin, COT: Cotrimoxazole, CFS: Cefoperazone Sulbactum, DOX: Doxycycline, MER: Meropenem, PIT: Piperacillin Tazobactum
about the preventive measures, earlier clinical and laboratory identification, and appropriate management of severe sepsis are required to reduce the burden of this disease.

**References**

1. Jesudason MV, Anbarasu A, et al. Septicemic melioidosis in a tertiary care hospital in south India. Indian J Med Res 2003; 117:119-121.
2. Saravu K, Vishwanath S, et al. Melioidosis—a case series from south India. Trans R Soc Trop Med Hyg 2008; 102:18-20.
3. Gopalakrishnan R, Sureshkumar D, et al. Melioidosis: An Emerging Infection in India. J Assoc Physicians India 2013; 61:612-614.
4. Ujiwayini Ray, Soma Dutta, et al. Melioidosis: Series of eight cases. J Assoc Physicians India 2016; 64.
5. Simpson AJH and Vanaporn W. Interaction of insulin with *Burkholderia pseudomallei* may be caused by preservative. J. Clin. Pathol 2000; 53:159–160.
6. Chaowagul W, Simpson AJ, et al. Empirical cephalosporin treatment of melioidosis. Clin. Infect. Dis 1999; 28:1328.
7. Cheng AC, Fisher DA, et al. Outcomes of patients with melioidosis treated with meropenem. Antimicrob Agents Chemother 2000; 48:1763–1765.
8. Jenney AW, Lum G, et al. Antibiotic susceptibility of *Burkholderia pseudomallei* from tropical northern Australia and implications for therapy of melioidosis. Int. J. Antimicrob. Agents 2001; 17:109–113.