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 underreported from many centres. 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.

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 possible. In this report, we describe a case series of melioidosis patients presenting during 2014 to 2016 in south Tamilnadu.

All of them were middle aged men except one case. 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 *B. 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). *B. pseudomallei* is known to survive and multiply within cell lines of macrophage/monocyte and neutrophils. Also the comorbid risk factors for melioidosis contribute by impairing neutrophil function. In diabetes mellitus, neutrophil is structurally and functionally affected thus unable to perform optimally during inflammation. The function still deteriorates during acute and chronic hyperglycemic states. Such type of defects are also observed in association with high alcohol consumption, chronic renal failure and thalassemia. As...

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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* is transmitted by inhalation, ingestion, and inoculation. There is a strong association with monsoonal rains and occupational and recreational exposure to surface water. In our centre, all the cases were reported during the monsoon. Cellulitis, arthritis, osteomyelitis, pyelonephritis and abscesses were the clinical presentations. Skin and soft tissue infections were rapidly progressive, mimicking necrotizing fasciitis from other organisms like *Streptococcus* and filamentous fungi. High proportions of patients can present with internal abscess, like in one of our cases, multiple pyogenic abscess with liver and spleen involvement.

Markers of organ dysfunction including leucopenia, elevated liver enzymes, renal parameters, and metabolic derangements (hypoglycemia and acidosis), during admission appear to predict mortality. In the present case series, renal dysfunction and metabolic derangements were markers of impending mortality. As the microbiological clearance is slow, repeated positive cultures and persistent radiological abnormalities does not necessarily mean a poor prognosis.

*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. Cefazidime 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 ceftazidime 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**

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

CAZ: Ceftazidime, 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