

# Myriad Presentations of Melioidosis in Sri Lanka: A Review

Thaabit Raziq<sup>1</sup>, Tehreemah Raziq<sup>2</sup>, Rushdan Firdous<sup>3</sup>, Juraij Mohamed<sup>4</sup>, Saamy Johnson<sup>5</sup>  
Zainab Ifthikar<sup>6</sup>

<sup>1</sup>College of Medicine, Alfaisal University, Riyadh, KSA  
Email: [mraziq@alfaisal.edu](mailto:mraziq@alfaisal.edu)

<sup>2</sup>College of Medicine, Alfaisal University, Riyadh, KSA.  
Email: [fraziq@alfaisal.edu](mailto:fraziq@alfaisal.edu)

<sup>3</sup>College of Medicine, Alfaisal University, Riyadh, KSA.  
Email: [rfirdous@alfaisal.edu](mailto:rfirdous@alfaisal.edu)

<sup>4</sup>Faculty of Medicine, University of Colombo, Sri Lanka  
Email: [juraij7777@gmail.com](mailto:juraij7777@gmail.com)

<sup>5</sup>Amrita Institute of Medical Sciences, Kochi, Kerala, India  
Email: [saamyjohnson@gmail.com](mailto:saamyjohnson@gmail.com)

<sup>6</sup>College of Medicine, Alfaisal University, Riyadh, KSA.  
Email: [zifthikar@alfaisal.edu](mailto:zifthikar@alfaisal.edu)

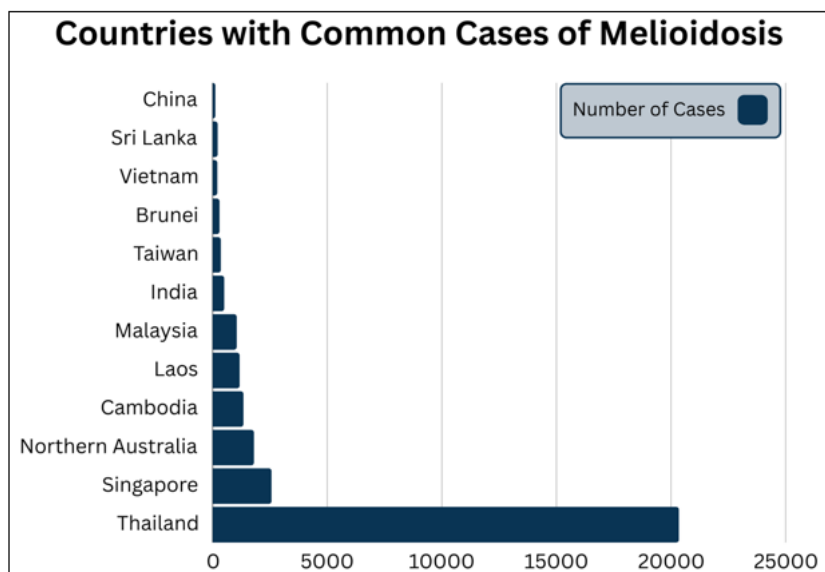
**Abstract:** *Melioidosis, caused by the bacterium Burkholderia pseudomallei, is a tropical infectious disease with a wide range of clinical presentations. In Sri Lanka, the disease is increasingly diagnosed, with diabetes and agricultural practices being the most common risk factors. This review explores the diverse manifestations of melioidosis in Sri Lanka, categorizing them by organ systems. Additionally, it discusses diagnostic and therapeutic strategies specific to the region. This study aims to improve clinician awareness of melioidosis in tropical countries and enhance diagnostic accuracy and treatment outcomes.*

**Keywords:** Melioidosis, Burkholderia pseudomallei, Sri Lanka, infectious diseases, tropical diseases

## 1. Introduction

Gaining the interest of many researchers in the recent past, a notorious disease has gained widespread attention. Melioidosis, often referred to as the great mimicker, has a wide range of symptoms that of life-threatening potential, has acquired this designation due to its protean range of non-specific symptoms and signs across multiple organ systems, often leading to misconceptions and misdiagnoses [1–4].

Melioidosis is an infectious disease caused by *Burkholderia pseudomallei*, a saprophytic, aerobic, non-spore-forming, non-fermenting, environmental, Gram-negative bacillus commonly found in the rhizosphere and superficial groundwater sources of tropical and subtropical regions [2,4–7]. Factors such as high levels of rainfall, extreme weather events like floods and storms, and occupational exposure during paddy field cultivation contribute to its increasing occurrence [1–5,7].



**Figure 1:** Countries with the most common cases of Melioidosis (with a sum number of cases reported to be  $\geq 100$  as of 2022) [8,9]

Volume 13 Issue 10, October 2024

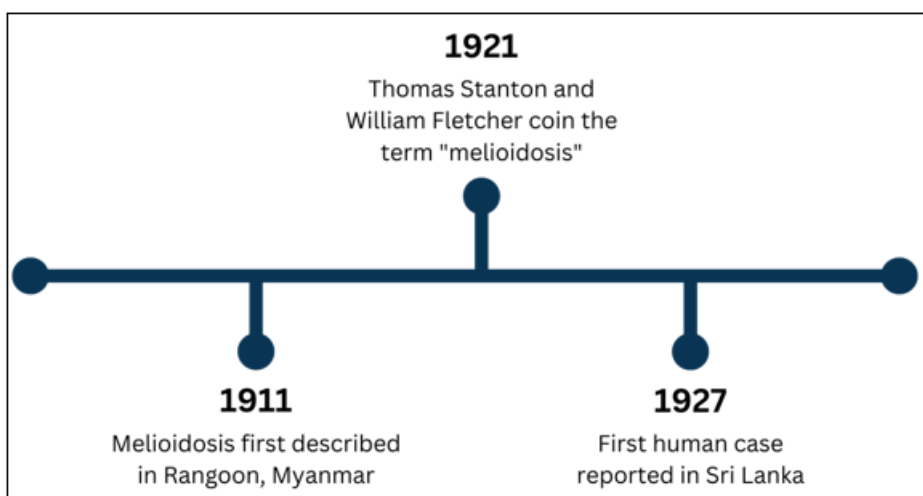
Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

[www.ijsr.net](http://www.ijsr.net)

Researchers have reported individuals being affected over a wide age range (2-92 years), with a greater number of patients anchored in rural areas and being male [1,5,6]. Additionally, investigations revealed that different population groups (based on occupation and exposure) were involved and found to be infected [2,5,6]. This helps link the prevalent lifestyle practices of the country to the dissemination of the microorganism; most influentially, the ‘outdoor, agricultural, barefoot’ way of life exposing them to the aforementioned conditions, allowing penetration through broken skin, ingestion of untreated water, and amusingly even inhalation of dust containing *B. pseudomallei* [2,4–6]. Moreover, in addition to diabetes mellitus being the most common risk factor, other conditions have also been found to increase susceptibility (refer Table 1) [1,3–7].

**Table 1:** Categorized Risk Factors Associated with Melioidosis

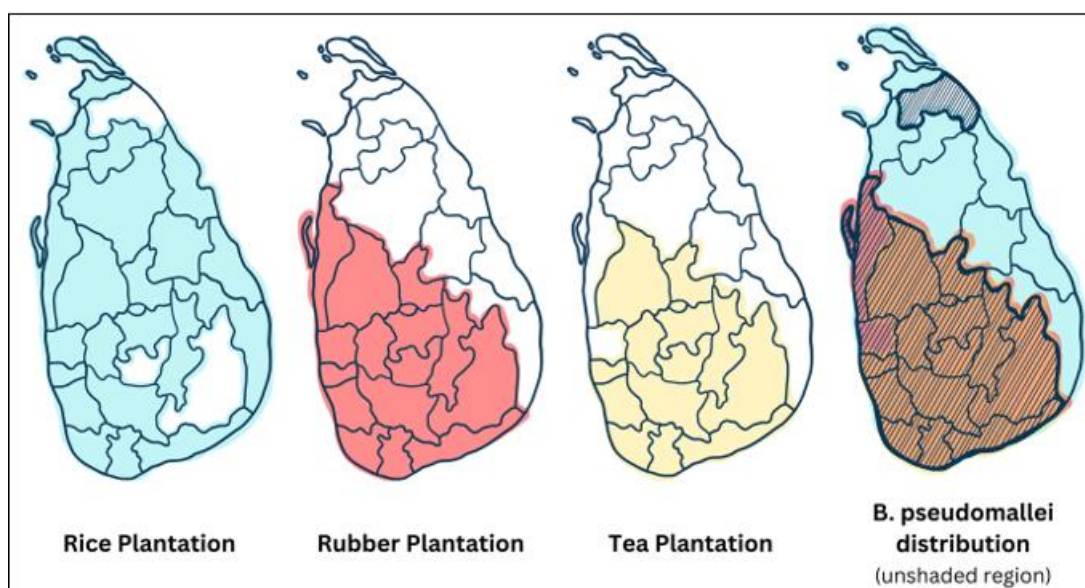
Risk Factors
<b>Age-Related</b>
Age > 45 years
<b>Lifestyle</b>
Increased consumption of alcohol
<b>Medical Conditions</b>
Organ diseases (Liver, Lung, Kidney)
Thalassemia
Prolonged steroid use
Immunosuppression
<b>Sri Lanka Specific</b>
Dengue hemorrhagic fever
IgA nephropathy
Lepromatous leprosy
Prednisolone administration during SLE



**Figure 2:** Timeline illustrating key events in the history of melioidosis in relation to Sri Lanka [4,5,10]

Sri Lanka has been significantly affected by this disease, particularly in its rice-growing areas. Nevertheless, *B. pseudomallei* is rarely detected in tea and rubber plantations due to lower temperatures, soil conditions and agricultural

practices (refer Figure 3) [6]. Conversely, the microorganism showcases impressive resilience in diverse settings, including water, sand, soil lacking in nutrients, and extreme ranges of pH and temperature [1,4].



**Figure 3:** The agricultural landscape of Sri Lanka alongside the geographical distribution of *B. pseudomallei* [11–13]

*B. pseudomallei* infection can present as acute in the majority of cases (85%), with a minority experiencing chronic or latent

forms [4]. Recurrent infections affect 5-28% of acute cases [4]. The bacterium employs a series of steps to establish

infection (refer Figure 4) [1,4]. These strategies collectively enable *B. pseudomallei* to persist and spread effectively, posing challenges for treatment and containment efforts.

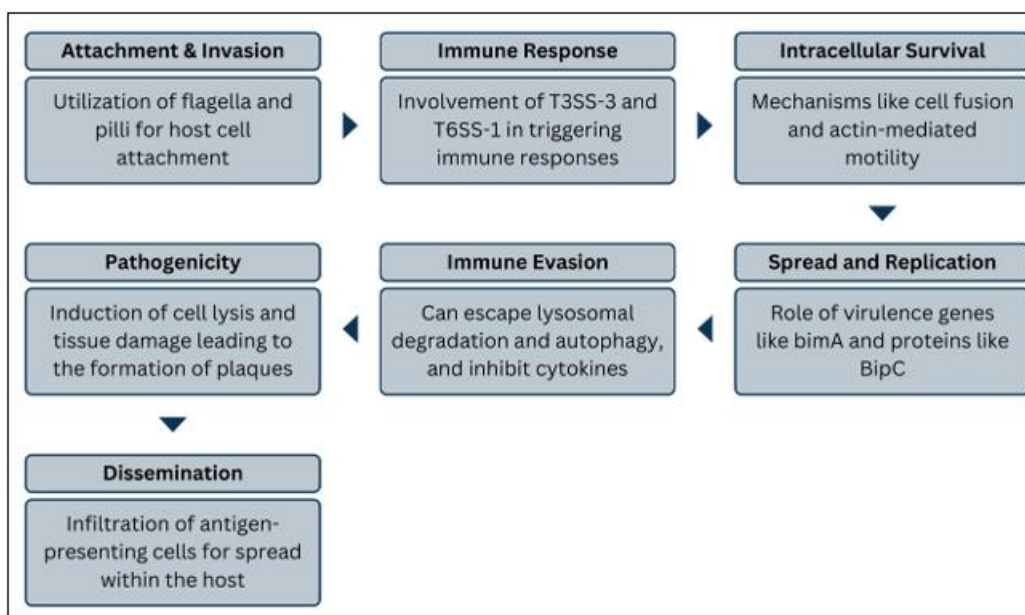


Figure 4: Flowchart depicting the pathophysiology and mechanisms of action of *B. pseudomallei*

Classified as a tier 1 select agent (high-risk entities with potential for significant harm) by the US Centers for Disease Control (CDC) and a hazard group 3 pathogen (biological agents with severe health risks, warranting careful management), suspected cases must be immediately reported to the hospital laboratory to ensure all necessary precautions

are followed [1,3,4]. However, reaching that diagnosis is not easy in the first place [5]. The time required for incubation is typically around 1-21 days [4]. Yet, if the microorganism is inhaled or aspirated, a severe form of the illness could unfold with a shorter period [4].

Table 2: Spectrum of *B. pseudomallei* Infection manifestations [4,7]

<b>Presentation of Melioidosis</b>
<b>Central Nervous System</b>
Meningitis
Subdural Empyema
Cerebral Abscess
Brain-Stem Encephalitis
Transverse Myelitis
Guillain-Barré Syndrome
Status Epilepticus
<b>Musculoskeletal</b>
Septic Arthritis
Muscles Abscesses
Osteomyelitis
<b>Gastrointestinal</b>
Liver Abscesses
Splenic Abscesses
Psoas Muscle Abscesses
<b>Integumentary</b>
Skin and Soft Tissue Abscesses
Cutaneous Symptoms
<b>Genitourinary</b>
Urinary Tract Infections
Prostatitis
<b>Lymphatic and Salivary Glands</b>
Infections
<b>Cardiovascular</b>
Pericardial Effusion
Endocarditis
<b>Other</b>
Bacteremia
Sepsis

But clinical signs and symptoms alone do not suffice for a final say; microbiological culture remains the backbone [3,4,7]. However, it is worth mentioning that there are specific identification steps that aid in differentiating *B. pseudomallei* (refer Table 3) [1,3–5,7,14]. While *B. pseudomallei* may be able to grow on most routine media, the untrained eye, due to the bacteria's unspecificity, can dismiss it as a contaminant, or altogether misidentify it as another microorganism [1,4,14]. Due to this disease's diverse clinical presentations, it can often be misdiagnosed. This review article emphasizes presenting all these manifestations in one place, thematically arranged according to the organ system. The aim is to enhance clinician awareness by providing a compilation of cases specific to Sri Lanka.

**Table 3:** Diagnostic Strategies for *B. pseudomallei* Infection

Diagnostic Methods	
<b>Colony Characteristics</b>	
	Small gram-negative bacilli
	Bipolar staining (safety pin appearance)
	Metallic appearance
	Sweet earthy smell
	Positive oxidase reaction
<b>Drug Interactions</b>	
	Resistant to colistin and gentamicin
	Sensitive to co-amoxiclav
<b>Sample Collection</b>	
	Blood, throat, or rectal swabs
	Urine deposits
	Pus
	Sputum
<b>Growth Media</b>	
	Selective media like Ashdown's agar and broth
<b>Molecular Approaches*</b>	
	16S rDNA sequencing
	Specific PCRs
	Disc diffusion antibiotic sensitivity tests
	Antigen detection
	Nucleic acid amplification tests
	Indirect hemagglutination assay
	16S rDNA sequencing

\* Novel tests may not be cost-effective in resource-limited settings

## 2. Methodology

This review article synthesizes available literature to provide a comprehensive overview of melioidosis manifestation in the specific geographical context of Sri Lanka.

A thorough literature search was conducted using databases such as PubMed, Google Scholar, Cochrane Library, and Scopus. The search focused on articles published in English without date restrictions. Keywords used included "Melioidosis", "Sri Lanka", "Clinical presentations", "Integumentary", "Musculoskeletal", "Reproductive", "Gastrointestinal", "Lymphatic", "Sepsis", "Neurological", "Genitourinary", "Cardiovascular", and "Pulmonary systems."

### Inclusion Criteria

Studies were included if they provided insights into the clinical manifestations of melioidosis in human populations within Sri Lanka across all ages. This includes studies that

represent epidemiological data, laboratory investigations, treatment, and outcomes in the country.

### Exclusion Criteria

Articles on melioidosis cases outside of Sri Lanka, non-human studies, and other infectious diseases, were all excluded.

### Data Extraction and Analysis

A total of 5,659 articles were screened and 5,588 were excluded from this review due to not meeting the inclusion criteria, such as data not being from Sri Lanka, multiple duplicates of the same study across different databases, or melioidosis-like diseases.

Information from the selected articles was recorded on two online spreadsheets. One with columns for: article title, study type, year of publication, date of search, and type of clinical manifestation. The second sheet had columns for data extracted: patient demographics, prevalence in Sri Lanka, specific signs and symptoms reported, frequency, duration, and severity of symptoms, risk factors, diagnostic measures, treatment administered, and outcome (morbidity/mortality).

The spreadsheet was a standardized template that was used by all reviewers and at the end of the data extraction, two reviewers re-checked all the collected data for accuracy, redundancies, and language errors. The data was then organized in this article with clinical presentation being the common theme.

### Limitations

This review article may have missed some papers from the literature due to human error when screening; this was minimized to the best by two separate reviews of the data. This review only used papers published in English; however, it can be considered to have less impact since most Sri Lankan journals are in the English language.

## 3. Funding

There was no funding obtained for this review.

### Clinical Presentations Across Organ Systems

#### Integumentary Melioidosis

In melioidosis, cutaneous signs are apparent in 60% of children and 13% of adults. This is often linked with other symptoms and seldom presents as an isolated problem<sup>15</sup>.

The first case was a 53-year-old lady who did not have any contact to infected water or soil. She had fever, oral ulcers, and bilateral blepharitis, with a discharging sinus over the submental region. Inspection showed multiple tender papules, targetoid lesions, and subcutaneous nodules. However, primarily considered suggestive of sweet syndrome, the lymph node aspirate confirmed it as *Burkholderia pseudomallei*. She was treated with meropenem, after which she recovered<sup>16</sup>.

The second case was an 11-year-old girl with recent history of exposure to paddy fields. She was diagnosed with melioidosis based on fever, sore throat, and erythematous



nodules on the lower limbs, initially misidentifying erythema nodosum for streptococcal pharyngitis. There was no improvement in her condition with penicillin, but after further tests confirmed melioidosis, she improved remarkably after the administration of antibiotics<sup>17</sup>.

The third case was a 42-year-old diabetic male who had pyrexia of unknown origin, periorbital cellulitis, rhinosinusitis, and leg abscesses. The diagnosis at presentation was invasive fungal sinusitis; however, *B. pseudomallei* was finally cultured from the blood, and the patient responded to treatment with antibiotics<sup>18</sup>.

### Musculoskeletal Melioidosis

Musculoskeletal infections by melioidosis are sporadic, happening in only 4% of cases, with 11 cases documented in Sri Lanka<sup>15</sup>. It is more frequently seen amongst males, farmers, and diabetics between 45 and 60 years old, with septic arthritis mostly due to a barefoot lifestyle<sup>19</sup>.

Out of the 11 cases, 6 had septic arthritis, and 5 affected the knee joint; all patients were diabetics with constitutional symptoms. The first case was a female with severe bilateral septic arthritis, who died from septic shock despite treatment with ceftazidime and cotrimoxazole, and had an antibody titre of 5,120. The remaining cases were unilateral septic arthritis. One male patient with knee arthritis developed multiple skin abscesses and required ventilatory support after septic shock<sup>20,21</sup>. Another male farmer, initially misdiagnosed with pneumonia, was found to have *B. pseudomallei* after knee aspiration. Two other patients with right knee pain developed hepatic abscesses and were treated successfully. The sixth case involved a female gardener with autoimmune hepatitis, who developed left hip pain and had an antibody titre of 10,240.<sup>22,23</sup>

A diabetic woman with sacroiliitis and melioidosis-proven intramuscular abscesses recovered after intensive antibiotic treatment. Two male diabetic farmers presented with right thigh myositis, confirmed via biopsy and ultrasound, and both recovered on antibiotics. The final three cases were of osteomyelitis in male farmers, each with a history of abscesses or prior injuries. All had high antibody titres and achieved full recovery with antibiotics.<sup>26-30</sup>

### Reproductive Melioidosis

Reproductive system manifestations of melioidosis have only been documented in a few publications, with one mainly from Sri Lanka. These conditions, though, suggest while reproductive involvement is likely, it is rare in melioidosis.

The first case is a 38 years old female patient there was an ovarian teratoma and gliomatosis peritonei associated with melioidosis. She had constitutional symptoms and had lost at least 10kg of weight due to the other normal activities weight loss and abdominal swelling. Examination of the genitalia indicated a tender bulge in the lower abdomen more specifically a 20-week pregnant uterus. This was after a trip to India and North Central Province in Sri Lanka where she participated in water sports. Imaging showed the presence of ovarian teratoma. The titre of the melioidosis antibody was positive. This was performed due to the high suspicion of an infection. She underwent left salpingo-oophorectomy and

omentectomy due to the presence of infection and was on antibiotics which improved her condition.<sup>31</sup>

The other two cases involved melioidosis related prostatic abscesses. The patients were between 45 and 60 years of age and were fine on antibiotics. The first case was a 73 year old man with a 4 year history of hypertension, prostatitis, and acute urinary retention with acute kidney injury, who received so called standard treatment in case of severe Euroaganistic syndrome. He was treated for urosepsis and septic shock.<sup>32</sup> The prostate was found to have an abscess that was detected by Transrectal ultrasound and underwent drainage. There were cultures that have also grown *Burkholderia pseudomallei*, the patient underwent eradication therapy that was included in the treatment given to him which comprised folic acid. The second patient was a diabetic farmer who presented with nephrolithiasis with low abdominal and low back pain, dysuria, and diarrhea. Digital rectal examination revealed enlarged prostate. Ultrasound revealed multiple prostate abscesses, which resolved following a course of antibiotics and he was adequately recuperated.<sup>33</sup>

### Genitourinary Melioidosis

Genitourinary illnesses of melioidosis are rare, accounting for a mere 4% of the reported cases in Sri Lanka. These usual presentations are bladder infection and prostatitis<sup>6</sup> with only four literature reviewing diseases of the urogenital system involving *Burkholderia pseudomallei*.

The first case of this disease is a postpartum 33-year-old woman who developed a fever that improved but came back showing signs of pneumonia. Imaging shows bilateral pyelonephritis with multiple abscess collections. There were raised levels of serum lactate dehydrogenase, serum creatinine and titers of specific antibodies suggesting melioidosis infection. As treatment was initiated, her condition improved, and she was discharged without any complications<sup>34</sup>.

The second case encompassed a 54-year-old male farms worker who came with a painful screaming leg with septicemia and an open cut. His progress was short lived as he developed acute kidney dysfunction and septicemia. Even with all the treatment including the use of antibiotics and infections, he went into multi-organ failure within a short time and died<sup>35</sup>.

The third case was a 29-year-old soldier with a history of IgA nephropathy, who presented with flank pain and constitutional symptoms. Imaging showed pyelonephritis, and blood cultures confirmed melioidosis. After treatment with meropenem, he was discharged on co-trimoxazole and ciprofloxacin, leading to a complete recovery<sup>36</sup>.

Common factors in these cases included exposure to paddy fields and surface water, alongside conditions like IgA nephropathy or substance use, which could increase the risk of infection<sup>1,4-6</sup>. The final case was a 60-year-old man with prostatitis, dysuria, and urinary retention. Imaging identified a prostate abscess<sup>14</sup>, confirmed to be due to *B. pseudomallei*. He was treated with antibiotics and folic acid, resulting in full recovery<sup>32</sup>.

Cardiovascular presentation of melioidosis is an infrequent occurrence and the incidence is about 1%<sup>37</sup>. Of this, 95% occur in males with pericarditis being the most common manifestation of the disease followed by endocarditis and myocarditis<sup>38</sup>. It has reported four cases of cardiovascular involvement in Sri Lanka; three of which were cases of infective endocarditis (IE) and one mycotic aneurysm<sup>39</sup>.

The 66-year-old male aneurysm case has no risk factors. He complains of dull and severe pain in the right iliac fossa which spreads to the upper thigh. On examination, a pulsatile mass was palpable in the same region. A CT scan was also performed with a leaking saccular aneurysm in the common iliac artery.<sup>37</sup> Though he developed septic shock and had to undergo emergency surgery, he had a complete recovery with antibiotic therapy.

Two of the three cases of IE were part of invasive melioidosis. One is a 60-year-old diabetic, alcoholic, former farmer and smoker. which came with pneumonia and a herb was found on the mitral valve. The second case is a 53-year-old diabetic worker with diabetes. Chronic fever and joint pain. The echo reveals healthy flora over the mitral valve. Both were diagnosed through blood cultures and cured with antibiotic treatment<sup>40</sup>.

The third case of IE is a 73-year-old farmer with chronic obstructive pulmonary disease. He came in with a fever and difficulty breathing. The echo shows vegetation on the aortic valve. Early misdiagnosis His symptoms improved after switching to melioidosis-specific antibiotics. This was confirmed by PCR<sup>41</sup>. Such cases suggest that doctors suspect melioidosis in infected patients from endemic areas, high-risk occupations, or those with compromised immune systems. Due to early diagnosis and treatment, it will be useful.

#### **Pulmonary melioidosis**

Lung involvement is common in melioidosis. This accounts for approximately 50%<sup>42</sup> of all cases. The large number of cases in Sri Lanka highlights the importance of lung symptoms. Pneumonia and lung abscesses are often found. Especially with diabetes or other chronic diseases. Bleeding in both lungs was found in a 59-year-old farmer with co-infection with leptospirosis. She was initially treated for leptospirosis before receiving melioidosis-specific antibiotics. This resulted in recovery<sup>43</sup>. Other cases<sup>45-50</sup> reported pneumonia with typical symptoms such as coughing and crackling on auscultation. Chest x-ray and priapism confirmed. Specifically, a 33-year-old woman developed dyspnea and pneumonia after a cesarean section. Along with neurological symptoms due to thrombotic purpura (TTP)<sup>34</sup>

#### **Neurological Melioidosis**

Neuromelioidosis which involves the central nervous system (CNS), occurs in approximately 4% of cases and is associated with high morbidity and mortality<sup>51</sup>. In Sri Lanka, 14 cases of neurological involvement have been recorded, with the majority affecting the central nervous system (CNS). central nervous system A notable case involved a 21-year-old farmer who had spinal cord inflammation and multiple abscesses extending all the way to his spine. He presented with sudden weakness in both limbs and was unable to urinate. despite

receiving treatment and every patient has some residual symptoms. Brain abscesses are a common symptom in neurological cases. It affects both young and elderly patients. Often presenting with headaches, confusion, and in some cases seizures. A 15-year-old girl who had multiple bilateral brain abscesses. Full recovery is possible after appropriate antibiotic treatment<sup>52-60</sup>.

#### **Gastrointestinal melioidosis**

Gastrointestinal involvement is prominent in melioidosis in Sri Lanka, with 16% of cases showing symptoms<sup>6,61</sup>. Patients often experience abdominal pain, splenomegaly in the liver, and sometimes gastritis. A typical case is a 61-year-old diabetic woman with fever, chills, and splenomegaly in the liver<sup>62</sup>. Imaging confirmed multiple liver abscesses and mild pancreatitis. Cases of gastritis have been observed. Especially in children who come into contact with soil and water. Causes swelling in the mouth and in some cases, oral paralysis<sup>63</sup>. In general, antibiotic treatment is effective. But there was one death in a 58-year-old woman who had liver abscess and melioidosis<sup>64-66</sup>.

#### **Lymphatic melioidosis**

Lymph node involvement is rare in melioidosis. and is often found in conjunction with other systemic symptoms A notable case involved a 54-year-old diabetic man with lymphadenitis in the groin and a splenic abscess<sup>67</sup>. It presents with multiple episodes of lymphadenopathy and sinus drainage due to noncompliance with antibiotic therapy. Many other cases of diabetes that present with abscesses and lymph nodes occur in the neck and groin. Treatment typically involves a combination of antibiotics, including co-amoxiclav and doxycycline, with mixed results regarding Recovering and remaining symptoms<sup>68</sup>.

#### **Sepsis melioidosis**

Infections associated with melioidosis remain a major concern because of their high mortality rate. This accounts for more than half of all melioidosis cases<sup>69</sup>. In Sri Lanka, cases of sepsis usually result from lung infections or skin lesions from contact with soil. The first laboratory-confirmed case in Sri Lanka is of diabetes with fatal septicemia. It emphasizes the serious consequences of melioidosis infection. A recent report of 54-year-old farmer suffering injuries in his rice fields led to multiple organ failure and death<sup>35</sup>. Emphasize the importance of Targeted antibiotic detection and treatment Clinical practice guidelines recommend suspicion of melioidosis in cases of sepsis. Especially in people who come into contact with soil through occupation or in people with impaired immune systems<sup>70-74</sup>.

## Management and Prevention

Table 4: Management and Prevention Strategies for Melioidosis [3–5,7]

Treatment Stage*	Aim	Therapy	Duration
Initial Therapy	Resolution of current illness	Intravenous ceftazidime or meropenem	Minimum 10-14 days (as long as needed)
Eradication Therapy	Prevention of recurrence	Trimethoprim-sulfamethoxazole (preferred)	3-6 months
		Co-amoxiclav or doxycycline (second line)	
Non-Pharmacological	Management	Inspection for abscesses, drainage, and oral therapy	-

\* Following international guidelines

#### 4. Conclusion

This review emphasizes the clinical spectrum of melioidosis in Sri Lanka, highlighting its varied manifestations across multiple organ systems with considerable overlap within systems as well. Of note, meropenem and co-trimoxazole were the drugs of choice used in combination for complicated infections. Diagnosis was often confirmed by positive titers for *B. pseudomallei* following a positive occupational history. Pulmonary infection was the most common presentation of melioidosis in Sri Lanka with diabetes as the leading risk factor. Considering the disease's complexity and consequences of delayed treatment, healthcare professionals from endemic regions like Sri Lanka must be aware of the multitude of melioidosis presentations.

#### References

- Gassiep I, Armstrong M, Norton R. Human Melioidosis. *Clin Microbiol Rev*. 2020 Mar 11;33(2):e00006-19.
- Jayasinghearachchi HS, Muthugama TA, Masakorala J, Kulasekara US, Jayaratne K, Jayatunga DADN, et al. *Burkholderia pseudomallei* in soil and natural water bodies in rural Sri Lanka: A hidden threat to public health. *Front Vet Sci*. 2023 Jan 17;9:1045088.
- Mukhopadhyay C, Shaw T, Varghese GM, Dance DAB. Melioidosis in South Asia (India, Nepal, Pakistan, Bhutan and Afghanistan). *Trop Med Infect Dis*. 2018 May 22;3(2):51.
- Wiersinga WJ, Virk HS, Torres AG, Currie BJ, Peacock SJ, Dance DAB, et al. Melioidosis. *Nat Rev Dis Primer*. 2018 Feb 1;4:17107.
- Corea E. Melioidosis: a neglected tropical disease. *Ceylon Med J*. 2018 Mar 31;63(1):1–4.
- Corea EM, de Silva AD, Thevanesam V. Melioidosis in Sri Lanka. *Trop Med Infect Dis*. 2018 Feb 21;3(1):22.
- Gopalakrishnan R. Melioidosis—Commonly Missed, Yet Not Uncommon and Eminently Treatable. *Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med*. 2021 Mar;25(3):258–9.
- Melioidosis - Cases Information Database [Internet]. [cited 2024 Jun 24]. Available from: <https://melioidosis.info/info.aspx?pageID=107&contentID=1070104>
- Melioidosis - Country Data Summary Database [Internet]. [cited 2024 Jun 24]. Available from: <https://melioidosis.info/info.aspx?pageID=107&contentID=1070102>
- Männikkö N. Etymologia: Melioidosis. *Emerg Infect Dis*. 2011 Jul;17(7):1341.
- Esham M, Rosairo R, Wijeratne A. Future of Work for Tea Smallholders in Sri Lanka. 2018.
- Premasiri HM, Fernando P, Kudaligama KVV. Spatial Techniques for Assessing Favorable Topographic Conditions for Rubber Plantation. 2017 Jul 9;
- Sri Lanka Rice Area, Yield and Production [Internet]. [cited 2024 Jul 23]. Available from: <https://ipad.fas.usda.gov/countrysummary/Default.aspx?id=CE&crop=Rice>
- Fernando R, Silva K, Nathaniel D, Yapa Y, Amarasinghe R, Sliwa W. Melioidosis: An Uncommon Cause of Abscess. *Bull SRI LANKA Coll Microbiol*. 2017 Aug 1;15(1):76–7.
- Chakravorty A, Heath CH. Melioidosis: An updated review. *Aust J Gen Pract*. 2019 May 1;327–32.
- Vithoosan S, Thanushah B, Piranavan P, Gamlaksha D, Karunatilake H, Jayanaga A. A rare case of Sweet syndrome secondary to melioidosis. *BMC Dermatol*. 2019 Dec 2;19(1):16.
- Keragala BSDP, Herath HMMTB, Samaranayake PGWS, Weerasinghe TD, Pirabakaran S, Pathirage H, et al. Melioidosis presenting as erythema nodosum – a report of rare occurrence in literature [Internet]. 2019 [cited 2024 Jul 3]. Available from: <https://slcd.lk/assets/img/member-info/journals/volume-21/sljod-v21-p90-91.pdf>
- Udayani LADN, Dumingoarachci D. Melioidosis presenting with periorbital cellulitis and rhinosinusitis. *Ceylon J Otolaryngol*. 2020 Dec 31;9(1):73–7.
- Corea EM, Merritt AJ, Ler YH, Thevanesam V, Inglis TJJ. Sri Lankan National Melioidosis Surveillance Program Uncovers a Nationwide Distribution of Invasive Melioidosis. 2015;
- Pirasath S, Pradeepan J, Kumanan T. Case Review of Melioidosis in a Tertiary Care Centre from Northern Sri Lanka. *Int J Trop Dis Health*. 2018;1–6.
- Caldera AS, Kumanan T, Corea E. A rare cause of septic arthritis: melioidosis. *Trop Doct*. 2013 Oct 1;43(4):164–6.
- Arunpriyandan V, Pakkiyaretnam M, Umakanth M, Arunpriyandan V, Mayurathan P, Umakanth M. Systemic Melioidosis Presenting as Septic Arthritis. *Cureus [Internet]*. 2022 May 15 [cited 2024 Jul 3];14. Available from: <https://www.cureus.com/articles/95978-systemic-melioidosis-presenting-as-septic-arthritis#!/>
- Hettige D, Weerawansa P, Siribaddana S, Sarathchandra C. Melioidosis presenting as knee joint septic arthritis: a case report. *Anuradhapura Med J*. 2021 Aug 15;15:19.
- Weerasinghe NP, Herath HMM, Liyanage TMU. Isolated septic arthritis of hip joint: a rare presentation of melioidosis. A case report. *BMC Res Notes*. 2018 Jan 19;11(1):50.
- Karunaratna AKTM, Mendis SA, Perera WPDP, Patabendige G, Pallewatte AS, Kulatunga A. A case

- report of melioidosis complicated by infective sacroiliitis in Sri Lanka. *Trop Dis Travel Med Vaccines*. 2018 Sep 19;4(1):12.
- [26] Jayawardena N, Ralapanawa U, Kumarihamy P, Jayalath T, Abeygunawardana SP, Dissanayake N, et al. Infective myositis, an uncommon presentation of melioidosis: a case report and review of the literature. *J Med Case Reports*. 2019 Dec 31;13(1):388.
- [27] Vithana SMP, Chathuranga LS, Jayasinghe S, Udayakumara EAD. A rare case of melioidosis presenting as myositis in Sri Lanka. *BMC Infect Dis*. 2022 Jun 15;22(1):549.
- [28] Mathurageethan M, Kahathuduwa CN, Badanasinghe N, Corea E, Fernando R. Melioidosis associated with chronic osteomyelitis and visceral organ abscesses. *Sri Lanka J Surg*. 2014 Sep 3;32(2):41.
- [29] Rodrigo K, Premaratna R, De Silva H, Corea E. Melioidosis as a cause of femoral osteomyelitis and multifocal intramuscular abscess around the hip joint in a farmer: a case report. *Sri Lankan J Infect Dis*. 2013 Feb 6;3(1):50.
- [30] Jayarajah U, Arulanantham A, Koculen V, Palkumbura C, Faleel A, Sooriyarachchi R. *Burkholderia pseudomallei* peri-prosthetic infection following medial malleolar internal fixation: a case report. *BMC Infect Dis*. 2020 Mar 19;20(1):236.
- [31] Ranathunga UVV, Silva LJD, Wijenayake UN, Kaluarachchi A, Silva MVC de. Melioidosis complicating an ovarian teratoma with gliomatosis peritonei; a rare case with review of the literature on melioidosis affecting the gynaecological tract. 2021 Dec 31;16(2):25.
- [32] Makeen FS, Pitagampola MN, Chandrasiri S, Mendis S, Abeygunasekera AM. Systemic melioidosis with prostatic abscess. 2023 Oct 24;13(2):E50:1.
- [33] Subasinghe S, Aszher S, Senadeera J, Abeywardena M. A rare case of melioidosis with isolated prostate abscesses which responded to antibiotic therapy. - *Journal of the Postgraduate Institute of Medicine* [Internet]. 2024 [cited 2024 Jul 3]. Available from: <https://jppgim.sljol.info/articles/10.4038/jppgim.8452>
- [34] Wijewickrama PSA, Weerakoon R. Acute disseminated melioidosis giving rise to pneumonia and renal abscesses complicated with thrombotic thrombocytopenic purpura in a post partum woman: a case report. *BMC Res Notes*. 2017 Nov 29;10:653.
- [35] Warapitiya DS, Subasinghe S, de Silva RF, Piyarisi DL, Jayatilleke K. Severe Sepsis with Multiorgan Failure due to Melioidosis: A Lesson to Learn. *Case Rep Med*. 2021 Apr 8;2021:5563214.
- [36] Pathirathne SH, Athukorala GP, Hussain H, Nishantha PLB, Senevirathne HMPK, Corea E, et al. Melioidosis mimicking pulmonary tuberculosis. *Sri Lanka J Med* [Internet]. 2016 May 9 [cited 2024 Jul 8];24(1). Available from: <https://sljm.sljol.info/articles/10.4038/sljm.v24i1.5>
- [37] Subramony H, Gunasekaran S, Paul Pandi VK. Disseminated melioidosis with native valve endocarditis: a case report. *Eur Heart J - Case Rep*. 2019 Jun 1;3(2):ytz097.
- [38] Velusamy R, Muhi S. Melioidosis and the Heart: A Systematic Review. *Trop Med Infect Dis*. 2020 Sep;5(3):121.
- [39] Wedagedara VM, Nuwan C, Ubayasiri RA. Common iliac artery mycotic aneurysm due to melioidosis. *Galle Med J*. 2021 Sep 15;26(3):141–3.
- [40] Jazeer M, Maheswaran U. Infective Endocarditis - An uncommon presentation of disseminated melioidosis: a case report. *Anuradhapura Med J*. 2023 Dec 31;17(3):64–8.
- [41] Piyasiri LB, Wickramasinghe SA, Lekamvasam VC, Corea EM, Gunarathne R, Priyadarshana U. Endocarditis in melioidosis. 2016 Dec 30;61(4):192.
- [42] Cheng AC, Currie. *Melioidosis: Epidemiology, Pathophysiology, and Management* [Internet]. 2005 [cited 2024 Jul 11]. Available from: <https://journals.asm.org/doi/epub/10.1128/cmr.18.2.383-416.2005>
- [43] Gunasena J, De Silva S. Double-trouble: A rare case of co-infection with melioidosis and leptospirosis from Sri Lanka. *Trop Doct*. 2023 Apr 1;53(2):332–7.
- [44] Selvaratnam N, Thananchayan S, Uthayakumaran S, Srivickneswaran G. Melioidosis presenting as pneumonia and left parietal lobe focal meningitis with a subdural collection: a case report. 2022 Aug 29;9(2):E186 1.
- [45] Nasim FN, Herath LY, Bowattage S, Kularathna K. Melioidosis : The Great Mimicker: A Case Report. 2022 Aug 24;9(2):E182 1.
- [46] Bovornkitti S. Tropical pulmonary diseases. *Respirology*. 1996;1(1):11–21.
- [47] Peetermans WE, Wijngaerden EV, Eldere JV, Verhaegen J. Melioidosis Brain and Lung Abscess After Travel to Sri Lanka | *Clinical Infectious Diseases* | Oxford Academic [Internet]. 1999 [cited 2024 Jul 7]. Available from: <https://academic.oup.com/cid/article/28/4/921/401810>
- [48] Fonseka CL, Galappaththi SR, Illagatilaka A, Dasanayake D, Tissera N. Acute pulmonary melioidosis presenting with multiple bilateral cavitory lesions in a healthy young adult: an authentic case report from Sri Lanka. *BMC Res Notes*. 2016 Jul 22;9(1):360.
- [49] Perera GND, Dias LD, Kulatunga A, Corea E, Masakorala. A Case Report of Melioidosis - *Sri Lankan Journal of Infectious Diseases* [Internet]. 2012 [cited 2024 Jul 7]. Available from: <https://sljid.sljol.info/articles/10.4038/sljid.v2i1.3795>
- [50] Chandramal N, Kalupahana R, Pothmulla C. A farmer with successful recovery from pulmonary melioidosis - *Journal of the Postgraduate Institute of Medicine* [Internet]. 2021 [cited 2024 Jul 7]. Available from: <https://jppgim.sljol.info/articles/10.4038/jppgim.8318>
- [51] Vithoosan S, Kumarasiri A, Vithanage NM, Senanayake B. Case report long segment myelitis secondary to neuro melioidosis. *BMC Neurol*. 2022 Oct 19;22(1):387.
- [52] Nandasiri S, Wimalaratna H, Manjula M, Corea E. Transverse myelitis secondary to Melioidosis; A case report. *BMC Infect Dis*. 2012 Sep 28;12(1):232.
- [53] Abeyundara, Nishad, Perera, De Silva. Neurological melioidosis complicated by cerebral venous sinus thrombosis - *Journal of the Ceylon College of Physicians* [Internet]. 2020 [cited 2024 Jul 7]. Available from: <https://jccp.sljol.info/articles/10.4038/jccp.v51i2.7907>
- [54] Arif, Abid, Siddiqui. Central and peripheral nervous system involvement in neuromelioidosis | *BMJ Case*



- Reports [Internet]. 2015 [cited 2024 Jul 7]. Available from: <https://casereports.bmj.com/content/2015/bcr-2015-211001>
- [55] Ratnayake G, Dissanayake A, Liyanage D, Sivanesan P. Neuromelioidosis in the guise of a Demyelinating illness (P1-1.Virtual). *Neurology*. 2022 May 3;98(18\_supplement):3150.
- [56] Paththamperuma SR, Samarasena AH, Kothalawala M. A Case of Central Nervous System Melioidosis - Sri Lanka Journal of Medicine [Internet]. 2022 [cited 2024 Jul 7]. Available from: <https://sljm.sljol.info/articles/10.4038/sljm.v31i1.295>
- [57] Selvaratnam N, Thananchayan S, Uthayakumaran S, Srivickneswaran G. Melioidosis presenting as pneumonia and left parietal lobe focal meningitis with a subdural collection: a case report. 2022 Aug 29;9(2):E 186 1.
- [58] Amarasena HLP, Silva FHDS, Tilakaratna PMYI, Jayamanne SF, Ranawaka UK. Melioidosis with a subdural collection – a case report | BMC Infectious Diseases | Full Text [Internet]. 2019 [cited 2024 Jul 7]. Available from: <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-019-3782-0>
- [59] Dalugama C, Tennegedara A, Gawarammana IB. De novo subgaleal abscess – a rare presentation of melioidosis: a case report. *J Med Case Reports*. 2018 Apr 30;12(1):115.
- [60] Wijekoon PWMCSB, Bandara K a. S, Kailainathan A, Chandrasiri NS, Hapuarachchi CT. Guillaine-barre syndrome; a rare complication of melioidosis. a case report. *BMC Infect Dis*. 2016 Aug 9;16:388.
- [61] Teparrukkul P, Kongkasame W, Chitsaeng S, Wongsuwan G, Wuthiekanun V, Peacock SJ, et al. Gastrointestinal tract involvement in melioidosis. *Trans R Soc Trop Med Hyg*. 2017 Apr;111(4):185–7.
- [62] Kahandawaarachchi ICI, Premawansa GS, Warnasuriya W, Dassanayake M, Corea E. A case report of co-infection of Melioidosis and cutaneous Leishmaniasis. *BMC Infect Dis*. 2017 Aug 1;17(1):533.
- [63] Pirasath S, Selvaratnam G, T, Kumanan, Pradeepan J, Mubarak FN. Melioidosis: Emerging infection in Northern Sri Lanka. *IP Int J Med Microbiol Trop Dis*. 2(3):112–4.
- [64] Dayasiri MBKC, Mudiyanse RM, Kudagammana HDWS, Rifaya MI, Dissanayaka P, Jeyaratnasingam C, et al. Melioidosis manifesting as severe emaciation and clinically indolent liver abscesses, in a child with Beta Thalassemia Major. *Sri Lanka J Child Health* [Internet]. 2016 Jun 6 [cited 2024 Jul 8];45(2). Available from: <https://sljch.sljol.info/articles/10.4038/sljch.v45i2.7617>
- [65] Premaratne KKMK, Karunaratne GKD, Dias R, Lamahewage AK, Samarasinghe M, Corea E, et al. Melioidosis presenting as parotid abscess in children: two consecutive cases. *Sri Lankan J Infect Dis* [Internet]. 2017 Oct 16 [cited 2024 Jul 8];7(2). Available from: <https://sljid.sljol.info/articles/10.4038/sljid.v7i2.8149>
- [66] Madegedara D, Bandara A, Mohamed A, Luckmy S, Rifai M. Recurrent Parotid Abscess; A Diagnostic Dilemma- A Case Report. *Acta Sci Microbiol*. 2019 Dec 4;3(1):22–5.
- [67] Bataduwaarachchi VR, Jayasundara C, Tissera N. RETRACTED: Chronic melioidosis causing an inguinal sinus in a Sri Lankan male. *JMM Case Rep*. 2015;2(2):e000027.
- [68] Chlebicki MP, Tan BH. Six cases of suppurative lymphadenitis caused by Burkholderia pseudomallei infection. *Trans R Soc Trop Med Hyg*. 2006 Aug;100(8):798–801.
- [69] Jin J, Ning Y. Septicemic melioidosis: a case report and literature review. *J Thorac Dis* [Internet]. 2014 Feb [cited 2024 Jul 13];6(2). Available from: <https://jtd.amegroups.org/article/view/2046>
- [70] Inglis TJJ, Merritt A, Montgomery J, Jayasinghe I, Thevanesam V, McInnes R. Deployable Laboratory Response to Emergence of Melioidosis in Central Sri Lanka. *J Clin Microbiol*. 2008 Oct;46(10):3479–81.
- [71] Jayasekara K, Perera S, Wijesundere A. Fatal *Burkholderia pseudomallei* septicaemia. *Ceylon Med J*. 2009 Dec 7;51(2):69.
- [72] Jayasinghearachchi HS, Corea EM, Krishnananthasivam S, Sathkumara HD, Francis VR, Abeysekere TR, et al. Whole-Genome Sequences of Eight Clinical Isolates of Burkholderia pseudomallei from Melioidosis Patients in Eastern Sri Lanka. *Microbiol Resour Announc*. 2019 Aug 15;8(33):e00645-19.
- [73] Natesan M, Corea E, Krishnananthasivam S, Sathkumara HD, Dankmeyer JL, Dyas BK, et al. Calprotectin as a Biomarker for Melioidosis Disease Progression and Management. *J Clin Microbiol*. 2017 Mar 24;55(4):1205–10.
- [74] Sathkumara HD, Merritt AJ, Corea EM, Krishnananthasivam S, Natesan M, Inglis TJJ, et al. Clinical, Bacteriologic, and Geographic Stratification of Melioidosis Emerges from the Sri Lankan National Surveillance Program. *Am J Trop Med Hyg*. 2018 Feb;98(2):607–15.