

Clinical and Imaging Features of Melioidosis: A Study at Maharaj Nakorn Chiang Mai Hospital

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ABSTRACT

OBJECTIVE Melioidosis is a life-threatening infectious disease caused by *Burkholderia pseudomallei*. The clinical presentations are diverse with high mortality. The disease requires timely and appropriate antibiotics. Imaging studies play an important role in the diagnosis. This study evaluated clinical manifestations, risk factors, and imaging patterns of melioidosis.

METHODS This retrospective study reviewed medical records and imaging studies of patients with melioidosis conclusively identified by cultures at Maharaj Nakorn Chiang Mai Hospital during 2017–2023.

RESULTS Of 33 melioidosis patients, most were male (75.76%) and the mean age was 57. Fever (66.67%) and localized pain (48.48%) were the common symptoms, while septicemia occurred in 33.33% of cases. Diabetes mellitus (48.48%) was the predominant risk factor. Imaging studies, including chest radiographs, computed tomography (CT), magnetic resonance imaging (MRI), and ultrasonography, detected infections in 90.90% of the patients, with lung involvement being the most frequent (39.39%). CT was particularly effective in identifying pulmonary and visceral abscesses, while MRI aided in diagnosing osteoarticular infections. Imaging successfully guided specimen collection in 78.57% of hemoculture-negative cases.

CONCLUSIONS This study underscores the importance of imaging in diagnosing melioidosis, particularly in patients with risk factors, and highlights the need for tailored imaging strategies based on clinical features.

KEYWORDS melioidosis, sepsis, pneumonia, diagnostic imaging, multi-detector computed tomography

INTRODUCTION

Melioidosis, caused by the Gram-negative bacilli *Burkholderia pseudomallei*, is a significant infectious disease often associated with environmental exposure. Individuals with certain conditions such as diabetes mellitus, chronic kidney disease, chronic lung disease, thalassemia, corticosteroid use, and immunosuppressive therapy

are at higher risk (1). The disease is particularly prevalent in Southeast Asia and Northern Australia (2). The global burden of melioidosis in 2015 was approximately 165,000 new cases and 89,000 deaths (3), prompting the World Health Organization (WHO) to develop comprehensive strategies for a better understanding of the disease (4). Melioidosis can be misdiagnosed due to its diverse

clinical presentations and lack of awareness of the disease. Variations in prevalence across different areas can be attributed to underreporting. The management of melioidosis is a world-wide public health challenge, not only in the endemic regions (5, 6).

Diagnosing melioidosis is challenging due to its wide range of clinical symptoms, the severity of the disease, and diverse organ involvement. In the mildest form, patients may experience low-grade fever, fatigue, and general malaise, which can be easily mistaken for a common viral illness. Localized symptoms may develop when certain organs are involved, such as cough and chest pain in lung infection, or abdominal pain when the liver or spleen is involved. Patients might also present with localized pain and swelling in the skin or with soft tissue infection. In severe cases, melioidosis can lead to pneumonia, abscesses in multiple organs, and bacteremia, manifesting as high fever and septicemia. In the most critical form, the infection causes septic shock, multiorgan failure, and a high risk of mortality (1, 3, 6, 7). These nonspecific clinical presentations complicate differentiation from other diseases, necessitating a high level of clinical suspicion. A definite and reliable diagnosis can be made only by positive cultures of *B. pseudomallei* from clinical specimens (8). Cultures take at least 48 hours, which may cause treatment delays (1). Serology tests alone cannot reliably make the diagnosis or exclude melioidosis (8). Collecting specimens from the appropriate sites is crucial for an accurate diagnosis. Appropriate treatment begins with 4 to 6 weeks of intravenous ceftazidime or meropenem during the acute phase, followed by 3 to 6 months of oral antibiotics such as doxycycline, trimethoprim-sulfamethoxazole, or amoxicillin-clavulanate during the eradication phase, as well as eradication of the infected sites (1, 7, 9).

Imaging studies have been used as an initial evaluation of several diseases, including melioidosis. Radiography, ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI) are also commonly used (10–15). Pulmonary infection, the most common infected organ in melioidosis, can be detected by chest radiographs or CT (16, 17). The presence of abscesses, which is a sign of infection in any organ, can be detected by ultrasonography (US), CT, or MRI.

Knowing the clinical and imaging patterns of the disease assists understanding the manifestation of melioidosis, leading to clinical suspicion, appropriate use of imaging modalities, and timely correct diagnosis (3, 5). This study aims to explore the clinical manifestation and imaging patterns of patients with melioidosis at Maharaj Nakorn Chiang Mai Hospital, with emphasis on the usefulness of imaging studies.

METHODS

After the Institutional Research Ethics Committee approval (RAD-2567-0186), this retrospective observational cohort study was conducted using data of melioidosis patients at Maharaj Nakorn Chiang Mai Hospital from January 2017 to December 2023. Patients with cultures positive for *B. pseudomallei* were included in the study. Exclusion criteria were patients who did not receive imaging investigation, had poor image quality or had only positive titer without positive culture. From the database of the Microbiology Laboratory, 40 patients had positive cultures of *B. pseudomallei*. We excluded seven of those patients who did not receive imaging studies at the initial presentation. Thirty-three patients met the inclusion criteria.

The patients' medical records were reviewed for demographic data, clinical symptoms, type of positive culture specimens, and risk factors, which include diabetes mellitus, alcohol intake, chronic lung disease, chronic renal disease, thalassemia, soil contact, smoking, immunosuppression, rheumatic heart disease or cardiac failure, and malignancy (2, 6, 7, 9, 18, 19).

Imaging studies were reviewed by four medical students and consensus was reached. The interpretation was performed by reviewing radiology reports and re-evaluating the images, and the final diagnosis was confirmed by a radiologist sub-specialized in advanced body imaging and musculoskeletal radiology. Data are presented as means or proportions. All analyses were performed using STATA software version 16 (Stata Corp., College Station, TX, USA).

RESULTS

Of 33 patients with melioidosis, 25 patients (75.76%) were male and the mean age of the patients was 57 years (range 21–89 years). The clinical

presentations of these patients were diverse with fever being the most common presentation ($n = 22$, 66.67%). Eighteen patients (54.55%) had an acute fever, while four (12.12%) exhibited intermittent fever. Localized pain in the infected organs was reported by 16 patients (48.48%). Septicemia with unstable vital signs (septic shock), a fatal condition, occurred in 33.33% ($n = 11$) of the cases. Risk factors were identified in 29 patients (87.88%), with diabetes mellitus the most common ($n = 16$, 48.48%). Twenty-three patients (69.70%) had more than one risk factor. The list of risk factors and number of patients with each factor is shown in Table 1.

Of the 33 patients, nineteen cases (57.58%) were confirmed by positive blood cultures with *B. pseudomallei*. Among these, the organism was detected from blood culture alone in seven patients (36.84%), while for the other 12 patients (63.16%) it was detected in blood and other specimens. In addition, of the 33 patients, 14 (42.42%) showed positive only from other clinical specimens. No serological testing for melioidosis was performed in any of the patients in this study. Details of the clinical presentations, laboratory investigations, and imaging results are presented in Table 2 and 3. Imaging studies detected infected sites in 30 patients (90.90%). Multiple organ involvement was detected in 16 patients (48.48%). Among 14 patients who were hemoculture negative but had positive clinical specimens, imaging helped to target the sites of specimen collection in 11 patients

Table 1. Risk factors

Risk factors	n (%)
Diabetes mellitus	16 (48.48)
Smoking	11 (33.33)
Alcohol drinking	8 (24.24)
Chronic kidney disease	6 (18.18)
Soil contact	5 (15.15)
Chronic lung disease	4 (12.12)
Immunosuppression	4 (12.12)
Malignancy	3 (9.09)
Thalassemia	3 (9.09)
Rheumatic heart disease	3 (9.09)

(78.57%), while in 3 patients, imaging studies did not allow detection of the infection site, but these patients did have chest radiographs for screening of pulmonary infection. Details of where cultures were obtained is shown in Supplementary Table 1 and 2.

The lung was the most common infected site (13 patients, 39.39%) (Figure 1), and was more frequent in patients with positive hemoculture (11 of 19 patients, 57.89%) than those who had negative hemoculture (2 of 14 patients, 14.29%). Other involved organs were spleen (5 patients, 15.15%) (Figure 2), liver (3 patients, 9.00%) (Figure 3), and prostate (3 patients, 9.00%) (Figure 4). One patient each had brain and adrenal gland abscesses. Of three patients with prostatic abscesses, two had disease in other urogenital organs: one had associated epididymitis, and the other had a renal abscess. Bone and soft tissue structures were

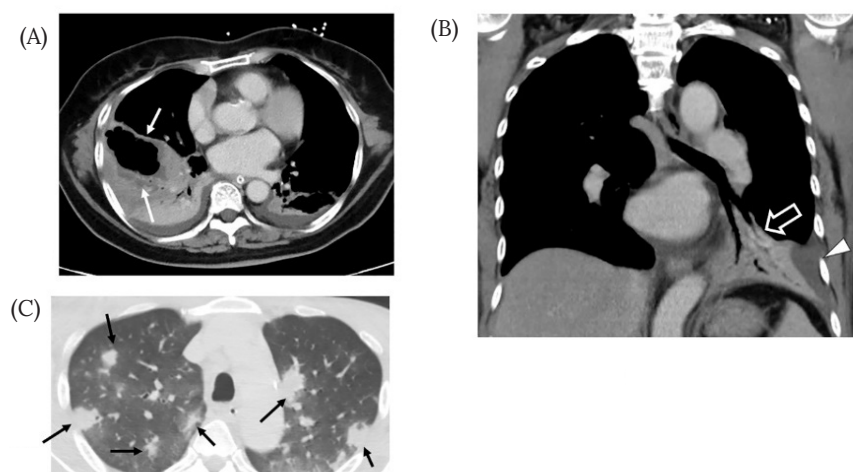


Figure 1. Patterns of lung involvement in melioidosis in 3 patients. (A) Axial CT of a lung abscess in a 65-year-old woman shows a cavity in the right lung (arrows). (B) Coronal CT displayed in soft tissue windows of a 59-year-old woman shows lung consolidation in the left lower lobe (open arrow) and pleural effusion (arrowhead). (C) Axial CT of a 45-year-old man shows multiple nodules, representing septic emboli (black arrows).

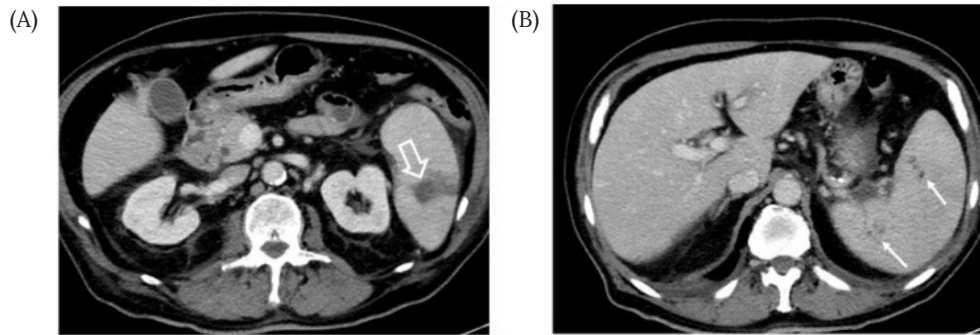


Figure 2. Splenic abscesses in a 70-year-old man. Axial CT shows (A) a large abscess (open arrow) and (B) clusters of microabscesses (arrows).

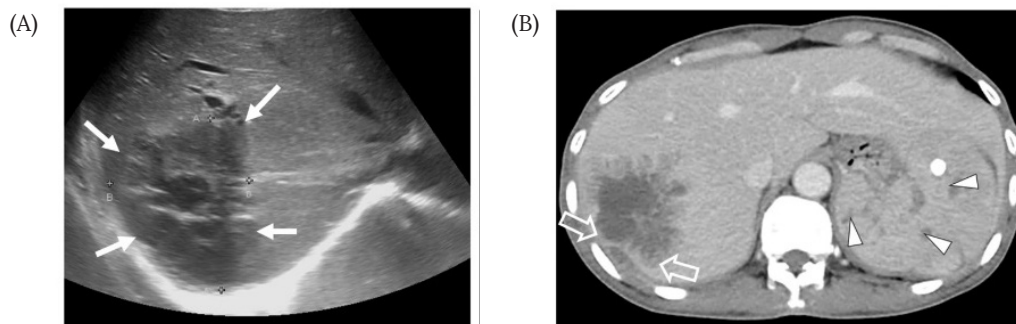


Figure 3. Liver abscesses in a 52-year-old man. (A) The US of the liver shows a multiloculated liver abscess (arrow). (B) Axial CT shows a liver abscess with a ruptured wall (open arrows) and multiple microabscesses in the spleen (arrowheads).



Figure 4. Prostatic abscess in a 50-year-old man. Coronal CT shows an abscess (arrow) [UB, urinary bladder].

the infected sites in eight patients (24.24%), and MRI was performed in 5 patients for diagnosis or treatment planning.

The patients were initially treated by antibiotics, either ceftazidime or meropenem, except for one asymptomatic patient whose melioidosis was incidentally detected from a dissected lymph node as part of a treatment for thyroid cancer (Table 2, case 14). Among the 33 patients, 16 (48.48%) completed the course of treatment at our hospital with favorable outcomes, while nine (27.27%)

were referred to local hospitals for treatment. Six patients had poor outcomes (18.18%): four died, and two were discharged from the hospital while in unstable clinical status. These six patients all had positive blood cultures.

DISCUSSION

This case series provides a comprehensive overview of melioidosis, highlighting the need for a combination of clinical presentations, identification of patient risk factors, and the utility

Table 2. Clinical and imaging findings of 19 patients with hemoculture positive

Case	Sex/ age	Symptom	Risk factor	Positive other specimens	Chest X-ray	US	CT	MRI	Outcome
1	M/44	Fever	DM, Smoking, Alc, HIV	Sputum	Y patchy RLL/LLL	N/A	Y liver & spleen microabscesses	N/A	C
2	M/45	Fever Facial and abdominal pain	Smoking, Alc	-	N/A	N/A	Y lung septic emboli, abscesses in neck muscles and adrenal gland	N/A	C
3	M/75	Fever	Smoking, Alc	-	N/A	N/A	Y spleen large & micro-ab- scesses	N/A	C
4	M/50	Pyuria	DM, Smoking, CKD, Thalas- semia, RHD	Urine	N	N/A	Y prostate abscess epididymorchitis	N/A	C
5	M/68	Fever Respirato- ry distress	DM, Lung cancer	-	N	N/A	N/A	N/A	C
6	F/65	Fever Abdominal pain	DM, Smoking, CLD	Pus (lung ab- scess)	Y lung abscess RUL	N/A	Y septic emboli lung abscess pleural effusion	N/A	C
7	M/28	Gluteal and sacral pain	DM	Pus (bone and gluteal soft tissue)	Y patchy RUL	N abdo- men	Y patchy RML	Y liver micro- abscesses, sacrum os- teomyelitis	C
8	M/67	Fever Respirato- ry distress	DM, Thal- assemia	Sputum	N/A	N/A	Y spleen microabscess	N/A	C
9	M/69	Fever Productive cough Diarrhea Pyuria	Smoking, CKD, CLD	Urine	N	N/A	N/A	N/A	C
10	M/63	Fever Pyuria	-	Urine	N/A	N/A	Y peribronchial infiltra- tion RUL kidney& prostate abscesses	N/A	C
11	M/63	Fever Productive cough	Smoking, Alc	-	Y patchy LUL	N/A	N/A	N/A	R
12	M/58	Fever Lower limb pain	CKD	-	N	N	N/A	N	R

Table 2. Clinical and imaging findings of 19 patients with hemoculture positive (continued)

Case	Sex/ age	Symptom	Risk factor	Positive other specimens	Chest X-ray	US	CT	MRI	Outcome
13	F/59	Fever Chest pain	DM, CKD, Soil contact	Pleural fluid	Y patchy LLL pleural fluid	Y pleu- ral effu- sion	Y patchy LLL pleural effusion	N/A	R
14	M/62	SVC syn- drome	DM, Smoking, CKD	Mediastinal lymph node	Y right paratra- cheal mass	N/A	Y necrotic lymph node	N/A	D 3 days
15	M/48	Fever Respirato- ry distress Abdominal pain	DM Hepato- cellular carcinoma	Ascitic fluid	N	N/A	Y ascites	N/A	D 13 days
16	F/58	Fever Respirato- ry distress Diarrhea	-	-	Y patchy RLL, LLL	N/A	Y septic emboli patchy RLL/LLL	N/A	D 2 days
17	F/71	Fever	DM, CLD, RHD	-	Y septic emboli	N/A	N/A	N/A	D 6 days
18	M/89	Respirato- ry distress Pyuria	DM, Smoking, CLD	Urine	Y patchy RLL, LLL	N/A	Y patchy RLL, LLL pleural effusion prostate abscess	N/A	U
19	M/80	Fever Respirato- ry distress Diarrhea	Alc, Soil contact	Sputum	Y patchy RLL	N/A	Y patchy RLL pleural effusion	N/A	U

Y, positive; N, negative; N/A, the study was not performed; DM, diabetes mellitus; Alc, alcohol drinking; CKD, chronic kidney disease; CLD, chronic lung disease; RHD, rheumatic heart disease; SLE, systemic lupus erythematosus; HIV, human immunodeficiency virus infection; SVC syndrome, superior vena cava syndrome; RML, right middle lobe of the lung; RLL, right lower lobe of the lung; LUL, left upper lobe of the lung; LLL, left lower lobe of the lung; C, Complete treatment at our site; R, referred to local hospital; D, death; U, patient-initiated discharge with unstable condition - patient refused further treatment and chose to continue care at home

of imaging studies in the diagnosis. Findings indicate that patients with positive blood cultures have a higher risk of death. The clinical presentations were varied, and a majority of the patients had risk factors. In terms of diagnostic imaging, a chest radiograph proved beneficial in identifying infection in the lung, which is the most common infected site in melioidosis (20). Additionally, in this study lung involvement suggested septicemia and a severe form of the disease. This supports the value of chest radiographs as an effective initial investigation, which should be performed in all patients when there is suspicion of melioidosis (6). CT, MRI, and US provide a more comprehen-

sive assessment and help target sites for clinical specimens.

Each imaging modality has distinct strengths and limitations. US is a radiation-free method that is particularly useful for detecting intra-abdominal infections such as hepatic, splenic, and renal abscesses, as well as musculoskeletal conditions like muscle abscesses or joint effusions. However, its utility is limited in evaluating deep-seated infections, and accuracy may be affected by operator experience or obscuration from bowel gas. CT is highly effective in identifying multiple lesions in the chest, abdominal organs, and deep musculoskeletal structures such as the spine. Contrast-

enhanced CT is especially valuable for delineating abscesses, although the use of iodinated contrast carries risks of adverse reactions and renal function deterioration. Nevertheless, CT remains a preferred modality in emergency settings and for critically ill patients who cannot tolerate the longer scan times required for MRI. MRI is superior for assessing osteoarticular involvement due to its excellent ability to demonstrate both bone lesions and soft tissue extension. In addition, MRI provides high sensitivity for central nervous system disease, detecting small brain abscesses, meningitis, cerebral edema, and spinal cord compression.

CT is a highly effective imaging modality for detecting subtle lung lesions and other visceral organ infections. It helps define the extent and severity of the disease, as multiple organ involvement is common (approximately 49% in our series) (20). CT can detect pulmonary septic emboli that may not be visible on chest radiographs (Figure 5, Table 3 case 1). Imaging findings of melioidosis in the lung are variable, depending on the severity and stages of the disease. During bacteremia, the presence of septic emboli in both lungs is the most common pattern (16). Melioidosis can present as acute pneumonia with solitary or multifocal patchy infiltration. In the chronic stage, pulmonary melioidosis is seen as fibronodular infiltration, resembling pulmonary tuberculosis (10, 16, 17). CT is more sensitive than chest radiography for detecting subtle pulmonary lesions, especially in the early stages of fatal disseminated melioidosis (21). Therefore, chest CT should be considered in patients with high clinical suspicion despite negative chest radiographs.

This study highlights the role of advanced imaging studies like CT, US, and MRI. CT is particularly valuable in detecting localized infections in visceral organs. However, the features of melioidosis in visceral organs are variable and are not specific to melioidosis. Patterns of lesions can be multiple small microabscesses or large uni- or multi-locular abscesses (22). The US can help detect abscesses in the liver and spleen as well as soft tissue lesions (13). MRI, on the other hand, is useful in evaluating osteoarticular infections (five patients in our series) (13, 23). In this study, it was shown to be more effective than CT and US in detecting liver microabscess (Figure 6, Table 2 case 7).

Four patients in this study presented with pyuria, of whom three had CT scans revealing prostatic abscesses. Transrectal ultrasound is recommended for prostatic abscesses as the first-line investigation (24), and drainage can be performed via transrectal ultrasound guidance. However, due to the need for a special ultrasound probe and trained operators, as well as the invasiveness of this procedure, it may not be accessible for all cases. CT is a useful alternative tool and offers the additional advantage of measuring the abscess size, which is crucial when drainage is recommended for abscesses larger than 2 cm (24). CT also helps detect other urogenital organ involvements, such as the kidney or testis (24, 25). Melioidotic prostatic abscesses have imaging features that overlap with other pyogenic abscesses (12). Gas-forming (emphysematous) abscesses, however, are most often due to *Klebsiella pneumoniae* (26).

Spondylitis was found in one patient who presented with febrile illness and liver abscesses. Melioidotic spondylitis demonstrates highly variable patterns, and imaging alone cannot reliably distinguish it from other etiologies. Rapid structural destruction may resemble pyogenic infection, whereas a more indolent course with gradual bone loss, large abscesses, and minimal inflammatory response can mimic granulomatous infections such as tuberculosis, brucellosis, or fungal spondylitis. The presence of disseminated



Figure 5. Subtle septic emboli in a 52-year-old man with septic arthritis and osteomyelitis of the shoulder who underwent a CT examination to search for visceral organ involvement as part of an evaluation of persistent fever. Axial CT in the lung window shows septic emboli (arrows) which were undetectable by chest radiographs (not shown)

Table 3. Clinical and imaging findings of 14 patients with positive cultures from specific organs

Case	Sex/ age	Symptom	Risk factor	Specimens	Chest X-ray	XR	US	CT	MRI	Outcome
1	M/52	Fever Right shoulder pain Leg pain	DM, Smok- ing, Alc	Pus Joint fluid	N	N shoul- der	Y pretibial soft tissue abscess	Y lung septic emboli necrotic lymph nodes	Y shoulder osteomy- elitis septic arthritis	C
2	M/30	Right facial pain	Alc	Pus	N	N/A	N/A	Y preorbital cellulitis	N/A	C
3	M/56	Fever Epigastri- um pain	DM, Alc, Thalas- semia	Pus liver	N	N/A	Y liver multi- loculated & micro- abscesses spleen micro- abscesses	Y liver spleen abscesses	N/A	C
4	M/49	Knee pain	Soil contact, HIV	Pus	N	Y osteo- myeli- tis	N/A	N/A	Y osteomy- elitis septic arthritis	C
5	F/74	Lower limb pain	DM	Pus	N/A	N/A	Y necrotizing fasciitis	N/A	Y necrotizing fasciitis	C
6	F/72	Enlarge cervical neck with sinus tract	Soil contact	Pus	N	N/A	N/A	N/A	N/A	C
7	M/60	Fever	DM, Smok- ing	Bronchoal- veolar lavage Mediastinal lymph node	Y patchy RML	N/A	N/A	Y bronchoalveolar infiltration (tree-in-bud) necrotic medi- astinal lymph node spleen micro- abscesses	N/A	C
8	M/53	Fever Back pain	-	Pus psoas muscle and liver	N/A	Y spon- dylitis	N/A	Y liver micro- abscesses spondylitis	Y spondylitis	R
9	M/61	Fever Draining pus from chest wall defect related to aspergil- loma	Smok- ing, Soil contact, CLD	Pus chest wall	Y chronic lung disease & fistula	N/A	N/A	Y chest wall fistula and abscesses	N/A	R
10	M/49	Fever Abdominal pain	DM	Pus	N/A	N/A	Y spleen abscess	Y spleen abscess	N/A	R
11	F/40	Headache	SLE	Pus	N/A	N/A	N/A	Y Brain abscess	N/A	R

Table 3. Clinical and imaging findings of 14 patients with positive cultures from specific organs (continued)

Case	Sex/ age	Symptom	Risk factor	Specimens	Chest X-ray	XR	US	CT	MRI	Outcome
12	M/63	Fever	-	Pus	N	N/A	N/A	Y necrotic medi- astinal lymph- node	N/A	R
13	M/45	Fever	Alc	Urine	N	N/A	N/A	N/A	N/A	R
14	F/21	Incidental finding from neck node dis- section	Thyroid cancer	Lymph node	N	N/A	N	N/A	N/A	No treatment

Y, positive, N, negative; N/A, the study was not performed; DM, diabetes mellitus; Alc, alcohol drinking; CLD, chronic lung disease; SLE, systemic lupus erythematosus; HIV, human immunodeficiency virus infection; RML, right middle lobe of the lung; XR, radiograph of the location with pain; C, complete treatment at our site; R, referred to local hospitals

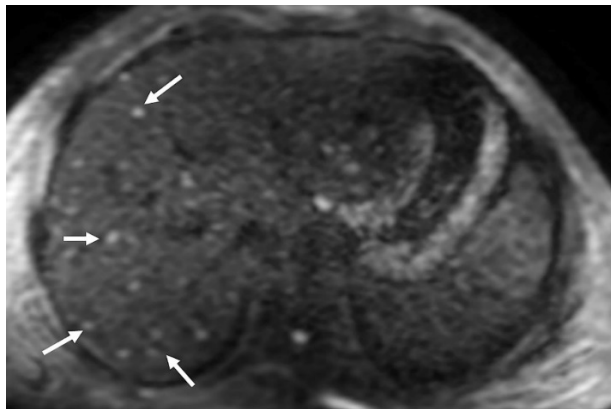


Figure 6. A 28-year-old man with diabetes mellitus initially presented with gluteal and sacral pain, and later complained of abdominal discomfort. US and CT of the abdomen were unremarkable (not shown). Axial MRI on diffusion-weighted image (b value 800) shows bright signal intensity of multiple microabscesses in the liver (arrows)

disease and additional organ lesions in patients with risk factors who are living in or travelling to endemic regions can help narrow the differential diagnosis toward melioidosis (27).

Adrenalitis is a rare manifestation of melioidosis with only a few reported cases (28, 29). The CT findings of the case in the present study (Figure 7, Table 2 case 2) revealed an enlarged adrenal gland with peripheral rim enhancement and central low attenuation, indicating a suppurative abscess. Other infectious diseases such as adrenal tuberculosis and histoplasmosis in the early stage can present similar features. In the later stages, adrenal tuberculosis and histoplasmosis show gland atrophy and calcification (30, 31). Hemor-

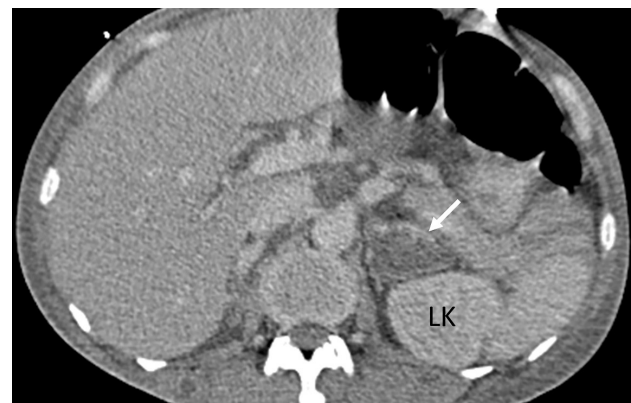


Figure 7. A 45-year-old male smoker with chronic alcohol consumption presented with facial and abdominal pain. CT of the abdomen shows a left adrenal abscess with thin peripheral rim enhancement and central low attenuation (arrow). [LK, left kidney]

rhagic tumors of the adrenal gland can mimic adrenal abscesses. Primary adrenal gland tumors associated with hemorrhage include pseudocyst, myelolipoma, adrenal hemangioma, pheochromocytoma, and adrenocortical carcinomas. Common hemorrhagic metastasis tumors are bronchogenic carcinoma and malignant melanoma. The presence of a thickened irregular rim of a tumor component or tumoral fat can help distinguish tumors from adrenal abscesses (31).

Surprisingly, one patient diagnosed with thyroid cancer presented with a lymph node culture positive for melioidosis as an incidental finding. This case aligns with the pathophysiology of melioidosis, where *B. pseudomallei* can evade immune detection by invading various cell types, such as

macrophages. This mechanism enables the bacterium to persist in a latent form that may reactivate when the host's immune system is compromised (1, 6). To the best of our knowledge, there are no specific guidelines for managing asymptomatic individuals with positive *B. pseudomallei* cultures. Recent recommendations for patients with lymphadenopathy or culture-positive resected specimens from deep-seated infections suggest medical treatment consisting of a 4-week intensive phase with intravenous therapy, followed by a 3-month eradication phase with oral antibiotics (32).

The present study has several limitations. First, it was conducted within a single institution in Chiang Mai, Thailand, which may limit the generalizability of its findings to other regions where melioidosis is endemic. Additionally, the study's small sample size restricted its ability to capture the full spectrum of clinical and imaging features of the disease. Many patients had multiple comorbidities, making it difficult to distinguish clinical and imaging features directly attributable to melioidosis from those arising from other underlying conditions. This issue was compounded by the presence of nonspecific symptoms in some patients, which complicated efforts to confirm melioidosis as the primary diagnosis. Additionally, the study was affected by the structure of Maharaj Nakorn Chiang Mai Hospital as a tertiary referral center. Some patients were discharged to primary care facilities for further treatment, which limited assessment of treatment outcomes. Variations in imaging procedures performed during the disease episode complicated comparing findings across cases.

CONCLUSIONS

In conclusion, melioidosis has diverse clinical and imaging patterns. Awareness should be raised in the case of patients with febrile illness or signs of infection, particularly those with risk factors for melioidosis. The selection of imaging modalities should be tailored based on the fact that the lung is the most commonly affected site, and many patients have multiple organ involvement. Chest radiographs should be performed in all cases at the initial stage. CT of the chest should be performed in severely ill patients with bacteremia, even those with negative chest radiographs. CT of the abdomen is useful when

intra-abdominal organ involvement is suspected and in males with pyuria.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR CONTRIBUTIONS

N.P.: conceptualization, data curation, investigation, formal analysis, writing – review and editing; N.W.: writing – original draft, investigation, formal analysis; W.W.: writing—original draft, investigation, formal analysis; S.K.: writing – original draft, investigation, formal analysis; S.S.: writing—original draft, investigation, formal analysis; P.K.: data providing, writing—review and editing.

DATA AVAILABILITY STATEMENT

The datasets used in the current study are available from the corresponding author on reasonable request.

INSTITUTIONAL REVIEW BOARD STATEMENT

Ethical approval for this study was obtained from the Institutional Review Board (RAD-2567-0186, approval date April 17, 2024)

INFORMED CONSENT STATEMENT

Informed consent was waived due to the retrospective design of the study and the use of anonymized data.

SUPPLEMENTARY MATERIALS

The following supporting information can be downloaded at: [Supplementary appendix](#)

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Supplementary Table 1 Specimens obtained for cultures and where *B. pseudomallei* was isolated in 19 patients with hemoculture positive.

Case	Sex/Age	Obtained specimens	Positive specimens
1	M/44	Blood, liver, spleen, sputum, urine	Blood, sputum
2	M/45	Blood kidney muscle	Blood
3	M/75	Blood, spleen	Blood
4	M/50	Blood, urine	Blood, urine
5	M/68	Blood, sputum, urine	Blood
6	F/65	Blood, lung (lung abscess), sputum, stool	Blood, pus (lung abscess)
7	M/28	Blood, bone, muscle, sputum, urine	Blood, pus (bone and gluteal soft tissue)
8	M/67	Blood, sputum, urine	Blood, sputum
9	M/69	Blood, sputum, urine	Blood, urine
10	M/63	Blood, urine, stool	Blood, urine
11	M/63	Blood, lymphnode, lung (pleural eff)	Blood
12	M/58	Blood	Blood
13	F/59	Blood, lung (pleural effusion)	Blood, pleural fluid
14	M/62	Blood, lymphnode	Blood, mediastinal lymph node
15	M/48	Blood, ascites fluid	Blood, ascitic fluid
16	F/58	Blood	Blood
17	F/71	Blood	Blood
18	M/89	Blood, sputum, urine	Blood, urine
19	M/80	Blood, sputum, urine	Blood, sputum

Supplementary Table 2 Specimens obtained for cultures and where *B. pseudomallei* was isolated in 14 patients with positive culture from specific organs.

Case	Sex/Age	Obtained specimens	Positive specimens
1	M/52	Blood, sputum, pus and joint fluid (shoulder)	Pus and joint fluid (shoulder)
2	M/30	Pus (right cheek)	Pus (right cheek)
3	M/56	Sputum, liver, spleen, urine	Pus (liver)
4	M/49	Synovial fluid	Synovial fluid
5	F/74	Pus (lower limb muscle)	Pus (lower limb muscle)
6	F/72	Blood, lymph node	Pus (lymphnode)
7	M/60	Blood, lung, lymph node	Bronchoalveolar lavage, Mediastinal lymph node
8	M/53	Psoas muscle, liver, bone, urine	Pus (psoas muscle and liver)
9	M/61	Blood, lung (chest wall fistula and abscesses)	Pus (chest wall)
10	M/49	Spleen	Pus (spleen)
11	F/40	Brain	Pus (brain)
12	M/63	Lung, lymphnode, sputum, urine	Pus (Necrotic mediastinal node)
13	M/45	Blood, urine	Urine
14	F/21	Lymph node	Lymph node