

A Prolonged Course of Hepatosplenic Melioidosis with Persistent Abscesses in Transfusion-Dependent β -Thalassemia Before Hematopoietic Stem Cell Transplantation: A Case Report

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Case Report

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Abstract

Background: Melioidosis is a tropical infection caused by *Burkholderia pseudomallei* and commonly involves deep-seated abscess formation in multiple organs. Thalassemia has been identified as an independent risk factor for melioidosis infection. However, optimal diagnostic and therapeutic strategies for hepatosplenic abscesses caused by melioidosis in patients with transfusion-dependent β -thalassemia remain unclear.

Case presentation: We report a 17-year-old male patient with transfusion-dependent β -thalassemia from Hainan Province, China, an endemic area for melioidosis. Long-term transfusion therapy resulted in iron overload and increased susceptibility to infection. Since 2018, he had experienced recurrent episodes of fever. In 2022, *Burkholderia pseudomallei* was isolated from liver abscess aspirate culture, confirming melioidosis infection with hepatosplenic abscess formation. The patient received sequential antimicrobial therapy including ceftazidime, imipenem, and doxycycline; however, residual lesions persisted in the liver and spleen. To reduce the risk of infection recurrence during the immunosuppressive period associated with hematopoietic stem cell transplantation, staged laparoscopic debridement of the abdominal lesions was performed. Following surgery, the abscesses gradually resolved, leaving only calcified lesions. After effective infection control, the patient successfully underwent allogeneic hematopoietic stem cell transplantation, with no evidence of recurrence during follow-up.

Conclusion: This case emphasizes the importance of considering melioidosis in adolescents with transfusion-dependent β -thalassemia who develop refractory hepatosplenic abscesses in endemic regions. Early pathogen identification through abscess aspiration and timely evaluation for surgical debridement are crucial for infection control. This case provides clinical insights into the diagnosis, management, and pre-transplant infection prevention strategies for similar high-risk patients.

Background

Burkholderia pseudomallei is an intracellular pathogen transmitted through broken skin, the respiratory tract, or contaminated water. Severe melioidosis may cause disseminated abscesses, organ dysfunction, and recurrence, particularly in patients with impaired immunity^{1,2,3}. Clinical manifestations vary widely, ranging from localized abscesses to septicemia and multiple organ involvement. The ability of *B. pseudomallei* to persist within host cells and evade immune clearance contributes to prolonged infection⁴. Patients with transfusion-dependent β -thalassemia major have impaired immune defenses. Long-term transfusion therapy can result in iron overload, which further compromises host immunity^{5,6}. In addition, reduced splenic function or splenectomy may increase susceptibility to intracellular pathogens⁷. Therefore, patients with thalassemia are at increased risk of developing deep-seated hepatic and splenic abscesses, which are difficult to eradicate and may recur^{1,2}. Although reported cases have increased, the diagnosis and management of hepatosplenic melioidosis in patients with β -thalassemia major remain challenging due to nonspecific clinical manifestations and the lack of routine

screening strategies. No consensus currently defines the optimal antimicrobial duration, timing of surgery, or infection control criteria before transplantation. Antimicrobial therapy alone may be insufficient for persistent deep-seated abscesses, and additional interventions may be required. In endemic regions, melioidosis should be considered in adolescents with β -thalassemia major and refractory hepatosplenic abscesses. Early aspiration-based pathogen identification and multidisciplinary evaluation for surgical intervention may facilitate timely diagnosis and management.

Case presentation

Patient information

The patient was a 17-year-old boy at the last follow-up and had lived in Hainan, a melioidosis-endemic region, for many years. He was diagnosed with transfusion-dependent β -thalassemia major at 1 year of age and had received regular blood transfusion support for 16 years. At 9 years of age, he developed iron overload and subsequently received regular iron chelation therapy with deferasirox, deferoxamine, and deferiprone. At 10 years of age, hepatic and splenic abscesses were first identified. At 14 years of age, he was diagnosed with melioidosis. In 2024, after infection control was achieved, he underwent allogeneic hematopoietic stem cell transplantation.

Clinical findings and diagnosis

The patient was first found to have hepatic and splenic abscesses in 2018. Ultrasound- and CT-guided liver abscess aspiration was performed; however, specific testing for *Burkholderia pseudomallei* was not performed at that time. In 2019, imaging showed progressive lesions with intrahepatic calcification, splenomegaly, and possible bone involvement, suggesting a chronic infectious process (Figure 1A). However, microbiological confirmation was not obtained.

In 2020, the abscesses continued to enlarge and involved adjacent vessels and lymph nodes. Liver biopsy revealed severe hepatic iron overload (Figure 1B). From 2021 to 2022, the patient developed progressive liver fibrosis, portal hypertension, and chronic osteomyelitis (Figure 1C–D). During this period, he experienced recurrent high fever (maximum temperature, 40°C) and required five hospital admissions because of persistent hepatosplenic lesions.

The patient received multiple empirical antimicrobial regimens based on clinical conditions and drug tolerance. Although these treatments provided temporary symptom relief, follow-up imaging demonstrated persistent and progressive lesions. In 2022, because of inadequate response to prolonged antimicrobial therapy, ultrasound-guided liver aspiration was repeated. Pathogen sequencing and microbiological examination confirmed *Burkholderia pseudomallei* infection, establishing the diagnosis of hepatosplenic melioidosis.

Treatment and follow-up

After diagnosis, the patient received a standard two-stage antimicrobial regimen for melioidosis. During the intensive phase, ceftazidime was administered intravenously at 40 mg/kg every 8 hours. During the eradication phase, trimethoprim-sulfamethoxazole was initially used; however, it was discontinued because of delayed hypersensitivity. The regimen was subsequently adjusted to imipenem-cilastatin followed by amoxicillin-clavulanate potassium (Figure 1E). The patient completed the antimicrobial course with a stepwise treatment strategy.

Despite prolonged antimicrobial therapy, the hepatic and splenic abscesses persisted. Because the lesions had developed fibrous capsules and remained difficult to eradicate, surgical intervention was considered. In February 2023, the patient underwent laparoscopic partial splenectomy and hepatic wedge resection. Postoperatively, fever developed, and vancomycin was administered; however, the clinical response was limited. In May 2023, imipenem combined with doxycycline was restarted. In December 2023, pathogen testing of liver aspiration specimens was negative; however, residual infection could not be completely excluded because ongoing antimicrobial therapy might have affected the results.

In February 2024, the patient underwent a second laparoscopic procedure, including total splenectomy and removal of residual hepatic abscesses. Thirty days after surgery, imaging showed only intrahepatic calcification without active abscess formation. Inflammatory markers and pathogen tests remained negative. Based on clinical, laboratory, and radiological evaluation, infection control was considered achieved, and the patient subsequently underwent allogeneic umbilical cord blood hematopoietic stem cell transplantation.

During transplantation, the patient received low-dose trimethoprim-sulfamethoxazole prophylaxis without allergic reactions. After transplantation, he developed viral infection, liver injury, and hemorrhagic cystitis, which improved after supportive treatment. During follow-up, no recurrence of melioidosis was observed. The clinical course, including diagnosis, staged treatment, transplantation, and long-term follow-up from 2018 to 2025, is summarized in Figure 2.

Discussion

Burkholderia pseudomallei can survive within host cells, and the fibrous capsule of abscesses can limit antibiotic penetration. In this case, may have contributed to persistent infection and intracellular survival⁸. Reduced splenic function further weakened immune defense and increased the risk of persistent deep abscesses, allowing bacteria to remain in lesions for a long time⁹. After treatment with carbapenem combined with doxycycline, the lesions only slightly decreased, with residual hepatic and splenic abscesses and recurrent inflammation. These findings suggest that residual encapsulated abscesses may have contributed to incomplete response to antimicrobial therapy alone.

The patient developed recurrent fever at 10 years of age in 2018, and imaging showed encapsulated hepatic and splenic abscesses. Bone destruction appeared in the following year, suggesting possible disseminated infection. However, early aspiration samples were not tested specifically for *Burkholderia*

pseudomallei, and clinicians had limited awareness of the high risk of melioidosis in patients with β -thalassemia major. Therefore, the diagnosis was delayed for nearly four years. This delay resulted in irreversible organ damage and persistent hidden infection sites. The patient required staged laparoscopic surgery to remove the abscesses and reduce the risk of recurrence after transplantation-related immunosuppression^{4,7,10}. The prolonged infection period delayed the optimal timing of transplantation. Long-term infection and severe transfusion-related iron overload contributed to liver fibrosis, portal hypertension, and osteomyelitis. In this patient, antimicrobial therapy alone was insufficient to achieve complete resolution of the lesions.

The treatment of melioidosis includes two stages: an intensive phase and an eradication phase. During the intensive phase, patients usually receive ceftazidime or carbapenems, and patients with severe abscesses may also require surgical debridement. During the eradication phase, trimethoprim-sulfamethoxazole is the preferred treatment. In this case, the patient developed an allergic reaction to trimethoprim-sulfamethoxazole and was switched to amoxicillin-clavulanate. However, amoxicillin-clavulanate may have limited eradication efficacy, and patients require long-term follow-up based on antimicrobial susceptibility results^{4,11,12}. In this case, ceftazidime alone showed limited effectiveness. The patient's iron overload may impair host defense and contribute to persistent infection.⁸

Patients with β -thalassemia major who develop extensive hepatic and splenic abscesses and respond poorly to antimicrobial therapy require early multidisciplinary evaluation. These patients may need surgical debridement to reduce the risk of infection recurrence after transplantation. Previous studies have shown that outcomes vary among similar cases. Antimicrobial therapy alone may result in severe complications, including multiple organ failure. Combined drainage or surgical treatment may improve clinical outcomes^{2,3}.

In 2023, the patient had a high risk of surgical bleeding due to portal hypertension and impaired liver function. Therefore, the first surgery only included partial splenectomy and wedge resection of the liver, rather than complete removal of all lesions. After surgery, the patient continued standard antimicrobial therapy for nearly one year. During this period, the abscesses gradually decreased in size and became more limited. In 2024, the patient underwent a second surgery with total splenectomy and removal of the remaining hepatic abscesses. After surgery, the abscess cavities disappeared, with only calcified lesions remaining. These findings suggest that individualized staged surgery is an effective approach for controlling persistent infection.

No unified criteria are currently available for infection control before transplantation in patients with β -thalassemia major complicated by hepatosplenic melioidosis. After multidisciplinary evaluation, the patient received hematopoietic stem cell transplantation 30 days after the second surgery. At that time, the patient showed no clinical symptoms, and inflammatory markers, imaging findings, and pathogen tests indicated complete infection control. This strategy may have reduced the potential risk of melioidosis recurrence during transplantation-related immunosuppression. During follow-up, the patient

had no signs of recurrence. This case provides practical considerations for the diagnosis and multidisciplinary management of similar high-risk patients.

Limitations

This report has several limitations. First, the patient did not receive specific testing for *Burkholderia pseudomallei* in all previous specimens collected from 2018 to 2022. Therefore, earlier undetected infection or co-infection cannot be completely excluded. Second, the patient's complete antimicrobial susceptibility results and early treatment records were not available. Third, residual calcified lesions remained after treatment. Current methods cannot clearly distinguish between remaining viable bacteria and noninfectious tissue changes. Finally, this report describes only one patient. Therefore, further studies are required to further evaluate the role of surgical debridement and to establish appropriate criteria for infection control before hematopoietic stem cell transplantation.

Conclusion

This report describes an adolescent with β -thalassemia major who lived in a melioidosis-endemic area and developed chronic hepatosplenic melioidosis abscesses. The patient received stepwise antimicrobial therapy and staged surgical treatment. The patient achieved complete resolution of the lesions and successfully underwent hematopoietic stem cell transplantation. This case suggests that clinicians should consider melioidosis testing early when patients with β -thalassemia, iron overload, or other immune impairments develop persistent hepatic and splenic abscesses in endemic areas. For patients with residual encapsulated or multiloculated abscesses after standard antimicrobial therapy, especially those preparing for hematopoietic stem cell transplantation, clinicians should perform multidisciplinary evaluation. Early drainage or surgical removal of infection sites should be considered to reduce the risk of recurrence.

Declarations

CRedit authorship contribution statement: Jiamin Zhang: Data curation, Investigation, Writing – original draft. Yehua Wu: Supervision, Writing – review & editing. Liheng Ma: Conceptualization, Supervision, Writing – review & editing. Yuefu Zhan: Conceptualization, Supervision, Writing – review & editing. All authors read and approved the final manuscript.

Competing interests: The authors declare that they have no competing interests.

Consent for publication: Written informed consent for publication of this case report and accompanying images was obtained from the patient's guardian.

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Ethics approval and consent to participate: This case report was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committees of Shenzhen Longgang Third People's Hospital ([2026] Ethics Review No. 4) and Hainan General Hospital ([2025] Ethics Review No. 557). Written informed consent to participate was obtained from the patient's guardian. Patient information was anonymized throughout the report.

Data Availability Statement: The clinical, laboratory, and imaging data generated during this case report are not publicly available due to patient privacy concerns. De-identified data may be obtained from the corresponding author upon reasonable request.

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Figures

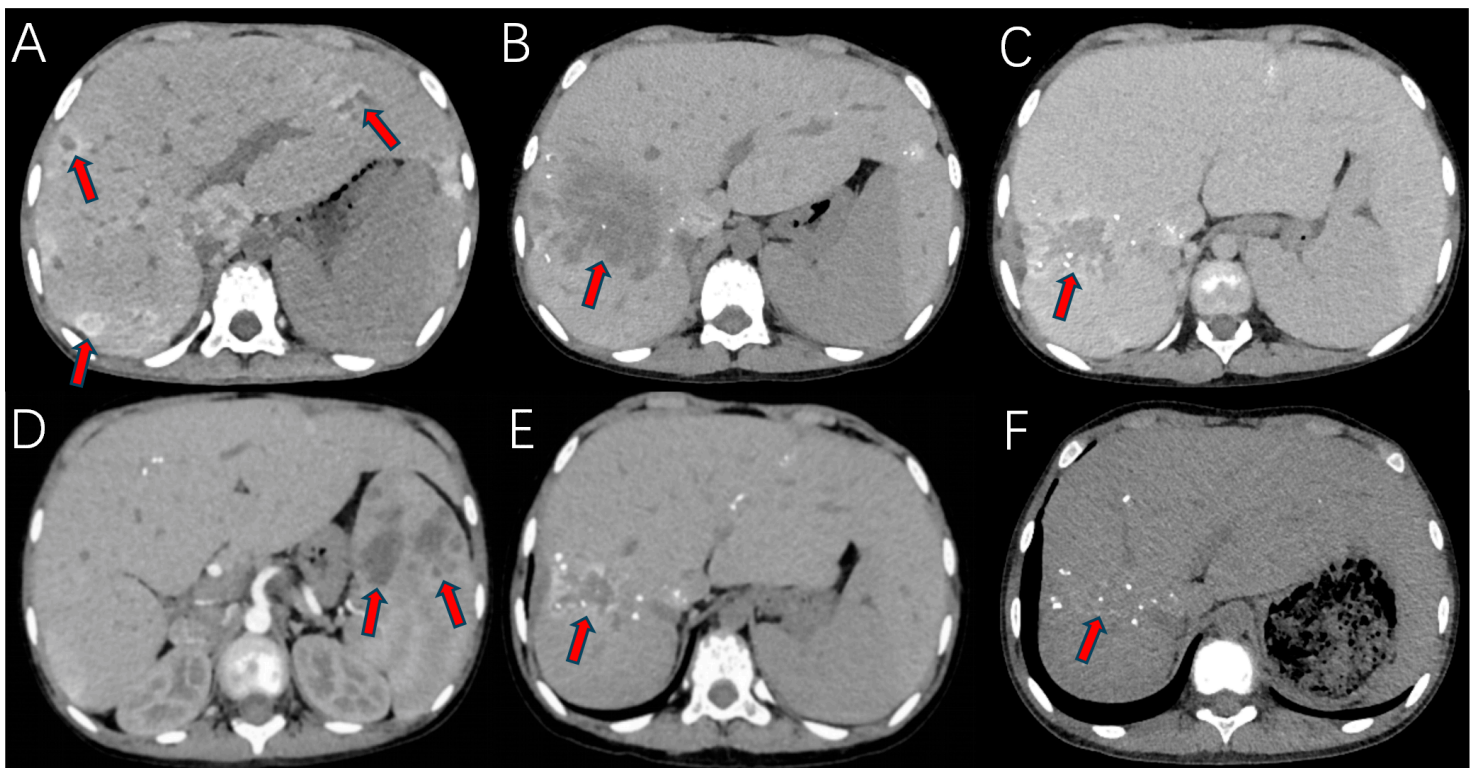


Figure 1

Serial CT changes of hepatosplenic abscesses during treatment.

A. 10 April 2019 CT, showing multiple abscesses of varying sizes scattered throughout the liver.

B. 27 September 2020 CT, showing enlargement of some abscesses compared with previous imaging, with scattered small calcifications within and around the lesions.

- C. 9 March 2022 CT, showing that most hepatic abscesses had been absorbed, with scattered calcifications within and around the lesions.
- D. 9 March 2022 CT, showing splenomegaly with multiple splenic abscesses of varying sizes.
- E. 9 December 2022 CT, showing further reduction and absorption of the previous hepatic abscesses, with increased number and enlargement of calcifications.
- F. 27 February 2024 CT, showing partial absence of the liver, complete resolution of the previous hepatic abscesses, scattered coarse intrahepatic calcifications, and non-visualization of the spleen.

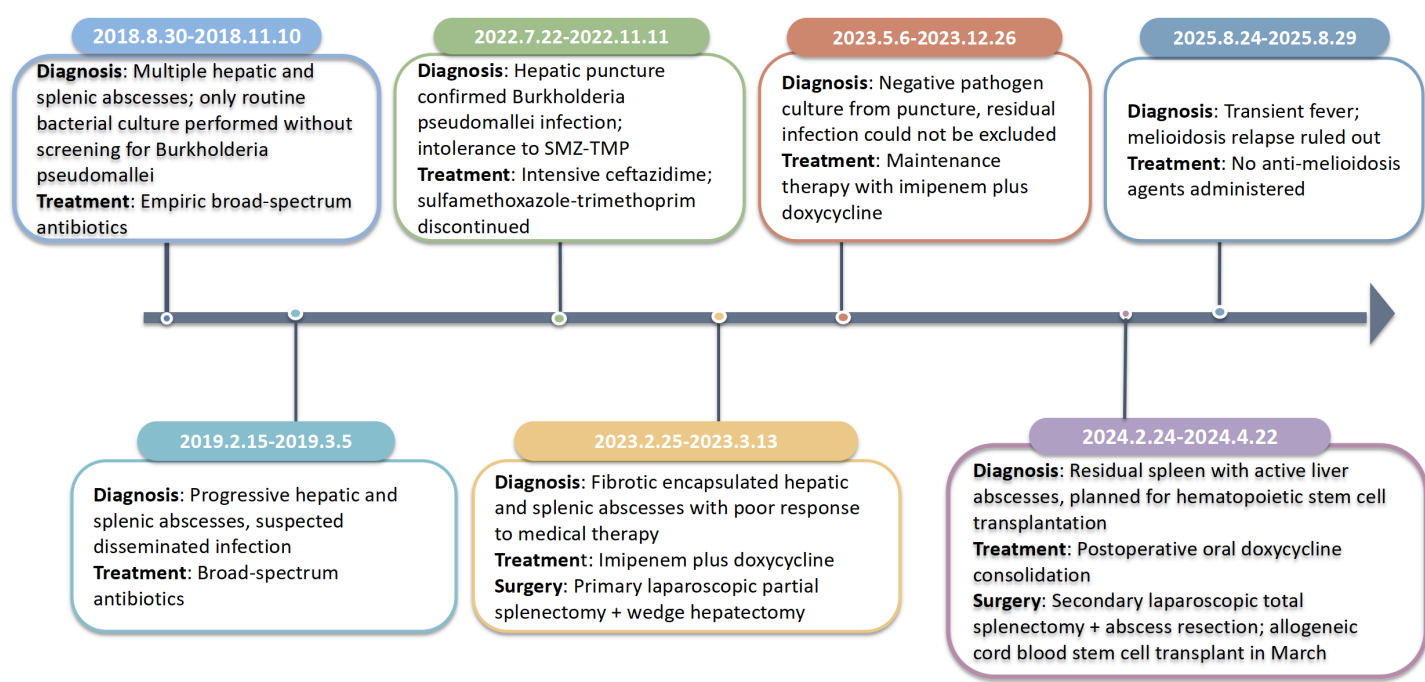


Figure 2

Summary of Key Clinical Management Course, 2018–2025