

CASE REPORT

A Case of *Mycobacterium Fortuitum* Infection in the Left Thigh

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SUMMARY

Background: In March 2024, our hospital confirmed a case of *Mycobacterium fortuitum* infection in the left thigh. In January 2024, the patient underwent buttock augmentation surgery at a private plastic surgery hospital. One month after the surgery, the patient sought medical attention at the plastic surgery hospital, due to pain in both legs while sitting. Upon examination, two subcutaneous masses were found in the left thigh, the tumors were painful to pressure, with obvious redness and swelling and elevated skin temperature; therefore, the patient was treated with intravenous infusion (cephalosporin drugs), but after one month of treatment, no significant improvement was observed. In order to seek additional diagnosis and treatment, the patient came to our hospital for treatment.

Methods: Clinical treatment of the left lower limb included wound debridement, abscess incision and drainage, and photodynamic therapy with 5-aminolevulinic acid-mediated photodynamic therapy (ALA-PDT). During surgery, subcutaneous tough tissue was taken for pathogen examination, including acid fast staining, bacterial culture, and identification. Additional auxiliary examinations: urine routine, blood routine, coagulation function, liver function, kidney function, blood lipids, and blood sugar.

Results: Bacterial acid-fast staining: positive. Bacterial Culture and Identification (MALDI-TOF MS): *Mycobacterium fortuitum*. Clinical treatment plan: clarithromycin 500 mg po bid, moxifloxacin 400 mg po qd, abscess incision and drainage, ALA-PDT. After 24 days of treatment, the patient's condition was good, the surgical incision healed well, there was no bleeding, exudation, or bruising, no redness, swelling, or tenderness, and the skin temperature was normal. The patient improved and was discharged.

Conclusions: This article reports a case of *Mycobacterium fortuitum* infection in the left thigh. The *Mycobacterium fortuitum* was quickly and accurately identified by MALDI-TOF MS, and reasonable treatment measures were adopted clinically. The patient improved and was discharged. I hope that in the future, this study can provide assistance for the clinical diagnosis and treatment of *Mycobacterium fortuitum* infections.

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KEYWORDS

Mycobacterium fortuitum, MALDI-TOF MS, ALA-PDT

CASE PRESENTATION

Case

The patient, a 41-year-old female, was diagnosed with *Mycobacterium fortuitum* infection in the left thigh in our hospital in March 2024. The patient sought medical attention at our hospital 3 months after buttock augmentation surgery and 2 months after subcutaneous mass in the left thigh was found. The patient underwent buttock augmentation surgery at a private plastic surgery hospital three months ago. One month after the surgery, pain was found in both legs while sitting, and two subcutaneous masses had appeared in the left thigh. The tumors were painful to pressure, with obvious redness and swelling and elevated skin temperature. Therefore, the patient sought medical attention at the plastic surgery hospital. Clinical doctors treated the patient with intravenous infusion (cephalosporin drugs), but after one month of treatment, no significant improvement was observed. In order to seek additional diagnosis and treatment, the patient came to our hospital for treatment. Physical examination: A significant discoloration and swelling can be seen on the left thigh of the patient, with no obvious epidermal rupture observed. Two subcutaneous nodules about the size of walnuts can be palpated, which are relatively shallow. The nodules below the thigh have a wave-like sensation (Figure A). Admission diagnosis: 1. Left lower limb mass, 2. Mycobacterium infection. Clinical implementation of left lower limb wound debridement and photodynamic therapy. During surgery, subcutaneous hard tissue was taken for pathogen examination, including acid-fast staining, bacterial culture, and identification. Additional auxiliary examinations: urine routine, blood routine, coagulation function, liver function, kidney function, blood lipids, and blood sugar. Laboratory test results, acid fast staining of bacteria: positive (Figure C). Bacterial culture and identification (MALDI-TOF MS): *Mycobacterium fortuitum* (Figure B, D). Blood routine (venous blood): The percentage of lymphocytes is 19.7%, the total number of monocytes is $0.65 \times 10^9/L$, the total number of neutrophils is $6.37 \times 10^9/L$, and the platelet ratio is 0.290%. Coagulation function: Fibrinogen test 4.43 g/L. Liver function: total protein 61.2 g/L, albumin 36.5 g, alanine aminotransferase 46.3 U/L, L- γ -Glutamyltransferase 54.7 U/L, lactate dehydrogenase 104.6 U/L. Renal function: creatinine 33.60 $\mu\text{mol/L}$, no other abnormalities observed. Clinical treatment plan: clarithromycin 500 mg po bid, moxifloxacin 400 mg po qd, abscess incision and drainage, ALA-PDT. After 24 days of treatment, the patient's condition was good, the surgical incision healed well, the outer dressing was clean and dry, and the inner dressing had no obvious bleeding or exudation. There is no redness, swelling, heat, pain, oozing blood or fluid around the incision, the skin temperature is normal, and the patient has improved and been discharged. Discharge advice: 1. Pay attention to rest and strengthen nutrition; 2. Keep the surgical area clean and dry, and apply local pressure bandaging; 3.

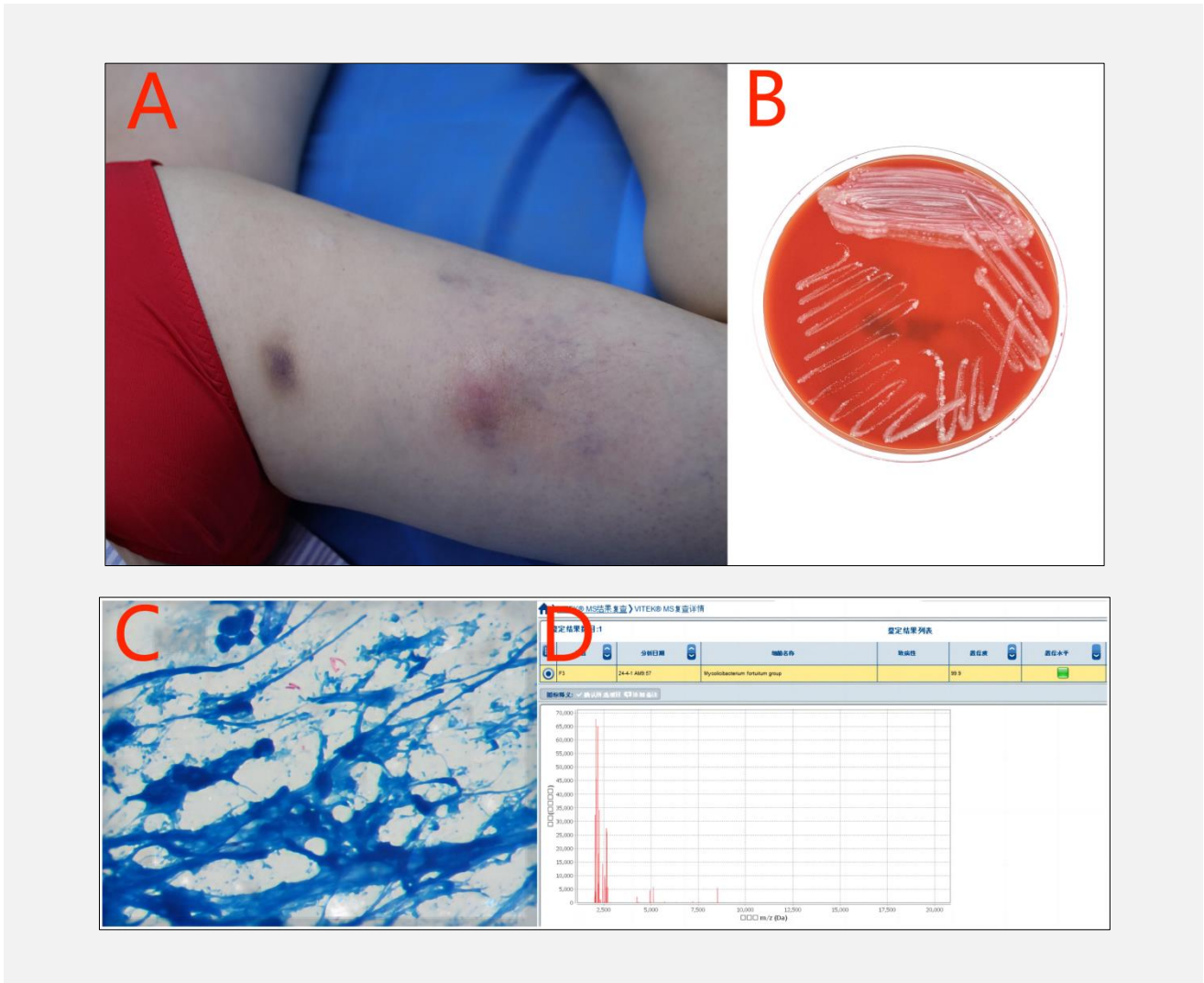
Discharge medication: Clarithromycin tablets 0.5 g po bid; Moxifloxacin hydrochloride tablets 0.4 g po qd.

DISCUSSION

Mycobacterium fortuitum was first isolated from pus in 1938. *Mycobacterium fortuitum* [1], along with *Mycobacterium turtle*, *Mycobacterium smegmae*, and *Mycobacterium grass*, belongs to the rapidly growing non tuberculosis mycobacterium (NTM) group IV in the Runyon classification system [2]. *Mycobacterium fortuitum* can cause infections in the lungs, bones, lymph nodes, skin, and soft tissues, especially in immunocompromised individuals who are susceptible to infection [3]. *Mycobacterium fortuitum* have certain drug resistance, and conventional antibiotic treatment is ineffective in treating the disease, resulting in persistent lesions that are difficult to cure [4]. In recent years, with the increasing use of invasive treatment methods, cases of iatrogenic infections have occurred from time to time. This study reported one case of iatrogenic skin *mycobacterium fortuitum* infection, which was identified by MALDI-TOF MS and treated clinically with a reasonable plan. After about one month, the patient improved and was discharged.

The causes of iatrogenic infection of *Mycobacterium fortuitum* usually include contact with contaminated medical devices (such as acupuncture and moxibustion, injection, hair transplantation, liposuction), receiving foreign implants (such as prosthetic breast implants, heart implantable devices), and contact with unclean water bodies (foot treatment, tooth extraction, and contaminated water supply systems in operating rooms) [5]. The vast majority of surgical equipment, catheters, prostheses, and indwelling devices contain silicone, stainless steel, polyvinyl chloride, and polycarbonate [6]. Various NTMs, including *Mycobacterium fortuitum*, can form biofilms on them, causing opportunistic infections [7]. In this case, the lesion occurred at the injection site, and the possible cause is considered to be 1. syringe contamination: the beauty institution used a non-disposable syringe; 2. Injection site infection: Occasional contamination of mycobacteria leads to local wound infection.

Mycobacterium fortuitum mainly cause skin and soft tissue infections, and in a few cases can cause lymph node, eye, ear, heart valve, and systemic spread [8]. Systemic symptoms such as conjunctival congestion, cough, difficulty breathing, dizziness, nausea, etc. may occur. Some cases may progress to large, fluctuating abscesses, as well as local rupture manifestations. About half of the sporadic cases of *Mycobacterium* infection only involve the skin, starting with small erythematous papules and progressing to locally infiltrating erythema, dark red nodules, abscesses, exudates, and sinus formation [1]. Pathologically, neutrophil microabscesses in the dermis and subcutaneous tissues are characteristic, but there may be tuberculosis-like granulomas with or



Clinical and bacteriological images:

Figure A. Image of left thigh lesion before treatment.

Figure B. Growth of *Mycobacterium fortuitum* on blood agar medium at 35°C, 5% CO₂, 72 hours, aerobic cultivation.

Figure C. Acid-fast staining of bacteria x 1,000.

Figure D. Identification results of *Mycobacterium fortuitum* MALDI-TOF MS.

without necrosis, and acid-fast staining may be negative. If non tuberculosis mycobacterial infection is suspected, tissue biopsy should be performed [9]. Unfortunately, clinical doctors in our hospital did not conduct histopathological examinations to determine whether the lesion had the characteristics of tuberculous granuloma.

When treating abscess patients with unknown pathogens in clinical practice, doctors need to identify the pathogens as early as possible and make accurate diagnoses to provide more accurate targeted treatment. Due to the difficulty in cultivating microorganisms and the lack of typical clinical symptoms, *Mycobacterium fortuitum* infections are often misdiagnosed [10]. This is also why the patient's condition deteriorated rapidly during the

pre-treatment period without effective drug treatment. In this case, the patient went to the local hospital for treatment on their own after experiencing clinical symptoms. It was the lack of typical clinical symptoms and outdated diagnostic techniques that led to the patient not receiving the best treatment plan. At present, the clear diagnostic measures include tissue examination, culture, and molecular analysis. It has been reported that the use of mass spectrometry (MALDI-TOF-MS), 16S rRNA gene sequencing, and mNGS can minimize the time required to diagnose the condition and course of sporadic Mycobacterium infection [11]. Therefore, in order to achieve early diagnosis, in addition to the mass spectrometry (MALDI-TOF-MS) method, molecular biology detection methods such as fungi (ITS region), bac-

teria (16sRNA region), and mycobacteria (16sRNA, Hsp65, rpoB region) can also be used to quickly, accurately, and comprehensively identify the cause of infectious skin lesions, avoiding misdiagnosis and missed diagnosis [12].

In terms of treatment, *Mycobacterium fortuitum* has strong hydrophobicity, cell wall permeability barrier, and strong β -lactamase activity. The activity of lactamases leads to resistance to multiple antibiotics and anti-tuberculosis drugs, making treatment difficult [13]. Therefore, long-term treatment and even wound debridement are needed to eliminate these infections. Based on the characteristics of bacteriology, in this case, we chose a combination of clarithromycin and moxifloxacin, which have good antibacterial activity against *Mycobacterium fortuitum*. Adjuvant treatment included abscess incision and drainage and 5-aminolevulinic acid photodynamic therapy. The hospital treatment lasted for 24 days and achieved good treatment results. After discharge, she continued to receive anti-infection treatment and regularly checked liver function. Common clinical reasons for stopping or changing medication include vomiting, elevated transaminases, hearing loss, and other adverse drug reactions. The patient in this case did not experience any discomfort during the treatment process, and the antibiotic regimen was continuously applied.

Mycobacterium fortuitum should be distinguished from *Mycobacterium tuberculosis*. 1. Infection route: *Mycobacterium tuberculosis* is mainly transmitted through respiratory and gastrointestinal transmission. The main routes of infection for non-*Mycobacterium tuberculosis* include direct contact transmission and indirect contact transmission. 2. Infectiousness: *Mycobacterium tuberculosis* has strong infectivity and is prone to cause various diseases such as pulmonary tuberculosis and lymphatic tuberculosis. The infectivity of non-*Mycobacterium tuberculosis* is relatively weak, making it less likely to cause the occurrence of various other diseases. 3. Clinical symptoms: Infection with *Mycobacterium tuberculosis* may cause symptoms such as cough, sputum, and hemoptysis. In severe cases, it may also be accompanied by physical fatigue, loss of appetite, and other symptoms. Infection with non-*Mycobacterium tuberculosis* can lead to symptoms such as fever, night sweats, weight loss, as well as skin itching and rashes [14].

In summary, this article reports a case of *Mycobacterium fortuitum* infection in the left thigh. The *Mycobacterium fortuitum* was quickly and accurately identified by MALDI-TOF-MS, and reasonable treatment measures were adopted clinically. The patient improved and was discharged. I hope this study can provide assistance for the clinical diagnosis and treatment of *Mycobacterium fortuitum* infections in the future, and promote the popularization of MALDI-TOF-MS and ALA-PDT in grass roots hospitals.

Ethics Approval and Consent to Participate:

Ethical review and approval was not required for this study. The patient provided written informed consent to participate in this study.

Consent for Publication:

The patient provided written informed consent for study publication.

Availability of Data and Materials:

The original data and materials presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

Declaration of Interest:

The authors declare no competing interests.

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