MYCOBACTERIUM ABSCESSUS SKIN AND SOFT TISSUE INFECTION A CASE REPORT AND CHALLENGES IN TREATMENT

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SUMMARY

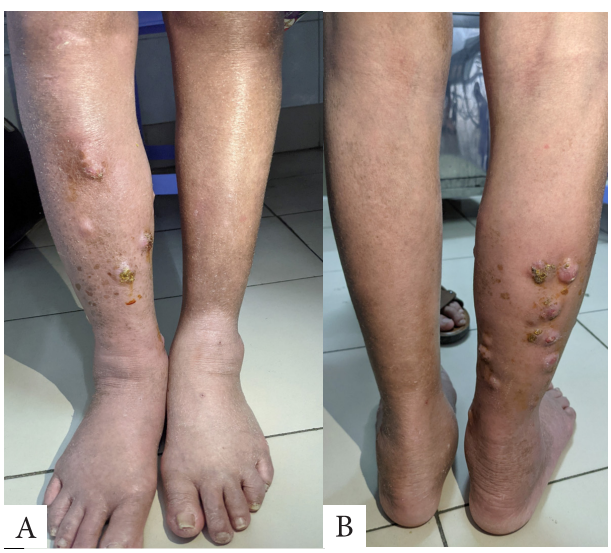
Mycobacterium abscessus complex is a group of rapidly growing, multidrug-resistant non-tuberculous mycobacteria (NTM) species causing serious respiratory and skin and soft tissue infections (SSTIs), yet often underdiagnosed and forgotten. We report the first case of *Mycobacterium abscessus* SSTIs in the National hospital of Dermatology and Venereology that we confirmed the pathology to underline the urgent concerns about this dangerous pathogen.

1. INTRODUCTION

Mycobacterium abscessus complex comprises a group of rapidly growing mycobacteria (RGM) group which is widespread in the environment. It can cause a broad range of infections including skin and soft tissue infections (SSTIs). The definitive diagnosis of *M. abscessus* infection is based on bacterial culture and identification at the lesion site or blood culture in cases of disseminated infection. The treatment involves removing the infected tissue and administering the appropriate combination of antibiotics for a prolonged period of time. Clarithromycin, amikacin, and cefoxitin is recommended for initial antibiotic therapy[1]. However, there is no consensus on the optimal treatment regimen and duration of treatment for SSTIs caused by *M. abscessus*. We present a case of *M. abscessus* SSTIs in an immunocompromised patient.

2. CASE REPORT

A 61-year-old female farmer visited our hospital with a 6 months history of multiple painful erythematous swollen nodules on the right leg and the left forearm (Fig. 1). Some lesions had central ulceration, purulent drainage and yellow scabs above. She was examined at many hospitals with diagnosis of skin abscesses and was treated with many different antibiotics such as meropenem, vancomycin, linezolid, ceftazidime, etc, but the lesions showed no improvement. She also had a history of diabetes for 6 years, drug-induced adrenal insufficiency for 2 months and had taken injections of unknown drugs for managing the chronic pain of her degenerative spine condition.



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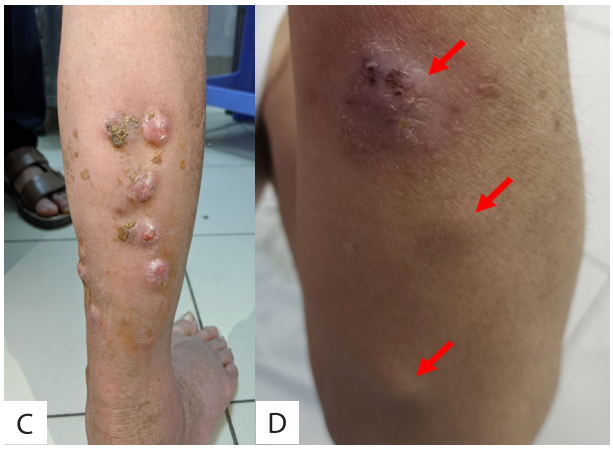

Figure 1. Painful erythematous swollen nodules on the right leg and the left forearm

Her inflammatory markers (C-reactive protein level, white blood cell count) were normal. The laboratory examinations to identify fungus in the pus specimen from the patient revealed negative result. On the tissue specimen, the histological findings showed suppurative inflammation and granulomatous inflammation in the dermis (Fig 2). Gram staining and PAS staining were also negative. Culture from the pus specimen showed yellowish colonies in 1 week (Fig 3). The isolated colonies were Ziehl-Zeelsen staining positive and were identified as *Mycobacterium abscessus* by LPA method. The *M. abscessus* showed resistance to Meropenem, Doxycyclin and Levofloxacin and was susceptible to Amikacin and Clarithromycin.

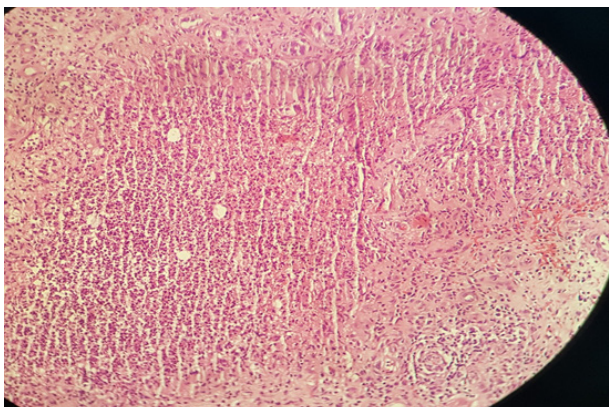

Figure 2. Histological findings showed suppurative inflammation and granulomatous inflammation in the dermis

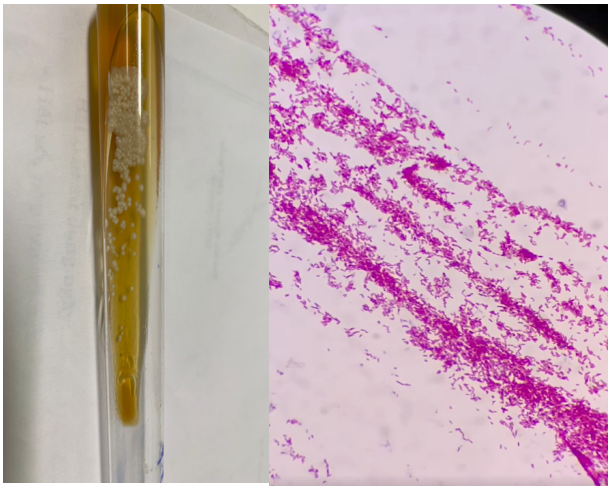

Figure 3. A. Culture from the pus specimen showed yellowish colonies in 1 week.

B. The isolated colonies were Ziehl-Zeelsen staining positive

The patient was treated with surgical debridement and combination of oral clarythromycin (500 mg, twice daily) and intravenous amikacin (500 mg, twice daily) and imipenem (2g per day). 2 weeks after surgical debridement and multi-antibiotic combination therapy (Fig 4), the wound had improved and there was no new lesions.

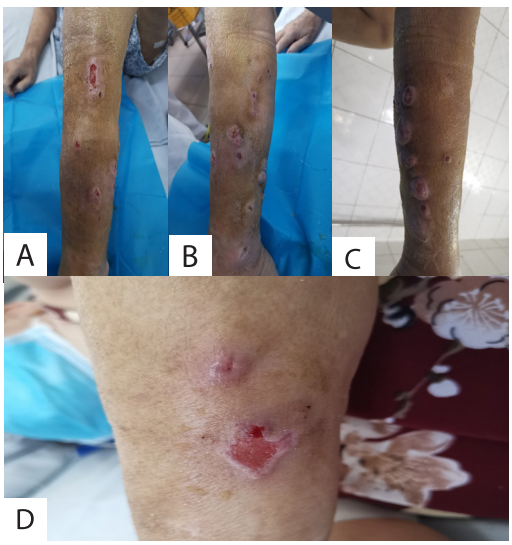

Figure 4. Lesions on the right leg (A), (B), (C) and the left forearm (D) 2 weeks after surgical debridement and multi-antibiotic combination therapy

3. DISCUSSION

Mycobacteria are extremely diverse, with many species recently only discovered or reclassified with use of new molecular identification techniques. As outlined by Runyon and others, *Mycobacteria* can be separated into two broad categories: tuberculosis-causing mycobacteria and non-tuberculous mycobacteria (NTM)[2]. NTM can be further classified according to their growth rate with rapidly growing mycobacteria, which form visible colonies on agar medium in less than 7 days, and slowly growing mycobacteria, which form visible colonies on agar medium only after 7 days. *M. abscessus complex* is a group of rapidly growing, multidrug-resistant NTM species that are ubiquitous in soil and water causing serious respiratory and skin and soft tissue infections. *M. abscessus complex* infection is especially prevalent in East Asia. For example, in Taiwan, *M. abscessus complex* comprises 17.2% of all clinical NTM isolates, which correlates to 1.7 cases/100.000 population[3].

The 2 major mechanisms for acquiring an *M. abscessus complex*-associated SSTIs are by direct contact with contaminated material or water through traumatic injury, surgical wound, or environmental exposure and secondary involvement of skin and soft tissue during disseminated disease. Recently, SSTIs caused by *M. abscessus* complex have been reported in patients who underwent cosmetic procedures (e.g., mesotherapy, liposuction), tattooing, and acupuncture[4,5]. However, there is very little risk of person-to-person transmission.

Cutaneous manifestations of *M. abscessus* SSTIs manifest as painful erythematous swollen nodules, cellulitis, ulcer or draining abscess which are easily to be misdiagnosed as other bacterial infections[6,7]. Host immune defects, poor efficacy of empiric antibiotics therapy and a history of environmental exposure or local invasive procedures may be a diagnostic clue. Mycobacterial culture and identification from pus or tissue specimens are necessary for definitive diagnosis. Suppurative inflammation and granulomatous inflammation were prominent histopathologic features[7]. We believe the source of *M. abscessus* infection in our patient was the environmental exposure because she is a farmer and frequently in contact with soil without protective clothing. Her diabetes and drug-induced adrenal insufficiency might have played an important role in her susceptibility to *M. abscessus*.

Treatment usually involves surgical debridement and removal of infected foreign bodies with combination antimicrobial therapy[1]. However, the optimal drug regimen and treatment duration for soft tissue infection remains unknown. Because *M. abscessus* complex is notoriously resistant to standard antituberculous agents and most antimicrobial agents, antibiotic susceptibility testing of all clinically significant isolates is recommended. The Clinical and Laboratory Standards Institute recommends testing rapidly growing mycobacteria for susceptibility to macrolides (clarithromycin and amikacin), aminoglycosides, fluoroquinolones, imipenem, doxycycline, tigecycline, cefoxitin, cotrimoxazole, and linezolid[8]. Among the agents suggested for *M. abscessus* complex susceptibility testing, clarithromycin, amikacin, and cefoxitin

have the best in vitro antimycobacterial activity. Recent studies have reported on the importance of the *erm* gene in *M. abscessus complex*; this gene confers macrolide resistance through methylation of 23S ribosomal RNA[9]. According to AST/IDSA statement about treatment of NTM diseases, initial combination antimicrobial therapy for *M.abscessus* involves a macrolide (clarithromycin 1,000mg daily or 500mg twice daily, or azithromycin 250mg - 500mg daily) plus intravenous agents for at least 2 weeks to several months followed by oral macrolide-based therapy. The choice for initial intravenous administration is amikacin (10 to 15 mg/kg daily) plus high-dose cefoxitin (up to 12 g/d given in divided doses) or amikacin plus imipenem (500mg 2 - 4 times daily)[1]. Our patient was treated with many different antibiotics before admission such as meropenem, vancomycin, linezolid, ceftazidime, etc, but the lesions showed no improvement. Oral clarythromycin (500 mg, twice daily) and intravenous amikacin (500mg, twice daily) and imipenem (500mg, 4 times daily) because of cefoxitin unavailability were administrated after we identified *M. abscessus*. The skin lesion showed improvement after 2 weeks of treatment.

In contrast to *M. abscessus* pulmonary disease, outcomes for soft tissue infection appear to be more favorable. The cure rate is 88% according to a review of Berkhout et al on 60 cases of *M. abscessus* SSTIs[6].

5. CONCLUSION

This is the first case of SSTIs caused by *M. abscessus* isolated the pathology at the National hospital of Dermatology and Venereology. An NTM infection should be considered for the case of a local cutaneous infection that's resistant to antibiotic therapy, and especially if this is seen on an immunocompromised patient.

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