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Mycobacterium peregrinum Skin Infection: Case Report

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Abstract

Background: *Mycobacterium peregrinum* is a rapidly growing mycobacterium (RGM) that rarely causes skin infections. The correct identification of the specific RGM infecting the skin will enhance therapeutic success.
Objective: To highlight the importance of rapid and precise identification of the *Mycobacterium* involved in skin infections in order to enhance therapeutic success.
Methods: We describe an RGM skin infection in an immunocompetent patient.
Results: Classic methods (biochemical tests and culture) of RGM identification are time-consuming, and the histopathological features are not specific. Some molecular methods are reliable but expensive. The PRAhsp-65 is a simple procedure that is helpful in identifying the specific agent of an RGM.
Conclusion: Although skin infections caused by *M peregrinum* are rare, they represent a substantial clinical challenge. Specific and more effective treatment options depend on the development of precise and rapid methods for identifying mycobacterial species.

Keywords

Mycobacterium peregrinum, rapidly growing mycobacteria, skin infection, bacterial skin diseases, case reports

Mycobacterium peregrinum is an opportunistic nontuberculous mycobacterium (NTM), which belongs to the rapidly growing mycobacteria (RGM) group.[1-3] *M peregrinum* is ubiquitous in nature and potentially pathogenic.[1,2]

Compared with other RGMs, *M peregrinum* skin infections are rare (1%-3.3% of all RGM infections).[2-4] Immunocompromised patients with traumatic injuries are most prone to both contamination and infection.[1,2,4,5] Most RGMs have a natural resistance to some antibiotics; therefore, relapses are common after empiric treatment. Precise identification of the NTM infectious agent enhances therapeutic success.

Case Report

A 53-year-old housewife, a resident in the southeast region of Brazil, attended a routine visit to monitor her psoriasis, which had been diagnosed 5 years previously. She complained of a painful lesion on her abdomen that had appeared 4 months previously. She had received several topical and oral antibiotics prescriptions without improvement.

She did not have any psoriatic lesions on physical examination, she denied previous use of injectable drugs and/or medications, and she was not using any immunosuppressive therapy.

We identified a painful erythematous-violaceous plaque on her abdomen, stiffened in the periphery with central cystic consistency (Figure 1, A and B). There was no antecedent history of traumatic injuries, contact with aquatic animals or water tanks, or previous surgical procedures at the site of the lesion. She did not have any systemic symptoms or comorbidities. Serological results for HIV and viral hepatitis were negative.

A biopsy sample was obtained, and the histopathological analysis revealed a suppurative inflammation with lymphocytes, macrophages, plasma cells, neutrophils, giant cells, and sketches of granulomas (Figure 2, A and B). Special stains were all negative, including the acid-fast bacilli (AFB) stain.

The patient's clinical symptoms suggested a *Mycobacterium* infection. A second biopsy was obtained for culture. Cultures for bacteria and fungi were negative.

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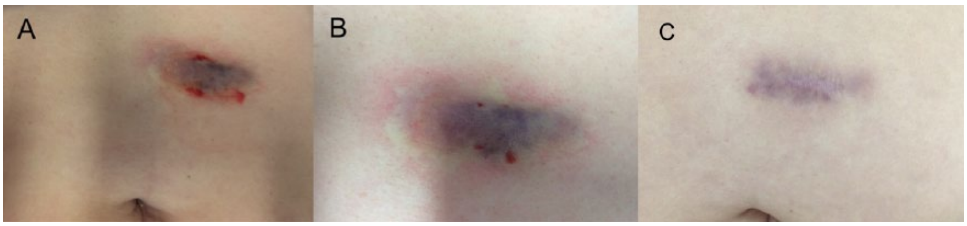

Figure 1. *A*, Erythematous-violaceous plaque on the abdomen, presenting a central cystic consistency, stiffened in the periphery, with bloody exudate. *B*, Magnification of the lesion. *C*, Abdominal lesion regression after 30 days of treatment with doxycycline 200 mg/d.

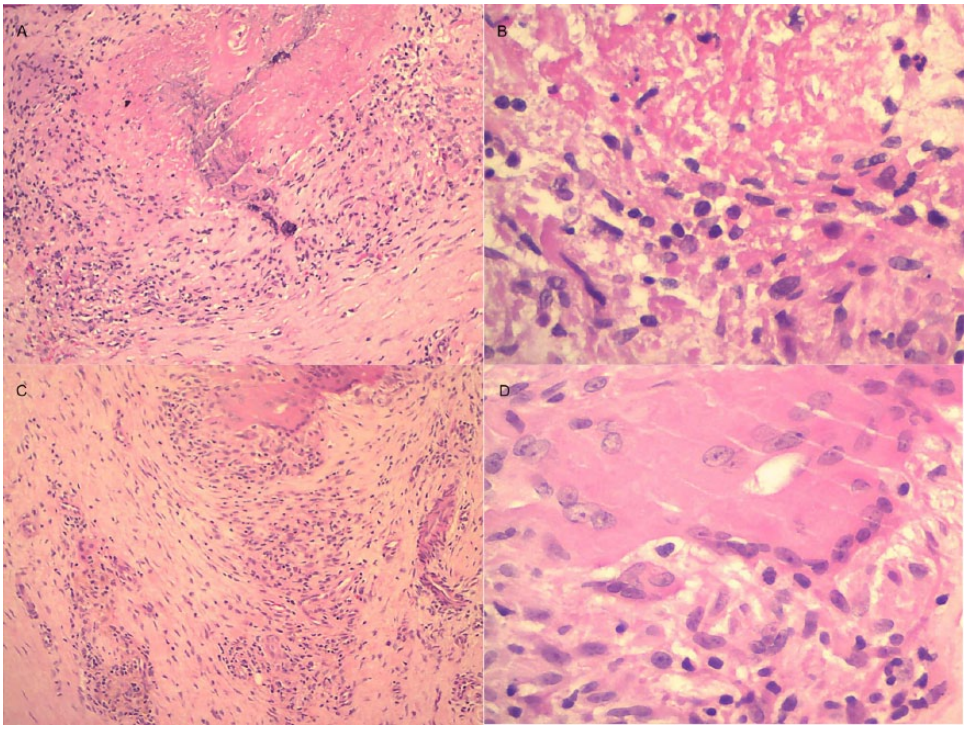

Figure 2. *A*, Hematoxylin and eosin (HE), ×10; chronic granulomatous and suppurative inflammatory process in the dermis with central necrosis. *B*, HE, ×40; in detail, granuloma composed of macrophages, lymphocytes, plasma cells, neutrophils, and central necrosis. *C*, Histopathological examination of the lesion after 30 days of treatment with doxycycline 200 mg/d. HE, ×10; skin with granuloma area in regression. *D*, HE, ×40; in detail, highlighting the regression in the inflammatory process, we can see fibrovascular proliferation, multinucleated giant cells (foreign body–like), and mild inflammatory infiltrate with a predominance of lymphocytes and histiocytes.

Culture in Lowenstein-Jensen medium (30°C and 37°C) was positive, with growth in the fourth day, indicating an RGM. We submitted aspirate specimens of the lesion to AFB and cultures: Again, an RGM was characterized in the culture, while AFB was negative.

Cultures were sent to the National Reference Laboratory on Tuberculosis and Mycobacteriosis for species identification. Polymerase chain reaction (PCR)–restriction enzyme analysis has been widely applied in Latin America and in most low-income countries.[6,7] This low-cost, reliable method uses the amplification of a fragment from the hsp65 gene by PCR, followed by restriction of the amplified product with BstEII and HaeIII (PRA-hsp65); the interpretation is performed by comparison with patterns described in published studies.[6,7] The PRA-hsp65 analysis identified *M peregrinum* as the infectious agent in this patient.

We prescribed doxycycline 200 mg/d for 30 days and observed resolution of the lesion, although a small scar persisted (Figure 1, C). After the completion of treatment, a new biopsy sample revealed regression of the inflammatory process, AFB staining was positive, but a culture for mycobacteria was negative (Figure 2, C and D).

Discussion

M peregrinum skin lesions usually exhibit erythematous plaques or nodules, which may be ulcerated, purulent, or cystic. The lesions are usually painful and most commonly affect the extremities.[1,8,9] The clinical appearance and evolution may suggest other NTM skin infections such as *Mycobacterium marinum, Mycobacterium avium*, and *Mycobacterium fortuitum* or deep mycoses such as phaeohyphomycosis.[9]

Culture assists in the confirmation of mycobacteria as the causative agent, enabling the differentiation between fast- and slow-growing mycobacteria.[1-3] Histopathological examination is not specific but may add important information on differential diagnosis.[4,9] Negative AFB analysis cannot be hastily interpreted as incompatible with mycobacteriosis because bacilli are seen only occasionally, even with the use of special stains.[9] Precise identification of the infectious agent is important when an RGM infection is evaluated, due to the high variability of antibiotic sensitivity and the fact that empirical therapy seems to be accompanied by high rates of relapse.[1,2,8]

Some of the first *M peregrinum* studies carried out mycobacterial species identification based on in vitro growth and biochemical methods, which are labor-intensive and time-consuming techniques. High-performance liquid chromatographic identification is routinely used in many reference laboratories but cannot identify accurately some mycobacteria to the species level.[10] Molecular identification methods include nucleic acid probes, amplified in situ hybridization, 16S ribosomal RNA gene sequence analysis and sequencing, and PCR-restriction enzyme analysis of hsp65.[10] Although very informative, commercial tests and some gene encoding methods are not attainable in laboratories in low-income countries.[7] PRA-hsp65 is a sensitive, fast, and easy to read molecular method that has been used in recent years to identify several species of mycobacteria, including NTM,[6,7,10] and has been described in previous case reports.

Appropriate therapy for *M peregrinum* infection is yet to be determined.[2] Kamijo et al[1] provided an interesting review of the treatment options already used in previous case reports. Most authors' descriptions included combined therapy with 2 or more antibiotics, with good success rates.[1] However, the same authors described previous recommendations to proceed with oral monotherapy for localized skin infections caused by the *M fortuitum* group, including *M peregrinum*.[1] In patients with multiple foci of cutaneous infections, the combination of amikacin and quinolones or β-lactams has been advocated; treatment duration varies from 6 weeks to 4 months.[1,2,8]

We chose to use monotherapy with doxycycline because our case involved a localized infection in an immunocompetent patient. In addition, doxycycline has important anti-inflammatory properties, blocking the pathway of matrix metalloproteinase, reactive oxygen species, nitric oxide, cytokines (tumor necrosis factor-α), and phospholipase A_2, which make a significant contribution to tissue injury.[9]

In this case report we highlighted the importance of using precise and rapid methods for identifying mycobacterial infections. Although skin infections caused by *M peregrinum* are rare in immunocompetent patients without a history of trauma, this condition should be considered.

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