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Review Article

Mycobacterium abscessus Infection In A Patient With Il-12 Receptor Immunodeficiency.

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Summary

Introduction: Nontuberculous Mycobacteria (NTM) constitute a diverse group of bacteria in the genus *Mycobacterium*. These bacteria are distinguished from *M. tuberculosis* and *M. leprae* by their inability to cause tuberculosis or leprosy.
Although NTM are generally of low pathogenicity, they have the capacity to cause opportunistic infections, especially in immunocompromised individuals.
Clinical case: We present the case of a male native and resident of Altotonga, Veracruz with a primary immunodeficiency in the IL12 receptor with *Mycobacterium abscessus* infection diagnosed by PCR, multi-treated without a favorable response
Conclusions: Fistulizing cervical adenitis in an immunocompetent adult that is refractory to antimicrobial and antituberculosis regimens should raise suspicion of resistant MNT.IL-12 deficiency is an autosomal recessive disorder characterized by a predisposition to recurrent and/or severe infections caused by mycobacteria, this mutation was key to the recurrent infections, the poor response to treatment, and the fatal outcome. It is imperative that, in rare and complex cases, we have a multidisciplinary team that addresses each area.

INTRODUCTION

Nontuberculous Mycobacteria (NTM) constitute a diverse group of bacteria in the genus *Mycobacterium*. These bacteria are distinguished from *M. tuberculosis* and *M. leprae* by their inability to cause tuberculosis or leprosy. These bacteria are ubiquitous in the environment, found mainly in soil and aquatic environments [1,2].

Although NTM are generally of low pathogenicity, they have the capacity to cause opportunistic infections, especially in immunocompromised individuals [1,3].

NTM are classified into two main groups based on their growth speed: Slow-growing and fast-growing. Among slow-growing species, *Mycobacterium Avium* complex (MAC) is the most prevalent and is a significant cause of Nontuberculous Mycobacterial Lung Disease (NTM-PD). Conversely, the Mycobacterium abscessus complex, comprising subspecies such as *M. abscessus subsp. abscessus*, exemplifies a rapidly expanding NTM and is progressively observed in cystic fibrosis patients. NTM infections can present in diverse forms, ranging from lung disease to disseminated infections, particularly in patients with compromised immune systems [3]. The diagnosis and treatment of NTM infections present significant challenges due to the presence of antibiotic resistance and the absence of a definitive correlation between in vitro susceptibility and clinical outcomes [4,6]. The accurate identification of NTM species is imperative for the effective management of these infections, given the diversity of species and their variability in pathogenicity [7].

These species have been particularly linked to the use of mesotherapy, liposuction, and other cosmetic interventions.

Due to their presence in aquatic environments and their

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resistance to multiple drugs, these organisms are often difficult to manage, and they have a wide variety of clinical manifestations, including subcutaneous nodules, abscesses, and fistulas. Patients infected with NTM typically present with the following comorbidities: Obesity, gastrointestinal diseases, HIV, Cystic Fibrosis (CF), diabetes mellitus, and asthma, respectively [3,8-10]. The diagnosis of these infections is paramount for determining their prognosis and the appropriate utilization of pharmacology. Consequently, the possession of specific cultures, histopathological studies, and molecular tools that facilitate expeditious identification is of the essence. These tools are instrumental in the rapid assessment of antibiotic resistance profiles, a crucial step in preventing future comorbidities and the onset of psychological and aesthetic sequelae in our patients.

Treatment typically necessitates meticulous debridement and the extraction of foreign material. The following drugs are considered to be of use: The following medications are recommended for administration: imipenem (1 g IV every 6 hours), 500 mg of levofloxacin intravenously or orally once daily, 500 mg of clarithromycin orally twice daily, 1 double-strength tablet of Trimethoprim/Sulfamethoxazole (TMP/SMX) orally twice daily, 100 to 200 mg of doxycycline orally once daily, 2 g of cefoxitin IV every 6-8 hours, and 10 to 15 mg/kg of amikacin

IV once daily

It is recommended that combination therapy be administered with at least two drugs that have demonstrated in vitro activity. The duration of therapy is 24 months, with the possibility of an extended period if the infected foreign material persists within the body.

Amikacin is typically incorporated into the initial 3 to 6 months of treatment. M. abscessus and M. chelonae are generally resistant to most antibiotics, and they are very difficult or impossible to eradicate. Patients with these infections should be referred to an experienced specialist [11].

Consequently, interdisciplinary efforts among dermatologists, plastic surgeons, and infectious disease specialists are imperative for addressing this issue [12,13].

CLINICAL CASE

A 38-year-old man, a bricklayer, residing in Altotonga, Veracruz. His illness began with unintentional weight loss of 5 kilograms over 3 months, diaphoresis, and unquantified fever (predominantly nocturnal), as well as a productive cough in the morning with mucopurulent sputum (small volume, non-foul-smelling). He was evaluated by a private physician, who initiated treatment with unspecified antibiotics, with no clinical improvement.

In January 2024, a nodular lesion appeared in the anterior neck triangle causing dysphagia. (**fig 1a, 1b**), An ultrasound performed in April 2024 reported cervical lymphadenopathy. A cervical lymph node fine-needle aspiration biopsy was performed on May 25, 2024, with the report noting scant material and keratin. Subsequently, the lesion increased in size, and lesions with the same characteristics appeared on the left side. A biopsy of the skin and soft tissues of the neck was performed (September 6, 2024) due to suspected M. tuberculosis infection, with a report of fistulizing lymphadenitis. Treatment with Dotbal was initiated (September 25, 2024) in the intensive phase, followed by maintenance doses (December 18, 2024), with a partial response. Discharge from the lymph node lesions persisted. He was evaluated at the Infectious Diseases Outpatient Clinic (December 19, 2024), where treatment was initiated with Levofloxacin (750 mg PO every 24 hours) and Linezolid (600 mg PO every 12 hours). He was re-evaluated (January 2025), where it was concluded that there was a "lack of response to treatment" due to the persistence of the described symptoms, the onset of progressive dyspnea (mMrc 2), and increased discharge from the lesions. After 24 hours in the emergency department, he was admitted to the Internal Medicine ward. A treatment regimen was established with amikacin, meropenem, tigecycline, and clarithromycin. At his initial evaluation, he was neurologically intact, with a cylindrical neck, central trachea, visible palpable lymphadenopathy, and fistulas, A purplish nodular lesion measuring approximately 5 cm × 3 cm is observed in the right infraclavicular region; it is tender on palpation, warm, erythematous, soft, not fixed to deeper structures, mobile, and suppurating, with a purulent-appearing discharge. Additionally, fistulous lesions are present in cervical regions IV and VI. No relevant laboratory findings were noted upon admission. During the course of the illness, a cervical lymph node biopsy was performed and sent for atypical mycobacterial culture, Zihel-Neelsen stain, (**fig 2**), and PCR; GenXpert testing of the lymph node reported no TB detected; the patient developed increased oxygen dependency; a chest CT scan was performed, identifying lymph node clusters; a thoracotomy was performed with biopsy sampling, where non-caseating granulomas and acid-fast bacilli were identified. After 15 days of treatment with IV antimicrobials, the fever subsided. The regimen was adjusted by replacing the carbapenem and tetracycline with an oxazolidinone and a fluoroquinolone. However, after 3 days, the patient relapsed with fever and diaphoresis, as well as a tendency toward somnolence, disorientation, and hearing loss. A plain and contrast-enhanced cranial MRI was performed, showing multiple ring-shaped lesions located supra- and infratentorially. No significant findings were noted on targeted questioning. Given the suspicion of primary immunodeficiency, an ELISA test was requested to quantify IL-12 levels, which yielded a value <0.05, well below normal

values for this cytokine, confirming the immunodeficiency.
A culture was performed in Lowenstein-Jennsen for mycobacteria cultured at 35°C, where after 6 days we had the development of a white, cerebriform colony, (**fig 3**). That we confirmed by the PCR-RFLP technique to be Mycobacterium abscessus as the causative agent. After prolonged treatment with four antibiotic regimens, the patient died.

CONCLUSIONS

Fistulizing cervical adenitis in an immunocompetent adult that is refractory to antimicrobial and antituberculosis regimens should raise suspicion of resistant MNT. This case highlights the diagnostic and therapeutic challenges, underscoring the importance of microbiological confirmation and multidisciplinary management to guide targeted therapy.
IL-12Rβ1 deficiency is an autosomal recessive disorder characterized by a predisposition to recurrent and/or severe infections caused by mycobacteria and salmonella, which are otherwise not very pathogenic. IL-12Rβ1 is a receptor chain for both the IL-12 and IL-23 receptors, and its deficiency abolishes signaling from both receptors. This deficiency is due to biallelic mutations in the IL12RB1 gene. [14]
In our patient's case, this mutation was key to the recurrent infections, the poor response to treatment, and the fatal outcome. It is imperative that, in rare and complex cases, we have a multidisciplinary team that addresses each area precisely, from the clinical, microbiological, histopathological, and genetic perspectives. We also need coordinated strategies and tools that allow us to increase survival in these types of patients with rare diseases.

Figure 1a and 1b.- nodular lesions, fistulas at the supra and infraclavicular level with drainage of abundant seropurulentmaterial.



Figure 2.- ZiehlNeelsen stain: numerous acid-fast bacilli.

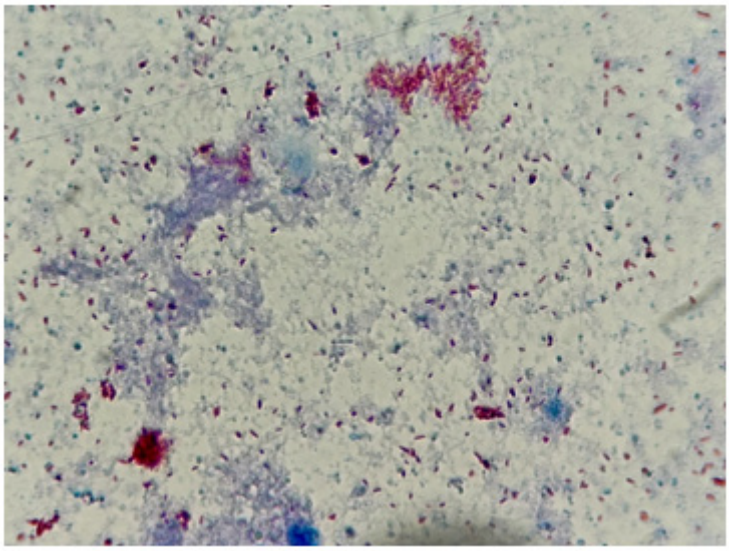


Figure 3.- Lowenstein-jennsen culture with growth of a white, cerebriform colony compatible with Mycobacterium spp.



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