Title: Atypical coinfection by *Mycobacterium tuberculosis* and *Mycobacterium fortuitum* in an immunosuppressed patient: case report

Presenting Author:

Suzamar Hipólito Simiema – Affiliation: Internal Medicine Residency Program, Universidade Nove de Julho (UNINOVE), Conjunto Hospitalar Mandaqui, São Paulo, Brazil.

Abstract:

Introduction

Pulmonary tuberculosis remains an important respiratory infectious disease, mainly caused by *Mycobacterium tuberculosis*, whose transmission occurs predominantly through the inhalation of aerosols containing the bacillus. Despite advances in diagnosis and treatment, it continues to represent a global challenge, particularly among vulnerable and immunosuppressed populations. Non-tuberculous mycobacteria (NTM) comprise a heterogeneous group of microorganisms found mainly in environmental sources, such as water, soil, and biofilms. Among these species, *Mycobacterium fortuitum* stands out as a rapidly growing mycobacterium capable of causing opportunistic infections. Its transmission may occur through inhalation of aerosols, ingestion of contaminated water or food, and direct inoculation following invasive procedures. The most commonly described clinical manifestations include skin and lymph node infections, while pulmonary involvement is considered uncommon, especially in individuals without previous structural lung abnormalities. Pulmonary disease caused by NTM is frequently associated with predisposing conditions such as immunosuppression, chronic diseases, pulmonary anatomical alterations, or prolonged use of immunomodulatory therapies. Diagnosis can be challenging, requiring correlation between clinical, radiological, and microbiological findings to differentiate active infection from colonization.

The simultaneous occurrence of infection by *M. tuberculosis* and *M. fortuitum* is rare and represents a diagnostic and therapeutic challenge, as it requires accurate identification of the involved pathogens and individualized antimicrobial treatment. In this report, we describe an atypical case of pulmonary mycobacterial coinfection in an immunosuppressed patient, highlighting the diagnostic and therapeutic challenges involved.

Case Description

A 52-year-old female patient, born in Bolivia and residing in São Paulo, Brazil, with a history of smoking (20 pack-years), was admitted to the hospital emergency department due to diabetic ketoacidosis associated with unexplained respiratory failure. She had a previous diagnosis of insulin-dependent diabetes mellitus secondary to pancreatectomy and was using metformin and insulin therapy. Due to clinical instability, she was transferred to the intensive care unit. During the investigation of metabolic decompensation, chest radiography and computed tomography revealed pulmonary cavitation in the left upper lobe. Further investigation for infectious pulmonary etiology was initiated. Sputum testing for acid-fast bacilli (AFB) in a mucopurulent sample was positive, and standard treatment for pulmonary tuberculosis was started with rifampicin, isoniazid, pyrazinamide, and ethambutol (RIPE regimen). The patient showed favorable but slow clinical progression, with resolution of diabetic ketoacidosis, metabolic improvement, and subsequent transfer from the intensive care unit to a respiratory isolation

bed in the Internal Medicine ward. During case review and investigation with Epidemiological Surveillance, previous records of infection with *M. tuberculosis* and *M. fortuitum* were identified, both without complete treatment through the primary healthcare system. New specific mycobacterial cultures and bacterial resistance tests were performed, confirming active coinfection by *M. tuberculosis* and *M. fortuitum*.

Following microbiological confirmation, combined antimicrobial therapy was initiated based on recommendations from the *Sanford Guide*, including imipenem, amikacin, and levofloxacin for coverage of *M. fortuitum*, associated with the RIPE regimen for treatment of *M. tuberculosis*. The therapeutic approach considered the susceptibility profile of the identified pathogens and the need for simultaneous management of both infections.

After targeted treatment, the patient showed significant clinical improvement and favorable laboratory evolution, with recovery from the pulmonary infectious condition and metabolic stabilization. She was discharged with specialized outpatient follow-up and prolonged maintenance therapy for *M. fortuitum*, consisting of clarithromycin, doxycycline, and sulfamethoxazole-trimethoprim, with planned clinical and laboratory monitoring and repeat cultures to assess therapeutic response.

Discussion and Conclusion

Coinfection by *M. tuberculosis* and *M. fortuitum* is rare but should be considered in patients with predisposing factors, especially immunosuppressed individuals, such as those with long-standing diabetes mellitus or a history of pancreatic surgery. Differentiating colonization from active NTM infection can be complex, requiring integration of clinical, radiological, microbiological, and immunological data. This case reinforces the importance of active surveillance in immunocompromised patients with infectious respiratory conditions, emphasizing the need to consider the association of different etiological agents. Early diagnosis and appropriate management of coinfection by tuberculous and non-tuberculous mycobacteria are essential to prevent complications and unfavorable outcomes.