Dual Infection with *Mycobacterium tuberculosis* and *Mycobacterium leprae* at Same Site in an Immunocompetent Patient: An Unusual Presentation

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Abstract

Occurrence of two mycobacterial infections Tuberculosis & Leprosy in a single immunocompetent person and at single site is very unusual even in endemic countries like India. We report the case of 23yr old male, who previously presented with trophic ulcer under the ball of right great toe one yr back and diagnosed as a case of Multibacillary leprosy, now presented with chronic discharging sinus, ulceration, granulation and crusting over same site even under treatment with MDT MB. Such clinical presentation, in corroboration with proper diagnostic test likes AFB staining and BACTEC culture evaluation with no evidence immunosuppression prompted us to make a diagnosis of dual infection with *M. leprae* and *M. tuberculosis* at same site.

Key Words: *Mycobacterium leprae*, *Mycobacterium tuberculosis*, leprosy, tuberculosis

What was known?

Tuberculosis (TB) and leprosy are two chronic granulomatous disease caused by Mycobacterium tuberculosis and Mycobacterium leprae, respectively. Co infection with both these mycobacteria has already been reported but only few literatures till date.

Introduction

There are still more than 200,000 new cases of leprosy and more than 9 million new cases of tuberculosis (TB) registered annually worldwide[1] despite improvements in treatment and living conditions. Both diseases are chronic granulomatous infections caused by intracellular Gram-positive aerobic acid-fast bacilli (AFB). The occurrence of both infections is based on the transmission dynamics, means the higher reproductive rate of tubercular bacilli than the lepra bacilli and the degree of cross-immunity they offer in an individual. The occurrence of leprosy and pulmonary TB coinfection first time reported by Relvich[2] in 1954, after that it was elaborated by many authors. The occurrence of leprosy along with extrapulmonary tuberculosis including lupus vulgaris was first described by Ganapati et al.[3] in 1976. The simultaneous infection of both mycobacterial infections was initially reported by Pinto et al.[4] in 1991. To the best of our knowledge, there is no case report showing coinfection of *Mycobacterium leprae* and *Mycobacterium tuberculosis* at the same site of an immunocompetent patient till date, especially from an endemic country like India.

Case Report

A 23-year-old male patient presented with a painless nonhealing ulcer at planter aspect of the ball of right great toe associated with anesthesia of that region 1 year back. The patient was non-diabetic, non-hypertensive, and there was no history of neurological abnormality or immunocompromisation. He denied of having addiction as well as any contact with patients having TB or leprosy. There was no significant drug history. On examination, there were atrophied and discolored toes, secondary deformities, and muscle weakness with an ulcer of size 6 cm × 5 cm. The common peroneal nerve was thickened. Systemic examination was unremarkable. Slit skin smear was undertaken by slit and scrape method from the most active looking edge of the skin lesion, and it showed a positive result with a biological indicator of 5+ and myocardial infarction 28%. X-ray of the right foot was unremarkable. The patient was then diagnosed as a case borderline tuberculoid leprosy with trophic ulcer and advised multidrug therapy (MDT).
multibacillary adult with proper rest and regular dressing. In an interval of 2 weeks, the patient came for follow-up till 2 months, and it was evident that the ulcer was healing. After that, the patient did not come anymore. Now, 4 months back, he returned with chronic mucopurulent discharging sinus, ulceration, granulation, and crusting over the same site [Figure 1]. He stated that he had been suffering again for the past few weeks and already had stopped MDT for 3 months. He was advised strict bed rest and broad-spectrum antibiotics along with MDT to continue. After 3 weeks of treatment, there was no significant improvement. On 2nd visit, the pus was sent for Gram-stain and culture sensitivity along with fungal culture. There was no significant growth in culture report and fungal culture was negative. Stains for Nocardia and Actinomyces were negative. X-ray showed no significant change in great toe in both antero-posterior [Figure 2] and lateral view [Figure 3]. Even on 3rd visit after 1 month of antibiotics, dressing, MDT, and most importantly strict rest, the sinus was not healing at all. Then, the pus was sent for AFB staining with ZN stain (20% sulfuric acid as decolorizing agent) and BACTEC culture. Both the AFB staining [Figure Figure 4] and BACTEC culture [Figure 5] came positive with BACTEC negative for control [Figure 6] along with positive Mantoux test (16 mm indurations with 1 TU at 48 h). Chest X-ray along with all other investigations such as complete hemogram, urine analysis, and fasting blood sugar was normal. HIV ELISA was nonreactive. Based on the history, clinical features, and laboratory reports, a diagnosis of cutaneous TB was made at the same site which was already infected with M. leprae. He was then advised to start CAT-I antituberculous drug and to continue MDT without rifampicin 600 mg monthly dose. After 1 month of this treatment, the sinus was healing gradually, and there was no discharge [Figure 7]. However due to unavailability of facility, Antitubercular and antileprosy drug susceptibility was not carried out.

Discussion

The interaction between leprosy and TB still remains a matter of debate. Despite this long debate, the issue of the interaction between the two epidemics still remains to be clarified. This debate apparently ceased to be fuelled because of the yet unexplained recent decline in the number of reports of coinfected patients. Although an increased frequency of pulmonary TB

Figure 1: The presenting lesion of 4 months back with chronic discharging sinus, ulceration, granulation, and crusting

Figure 2: Anteroposterior view of X-ray of right foot showing no bony changes

Figure 3: Lateral View of X-ray of right foot showing no underlying bony involvement

Figure 4: Acid-fast bacilli seen from the discharge of presenting lesion (stain used ZN stain with 20% sulfuric Acid as decolorizing agent) ×100
in patients with lepromatous leprosy may occur as a result of malnutrition, TB occurs across the spectrum of leprosy. An inherent impaired immunity against both mycobacterial organisms has been postulated as the etiology for dual infection; however, it appears that the anergy in leprosy is pathogen specific. [7] Trophic ulcer is a chronic ulceration of the anesthetic sole of the foot, situated in well-defined areas overlying bony prominences, resistant to treatment with marked tendency of recurrence. Plantar anesthesia, nonprotective walking, poorly healed scar resulting from previous ulceration, and persisting foci of infection are some of the main reasons for recurrence of plantar ulcers. On the other side, cutaneous TB occurs rarely despite a high occurrence of TB worldwide. It can be acquired exogenously or endogenously and presents as multiple different clinical morphologies. Skin manifestation may present due to hematogenous spread or direct extension from active or latent foci of infection. The incubation period of both the infection differs as in leprosy it varies from 6 months to many years, whereas in TB, it ranges from few weeks to months. The duration of the gap between the development of leprosy and TB varied between 2 months and 10–15 years [8] as in our case it was 6–7 months. It has also been suggested that TB is more severe in coinfected patients; [9] however, this was not the case in our patient as he has a simultaneous coinfection of cutaneous TB and no pulmonary or disseminated TB. Due to logistic limitations, polymerase chain reaction for TB could not be done, but the history clinical feature and the investigation described above were fairly suggestive toward the diagnosis of dual infection of M. leprae and M. tuberculosis at the same site in an immunocompetent patient.

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Conflicts of interest
There are no conflicts of interest.

What is new?
Cutaneous TB and leprosy may share a common clinical picture. Hence, an early and prompt suspicion of these two diseases in a single person can change the outcome and prognosis. Recognition of tuberculosis is important to prevent emergence of rifampicin-resistant tuberculosis during treatment of leprosy.

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