

Coinfection of Pulmonary Tuberculosis and Leprosy with Type 1 Leprosy Reaction: A Case Report

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Abstract: Tuberculosis and leprosy are two of the oldest diseases that has become a global health burden. They are known to have similar geographic endemicity, thriving mostly in tropical climate countries. They are caused by gram positive aerobic acid-fast bacilli, but the occurrence of coinfection between these two diseases are rarely presented. We report a case of leprosy complicated with type 1 leprosy reaction diagnosed in a 28 year old male being treated for pulmonary tuberculosis. Patient came with skin lesions and soreness on both elbows that started 2 weeks after consuming anti-TB regiments. Diagnosis was made by clinically and histopathology. Patient then was given combination therapy of anti-TB regiments and MDT leprosy regiments. Low dose steroids was given for short term duration to manage the type 1 leprosy reaction. Knowledge of these mycobacterial infections are important, particularly for clinician practicing in developing countries. Unrecognised coinfection may predispose the risk of Rifampicin resistant during treatment. Screening for tuberculosis in the presence of leprosy is important before starting the therapy regiment, and likewise. Steroids therapy for leprosy reaction in the case of coinfection may be given with lower adjusting dose to prevent the reactivation of TB.

Keyword: tuberculosis, leprosy, coinfection, leprosy reaction, steroids

1. Introduction

Tuberculosis and Leprosy are granulomatous infectious diseases that caused by Gram positive aerobic acid-fast bacilli bacteria, *Mycobacterium spp.* The primary site of infection of Tuberculosis (TB) is the lungs, meanwhile leprosy manifests in skin and peripheral nerves. [1, 2]

Both diseases shows wide range of clinical manifestations, depending on the patient's cell mediated immune response towards the bacteria. [3] They are contagious, with transmission occurs mainly via respiratory droplets. [1, 4] Tuberculosis and leprosy are global health burden. Based on World Health Organization (WHO) data in 2020, 9, 9 million individuals became infected with TB. In 2019, an estimated of 465.000 cases of multidrug-resistant (MDR) TB, with almost 82% of the cases are Rifampicin (Rif)-resistant. [5] There were approximately 127.558 new leprosy cases detect globally in 2020, according to WHO data. [6] Both diseases thrives in tropical climate countries with low socioeconomic development, poor access to proper healthcare and sanitary. [2, 7, 8]

Despite these two diseases commonly found in the similar geographically endemic region, coinfection cases are rarely reported, especially in Indonesia. There are less than 20 cases reported globally within the last decade, with the mortality rate of the cases are 37, 2%. [3, 9, 10] Cases are usually found in patients with immunocompromised history, such as HIV, malignancy, or prolonged steroid use. [3, 11] Coinfection may potentially overlooked in clinical practice and there are limited references for treatment. An undiagnosed coinfecting patient may runs the risk of receiving Rifampicin monotherapy and developing resistance during therapy, further complicating the disease

progression. [12] Due to rarity and importance of prompt recognition and proper treatment, we are presenting this case report. The aim of this case report is to present a case of a 28 year old immunocompetent man, who presented with pulmonary tuberculosis and leprosy coinfection with type 1 leprosy reaction. We discuss the possible interplay between the two infections, the treatment given, and review the literatures on the coinfection cases.

2. Case Report

A 28 year old male came with complaint of multiple skin lesions that he had for 6 weeks. The lesions are non pruritic and painless. The lesions are hypopigmented and well-defined. The first lesion occurred on the facial area, 2 weeks after the patient took first line anti-tuberculosis (TB) drugs. It then spread rapidly to his neck, torso, and both extremities. Patient also complained of pain on both of his elbows and knees for the past 1 week. The pain sensation is electrical-shock-like and throbbing. The pain exacerbates with touch and improved with rest. The patient had a history of pulmonary tuberculosis that was diagnosed 2 months ago. His chest x-ray showed infiltrates on the left apex and his Gene Xpert MTB/RIF test results are MTB detected, without rifampicin resistance. He then treated with first line anti TB drugs category I. History of taking other medications are denied. History of other past illnesses are denied. There was no history of malignancy, rapid weight loss, and chronic illness. History of contact with leprosy patients are unknown.

On physical exam, patient has good nutritional status, with normal body mass index. Vital signs are normal. Thorax, abdomen, and extremities examinations are normal. Examination of skin lesions showed multiple

hypopigmented macule on the regions of buccal, posterior colli, thorax, bilateral brachii and antebrachii, bilateral palmar, bilateral genu, and bilateral dorsopedis. The lesions are asymmetric, well defined, regular border, and some covered with white fine scales. Neurological examination showed thickening with tenderness on palpation on the bilateral ulnar nerves, bilateral peroneus communis nerves, and bilateral posterior tibialis nerves. These findings showing signs of neuritis. The light touch, pin-prick test and thermal sensory test showed anesthesia on almost all skin lesions. Other sensory, motoric, and autonomic nerve disturbance were not detected. There are no muscle atrophy found during examination.

Slit-skin smear test was performed on both ear lobes and most active lesions. Acid-fast bacilli was detected with the result of Bacterial Index: 2+. The laboratory examinations are within normal range. Anti HIV test was non reactive and blood glucose levels are normal. From these findings, we established the diagnosis of the patient as Multibacillary (MH) Leprosy with Type 1 Leprosy Reaction and Pulmonary Tuberculosis coinfection. For therapy, patient shall continue the continuation phase of first line anti-TB drug regimen which consisted of Rifampicin 600 mg and Isoniazid 600 mg for 3 days in a week for 4 months. For the Leprosy, patient was treated with Multidrug Treatment (MDT) of Leprosy which consists of Lamprone 300 mg and Dapsone 100 mg on the first day of every month, followed by Lamprone 50 mg and Dapsone 100 mg daily. The Rifampicin from the MDT regimens were derived from the tuberculosis regimen.

When the patient completed the anti TB drugs regimen, single dose Rifampicin 600 mg will be given monthly until the MDT leprosy regimen finished. For the type 1 leprosy reaction, patient was treated with prednisone 25 mg daily for 12 weeks, and will be tapered off 5 mg per 2 weeks until reach minimal dose, 5 mg upon week 11 and week 12. During observation, 4 weeks into the therapy, the patient showed positive response. The neuritis symptoms were subsides, skin lesions are inactive, and there are no pulmonary and respiratory complains.



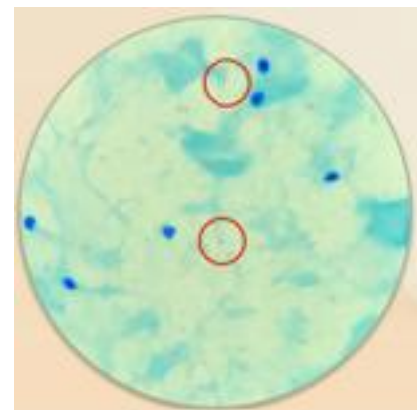
Figure 2: Extremities Lesions



Figures 3: Chest X-ray



Figure 1: Facial and Neck Lesions



Figures 4: Slit-skin Smear test

3. Discussion

Coinfection case of pulmonary tuberculosis and leprosy are rarely reported, despite sharing the similar endemic geographical area. It is thought that patients with leprosy are more susceptible to be infected with TB, due to impaired cell-mediated response. [3, 11] The host defence mechanism may be blunted. Inflammatory cytokines such as Toll-like receptor 2, chemokine ligand-2, and tumor necrosis factor alpha may be depressed, encouraging the growth and dissemination of tuberculosis bacilli when triggered. This phenomenon may lead to reactivation of the latent TB infection or facilitating new infection. [3, 10] Several literatures giving an antagonist perspective regarding the interaction between the two diseases due to the rarity of the cases. Leprosy and TB infection may not occurred in a frequent manners due to the different reproduction rates, and the possible cross-immunity between the two organisms. [3, 9, 11] The interactions are still remained conflicted to this day, but nevertheless coinfection is still an important issue that need to be studied, particularly in diagnosing and prescribing therapy regiments.

Our patient was on anti-TB regiment when he presented skin lesions of type 1 leprosy reaction. We suspected the anti-TB drugs may have exacerbation effect towards the patient's immune system. It caused release of antigens or dead cells fragments of *M. leprae* that was killed by the Rifampicin in the anti-TB regiments. It may also due to immune recovery caused by the therapeutic effect of anti-TB drugs. [10, 13] In most cases of coinfection, TB follows leprosy infection, or the patients were diagnosed with leprosy as the first infection. The first infection remains unclear for our patients, due to lack of information regarding history of contact. Although, we believe the patient may have infected with leprosy before the tuberculosis, but it remained latent. [11] It is recommended for clinician to screen for TB in patient with leprosy, and likewise. Among the cases that were reported, most of the patients were under immunocompromised condition, such as HIV positive or prolonged use of steroids. [3, 12] Our patient was immunocompetent, there were no comorbidities found in this case.

The risk of undiagnosed coinfection is developing resistance for Rifampicin, particularly towards tuberculosis during leprosy therapy. [9, 12] Our patient was first treated with anti-TB drugs, then added with MDT regiments for 12 months. [2] The Rifampicin in MDT regiments were derived from the anti-TB regiments. Once the regiments are finished, Rifampicin will be given in the original manner, which is 600 mg single dose, once a month on the first day. Leprosy reactions are treated with steroids. Our patient was displaying signs of type 1 leprosy reaction or so-called reversal reaction. [2, 4] Initial dosage of the steroid given in this patient was 25 mg. Steroid was given over the period of 12 weeks, with the dosage was tapered 5 mg, every 2 weeks. The steroid dosage in the therapy was lower than the dosage referenced in WHO guideline. The consideration was the risk of reactivating of the tuberculosis bacteria, and based on the TRIPOD studies, which 300 leprosy patients were followed up for 24 months, and cleared from having tuberculosis coinfection, despite the usage of steroids. [14]

This may be resulted from low dose of steroids, around 20 mg/day, which in our case, can be greater, due to the duration of treatment was not long. Such dosage was given to our patient, while we closely monitored the responses. The outcome was good, and we managed to subsides the leprosy reaction. Within 4 weeks of therapy, upon observation, neuritis symptoms were gone, skin lesions were inactive, and respiratory complaints were absent. Patient then advised to continued the regiments until finished, under monthly monitoring.

4. Conclusion

Although rarely reported, coinfection between tuberculosis and leprosy exist and shall not be overlooked by clinicians. Our case illustrates the coinfection under the condition of immunocompetent host and complicated with the leprosy reaction. Proper diagnostic, screening, and tailored therapy regiments are required in clinical practice to prevent the risk of developing drug resistance. There is a need of screening for TB in patients diagnosed with leprosy, and likewise. Steroids may be given under the condition of leprosy reaction, and dosage adjustment may be required to achieve maximum outcome.

5. Disclosure

All authors contributed equally. There is no conflict of interest in this case report.

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Author Profile



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