Case Report

# A case of lepromatous leprosy in a background of chronic hepatitis B infection

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## Abstract

Leprosy is a chronic granulomatous infection that primarily affects developing and underdeveloped countries. Co-infection with the hepatitis B virus can complicate its natural course by altering the host immune system response and thereby the disease outcomes. Early detection and treatment of the disease is thus imperative for preventing debilitating deformities. Several studies have shown positive viral markers for human immunodeficiency virus (HIV) and hepatitis B in patients with leprosy. However, in the Indian subcontinent, we have limited evidence highlighting this correlation. We present a case of a 42-year-old male with chronic hepatitis B infection presenting with new-onset lepromatous leprosy. The patient was successfully managed with a multibacillary multidrug regimen. In patients with hepatitis B co-infection, clinicians must be vigilant about the higher risk of complications and poorer patient outcomes. Extensive longitudinal studies assessing the correlation between leprosy and hepatitis B in India can help tailor future guidelines for management.

**Keywords:** Co-infection, hepatitis B, lepromatous leprosy

## Introduction

Leprosy is a chronic granulomatous infection involving the skin and peripheral nerves with complications ranging from scarring and deformity to disability. Human immunodeficiency virus (HIV), hepatitis B, and C negatively affect the immune system. They can thus change the course of leprosy, with an increased incidence of peripheral nerve damage and relapse.[1,2] Although the presence of hepatitis B viral markers in leprosy has been well-documented, there is limited evidence from the Indian subcontinent supporting this correlation.[2,3]

Our case report aims to add to this limited literature, addressing the diagnostic and therapeutic challenges of managing leprosy coexisting with hepatitis B, especially in primary healthcare practices with limited access to up-to-date laboratory techniques and technology. We present a case of a middle-aged man with a background of chronic hepatitis B with new-onset lepromatous leprosy.

## Case Report

A 42-year-old male with a past medical history of hepatic cirrhosis secondary to chronic hepatitis B infection presented to our tertiary care hospital with complaints of multiple hypopigmented

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patches over his limbs for one year and numerous hypopigmented patches over the trunk and back for six months [Figures 1 and 2].

The hypopigmented patches over the limbs were associated with tingling and numbness. In addition, the patient complained of generalized weakness of six months duration and intermittent fever for one month. The patient denied abdominal pain, nausea, vomiting, loss of appetite, loss of weight, joint pain, yellowish discoloration of skin or sclera, or bleeding manifestations. Past medical history was significant for hepatitis B infection diagnosed and treated four years ago with oral tenofovir.

Local examination confirmed the presence of multiple well-defined hypopigmented macules and patches over the chest, abdomen, back, and bilateral upper and lower limbs [Figures 1 and 2]. Multiple well defined hypopigmented plaques with raised borders were noted over the back and bilateral upper and lower limbs with inverted saucer appearance, pseudopods, and satellite lesions. Nervous system examination revealed reduced sensation of pain and fine touch over the hypopigmented patches of bilateral lower limbs. The left ulnar nerve, the left infraorbital nerve, and the left and right greater auricular nerves were thickened and non-tender to palpation. Deep tendon reflexes of the triceps, supinator, and lower limbs were reduced. Cardiovascular, pulmonary, and gastrointestinal examinations were unremarkable.

Laboratory investigations were significant for hypoalbuminemia, elevated serum transaminases, and reactive hepatitis B surface antigen with a quantitative viral load PCR (polymerase chain reaction) of 5256 IU/ml.

Abdominal ultrasonography revealed an altered liver echotexture with surface irregularity with normal hepatic doppler and splenomegaly with splenic vein enlargement. An esophagoduodenoscopy was suggestive of grade III esophageal varices with mild portal hypertensive gastropathy. Nerve conduction studies revealed asymmetrical axonal peripheral neuropathy involving bilateral lower limbs (sensory > motor). A split skin biopsy from one of the lesions over the right thigh revealed diffuse infiltration of foamy macrophages surrounded by lymphocytes and plasma cells with poorly defined granulomas infiltrating the blood vessels and sweat glands, suggestive of lepromatous leprosy [Figure 3]. Modified Ziehl Nielsen staining of the split skin smear revealed acid-fast bacilli (Grade 3) [Figure 4].

The patient was commenced on multibacillary multidrug treatment consisting of oral rifampicin, clofazimine, and dapsone in addition to pre-existing oral tenofovir for hepatitis B. An esophageal variceal ligation was performed for the management of esophageal varices. Regular follow-up was advised with periodic screening for viral markers for HIV, hepatitis B and C.

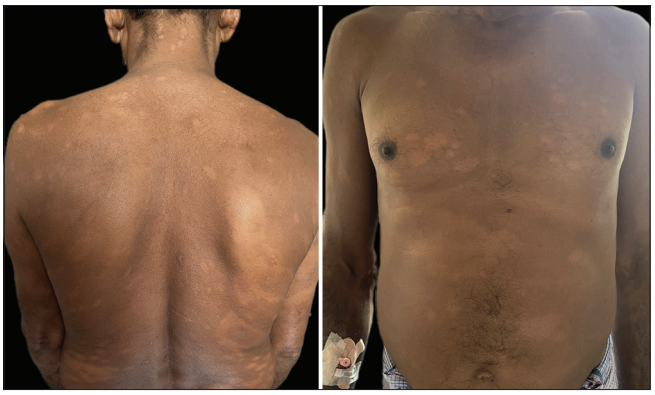

**Figure 1:** The gross image of skin lesions on the trunk and back showing multiple hypopigmented lesions

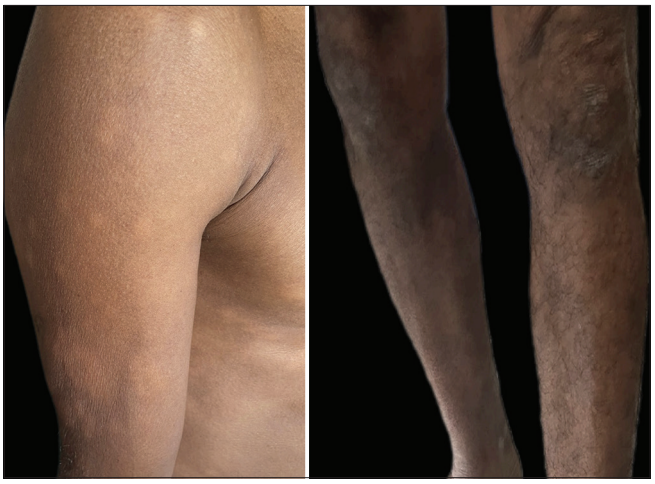

**Figure 2:** The gross images of skin lesions on the upper and lower limbs showing multiple hypopigmented lesions

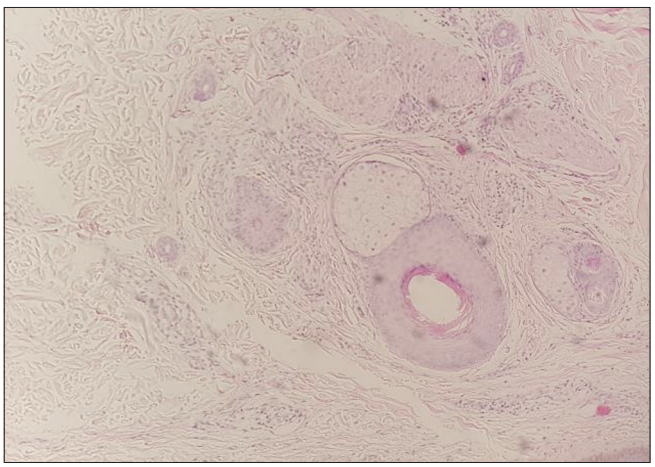

**Figure 3:** Split skin biopsy showing diffuse infiltration of foamy macrophages surrounded by lymphocytes and plasma cells with poorly defined granulomas infiltrating the blood vessels and sweat glands and a well formed grenz zone between the infiltrate and the epidermis on hematoxylin and eosin-stained section (magnification × 4)

## Discussion

Leprosy is an infectious disease that is prevalent in India. According to the statistics released by the World Health Organization (WHO), India showed an increase in detection of new cases in 2022 as compared to 2021 by about 37.7%.[4] The distribution of leprosy is mostly endemic to 'leprosy colonies'

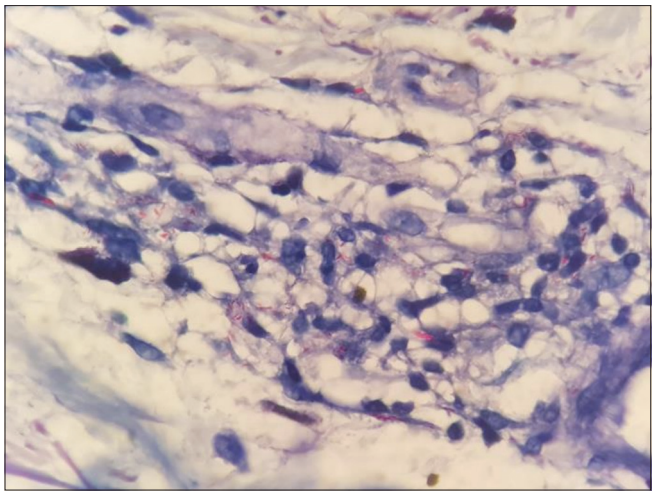

**Figure 4:** Zeihl-Nielsen stain showing acid-fast bacilli

where healthcare provided is through primary care physicians with limited resources. Hence, our case report seeks to educate them about the occurrence and alteration in the course of leprosy in those with chronic hepatitis B. Leprosy is broadly categorized into lepromatous and tuberculoid variants, with the former being the more contagious variant, hence, with an important epidemiological significance.

Some innate immunity factors predispose an individual to hepatitis B infection, which also affects susceptibility to *Mycobacterium leprae* and the course of leprosy, such as polymorphisms of killer-cell immunoglobulin-like receptors (KIR), human major histocompatibility complex class I chain-related gene A (MICA) genes and the lectin complement pathway.[5-7] Factors that increase the risk for both viral infections and leprosy include poor hygiene and low socio-economic status.[5] Hepatitis B infection has also been found to increase the susceptibility to *Mycobacterium leprae* infection by adversely affecting the immune system.[1,2]

Lepromatous leprosy is characterized by a Th2-type of the immune response.[8] Studies have found this pattern of inflammatory response to lower the viral clearance of hepatitis B virus and lower the host immunity.[9] Hence, patients affected by lepromatous leprosy are unable to mount a satisfactory immune response to adequately clear the hepatitis B infection, thereby leading to co-infection.[10] Furthermore, hepatitis B co-infection has been associated with higher rates of nerve function impairment, neuritis, and relapse in comparison to those not affected by leprosy.[1,2]

Literature supporting the association between hepatitis B viral markers (hepatitis B surface antigen and antibody) and leprosy is mixed.[2,3,11-13] There is, however, a paucity of data arising within India.[13-15] The relatively less evidence documented in India regarding this correlation drives one to consider the possibility of lack of access to serological testing facilities and regular follow-up leading to the lack of detection of co-infection.

Treatment of lepromatous leprosy involves a multidrug regimen consisting of dapsone, rifampicin, and clofazimine, in addition to treatment of co-infections. Supportive therapy with physiotherapy and surgical intervention may be required for deformities. Clinicians must consider regular screening of viral markers for HIV, hepatitis B, and C in leprosy patients to ensure early detection of co-infection and treatment to prevent morbidity.

In conclusion, primary care clinicians must be vigilant about the higher risk of complications and poorer patient outcomes in leprosy patients with hepatitis B co-infection. More extensive longitudinal studies assessing genes and the correlation between leprosy and hepatitis B in India can help tailor future guidelines for management.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. The patient has given consent for his images and other clinical information to be reported in the journal. The patient understands that their name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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