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# Tuberculoid Leprosy in a Patient with a History of Hemochromatosis

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## Abstract

Leprosy, a chronic infection of cutaneous and nervous tissue caused by *Mycobacterium leprae,* should be found early to avoid permanent sequelae. Leprosy can histologically mimic sarcoidosis due to the presence of noncaseating granulomas, so clinical pathologic diagnosis is imperative for early diagnosis. Clinically, the annular lesions of leprosy present with a peripheral pink elevated rim and may be mistaken for tinea corporis. *M. leprae* is a slow-growing bacterium and requires at least six months of Multidrug Therapy. Leprosy can be subtle, so we present a 53-year-old man with a single lesion caused by Tuberculoid leprosy on the left medial ankle. Due to this patient's history of hemochromatosis, alteration in the Multidrug Treatment regimen with an extended treatment time of one year resolved symptoms without recurrence. Early diagnosis and appropriate therapy eliminated a potential progressive disability.

**Keywords:** Tuberculoid Leprosy, Hansen's Disease, Paucibacillary, Mycobacterium leprae, Noncaseating granuloma, Hemochromatosis.

## Introduction

Leprosy, also known as Hansen's disease, is a chronic infection of the skin and peripheral nervous system caused by *Mycobacterium leprae.*[1] Although a wide range of clinical presentations exist, the most common features of this disease are skin lesions with diminished sensation (hypoesthesia) and thickened subcutaneous nerves.[2] The most severe form of leprosy is referred to as lepromatous leprosy, or multibacillary (MB), and includes widespread cutaneous lesions, nodules and progression of nerve damage resulting in loss of sensation in the hands and feet.[3] Tuberculoid leprosy, the least severe manifestation of leprosy, is often referred to as paucibacillary (PB) and presents as a single or small number of surface lesions on the skin with loss of sensation and may or may not involve a peripheral cutaneous nerve.[3] Clinical diagnosis of leprosy is based on three cardinal signs set out by the World Health Organization in 1997 which include a hypopigmented anesthetic skin lesion, a thickened peripheral nerve and a positive skin smear or bacilli observed in a biopsy. The presence of one of these three signs is sufficient to make the diagnosis of leprosy.[4] Patients showing positive smears at any site, meaning acid fast bacilli present, are classified as MB whereas patients showing negative smears are classified as PB.[5] PB lesions are characterized by a cellular response resulting in an abundance of epithelioid histiocytes and multinucleated giant cells, the hallmark of granulomas.[4] This intracellular pathogen, therefore, is commonly misdiagnosed as sarcoidosis due to the noncaseating granulomas that are a histopathological feature of both diseases.[2]

## Case Report

We present a 53-year-old male, with a history of hemochromatosis, who presented to the dermatology clinic with a new onset cutaneous plaque on his left medial ankle characterized by hypoesthesia (Figure 1). Upon questioning the patient endorsed a second, similar lesion, on the left toe present for one year. The solitary lesion was a well-defined annular pink plaque with a hypopigmented center on the left medial ankle.

A 3mm punch biopsy was performed to rule out tinea corporis versus leprosy. Pathology reported sarcoidal granulomatous dermatitis with nonspecific histological changes that could represent an infectious process such as leprosy (Figures 2a-c). Four additional 3mm punch biopsies were taken at the following patient encounter. One biopsy was performed for hematoxylin and eosin (H&E), and the remaining three biopsies were performed for cultures; tissue culture, fungal culture and for acid fast bacillus. Histopathology revealed a granulomatous dermatitis negative for fungal elements, negative for acid fast bacillus, and heavy growth of a common commensal bacteria that is part of the normal skin flora: Staphylococcus warneri. The patient was subsequently referred to the University of Miami Hospital Dermatology Clinic for diagnostic confirmation and therapeutic recommendations. Based on the clinical appearance of a solitary annular lesion with central hypoesthesia, anesthesia of the left second toe and a confirmatory granulomatous dermatitis on histopathologic examination, the patient was diagnosed with tuberculoid leprosy. The patient was initiated on minocycline 100mg daily for 12 months and rifampin 600mg once monthly for 12 months. This was the favored regimen due to the patient's underlying hemochromatosis. The patient was monitored for one year and at the completion of his treatment achieved an overall assessment of 0.0 (clear). The patient continues to be monitored regularly by his dermatologist and primary care physician.

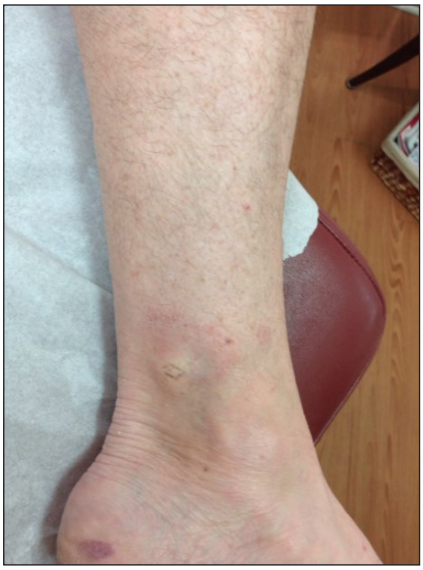
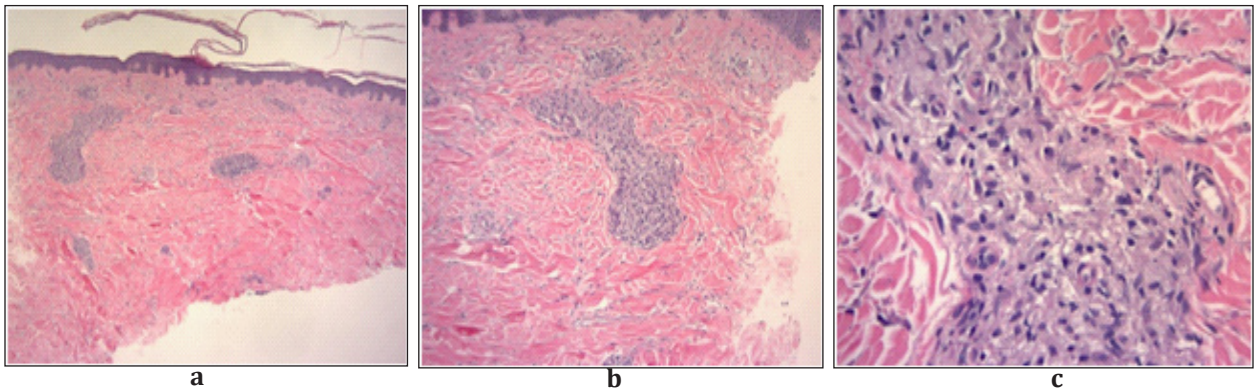


**Figure 1.** *Clinical image showing a well-defined annular pink plaque with a hypopigmented center on the left medial ankle*



a b c

**Figure 2.** *Histological Images (H&E) of left medial ankle. The overlying epidermis is rather unremarkable. In the superficial and deep dermis there are non-necrotizing, well-formed granulomas comprised of epithelioid histiocytes. 5-10% of the dermis contains scattered lymphocytes that tend to aggregate around vessels. Mild interstitial infiltrate presents as well. Nerve destruction is not an obvious feature, which is typical for borderline-tuberculoid leprosy. (a). Magnification of 5x, (b). Magnification of 10x, (c). Magnification of 40x*

## Discussion

*Mycobacterium leprae* infections occurs on a spectrum, as the clinicopathological presentation of leprosy is determined by the cell-mediated immune response of the host.[6] Patients with a robust cellular response develop tuberculoid leprosy, whereas patients with a weakened or absent cellular response develop lepromatous leprosy. While tuberculoid and lepromatous leprosy are the two polar stable forms of the disease, patients typically display an unstable borderline infection that lies between the two extremes.[6] This middle ground is referred to as unstable because the disease may shift toward either pole during the course of the infection or as a result of altered immunological reactions.[6]

The transmission of *M. leprae* is both anthropophilic and zoophilic. Although the spread from person to person is more common, the wild nine-banded armadillo, three species of non-human primates and red squirrels have been found to be natural reservoirs of this bacillus.[1] While lepromatous leprosy is quite contagious, tuberculoid leprosy is rarely spread from human to human.[4] The patient in this case reported prolonged contact with a nine-banded armadillo whilst hunting two years prior. This is believed to be the source from which the patient acquired tuberculoid leprosy, as *M. Leprae* is known for its particularly slow growth with a doubling time of 14 days.[1]

The clinical presentation of tuberculoid leprosy in this case was characterized by a single hypopigmented plaquewith a peripheral pink elevated rim, mild scale and reduced feeling at the center accompanied by anesthesia in the second toe. This is a characteristic presentation of tuberculoid leprosy, although it is possible for multiple lesions to be present.[3]Although rare, it is important to keep leprosy in your differential diagnosis when evaluating similar cutaneous lesions to avoid misdiagnosis. Histological examination is an important tool used to identify tuberculoid leprosy. Biopsy of the lesion and surrounding nerves will more than likely yield granulomas with an abundance of epithelioid histiocytes, multinucleated giant cells, absence of acid fast bacilli and CD4+ T cells.[4] The diagnosis is not straight forward, however, due to the similar histological findings found in sarcoidosis, a systemic disease characterized by noncaseating granulomas.[2,7] Clinical presentation of nerve involvement and histological examination of acid fast bacilli in the case of MB are important differentiating factors between sarcoidosis and leprosy.[2]

The standard treatment for leprosy is multidrug therapy (MDT) as determined by the World Health Organization in 1984.[4] According to up-to-date WHO recommendations, patients displaying MB should receive a combination of *rifampicin*, *clofazimine* and *dapsone* and patients displaying PB should receive *rifampicin* and *dapsone. Rifampicin,* the most important antileprosy medication, is utilized in both treatment combinations (Table 1).[4]

**Table 1.** *Current recommended treatment algorithm for leprosy*

| Presentation | Monthly Dose (mg) | Daily Dose (mg) | Duration |
|---|---|---|---|
| Paucibacillary | Rifampicin 600 | Dapsone 100 | 6 Months |
| Multibacillary | Rifampicin 600 | Clofazimine 50 | 12 Months |
| | Clofazimine 300 | Dapsone 100 | 12 Months |
| Single-Lesion Paucibacillary | Rifampicin 600 | | Single Dose |
| | Ofloxacin 400 | | Single Dose |
| | Minocycline 100 | | Single Dose |

The patient presented in this case received rifampicin and minocycline, a MDT chosen due to the history of hemochromatosis. This treatment regimen was chosen due to the history of hemochromatosis. Hemochromatosis is an autosomal recessive metabolic disorder that results in excessive iron accumulation in vital organs.[8] The liver is the most commonly affected organ secondary to the substantial blood supply it receives. The excess iron deposited in tissues causes an overproduction of free radicals resulting in tissue injury and, in the case of the liver, cirrhosis and liver failure.[8]*Rifampicin* is rapidly metabolized by the liver and is considered a hepatotoxic drug that should only be administered to patients with impaired liver function in cases of necessity.[9]*Dapsone*, the second drug recommended in MDT for PB leprosy, has been shown to increase the hepatotoxic nature of drugs like *rifampicin*. Previous studies report

that administration of *dapsone* in rats has been shown to produce hemolysis of erythrocytes causing continuous release of iron into the blood.[10] Following consultation with the patient's primary care physician and review of his transaminases, the recommended treatment of *rifampin* 600mg daily was downgraded to 600mg once per month and *dapsone* was replaced by *minocycline*100mg daily. As a result of the drug alterations, the usual 6-month course of MDT for PB leprosy was extended to 12 months. This patient continues to remain free of leprosy after therapy.

## References


1. Santos de Macedo C, Alves Lara F, Olmo Pinheiro R, Schmitz V, Berredo-Pinho M, Moura Pereira G, Vidal Pessolani M. New insights into the pathogenesis of leprosy: contribution of subversion of host cell metabolism to bacterial resistance, disease progression, and transmission. Available from: doi: 10.12688/f1000research.21383.1. eCollection 2020.
2. Liu J, Wen Y, Xing Y, Wang S. Borderline tuberculoid leprosy mimicking sarcoidosis: A case report. Medicine (Baltimore). 2018; 97(32): e11616. Available from: doi: 10.1097/MD.0000000000011616.
3. Genetics Home Reference. Leprosy. U.S. National Library of Medicine. 2020; Available from: https://ghr.nlm.nih.gov/condition/leprosy#resources.
4. Eichelmann K, Gonzalez Gonzalez S.E, Salas-Alanis J.C, Ocampo-Candiani J. Leprosy. An Update: Definition, Pathogenesis, Classification, Diagnosis, and Treatment. ActasDermosifiliogr. 2013; 104: 554-63. Available from: doi: 10.1016/j.adengl.2012.03.028.
5. World Health Organization. Leprosy Elimination. 2020; Available from: https://www.who.int/lep/disease/en/.
6. Aftab H, D. Neilsen S, L. Neilsen S, Due E, Bygbjerg I, Thybo S. A Case of Leprosy Mistaken for Cutaneous Sarcoidosis. Acta Dermato. 2011; 92(2): 189-90. Available from: doi: 10.2340/00015555-1253.
7. Mitchell D, Scadding J, Heard B, Hinson K. Sarcoidosis: histopathological definition and clinical diagnosis. J Clin Pathol. 1977; 30(5): 395-408. Available from: doi: 10.1136/jcp.30.5.395.
8. John Hopkins Medicine. Hemochromatosis. PDF file. 2001. Available from: https://www.hopkinsmedicine.org/gastroenterology_hepatology/_pdfs/liver/hemochromatosis.pdf.
9. AIDS*info*. Rifampin. U.S National Library of Medicine. 2019. Available from: https://aidsinfo.nih.gov/drugs/109/rifampin/63/professional.
10. Ezhilarasan D. Dapsone-induced hepatic complications: it's time to think beyond methemoglobinemia. J Drug Chem Toxicol. 2019. Available from: DOI: 10.1080/01480545.2019.1679829.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