# Erythema Nodosum Leprosum in Lepromatous Type Hansen's Disease: A Case Report

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## ABSTRACT

This case report describes a 39-year-old woman with lepromatous Hansen's disease accompanied by erythema nodosum leprosum (ENL) reaction. The patient had complained of lumps in the facial area since 2017 and did not experience any improvement after therapy. In 2022, the diagnosis of ENL was confirmed by BTA examination with a bacterial index of +1 and a morphological index of 90%. After undergoing one year of therapy and re-evaluation, an increase in morphological index was found. Currently, the lesions have spread to the hands and feet, and the patient is receiving anti-inflammatory and supportive therapy with regular monitoring. ENL is a type II reaction to immune-mediated Hansen's disease with the role of various inflammatory cytokines. Risk factors include lepromatous type, hormonal status, and bacterial index. Delayed diagnosis and suboptimal therapeutic response can worsen the clinical course. In conclusion, this case highlights the importance of early detection, immunological management, and a multidisciplinary approach in managing chronic ENL in lepromatous Hansen's disease.

**Keywords**: Erythema nodosum leprosum, Leprosy, Hansen's disease

## Introduction

Hansen's disease, also known as leprosy, is a chronic infectious disease caused by infection with Mycobacterium leprae, where humans are the main carriers of infection with M. leprae.1

Hansen's disease can occur in all age groups, especially in several endemic countries such as Indonesia, India, Brazil and Nepal.2 Hansen's disease primarily affects the skin and then progresses to a secondary stage causing peripheral neuropathy.3 Based on the incubation period, Hansen's disease is divided into two, namely lepromatous leprosy with an average incubation period of 10 years and tuberculoid leprosy with an average incubation period of 4 years.4. A total of 202,256 new cases were identified in 118 countries in 2019, with 79% of the total cases in Indonesia, India, and Brazil.5

Hansen's disease reaction is an acute hypersensitivity episode characterized by previous or new lesions that worsen, either before, during, or after treatment. This reaction has two types, namely reversal reaction and erythema nodosum leprosum (ENL), with ENL occurring in about 50% of cases of lepromatous Hansen's disease.1,4 ENL is a type II Hansen's disease reaction as a complication of immune-mediated inflammation and a major cause of disability. In Indonesia, ENL is the most common type of Hansen's disease reaction based on a retrospective study conducted, namely 20.3%.5 ENL lesions have clinical features such as erythematous, painful nodules, and plaques. There are also some rare types, such as bullous, pustular, ulcerated, hemorrhagic, and erythema multiforme lesions. In general, ENL lesions found on the skin have a picture of inflamed erythematous nodules or deep or superficial papules.6,7 Immunologically, ENL is described as an immune-mediated condition, with TNF-α and IL-1 considered as pro-inflammatory and stimulant cytokines believed to synergistically contribute to the development of ENL.7

The emergence of ENL as a reaction to Hansen's disease poses new challenges in diagnosis and treatment. Therefore, we report a case of a 39-year-old woman with ENL in lepromatous Hansen's disease. This case report aims to provide an overview of ENL in patients with Hansen's disease, which can improve the knowledge of physicians or other health workers and allow early identification of this reaction.

**Case Illustration**

A 39-year-old woman came to the dermatology and venereology polyclinic with complaints of lumps on her hands and feet that had not improved for about 2.5 years. These complaints were felt as heat, not accompanied by itching, but is quite disruptive to daily activities. The initial complaint occurred in 2017, after the patient gave birth, with the discovery of a lump on the left temple of the face. This initial lesion was ignored by the patient without treatment, until a similar lump appeared on the right temple accompanied by redness. Over time, the lesions spread to the upper and lower extremities. The patient first checked herself at a health center in

Surabaya in 2019 and received topical treatment in the form of ointment, but showed no improvement. In 2020, the patient consulted a dermatologist in Surabaya. At that time, the dermatologist said that there was a bacterial infection and gave medicine, but the condition still did not improve.

In 2022, the patient moved to Lamongan and was treated at Intan Medika Hospital with the main complaint of pain, heat, and discomfort in both hands and feet, as well as a lump that felt tight. The patient was then referred to the dermatology and venereology clinic at Soegiri Lamongan Hospital. The patient was then examined for acid-fast bacilli (AFB) and showed a bacterial index (BI) of +1 and morphological index (MI) of 90%. Based on the results of anamnesis and physical examination, supported by the results of AFB examination, the patient was then diagnosed with lepromatous type Hansen's disease with type 2 leprosy reaction erythema nodosum leprosum (ENL). The patient underwent routine treatment for one year in the form of diclofenac sodium 50 mg/12 hours, vitamin B1 twice a day, ranitidine 150 mg/12 hours, desoximetasone 0.25% cream twice a day, gentamicin cream twice a day, and methylprednisolone 16 mg/day.

After one year of treatment, the patient underwent a re-evaluation in 2023. The results of the BTA examination still showed BI remained +1 with an increase in MI to 95%. In addition, a complete blood count showed leukocytosis (15,330/µL with a normal value of 3,600-11,000/µL), increased ESR (53-106/hour with a normal value of 10-20/hour), high absolute neutrophils (12,190/µL with a normal value of 1,500-7,000/µL), and a neutrophil to lymphocyte ratio (NLR) of 5.19 (the normal cut-off limit is 3.13). Therefore, the therapy was continued for the next year. However, from November 2024 to May 2025, the patient no longer continued taking medication from the dermatologist. The patient chose to see a general practitioner and was prescribed methylprednisolone with an unknown dose.

Because the patient was worried about the current condition, the patient finally returned to the dermatology and venereology polyclinic for a check-up. At this last check-up, the results of the vital signs examination showed blood pressure of 130/80 mmHg, pulse rate of 88 bpm, body temperature of 36° C, and oxygen saturation of 90. On physical examination, lesions were found on both hands and feet (Figure 1). The patient is currently receiving therapy in the form of diclofenac sodium 50 mg/12 hours, vitamin B1 twice daily, ranitidine 150 mg/12 hours, desoximetasone 0.25% cream twice daily, gentamicin cream twice daily, and methylprednisolone 16 mg/day. The patient had no history of previous systemic disease. No systemic symptoms such as fever or neurological complaints, such as numbness, were found. The main complaint that remains felt at this time is a burning sensation in the lump that interferes

with daily activities. The patient will undergo a follow-up control in the following month. Informed consent has been obtained from the patient for the publication of data and clinical images in this report.

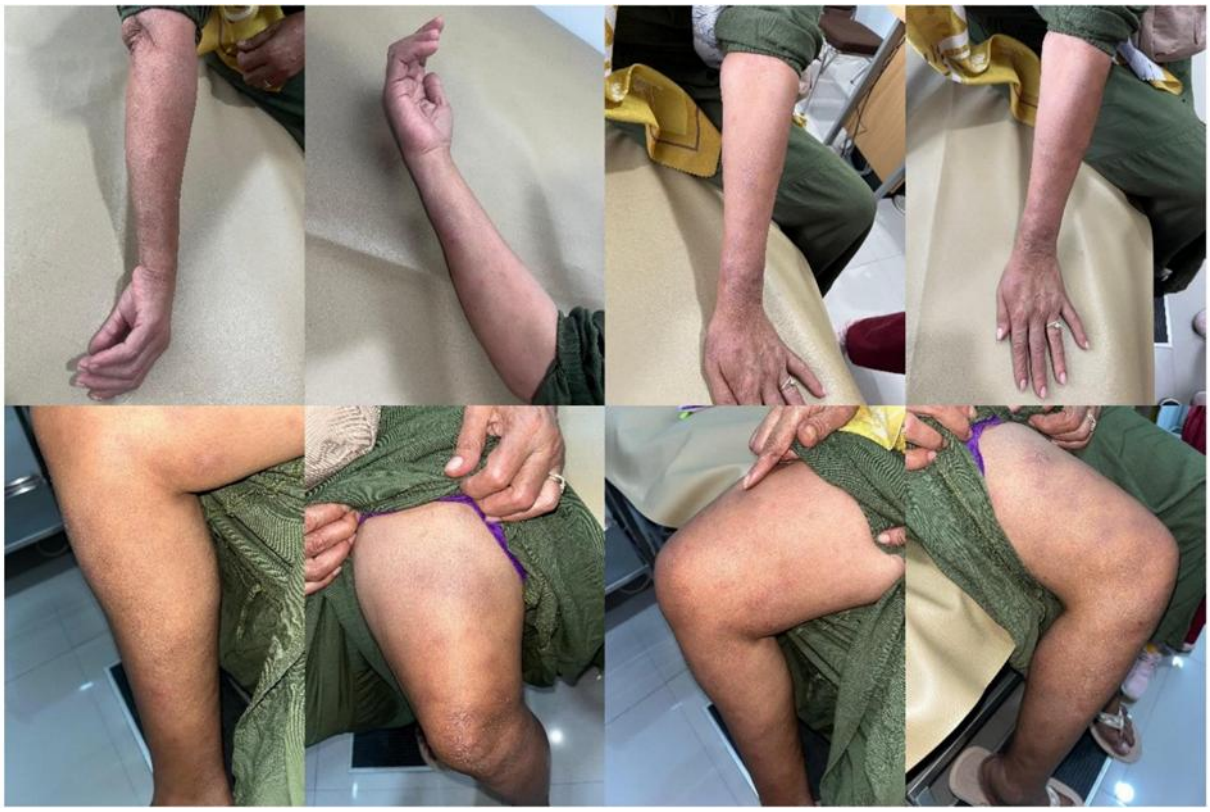

Figure 1. Clinical feature of the hands (top) and feet (bottom).

**Discussion**

The patient in this case presented with a clinical course of lepromatous Hansen's disease complicated by persistent ENL reaction. The onset of symptoms occurred since 2017, but the diagnosis was only established in 2022 after a long journey involving multiple referrals and ineffective therapies. The delay in diagnosis and the progression of inflammatory lesions spreading from the face to the extremities indicate the importance of early detection. Despite methylprednisolone therapy, the patient continued to experience recurrent ENL reactions. This indicates that ENL management requires not only eradication of the bacteria, but also long-term immunological control. This case is interesting because it shows the challenges in assessing the end of therapy, the need for continued immunosuppressive therapy, and the importance of multidisciplinary monitoring in patients with Hansen's disease with chronic type II reactions.

ENL is a type II Hansen's disease reaction which is included in the type III

hypersensitivity reaction found in patients with lepromatous and borderline lepromatous types of Hansen's disease. Several pro-inflammatory cytokines that have been shown to be associated with the occurrence of ENL include IL-1β, IL-4, IL-6, IL-8, IL-10, IL-12, Treg, TLR-9, CCL-5, TNF-α, and IFN-γ.6,8 In addition, cytokine receptors such as sIL2R and sIL6R have also been shown to contribute to the occurrence of ENL.9 Furthermore, neutrophils, T cells, and B cells were found to be abundant in ENL lesions, indicating that the increase in these three features is also related to the immunological process of ENL.10 This evidence suggests that treatment using inhibitors of these cytokines and molecules has potential in the clinical regulation of ENL in patients with lepromatous Hansen's disease.

Several risk factors that may be involved in the development of ENL in Hansen's disease include co-infection, steroid therapy, duration of multidrug therapy, lepromatous and borderline lepromatous types of Hansen's disease, bacterial index, and the presence of comorbidities.11–14 In addition, other studies have revealed that hormonal changes in pregnant, breastfeeding, and menopausal women are associated with an increased incidence of ENL.15 In this case, there are several factors that may contribute to the emergence of ENL. The initial lesion did appear after the patient gave birth and/or breast-feeding associated with hormonal changes, which may mark the initiation of Hansen's disease. However, the ENL reaction itself only appeared several years later, possibly triggered by other factors such as the lepromatous type of Hansen's disease, which is the type with the highest risk of developing ENL, and the bacterial index that remained during treatment. In addition, the NLR in this case reached 5.19, which significantly exceeded the threshold found in several studies to diagnose ENL, which is 2.95 to 4.99.16,17

Treatments given in this case include diclofenac sodium, methylprednisolone, vitamin B1, ranitidine, desoximetasone cream, and gentamicin cream. In ENL, treatment is given with the aim of reducing excessive inflammatory responses, relieving pain, and preventing further episodes. In terms of pain relief, diclofenac sodium was prescribed to the patient in this case. This is in accordance with the evidence that NSAIDs can be the main choice in regulating inflammation.18 In addition, corticosteroids are given to ENL patients because they control inflammation that occurs through the regulation of neutrophils and macrophages, and inhibit various pro-inflammatory cytokines involved in ENL. Some choices of corticosteroids are prednisone, dexamethasone, and methylprednisolone.7,18 Corticosteroids are given in this case to inhibit the inflammatory process that occurs, so that it is expected that there will be changes in cellular immunity levels. However, it should be noted that the dose of corticosteroids can be reduced periodically and stopped appropriately when ENL improves,

this is to avoid recurrence of reactions, opportunistic infections, and also reduce the side effects of corticosteroids.6,7,19 In this case, the patient had previously been given methylprednisolone therapy with an unknown dose. Inappropriate administration of corticosteroids and not being reduced periodically may be one of the factors causing recurrence of ENL reactions in patients. Therefore, medical personnel must have clinical skills in controlling triggering factors for reactions, especially in terms of appropriate administration of corticosteroids, in order to reduce the risk of recurrence of ENL reactions.20,21

This case highlights the importance of clinical alertness to early symptoms of Hansen's disease, especially in patients with a history of hormonal disorders that can trigger immunological disorders such as ENL. Delay in diagnosis and treatment can worsen the course of the disease and increase the risk of long-term complications. Therefore, early detection and immunological monitoring are essential in the management of lepromatous Hansen's disease with ENL. Clinical recommendations include a multidisciplinary approach, rational use of corticosteroids, and periodic evaluation of therapeutic response. Further studies are needed to evaluate biomarkers and individualized therapeutic strategies to prevent ENL recurrence and reduce the burden of disease in patients.

## Conclusion

This case emphasizes the importance of early detection and comprehensive management of lepromatous Hansen's disease with chronic ENL. Anti-inflammatory therapy needs to be given rationally and accompanied by close monitoring to prevent complications and recurrence.

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