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Erythema nodosum leprosum in a patient with lepromatous leprosy: A case report

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ABSTRACT

Rationale: Lepromatous leprosy is a skin condition. Erythema nodosum leprosum (ENL) aids in its diagnosis. ENL is a type-2 immune response, whereas lepra ENL is characterized by a hypersensitivity reaction and an exaggerated immune response through a different pathway.

Patient's Concern: A 40-year-old male patient, previously diagnosed with lepromatous leprosy, displayed painful skin lesions on his extremities.

Diagnosis: Type-2 lepra reaction, specifically erythema nodosum leprosum.

Interventions: The patient was initially treated with 100 mg dapsona daily and then with fusidic acid, prednisone, and other MDT agents, after development of dapsona resistance. After type-2 lepra reaction was lessened in just two weeks, the regimen was adjusted to prednisolone (up to 2 g daily), thalidomide (300 mg daily), minocycline (1.5 g daily), ofloxacin (1 g twice daily), and pentoxifylline (400 mg three times daily) over a six-month period.

Outcomes: The treatment effectively reduced the type-2 lepra reaction and improved the patient's skin lesions and overall health.

Lessons: Healthcare providers should maintain a high level of awareness regarding the symptoms and medical history associated with ENL to facilitate timely diagnosis and appropriate management strategies. It is critical to tailor treatment to each patient's symptoms and responses for successful management. Consistent monitoring of inflammatory markers and regular follow-up appointments play vital roles in preventing complications and ensuring positive outcomes for patients with ENL.

KEYWORDS: Leprosy; Type 2 reactions; Multi-drug therapy; Type 1 reactions; Risk factors

1. Introduction

Despite scientific advancements, leprosy, the oldest known disease, remains a significant challenge. Leprosy is a particularly aggressive disease that presents with symptoms ranging from minor to severe complications. It is essential to tell the difference between type-2 reactions, which cause inflammation through blood proteins, and borderline reactions, which worsen systemic inflammation and make diagnosis more difficult[1]. *Mycobacterium lepra* primarily affects nerve tissues, including the skin, upper respiratory tract, and eyesight. Leprosy is highly contagious and can affect multiple body parts in various ways[2]. When functioning correctly, the body's immune system activates specific mechanisms to halt the spread of infection. Patients with leprosy may require corticosteroids, thalidomide, clofazimine,

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minocycline, or immunomodulatory drugs[3]. Despite the recent addition of a multidisciplinary team expediting the process, we advise individuals diagnosed with leprosy to avoid vaccination due to the risk of adverse reactions. Conditions that result in permanent disability and nerve damage are defined as emergency medical conditions[4]. In prolonged or recurrent episodes, steroids may be required for a more potent and lasting treatment[3]. Thalidomide therapy is an alternative that inhibits the release of TNF- α , which causes nerve damage and muscle weakness[5]. This study examines drug therapies for type 2 reactive leprosy, with a particular focus on antileprosy neuritis.

2. Case report

The institutional ethics committee approved the case report (Approval No. SMCH/2023/06/234), which was drafted in accordance with standard guidelines and with the consent of the relevant patients. The preparation of the manuscript revealed no conflicts of interest.

Our hospital admitted a 40-year-old man with type II hypersensitivity lesions and numerous red-crust wounds. Despite initially experiencing a fever and joint pain, he had no other symptoms. The doctor prescribed a five-day regimen of amoxicillin and diclofenac injections after he tried topical pain medication. Within a week, the patient developed ulcerated red thickenings in his extremities, chest, abdomen, ears, and back. A specialised hospital admitted him. Nightly fever spikes caused new pustule bursting, erosion, and ulcers. A small lump of cicatrices broke open, transformed into ulcers, and formed clots (Supplemental Figure 1). In his medical history, there was nothing noteworthy. Examination revealed distinct edges on these pores, which did not appear circular or oval. Blood tests diagnosed a patient with inflammatory skin disease and endothelial necrosis, revealing painful red bumps and elevated levels of anaemia, neutrophilia, and ESR. A skin biopsy

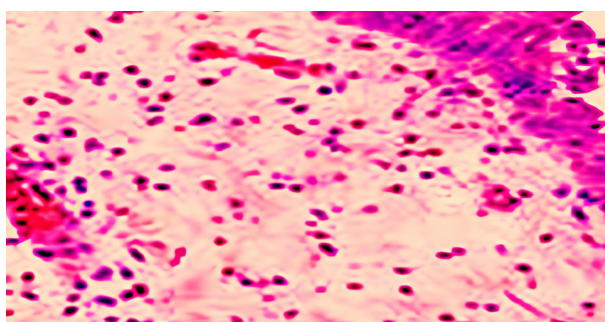


Figure 1. A skin biopsy of a 40-year-old patient diagnosed with erythema nodosum leprosum reveals enlarged blood vessels with red blood cell (RBC) extravasation, thrombus formation, and neutrophil infiltration. Hematoxylin and eosin (H&E), 400x magnification.

revealed that the lesion sample had a bacterial index of 6+, which included a globe, multiple blood vessels, and necrotic tissue. It also had a morphological index of 10% (Figure 1).

Microbe counts are used to detect infections and guide immunotherapy decisions. The patient promptly initiated a course of antibiotics to target bacterial infections present in the skin lesions. We also arranged a consultation with an immunologist to develop a suitable immunotherapy treatment plan for managing the patient's condition. To guarantee optimal treatment and constant supervision of a patient's bacterial infection and immune system problems, it is crucial to collaborate with dermatologists, infectious disease specialists, and immunologists. Antibiotic therapy, immunomodulatory agents, and effective wound care management help improve the patient's recovery and overall health by addressing both the infection and underlying immune system issues. Initially treated with 100 mg a day of dapsone for 15 days, the patient developed drug resistance. We used combination therapy with fusidic acid, prednisone, and other MDTs to manage the infection. The treatment significantly reduced the type-2 leprosum reaction two weeks later (Supplemental Figure 2). This regimen effectively managed the immune responses and controlled the erythema leprosum symptoms. Continuous monitoring and adjustment are essential to prevent drug resistance. Over the next six months, the patient received up to 2 g of prednisolone daily, 300 mg of thalidomide daily, gradually increasing Minocycline to 1.5 g daily, 1 g of Ofloxacin twice daily, and 400 mg of pentoxifylline three times daily.

This was due to the scheduled follow-up appointments, which ensured the treatment plan's efficacy and acceptability to the individual. The treatment plan significantly reduced inflammatory markers, improved overall health, alleviated pain, and enhanced mobility, confirming its effectiveness in enhancing the quality of life. A comprehensive approach and constant supervision during subsequent appointments successfully maintained the patient's treatment plan, resulting in no significant adverse effects or obstacles and leading to a positive outcome. The patient's overall health and well-being improved significantly.

3. Discussion

This study aimed to evaluate the effectiveness of a therapeutic intervention by examining the factors that contribute to positive outcomes. Its aim is to equip future researchers and practitioners with the knowledge to replicate and enhance these outcomes, as well as identify areas that may require improvement[3]. This case demonstrates that careful planning, adaptability, and a patient-centered approach can lead to successful therapeutic outcomes. Erythema leprosum is a severe immune reaction that causes painful

sores and blisters on the skin, nerve damage, and deformity in patients with lepromatous leprosy. We used corticosteroids and immunosuppressants to reduce inflammation and its progression[6].

Early detection and prompt management are essential to preventing long-term disability. Although the exact cause is unknown, it is likely due to an interaction between the immune system and *Mycobacterium lepra*. Patients with high bacterial levels and weakened immune systems are at a higher risk of complications from leprosy. Regular monitoring of symptoms is essential for mitigating neurological complications[7]. Early detection allows for prompt treatment and prevention of severe disease progression and permanent disability. Corticosteroids, NSAIDs, and antibiotics control the immune response and relieve symptoms.

Regular follow-up and treatment are essential to manage the disease and avoid long-term consequences. Secondary infections such as shingles and Hansen's disease can negatively impact leprosy, affecting response initiation and maintenance[8]. Co-infections, including bacterial and viral infections, may trigger the onset of ENL. Long-term corticosteroid use in ENL patients can weaken immunity, increasing the likelihood of side effects such as diabetic ketoacidosis, septic shock, and pneumonia[9]. Patients with leprosy who develop ENL face a significant risk of permanent nerve damage. Individuals with a history of leprosy or a genetic predisposition for inflammatory responses are more susceptible to ENL. Clofazimine and glucocorticoids are very effective in managing leprosy and inflammation because of their specific actions and proven success in treating the condition[4].

Further clinical trials are essential to investigate the efficacy of alternative immunosuppressants such as cyclosporine, azathioprine, methotrexate, and TNF- α inhibitors. Extensive research is crucial to confirming the safety and efficacy of leprosy and ENL treatments. It is crucial for healthcare providers to stay abreast of the most recent advancements to deliver optimal care and prevent long-term complications[10]. Collaboration among healthcare providers, researchers, patients, and policymakers is essential for advancing leprosy management. Collaboration can enhance treatment outcomes and quality of life for patients with leprosy, ensuring the adoption of evidence-based practices for the most effective therapy[7]. These findings underscore the critical importance of early intervention in preventing severe complications. Erythema leprosum, a type 2 reaction, underscores the necessity of ongoing research to address immune issues and enhance treatment outcomes. Urgent research is imperative to enhance the understanding of ENL mechanisms, identify early detection markers, and devise improved treatment strategies for future management[5]. The development of targeted therapies for ENL could significantly improve patient outcomes and quality of life.

Effective management of ENL requires educating and supporting patients to recognise early symptoms and seek prompt treatment.

Empowering patients to take charge of their care leads to increased medication adherence and improved outcomes. Collaboration between healthcare providers and patients is vital for successful ENL management and long-term results. Healthcare professionals must consider patients' perspectives when making treatment plans and decisions.

Conflict of interest statement

The authors report no conflict of interest.

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Authors' contributions

SSK is responsible for conceptualization, writing the original draft, and reviewing it. SS: Review, edit. SB is responsible for conceptualization, writing the original draft, and reviewing, whereas KE is responsible for reviewing and editing.

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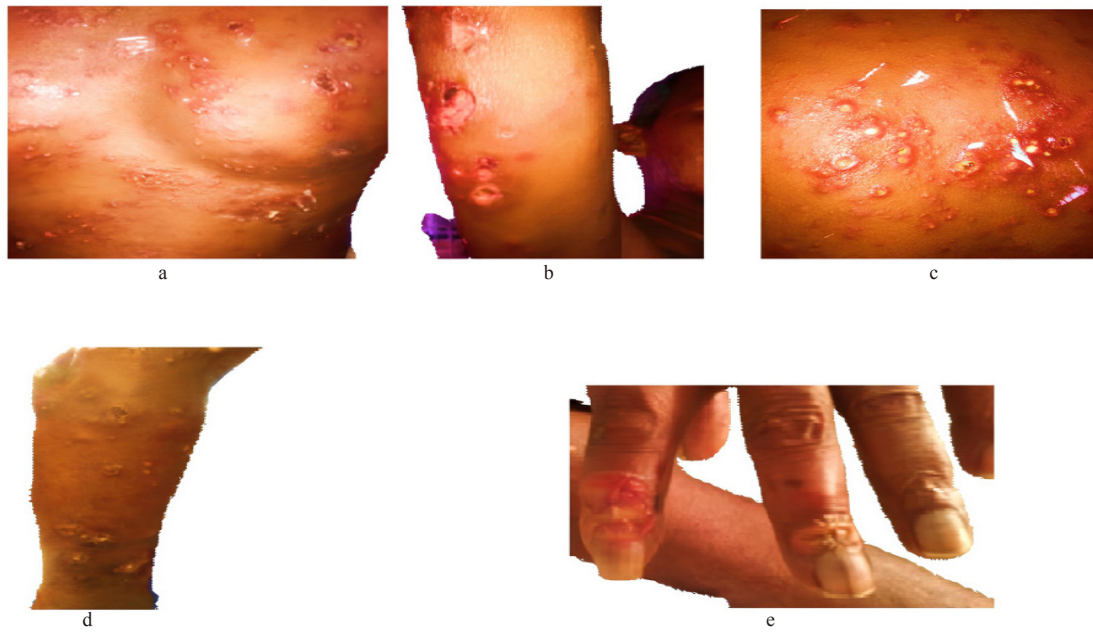
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Supplementary Figure 1. Type-2 lepra reaction before treatment a) abdominal region; b) right upper arm; c) back region; d) left upper arm; e) forefinger.



Supplementary Figure 2. Type-2 lepra reaction after two weeks of treatment a) abdominal region; b) right upper arm; c) back region; d) left upper arm; e) forefinger.

