Case Report

Lepromatous Lymphadenitis: A Rare Manifestation of Leprosy Diagnosed by Fine Needle Aspiration Cytology

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Abstract

Introduction: Leprosy is a widespread infectious and contagious disease with a prevalence rate of 0.4 per 10,000 population in India. It is a chronic infectious disease caused by *Mycobacterium leprae* and mainly affects the skin, the peripheral nerves, the mucosa of the upper respiratory tract, and the eyes. Lymph node involvement is rare.
Case Description: A 24-year-old male presented with right lower limb numbness for one year and a non-healing knee ulcer for one month, along with recurrent ulcers, sensory loss, and erythematous macules. Nerve conduction studies showed that the bilateral ulnar and sural nerves were non-excitable, and the median nerves had reduced amplitude. FNAC of a right inguinal lymph node revealed foamy macrophages and ill-defined granulomas; Modified Ziehl-Neelsen stain demonstrated numerous acid-fast bacilli, indicating lepromatous lymphadenitis. A punch biopsy from the knee ulcer showed epithelioid granulomas, foamy macrophages, and a Grenz zone with positive AFB staining. A diagnosis of Borderline Lepromatous (BL) leprosy was confirmed. The patient was started on multidrug therapy and showed clinical improvement.
Conclusion: When Leprosy presents as lymphadenopathy, FNAC can be a very useful tool for the diagnosis of Lymphadenopathy due to Leprosy and excludes other possibilities of Lymphadenitis. It is also a simpler, quicker, and less invasive technique for diagnosing such rare lesions.

Keywords: Leprosy; FNAC; lymph node; slit skin smear.

Introduction

Cytology is a commonly used diagnostic technique for a wide range of inflammatory and malignant disorders, as it is a quick, easy, and inexpensive investigation. Slit skin smears are a type of cytologic preparation that has been widely used to evaluate leprosy lesions. Using the Ridley-Jopling (R-J) scale, the morphologic index [MI] and bacterial index [BI] of acid-fast bacilli *Mycobacterium leprae* are evaluated to aid in diagnosis and classification.[1, 2]

Leprosy is a widespread infectious and contagious disease with a prevalence rate of 0.4 per 10,000 Population in India.[3] It is a chronic infectious disease caused by *Mycobacterium leprae*. It is a Gram-positive intracellular bacillus that was first identified by Hansen. It is a chronic infectious disease that mainly affects the skin, the peripheral nerves, the mucosa of the upper respiratory tract, and the eyes. Lymph node involvement is rare.[4] Although the majority of the population is exposed to the bacillus in endemic areas, more than 90% are immune and do not experience symptoms. Leprosy is typically classified into two major subtypes: tuberculoid and lepromatous.[5] Patients with tuberculoid leprosy have a strong cell-mediated

immune response, and few organisms invade organ tissues. In people with lepromatous leprosy, there is little immunity after infection, and a wide range of organisms can be discovered throughout the body. Some classification systems recognize borderline types of the disease.[6]

Case Report

A 24-year-old male patient was referred to our institute with the presenting complaints of numbness in the right lower limb for a one-year duration and a non-healing ulcer over the right knee of one month duration, for which he had taken treatment from outside. He also revealed a history of loss of sensation of the right leg and back with associated multiple erythematous macules of 5 months duration and a history of recurrent ulcers, which healed on their own for the past 2 years. His nerve conduction velocity report was suggestive of bilateral ulnar nerve not excitable, bilateral median nerve decreased amplitude, and bilateral sural nerve not excitable. The patient was referred for FNAC of the right inguinal lymph node in the department of cytopathology.

On clinical examination, bilateral inguinal lymph nodes were palpable and an ulcer was identified over the right knee measuring $10 \times 7 \times 1$ cm without any discharge (Figure 1). The ulnar nerve was also palpable and non-tender (L>R). FNAC was done from the largest palpable inguinal lymph node, and 4 smears were made. One of them was immediately fixed in 95% ethyl alcohol for Pap staining, and the rest of the smears were kept air-dried. Two of them were stained with Leishman & Giemsa (L&G) and one with Modified Ziehl-Neelsen stain with 5% H_2SO_4.

FNAC revealed cellular smears which were composed predominantly of foamy macrophages, focally forming ill-defined granulomas along with a few epithelioid cells in a background of fatty material and lymphocytes. Modified ZN Stain for AFB showed numerous intracellular and extracellular fast bacilli in the form of globi, and the final diagnosis of Lepromatous Lymphadenitis was given.

A punch biopsy from the ulcerative lesion on the knee was also done, which showed variable-sized epithelioid granulomas admixed with foamy macrophages and lymphocytes, especially around periadenexal structures and nerve twigs, with the presence of a Grenz zone. ZN stain (5% H_2SO_4) for acid-fast bacilli was positive. Hence, a confirmatory diagnosis was confirmed as Borderline Lepromatous (BL) leprosy on punch Biopsy (Figure 2).

Upon confirmation of diagnosis, the patient was commenced on the World Health Organization (WHO)-recommended Multibacillary Multidrug Therapy (MB-MDT) regimen, administered over 12 months with monthly clinical evaluations.

The treatment protocol consisted of a total of 12 blister packs, each corresponding to one month of therapy, with the following dosing schedule: Day 1 (supervised monthly) included Rifampicin (300mg x 2), Clofazimine (100mg x 3), and Dapsone (100mg x 1). From day 2-28 (self-administered daily dose) patient took Clofazimine (50mg x 1) and Dapsone (100mg x 1). Throughout the treatment period, the patient was monitored for adverse drug reactions and complications. Notably, the patient developed a Type II lepra reaction (Erythema Nodosum Leprosum), which was managed promptly per established therapeutic guidelines. Overall, the treatment regimen was well tolerated, and on follow-up, the patient's ulcer was healed.

Written consent from the patient and ethical approval was taken.

Discussion

Leprosy, a chronic granulomatous illness, typically shows up as cutaneous, neurological symptoms, but it can also affect the lymph nodes, spleen, bone marrow, eyes, and testes.[7] Lymph node involvement in lepromatous leprosy shows a characteristic microscopic picture which includes progressive accumulation of large, pale, rounded histiocytes (lepra cells), with no granuloma formation or necrosis.[8] In the analysis of 105 leprosy patients, Mohanty et al. discovered that all cases of Lepromatous (LL), borderline lepromatous (BL), and borderline (BB) type leprosy had clinically enlarged lymph nodes. Inguinal (76.2%), cervical (69.5%), and axillary (69.2%) groups of lymph nodes were the most frequent sites.[9] Nonetheless, it is extremely uncommon to diagnose leprosy mainly with lymph node cytology or biopsy. Our reported case had a similar type of involvement of the lymph node group. Cavett JR et al. reported the first instance of cytological identification of lymphadenopathy by FNAC in Lepromatous leprosy.[8] Ahamad et al. further assessed the value of FNAC for lymph node identification, and they even attempted to categorize the smears using the Ridley-Joplin spectrum based on the ratio of foamy histiocytes to epithelioid cells.[4] The cytomorphological picture in our case was indicative of lymph node involvement in Lepromatous leprosy.[10] Dominic et al stated in their research that the sensitivity and specificity of classifying leprosy on FNAC varied 80% to 100% and 84.6–100% respectively.[11]

Slit-skin smears and biopsies are typically thought to be more sensitive and specific than FNAC in the detection of *Mycobacterium leprae* in Lepromatous Leprosy, especially when it comes to identifying multibacillary cases. FNAC may not be as accurate as slit-skin smears and biopsies in identifying the total disease load, even if it can be useful in determining nerve involvement in leprosy, especially in instances that are pure neuritic.[12] However, the role of FNAC is limited; it is a

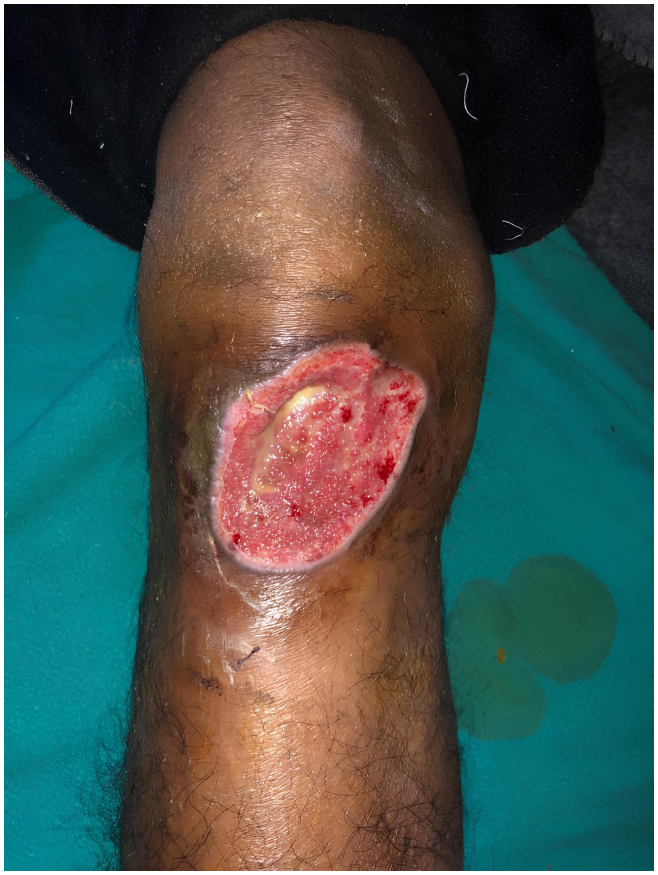

Figure 1: An ulcer with well-defined and clean borders on knee.

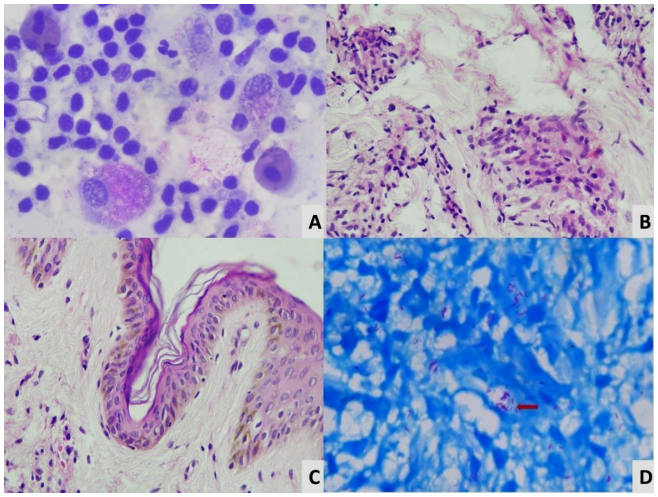

Figure 2: (A) ZN 5% H_2SO_4 on FNAC of inguinal lymph node revealed globi of lepra bacilli on 100X. (B&C) H&E-stained sections from ulcer show collections of epithelioid cells and presence of grenz zone on 40X. (D) ZN 5% H_2SO_4 on ulcer biopsy show positivity for globi of lepra bacilli.

useful tool in classifying leprosy into different groups of the spectrum.

Conclusion

Leprosy can present as generalized lymphadenopathy, and FNAC can help in diagnosis as well as exclude other causes of lymphadenopathy. It is a simpler, quicker, and less invasive technique for diagnosing such rare lesions. It acts as a viable alternative to slit skin smears and skin biopsy for diagnosing leprosy, providing sufficient material for cytological analysis.

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Competing Interests: None.

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