

Identification of a patient with multibacillary leprosy using the serological test (LID) in active search actions: a case report

Identificação de um paciente com hanseníase multibacilar por meio do teste sorológico (LID) em ações de busca ativa: um relato de caso

Identificación de un paciente con lepra multibacilar mediante prueba serológica (LID) en acciones de búsqueda activa: informe de un caso

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ABSTRACT

Leprosy is a chronic and infectious disease caused by *Mycobacterium leprae* (*M. leprae*). It has high infectivity and low pathogenicity. This study aimed to report the identification



of a patient with multibacillary leprosy using the serological test (LID) during an active search. A 54-year-old male patient, living in Governador Valadares, Minas Gerais, Brazil, from the active search of the Leprosy Research Center (NuPqHans/UFJF-GV), presented a positive serological test for recombinant bacillus proteins (ML0405/ML2331). He was referred to the Reference Center for Endemic Diseases and Special Programs (CREDENPES), complaining of skin lesions and nodules all over his body, and reported a history of head trauma, occasional dizziness, numbness in his feet, and nosebleeds. The patient presented positive bacilloscopy and biopsy results, concluding the diagnosis of multibacillary leprosy and receiving the indicated multidrug therapy. After three months of treatment, there was a reduction in the area/diameter of the lesions on the abdomen, indicating the effectiveness of the treatment. The positive result of the serological test (LID) allowed the identification of a multibacillary patient, who until then had not been diagnosed with leprosy. In addition, the use of the LID serological test in active search activities in endemic areas for early diagnosis can contribute to the zero-leprosy concept stipulated by the World Health Organization.

Keywords: *Leprosy. Diagnosis. Serology.*

RESUMO

A hanseníase é uma doença crônica e infectocontagiosa causada pelo *Mycobacterium leprae* (*M. leprae*). Apresenta alta infectividade e baixa patogenicidade. O estudo teve como objetivo relatar a identificação de um paciente com hanseníase multibacilar através do teste sorológico (LID) em ação de busca ativa. Paciente do sexo masculino, 54 anos, residente em Governador Valadares, Minas Gerais, Brasil, proveniente da busca ativa do Núcleo de Pesquisa em Hansenologia (NuPqHans/UFJF-GV), apresentou teste sorológico positivo para proteínas recombinantes do bacilo (ML0405/ML2331). Encaminhado ao Centro de Referência de Doenças Endêmicas e Programas Especiais (CREDENPES), queixando-se de lesões na pele e nódulos pelo corpo, relatou histórico de traumas na cabeça, tonturas ocasionais, dormência nos pés e sangramento nasal. O paciente apresentou resultados de baciloscopia e biópsia positivos, concluindo o diagnóstico de hanseníase multibacilar, recebendo poliquimioterapia indicada. Após três meses de tratamento observou-se redução na área/diâmetro das lesões do abdômen, indicando a eficácia do tratamento. O resultado positivo do teste sorológico, permitiu a identificação de um paciente multibacilar, até então sem diagnóstico de hanseníase. Ademais, a utilização do teste sorológico LID nas atividades de busca ativa em áreas endêmicas para realização do diagnóstico precoce pode contribuir para o conceito zero hanseníase estipulado pela Organização Mundial da Saúde.

Palavras-chave: *Hanseníase. Diagnóstico. Sorologia.*



RESUMEN

La lepra es una enfermedad infecciosa crónica causada por *Mycobacterium leprae* (*M. leprae*). Tiene una alta infectividad y una baja patogenicidad. El objetivo deste estudio fue relatar la identificación de un paciente con lepra multibacilar utilizando la prueba serológica (LID) durante una acción de búsqueda activa. Un paciente masculino de 54 años, residente en Governador Valadares-MG, proveniente de la búsqueda activa del Núcleo de Pesquisa em Hansenologia (NuPqHans/UFJF-GV), presentó prueba serológica positiva para la proteína recombinante del bacilo (ML0405/ML2331). Fui remitido al Centro de Referencia de Enfermedades Endémicas y Programas Especiales (CREDENPES), quejándose de lesiones cutáneas y nódulos por todo el cuerpo, refirió antecedentes de traumatismo craneoencefálico, mareos ocasionales, entumecimiento de los pies y hemorragia nasal. El paciente presentó resultados positivos de baciloscopia y biopsia, concluyéndose el diagnóstico de lepra multibacilar, recibiendo la terapia multimedicamentosa indicada. Después de tres meses de tratamiento hubo una reducción del área y diámetro de las lesiones en el abdomen, indicando la eficacia del tratamiento. El resultado positivo de la prueba serológica, permitió identificar a un paciente multibacilar que hasta entonces no había sido diagnosticado de lepra. Además, el uso de la prueba serológica LID en actividades de búsqueda activa en zonas endémicas para el diagnóstico precoz puede contribuir al concepto de lepra cero estipulado por la Organización Mundial de la Salud.

Palabras clave: *Lepra. Diagnosis. Serología.*

INTRODUCTION

Leprosy is a chronic disease caused by *Mycobacterium leprae* (*M. leprae*). The bacillus's preference for peripheral nerves leads to neurological changes that may result in physical disabilities and deformities¹. The disease is a public health problem in Brazil, which ranks second among the countries with the highest number of cases in the world². Concerning diagnosis, there is a need to develop new tests capable of detecting subclinical infections, confirming potential new cases with suspected leprosy lesions, and tracking asymptomatic contacts³. Recent advances in the development of serological assays targeting specific antigens have enhanced our understanding of the infection risk in household contacts. Examples include serological testing for recombinant proteins of *M. leprae* called Leprosy IDRI Diagnostic-1 (LID-1)^{4,5,6}. LID-1 results from the fusion of two known proteins from *M. leprae* (ML0405/ML2331) developed by the Infectious Disease Research Institute (IDRI), in Seattle, United States of America^{5,7}.

Therefore, this study reports the applicability of the LID-1 serological test in detecting multibacillary leprosy through an active search involving approximately 1,200 people.

CASE REPORT AND DISCUSSION

A 54-year-old male patient residing in Governador Valadares, Minas Gerais, Brazil, a leprosy endemic region, was identified through an active search conducted by NuPqHans at the Federal University of Juiz de Fora, Governador Valadares (UFJF-GV). The patient had no prior history of medical evaluation and exhibited a positive result in a blood sample obtained through digital puncture, tested in a multiplex assay with spheres coupled to the LID-1 antigen. In this test, IgG antibody titers were assessed through fluorescence, and positive values were determined using a cutoff point set at 3 standard deviations above the mean of non-endemic controls⁸. Project approved by REC/UFJF/CAAE: 138 25762219.7.0000.5147.

Figure 1 shows skin lesions and nodules throughout the body during the consultation. In addition, there were reports of head trauma, occasional dizziness, numbness in the feet, and nosebleeds. After evaluation, a deviated septum and nasal cavity wounds with bloody crusts were identified. In a subsequent consultation, calluses with wounds in the area of the tibial tuberosity, as well as two lesions on the lateral and dorsal sides of the foot, were observed.

Figure 1 – Presence of nodules in the abdominal region.



Source: Elaborated by the authors..

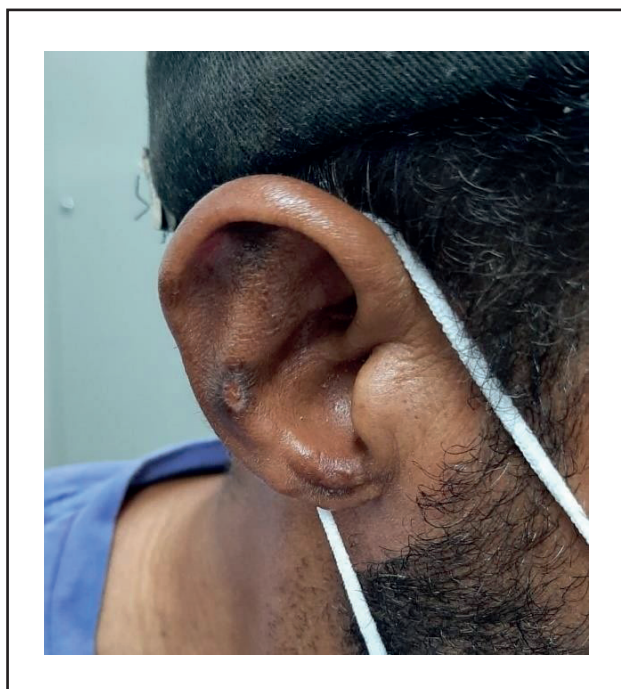
In Figure 2, it is evident that the patient also presented lesions in erythematous plaques with undefined external borders, well-defined ear canals, and a hypochromic center in the region of the right ear. The patient underwent smear microscopy of intradermal scrapings of the lesions, earlobes, and elbows. In these lesions, a bacilloscopic index (BI) = 2.25 was observed, being classified as multibacillary (MB). A skin biopsy was also conducted and sent to the Oswaldo Cruz Foundation (FIOCRUZ/RJ), revealing leprosy in the polar lepromatous form (LL) with BI = 5.5. Blood tests showed altered blood glucose values = 118 mg/dl and lactate dehydrogenase (LDH) = 860 U/L. Another relevant point is related to LDH, which may suggest damage to organs and tissues.

After clinical evaluations and test results, in September of 2022, the patient initiated multidrug treatment for multibacillary conditions as specified in the Clinical Protocol and Therapeutic Guidelines for Leprosy⁹. After three months, a clear reduction in the area/diameter of the abdominal lesions was observed (Figure 3), which may be related to the reduction of the inflammatory process. It is important to highlight that, throughout the patient's follow-up, no leprosy reaction was detected.

CONCLUSION

The use of the LID-1 serological test in active search actions for the early diagnosis of leprosy (paucibacillary and multibacillary) demonstrated the importance of the applicability of this test, especially in the case of an endemic

Figure 2 – Presence of lesion in the right ear pinna.



Source: Elaborated by the authors.

Figure 3 – Appearance of nodules in the abdomen three months after initiating treatment.



Source: Elaborated by the authors.

disease. Moreover, it is crucial to emphasize that the test can assist healthcare professionals in units distant from reference centers in making a conclusive diagnosis of leprosy. It is worth noting that, to carry out this test, only one drop of blood collected on filter paper is necessary, which, after drying and storage at -20 °C, must be sent to the Central Public Health Laboratory (CPHL).

ETHICAL APPROVAL AND INFORMED CONSENT: *the study was approved by the Research Ethics Committee (REC) of the Federal University of Juiz de Fora, CAAE: 138 25762219.7.0000.5147.*

CONFLICTS OF INTEREST: *the authors inform that there are no conflicts of interest in this article.*

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