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Case Report Open Access

Joint-related manifestations of leprosy: A case report

Hamidreza Bashiri[1], Mohammad Ebrahimzadeh Ardakani[2,3], Mahlagha Zahedi[3], Mohammad Sobhani[4], Sina Ghanei[5] , Hamidreza Soltani [1*]

[1]Department of Rheumatology, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. [2] Department of Dermatology, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.[3] Department of Pathology, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.[4] School of Medicine, ShahidSsadoughi University of Medical Sciences, Yazd, Iran.[5] School of Medicine, Shahid Sadoughi University of Medical Sciences,Yazd, Iran.

Leprosy is a chronic granulomatous disease in which the musculoskeletal system has been described as the third most commonly affected system. Leprosy infections may manifest with various autoimmune phenomena reminiscent of classic autoimmune diseases. Among the leprosy factors affecting the prognosis of the disease, early diagnosis was reported to be the most effective. A 46-year-old married woman was referred to the hospital with initial articular symptoms. The patient also had deep folds, increased thickness of the skin in the forehead area, and dryness of the skin with a progressive course. The finger deformities and swelling are certainly misleading, but they may constitute an unsuspected inaugural form of leprosy, especially in its lepromatous form. The skin smear and biopsy confirmed leprosy, and treatment consisting of multi-drug therapy, as suggested by the WHO, was prescribed for the patient. According to these findings, it seems that one of the major symptoms of leprosy is musculoskeletal involvement and rheumatological manifestations, which may obscure and mislead diagnostic and treatment plans.

Keywords: *arthritis; lepra reaction; leprosy; swollen hand foot syndrome*

Introduction

Leprosy, also known as Hansen's disease [1], is a chronic granulomatous disease that classically presents with cutaneous and neural involvement [1,2]. Leprosy is caused by rod-shaped, slow-growing, acid-fast bacilli of the Mycobacterium leprae complex [3], which includes *M. leprae* and Mycobacterium lepromatosis. Humans are the primary carriers of *M. leprae*, apart from the Americas, where the armadillo also serves as a zoonotic reservoir. Upper respiratory secretions are the most common transmission route, though skin contamination and vertical transmission have been rarely reported [4].

Rheumatic manifestations are not only encountered in leprosy but can also be the first and even the sole presenting manifestation. The hallmark of leprosy is skin and peripheral nerve involvement; however, it can involve many other organs, with the joints being the commonest [5]. Although musculoskeletal involvement has been described as the third most common organ system, it has been under-recognized and under-reported [2]. The reported skeletal complications include digital tuft changes, digit whittling and resorption, posttraumatic changes, neuropathic joints, and septic arthritis secondary to trauma or actual infiltration by the organism, M. leprae [6].

*Corresponding author: Hamidreza Soltani; Assistant Professor of Rheumatology, Department of Rheumatology, Shahid Sadoughi University of Medical Sciences, Yazd; Tel: 09132594495; E-mail: hr.soltan@yahoo.com

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Leprosy infections may manifest with a variety of autoimmune phenomena reminiscent of classic autoimmune diseases such as rheumatoid arthritis, systemic lupus erythematosus, and thyroid disease, which may lead to misdiagnosis [7]. In addition, Hansen's disease may uncommonly cause a chronic erosive deforming arthritis involving both large and small joints, which resembles rheumatoid arthritis. It also presents clinical and laboratory findings that mimic autoimmune connective tissue diseases and vasculitis [8].

Leprosy causes various symptoms, and most diagnoses are based on the clinical picture. Thus, false negative and positive diagnoses are relatively common [9]. Among the leprosy factors affecting the prognosis of the disease, early diagnosis was reported to be the most effective, i.e., a diagnosis delay of more than one year is a prognostic factor for disability [10, 11]. We reported a 46-year-old woman suffering from leprosy with skin changes along with swelling and pain in the fingers of both hands.

Case Presentation

A 46-year-old married woman was referred to Shahid Sadoughi Hospital with complaints and initial symptoms of swelling of the fingers of both hands. This was accompanied by pain in the movement of both hands' third and fourth fingers. She also had swelling in the dorsal area of her both feet. In addition to the joint symptoms, the patient also had deep folds and increased thickness of the skin in the forehead area, as well as dryness and milky color change of the skin that started two years ago and had a progressive course. She also had madarosis, i.e., loss of eyebrows and eyelashes (Figure 1). Moreover, she had no family history of musculoskeletal symptoms. The patient was admitted on April 17, 2023, and the following measures were requested for her during her hospitalization. Moreover, the patient obtained written consent for participation in the current study. The patient's laboratory findings at the time of admission are shown in Table 1. Abdominal and pelvic ultrasonography was

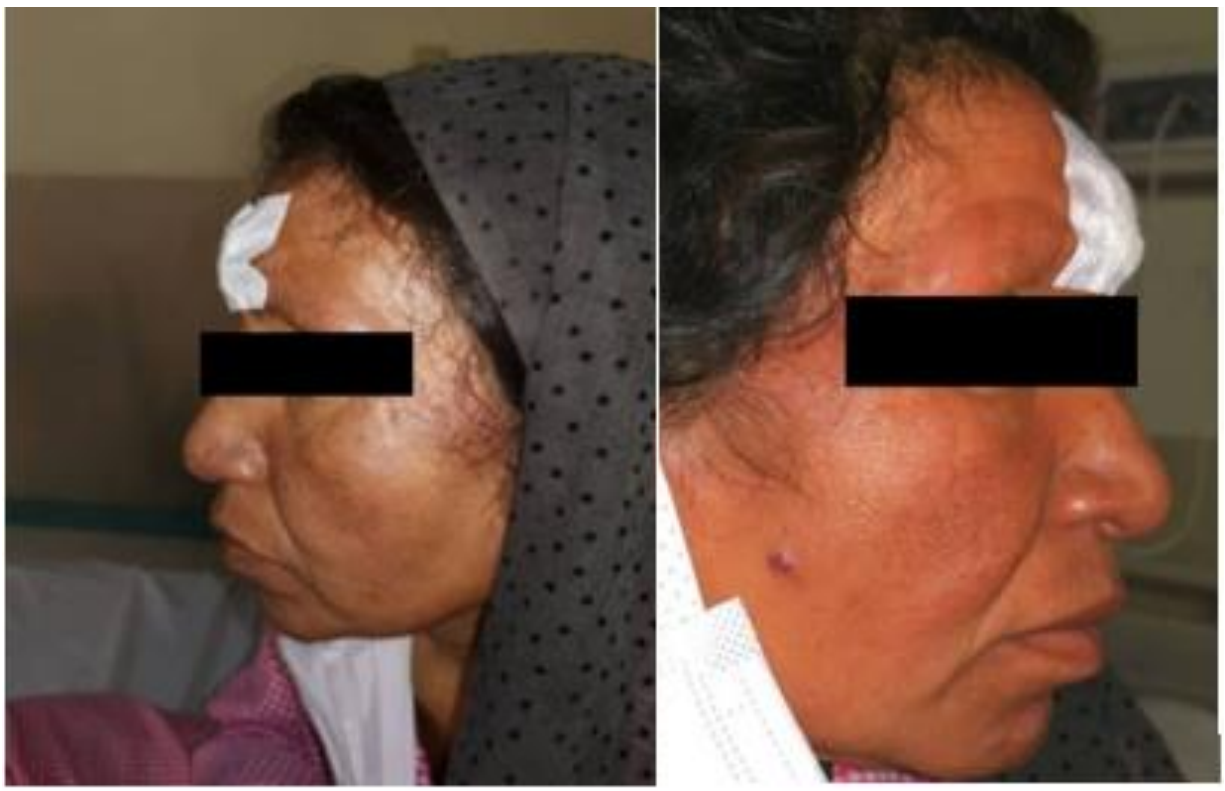

Figure 1. Prepend madarosis and milky color change in the patient's face.

Table 1. The laboratory findings of the patient at the time of admission

Test	Sample	Normal range
Urea (mg/dl)	23	5-20
Creatinine (mg/dl)	0.6	0.7-1.4
AST (IU/L)	16	10-40
ALT (IU/L)	5	<40
ALP (U/L)	209	40-150
Protein Total (g/dL)	8.5	6-8
Albumin (g/dL)	3.8	3.5-5.5
Na (mEq/L)	138	135-145
K (mEq/L)	4.2	3.5-5
ESR (mm/hr)	101	<20
Viral Markers	Neg	-
PT (second)	154.5	12-14
PTT (second)	34	25-35
CRP (mg/dL)	+1	Neg
Iron (µg/dL)	6.5	60-170
TIBC (ug/dL)	231	250-450
Ferritin (ng/mL)	57	25-200
Anti-CCP (units/mL)	8.9	<20
ANA (units/mL)	0.43	<0.9
RF (IU/mL)	Neg	0-20
WBC ($\times 10^9$/L)	6.5	4-12
Hb (g/dl)	8.6	<12
Plt (platelet//µl)	411000	150000-450000

AST, aspartate aminotransferase; ALT, alanine transaminase; ALP, alkaline phosphatase; Na, natrium; K, kalium; ESR, erythrocyte sedimentation rate; PT, prothrombin time; PTT, partial thromboplastin time; CRP, C-reactive protein; TIBC, total iron binding capacity; anti-CCP, anti-cyclic citrullinated peptide; ANA, anti-nuclear antibody; RF, rheumatoid factor; WBC, white blood cell; Hb, hemoglobin; Plt, platelet

performed. The only positive finding was fatty liver (grade 1-2). Lung computed tomography was normal. A skin biopsy was performed. Sections show collections and sheets of heavily parasitized cells (confirmed by acid-fast stain). Macrophages are present within the dermis with a sparse of lymphocytes. There are few Virchow cells and increased angiogenesis (Figures 2 and 3). Numerous acid-fast bacilli are seen in macrophages, sweat glands, and vascular endothelium. The ear and nose smear were done by the vaccination unit. They showed acid-fast

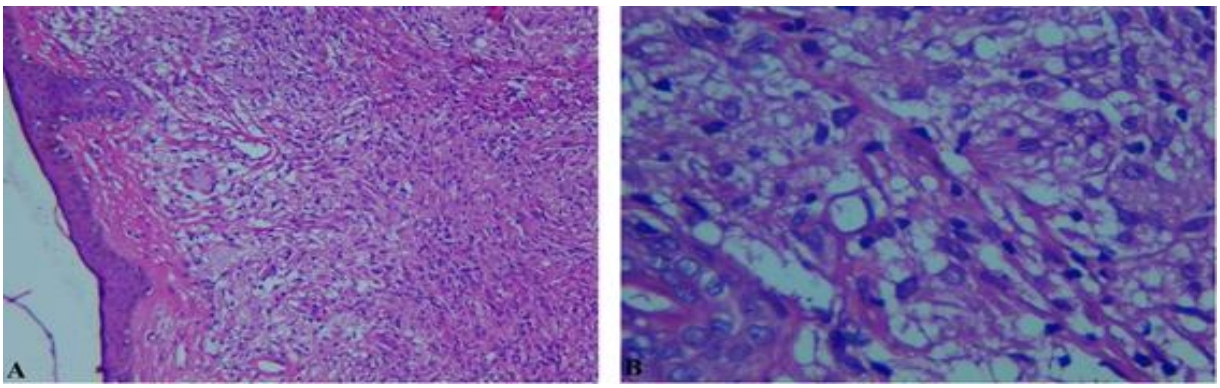

Figure 2. Heavily parasitized macrophages (Virchow cells) within the dermis. ×10 H&E (A) and ×40 H&E (B).

bacilli. After consultation with a dermatologist, leprosy was diagnosed. After starting the anti-leprosy treatment, the patient was discharged from the hospital on April 20, 2023, with good and stable general condition. In the subsequent visits, the anti-leprosy treatment was continued and the patient was doing well.

Discussion

In the 1990s, WHO set the goal of eliminating leprosy as a public health problem from 2000 to 2005, with a prevalence of less than 1 per 10,000 inhabitants. Despite being declared 'eliminated' as a global public health problem by the World Health Organization in 2000, approximately 200,000 new cases were reported worldwide in 2017 [4, 12]. Mansouri et al. conducted a study in Iran in 2017 and revealed 433 cases of leprosy from 2005 to 2014, of which 87.1% were Iranian [13]. Leprosy is primarily a health problem and remains a leading cause of deformities and disabilities. It can manifest an enormous variety of signs and symptoms, usually similar to rheumatoid arthritis. This can cause difficulties in patient diagnosis and management. Therefore, recognizing bone and joint involvement in leprosy is important to prevent unnecessary diagnostic tests, establish accurate diagnosis, and initiate early treatment [2, 14]. The finger deformities and swellings are certainly misleading, but they may constitute an unsuspected inaugural form of leprosy, especially in its lepromatous form [15]. In our patient, the swelling and pain in the movement of fingers suggested an onset of rheumatic disease and a possible microbial infection such as leprosy; besides, both feet were swollen in the dorsal area. The gold standard for diagnosing arthritis due to leprosy remains the presence of M. leprae bacilli in the joint, despite the difficulty in finding leprosy bacilli in the joint. Arthrocentesis can facilitate the diagnosis of infection within a joint space [14]. In cases of doubt, a skin smear and/or biopsy often help to establish the final diagnosis [16]. In our patient, a skin biopsy and ear and nose smear were performed. Finally, leprosy was confirmed by the test results, and the patient was prescribed multi-drug therapy as recommended by the WHO.

Sridana et al. reported a case in which leprosy mimicked rheumatoid arthritis [17]. In this case, a 20-year-old Balinese male initially presented with pain and swelling in small joints, raising suspicion of rheumatoid arthritis [17]. Additionally, he exhibited lesions resembling multiple erythema macules with round-shaped geography, indistinct boundaries, and nearly symmetrical bilateral distribution on the face, thoracoabdominal, and extremity regions [17]. The diagnosis of borderline lepromatous (BL) type leprosy was confirmed through history taking, physical examination, and investigations, including Ziehl-Neelsen stain and blood tests [17]. Do Espírito Santo et al. published “A case with osteoarticular changes in leprosy resembling rheumatoid arthritis” [18]. In this instance, a 64-year-old man presented with a

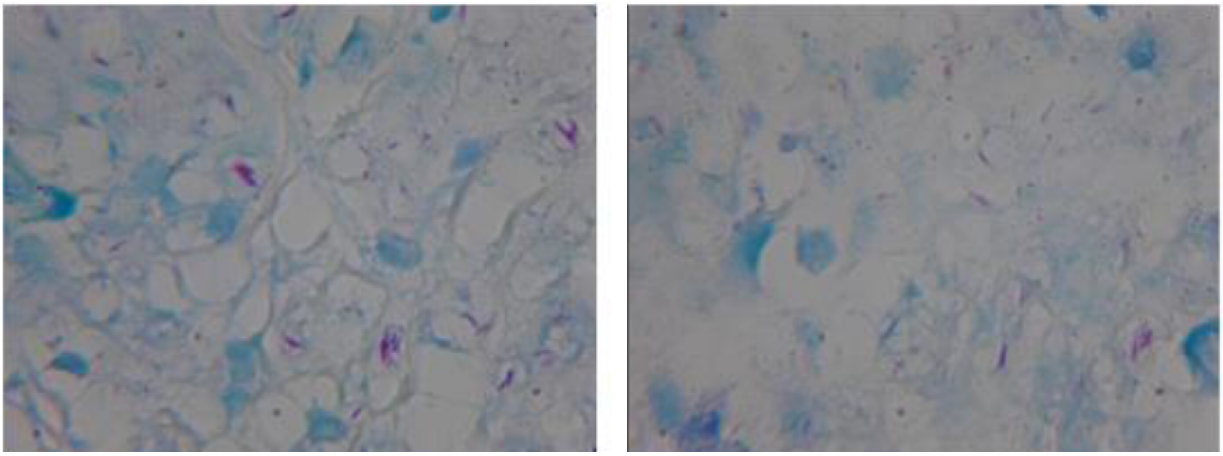

Figure 3. Some Acid-fast bacilli seen in macrophages infiltrated papillary dermis (Virchow cells) ×100, Ziehl-Neelsen stain

medical history of treatment for lepromatous leprosy and erythema nodosum leprosum episodes, leading to joint changes resembling those seen in rheumatoid arthritis [18]. They reported that many instances of arthritis related to leprosy are associated with reactional episodes [18]. In many patients, arthritis progresses chronically and does not respond to standard therapy for reactions [18]. Cossermelli-Messina et al. described 39 cases of persistent arthritis unrelated to leprosy reactions. While these patients experienced significant relief with anti-leprosy therapy, their arthritis never completely resolved, leading to permanent joint damage in some cases, particularly in the hands, resulting in 'swan neck' and 'boutonnière' deformities [19]. It is crucial to note that although Multidrug Therapy can effectively treat and cure leprosy patients, its impact on pre-existing bone alterations is limited. This emphasizes the importance of early diagnosis and treatment of the disease to prevent the development of disabling and disfiguring osteoarticular changes [18].

Conclusion

In this case, a patient with joint pain was referred to the hospital and finally diagnosed with chronic leprosy. As seen in other studies, one of the major symptoms of leprosy is musculoskeletal involvement and rheumatologic manifestations similar to those of rheumatoid arthritis, which may obfuscate and mislead the diagnostic and treatment plans.

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Conflict of interest

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