CASE REPORT

Secondary syphilis mimicking lepromatous leprosy: A diagnostic challenge

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Abstract

Secondary syphilis is well recognized for its diverse dermatological manifestations and has long been described as the "great imitator," with clinical presentations that can mimic conditions such as psoriasis, drug eruptions, and leprosy, making recognition of atypical features essential for timely diagnosis and treatment. We report a 55-year-old male hotel worker with hypertension who presented with a three-week history of generalized, asymptomatic erythematous papulosquamous lesions involving the trunk, face, scalp, palms, and soles, associated with intermittent arthralgia. Examination revealed generalized erythematous scaly papules and plaques over the trunk, diffuse facial infiltration with nodular induration of the earlobes, scalp scaling without alopecia, and coppery-coloured scaly patches over the palms and soles, along with a large painless superficial ulcer on the scrotum. There was no peripheral nerve thickening or neurological deficit. Initial differential diagnoses included leprosy and secondary syphilis.

Slit skin smears were negative for acid-fast bacilli, while histopathology demonstrated a dense upper dermal perivascular and periadnexal inflammatory infiltrate predominantly composed of plasma cells. Serological testing showed a highly reactive Venereal Disease Research Laboratory (VDRL) titre of 1:1024 and a positive Treponema pallidum particle agglutination assay (TPPA), confirming secondary syphilis. The patient was treated with a single intramuscular dose of benzathine penicillin G (2.4 million units), and at one-month follow-up, lesions had regressed with a decline in VDRL titre to 1:512 after treatment. This case highlights the importance of considering syphilis in the differential diagnosis of asymptomatic generalized cutaneous eruptions mimicking leprosy, emphasizing the role of careful clinical evaluation supported by appropriate serological and histopathological investigations for accurate diagnosis and management.

Keywords: secondary syphilis; lepromatous leprosy; papulosquamous eruption; great imitator

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Introduction

Syphilis, caused by the spirochete *Treponema pallidum*, remains an important infectious disease with diverse clinical manifestations. The secondary stage is characterized by systemic dissemination of the organism and frequently presents with dermatological findings involving the skin and mucous membranes.

Cutaneous manifestations of secondary syphilis are highly variable and may include maculopapular rashes, papulosquamous eruptions, condylomata lata, and mucous patches. Involvement of the palms and soles is considered a classical feature; however, the morphology of lesions can mimic a wide spectrum of dermatological conditions. Because of this clinical variability, syphilis is often referred to as the "great imitator."

Lepromatous leprosy, caused by *Mycobacterium leprae*, is another chronic infectious disease that primarily affects the skin and peripheral nerves. It is characterized by diffuse skin lesions, which may be macular, papular, nodular, or infiltrative. Both leprosy and syphilis exhibit a wide polymorphism of lesion morphology and may pose significant diagnostic challenges in regions where both infections are prevalent. Distinguishing between these two infections is particularly important as their management and public health implications differ significantly.

We report a case of secondary syphilis presenting with generalized infiltrated papulosquamous eruption and earlobe induration closely mimicking lepromatous leprosy, highlighting the diagnostic challenges faced in dermatological practice.

Case Presentation

A 55-year-old male hotel worker with a history of hypertension and ischemic heart disease presented with a three-week history of asymptomatic generalized skin lesions.

The eruption, which had initially appeared as scaly patches over the scalp, had subsequently progressed to involve the trunk and limbs, including the palms and soles. The lesions were non-pruritic and painless. He also reported intermittent symmetrical arthralgia affecting large joints without associated joint swelling or morning stiffness during the same period.

Further history revealed the presence of a painless genital ulcer located on the scrotum for approximately three weeks. He denied experiencing constitutional symptoms such as fever, weight loss, loss of appetite, night sweats, or alopecia. He had no history of contact with tuberculosis or leprosy, substance abuse, and denied high-risk sexual behaviour, though he lives away from his own family. Although the patient initially denied high-risk sexual behaviour, detailed information regarding the number of partners and nature of sexual exposure could not be reliably elicited.

Cutaneous examination revealed numerous erythematous infiltrated papules and plaques of varying sizes with a fine scale over the trunk and limbs. Multiple erythematous scaly plaques were noted over the scalp with no alopecia. Copper-coloured, oval-shaped patches with a collarette of scales were noted over the bilateral palms and soles. Diffuse, infiltrated papules were noted on the face, with coarsening of facial features. Bilateral earlobes were indurated with nodularity. Genital examination revealed a large superficial non-tender ulcer on the scrotum with a clean base (Figure 1A-D). Perianal examination showed no evidence of condylomata lata. There were no oral mucosal patches or ulcers. There was no thickening of peripheral nerves or sensory impairment on examination. There was bilateral non-tender cervical lymph node enlargement noted, but no epitrochlear node enlargement noted.

Diagnosis and Management: Given the dermatological findings, the initial differential diagnoses included secondary syphilis and lepromatous leprosy.

The patient was further evaluated for systemic complications of secondary syphilis. There were no symptoms suggestive of neurological involvement, such as headache, altered sensorium, or focal deficits. He denied visual disturbances or ocular symptoms suggestive of uveitis. There were no features of renal involvement, such as oedema or reduced urine output. No clinical evidence of hepatitis or meningitis was identified.

A slit skin smear for *Mycobacterium leprae* stained by modified Ziehl-Nielsen was performed, which was negative for acid-fast bacilli.

A skin biopsy performed for histopathological evaluation revealed a dense upper-dermal

perivascular and periadnexal inflammatory cell infiltrate predominantly composed of plasma cells. Lymphocytes, histiocytes, and a vague granuloma were also noted, compatible with secondary syphilis (Figure 2).

The patient was referred to a sexually transmitted infections clinic for further evaluation. Dark-field microscopy of the genital ulcer did not demonstrate motile spirochetes. Serological testing demonstrated a highly reactive Venereal Disease Research Laboratory (VDRL) test with a titre of 1:1024. Confirmation using the Treponema pallidum particle agglutination assay (TPPA) was positive (2+). Based on these findings, a diagnosis of secondary syphilis was established. Serological testing for HIV was negative.

He was treated with a single intramuscular dose of benzathine penicillin G, 2.4 million units, according to standard treatment guidelines for early syphilis. Partner notification and contact tracing were attempted but were unsuccessful.

At one-month follow-up, the skin lesions were resolving with residual hyperpigmentation at sites of previous plaques. A repeat VDRL testing one month after treatment demonstrated a reduction in titre to 1:512, indicating an early serological response to treatment.

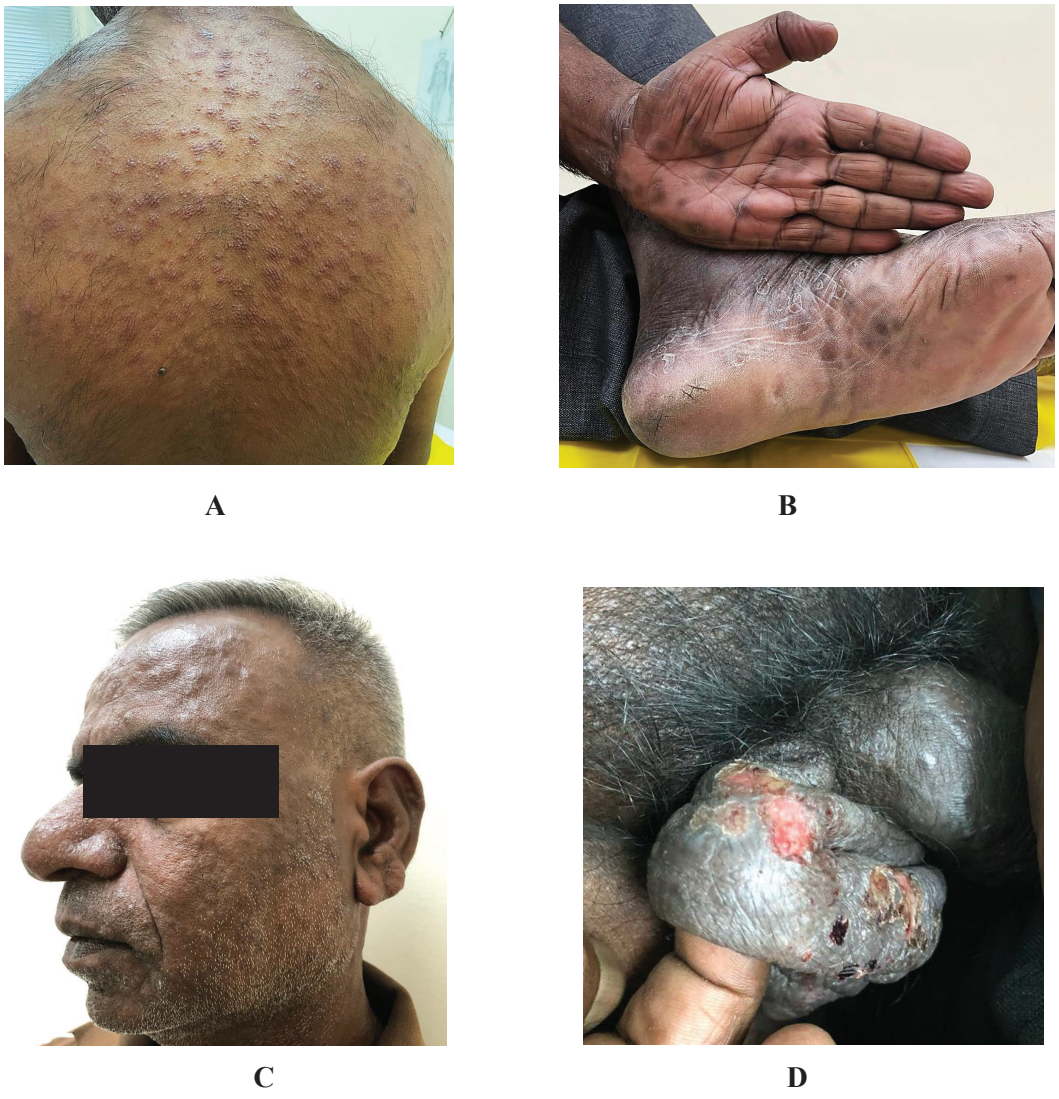

Figure 1. (A) Erythematous indurated plaques over the back with follicular prominence. (B) Well-demarcated coppery-coloured patches on palms and soles with a collarette of scale. (C) Multiple infiltrated skin-coloured papules on the face. Induration of earlobes with nodules. (D) Non-tender shallow ulcers on the scrotum.

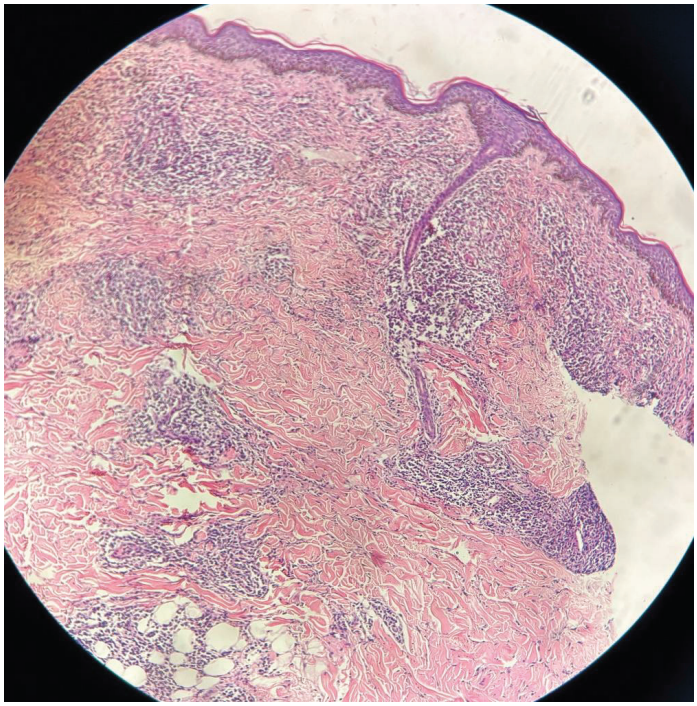

Figure 2. Thinned-out epidermis with spongiosis, dense upper dermal perivascular and periadnexal inflammatory cell infiltrate predominantly composed of plasma cells (H&E ×100).

Discussion

Secondary syphilis is characterized by hematogenous dissemination of *Treponema pallidum* and typically develops weeks to months after the primary infection. Dermatological manifestations are among the most common clinical features and may involve the trunk, extremities, palms, and soles.[1]

The papulosquamous variant of secondary syphilis can closely resemble several inflammatory dermatoses such as psoriasis, pityriasis rosea, lichen planus, drug eruptions, and viral exanthems. In endemic regions, the resemblance to early cutaneous lesions of leprosy can pose a diagnostic challenge.[2]

Although leprosy is a less common differential diagnosis of secondary syphilis, it should be strongly considered in patients presenting with suggestive features. In our patient, generalized infiltrated patches, papules, and plaques involving the face, trunk, scalp, and limbs, with coarsening of facial features and bilateral earlobe induration, raised suspicion for leprosy initially. However, clinically, the absence of peripheral nerve thickening, sensory impairment, and typical anesthetic patches argued against this diagnosis. In patients presenting with diffuse cutaneous infiltration suggestive of lepromatous leprosy, acid-fast bacilli are expected to be found in large quantities in skin smears and histopathology, both of which were negative in this patient.[3]

The presence of a painless genital ulcer further supported the possibility of syphilis. Although primary syphilis classically presents with a chancre appearing approximately 2–3 weeks (range 10–90 days) after exposure, progression to secondary syphilis typically occurs within 4–10 weeks if untreated. Overlapping stages may occur during this transition, and patients can present with both primary and secondary manifestations simultaneously.[4]

Histopathology provided a key diagnostic clue in this case. Histopathological examination in secondary syphilis typically demonstrates a superficial and deep perivascular and periadnexal inflammatory infiltrate with plasma cell predominance, as seen in this patient. The epidermis may show acanthosis, spongiosis, and a lichenoid interface infiltrate in certain cases. Infiltration around adnexal structures like the hair follicles and sweat glands is observed

frequently. The absence of well-formed granulomas, diffuse dermal infiltrate of foamy macrophages, or bacilli helped to differentiate secondary syphilis from lepromatous leprosy. Serological testing remains the cornerstone of syphilis diagnosis. The markedly elevated VDRL titre of 1:1024, together with positive TPPA, confirmed the diagnosis in this patient.

This case emphasizes the importance of maintaining a high index of suspicion for syphilis in patients presenting with atypical dermatological eruptions, particularly when palms and soles are involved.[5]

Failure to recognise such presentations may delay treatment and increase transmission risk.

Conclusion

Secondary syphilis continues to present diagnostic challenges due to its wide range of dermatological manifestations. This case illustrates how papulosquamous eruptions with diffuse infiltration may closely mimic lepromatous leprosy, particularly in endemic settings.

Clinicians should maintain a high index of suspicion and perform a thorough clinical examination with appropriate serological testing when evaluating unexplained generalized dermatoses. Prompt diagnosis and treatment are essential for effective disease control and prevention of transmission.

Ethics statement

Informed written consent was obtained from the patient for the publication of clinical details and images.

Authors' contributions

NP was involved in the clinical management of the patient and prepared the initial draft of the manuscript. ASDS participated in drafting the manuscript, captured the clinical photographs, and contributed to patient management. JA was in charge of treatment, led the case report conceptualization, and provided overall supervision of the manuscript. All authors contributed to the work, critically reviewed the content, and approved the final version for publication.

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