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Case Report

Concurrent Syphilis and Borderline Tuberculoid Hansen's Disease: A Diagnostic Challenge in a Young Male

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We report a case of concurrent syphilis and Hansen's disease in a 23-year-old male, highlighting the diagnostic complexity due to overlapping symptoms. Patient had a history of high- risk behaviour including unprotected sex with MSM (Men who have sex with men). He gave a history of painless lesion on glans penis. He presented with complaints of asymptomatic, multiple hypopigmented skin lesions over the abdomen, flanks, bilateral gluteal regions and bilateral arms and forearms. On examination, multiple well-defined hypopigmented saucer-shaped plaques on the trunk and upper limb were observed. Slit skin smear for acid-fast-bacilli (AFB) showed 1+bacteriological index (BI) in both eyebrows and 2+in the hypo pigmented plaque over the right gluteal region. Punch biopsy from the hypopigmented plaque over the flanks confirmed the diagnosis of borderline tuberculoid leprosy. Serological tests confirmed positivity for treponema pallidum haemagglutination test (TPHA) ,positive in dilution of 1:64. Case responded well to benzathine pencillin and multibacillary multidrug treatment (MB-MDT). The case explains the challenges of diagnosing co-infection in regions where both diseases are prevalent and emphasizes the importance of comprehensive testing and effective management.

Keywords: Borderline Tuberculoid Leprosy, Syphlis, Coinfection, Sexually Transmitted Disease (STD), Histopathology

Introduction

Leprosy also known as Hansen's disease, is a neglected tropical disease classified by the World Health Organization into multibacillary and paucibacillary types. It predominantly affects the skin and peripheral nerves, ranging from macular lesions to severe disabilities. The causative agent, *Mycobacterium leprae* is obligate microaerophilic intracellular acid-fast bacilli. *Mycobacterium lepromatosis* has emerged as second pathogen (Collin et al 2023) causing leprosy in Mexico, India and several other countries. On the other hand, syphilis is a chronic, multi-stage infection caused by *Treponema pallidum* starting with an initial asymptomatic phase followed by a prolonged latent period (Holmes et al 2008). Both leprosy and syphilis can co-exist (Londoño-Echeverri et al 2023). The overlapping cutaneous features necessitate comprehensive evaluation (Mani et al 2015). We report here a case having both syphilis and leprosy.

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Case Report

A 23-year-old unmarried male, drama artist was referred by Erode District Leprosy Medical Officer with features of Hansen's disease for management. Patient presented with complaints of asymptomatic, multiple hypo pigmented skin lesions over the abdomen, flanks, bilateral gluteal region and bilateral arms and forearms for the past 2 months.

On examination, we observed multiple well-defined hypo pigmented saucer-shaped plaques ranging in size from 1x1 cm up to 3x3 cm on the trunk and upper limb (Fig 1). Striae seen over the bilateral shoulder region. Hypo pigmented naevus of size 3 x 2 cm observed over right flank (Fig. 1). Multiple symmetrical erythematous maculo-papular lesions over bilateral suprascapular, infra-scapular and interscapular

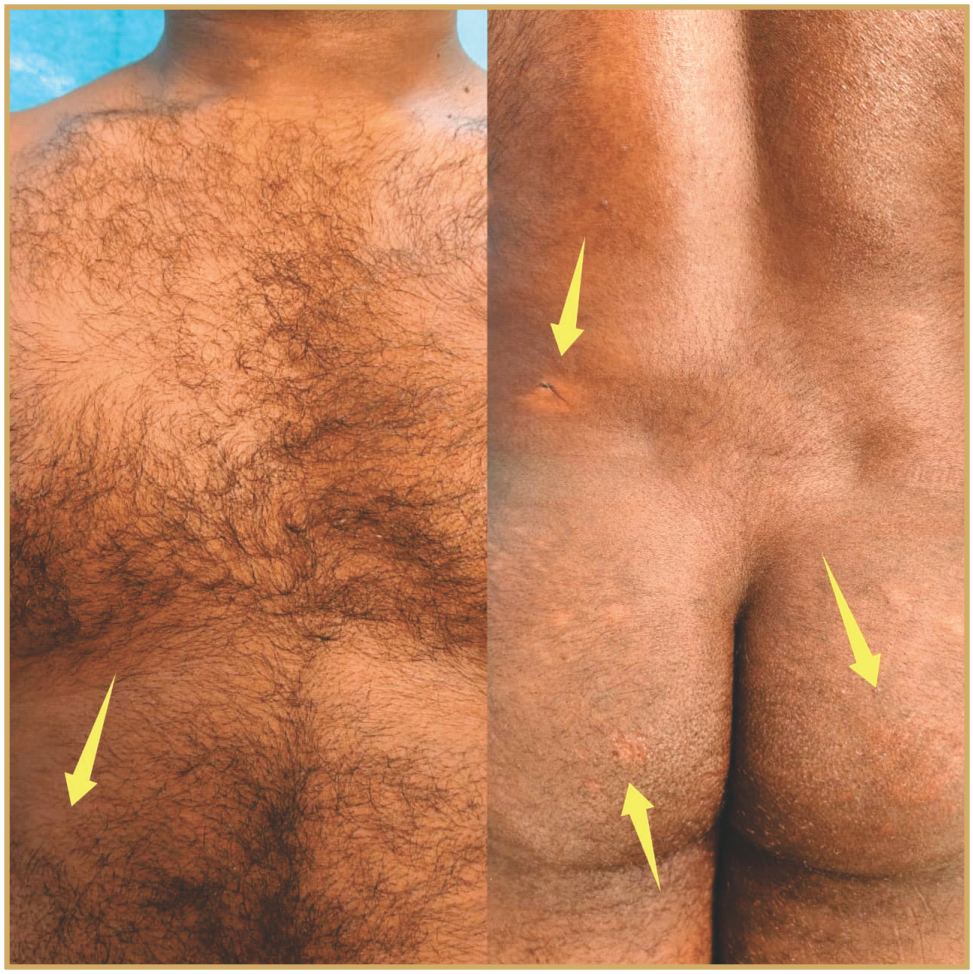

Fig. 1 : Multiple ill to well defined hypo-pigmented saucer shaped plaque over left lumbar region, left side of the back, gluteal region.

region. Pitted keratolysis were present over both soles. Multiple warty growths ranging from 2mm up to 8mm in size, with verrucous rough surface, were noted at the junction of the scrotal skin and the left perineal region (Fig. 2). No scaling, crusting, or erosion was observed over the lesions, and no lesions were found over seborrheic areas, palms, soles, perianal, groin, or axillary areas.

Bilateral radial cutaneous nerve and ulnar nerve were thickened and non- tender. Other peripheral nerves including bilateral median, common peroneal, posterior tibial, and greater auricular nerves were not thickened or tender. Sensory examination revealed no hypoesthesia, anaesthesia, or paraesthesia over the distribution of the ulnar, radial, or median nerves. There was no glove-and-stocking pattern of sensory loss.

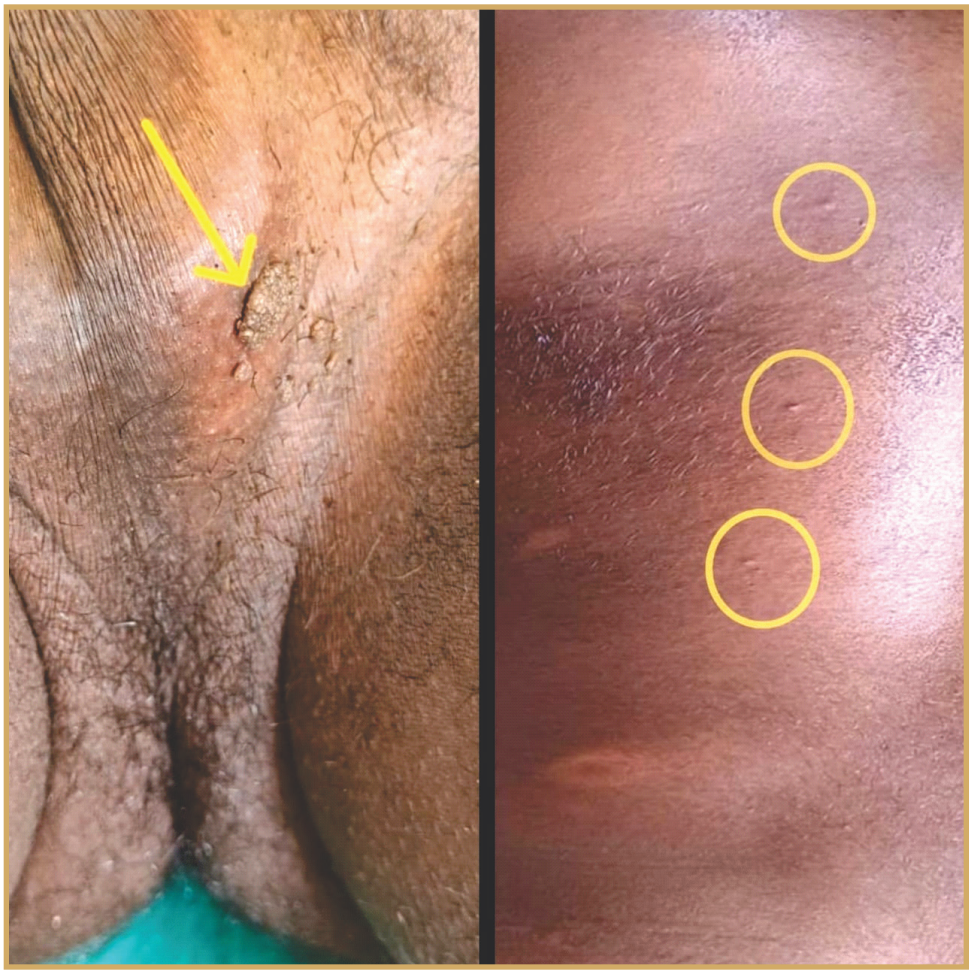

Fig. 2 : Multiple well defined verrucous growth of varying sizes over left scrotal and inguinal junction, along with multiple papules over back.

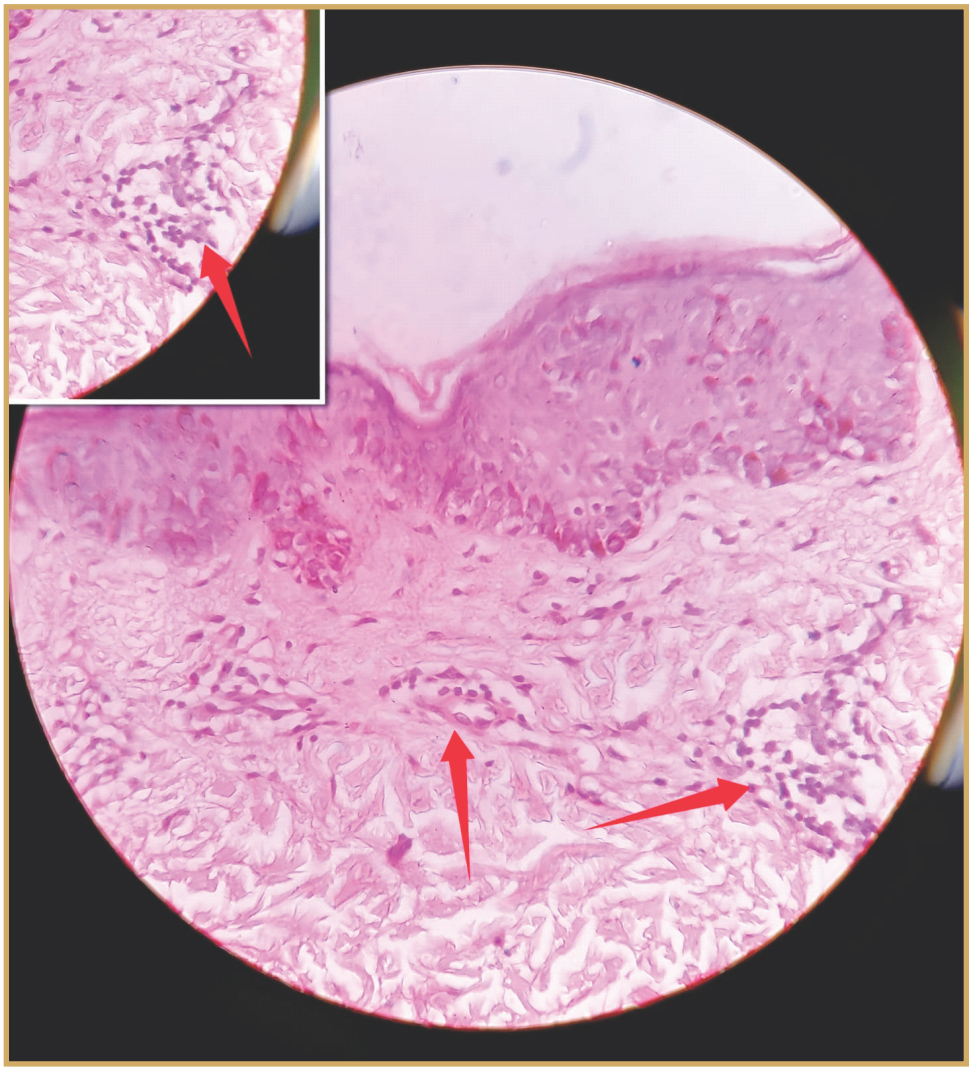

Fig. 3 : Dermis showing multiple non caseating epithelioid granulomas.

Temperature, pain, touch, vibration sensations were intact.

Motor examination showed normal bulk and tone in all muscle groups of upper and lower limbs. Power was 5/5 in all major muscle groups (MRC grading). There was no evidence of clawing of fingers, wrist drop, foot drop, or intrinsic muscle wasting. No trophic changes or deformities were noted.

Due to the above clinical symptoms and signs, we took detailed sexual history and patient admitted high risk behaviour for the past 2 years, history of unprotected sexual contact present with known and unknown MSM partners, last sexual contact was 6 months ago. History of painless genital ulcer 3 months ago. Hence, we did genital examination and there was a scar present over the glans penis at 11 o' clock position and Buschke – Ollendorff

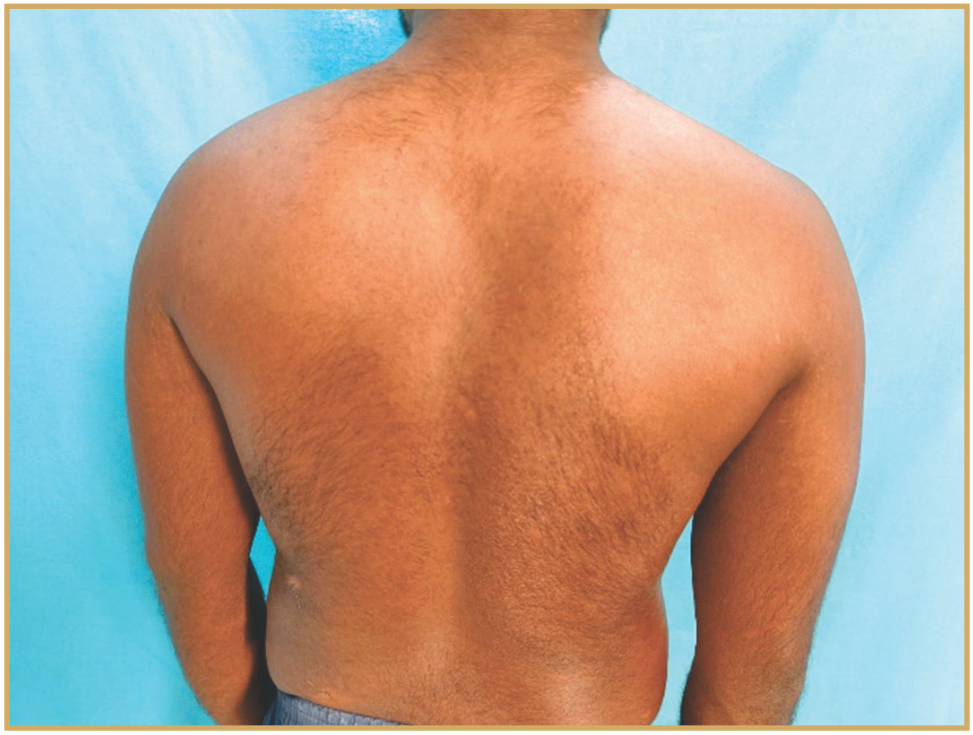

Fig. 4 : Complete resolution of papules after 15 days of Benzathine Penicillin injection with resolving hypopigmented patch over the left lumbar region.

test was positive.

Considering the high-risk factors and clinical signs, we screened for syphilis and Hansen's disease including VDRL, TPHA, slit skin smear for acid fast bacilli (AFB), and obtained a 5mm punch biopsy from the hypo pigmented plaque over the flanks. Serology tests confirmed positivity for TPHA with a VDRL dilution of 1:64, and the slit skin smear showed 1+ in both eyebrows and 2+ in the hypo pigmented plaque over the right gluteal region.

Histopathological examination revealed epithelioid cells, multinucleate giant cells with surrounding lymphocytes (Fig. 3). Based on these findings, we diagnosed the patient with co-infection of borderline tuberculoid Hansen's disease and secondary syphilis with genital warts (Fig. 2).

Initially, the patient received a single dose of injection benzathine penicillin, 2.4 million units administered in 2 divided doses in each buttock deep intramuscularly after test dose. The following week, we initiated him on the MB - MDT regimen. By 15th day of follow-up, the skin rash had completely disappeared with resolving hypo pigmented plaques. There were no complaints of recurrence of papular rash, hence therapeutically confirmed that he is a case of borderline Hansen's disease with secondary syphilis. The patient was followed up regularly; he has completed 12 months of MBMDT. His VDRL titre was 1:4 after one year.

Discussion

Leprosy is a chronic infectious disease with more than two lakh cases reported every year, predominantly affecting tropical countries like India, Bangladesh, Myanmar, Indonesia and Nigeria where the burden of the disease is most prevalent (Zhang et al 2025). The challenges of decreased clinical awareness, coupled with the socio-geographic isolation of endemic rural areas, often result in delayed diagnosis and disease progression. Particularly in the initial stages, the clinical diagnosis of leprosy can be challenging, as its manifestations can mimic those of other conditions such as deep mycosis or autoimmune conditions, potentially leading to misdiagnosis and further complications (Froes et al 2022).

Syphilis and leprosy co-infection represents a significant medical challenge (Londoño-Echeverri et al 2023), particularly in countries like India where both diseases are prevalent. Syphilis progresses through distinct stages, beginning with painless chancres in the primary stage, followed by secondary stage characterized by skin rashes and mucous membrane lesions. If untreated, it may lead to latent and tertiary forms with systemic involvement (Holmes et al 2008). It continues to be a problem globally (Ghanem et al 2020).

Leprosy primarily affects the skin and peripheral nerves, manifesting in a spectrum from tuberculoid (TT) to lepromatous (LL) forms. Tuberculoid leprosy is associated with strong cell-mediated immunity (Th1 response), characterized by high levels of IFN-γ, TNF-α, and IL-12, and low bacterial load. In contrast, lepromatous leprosy displays poor cell-mediated immunity to *M.leprae* antigens and a predominant Th2-type response, with elevated IL-4, IL-10, and IL-1β, leading to higher bacterial indices and disseminated disease. Syphilis, caused by *Treponema pallidum*, similarly interacts with the host's immune system. The immune response in syphilis is initially Th1-dominant during early infection but may shift toward a Th2 profile in late or latent stages. This shift potentially facilitates persistence of the pathogen and evasion of host immunity. Therefore, in co-infected individuals, especially those with lepromatous leprosy (Th2-predominant), an altered or ineffective immune response may hinder syphilis resolution or detection, contributing to diagnostic delays (Sadhu & Mitra 2018).

Moreover, clinical overlap between the two infections poses significant diagnostic challenges (Mani et al 2015). The maculopapular rash of secondary syphilis and annular or infiltrated plaques of leprosy can mimic each other. Misdiagnosis can result in inappropriate or delayed therapy, contributing to disease progression and transmission. For example, syphilitic lesions on the glans or palms may be mistaken for leprosy nodules or vice versa. In regions where both diseases are endemic, heightened clinical vigilance is required to avoid such pitfalls. Social stigma associated with these diseases further complicates timely diagnosis and management. Stigmatization may discourage affected individuals from seeking care, delaying diagnosis until advanced disease and irreversible complications, including peripheral nerve damage or tertiary syphilitic manifestations, have occurred.

Co-infection with Hansen's disease and syphilis (Londoño-Echeverri et al 2023) possibly represents a complex interplay of clinical, immunological, and socio-epidemiological factors. Understanding the divergent immune responses (Th1 vs Th2) and maintaining a high index of suspicion for dual pathology are critical for accurate diagnosis and timely intervention. This underscores the importance of heightened clinical vigilance and prompt multidisciplinary evaluations.

Conclusion

This case illustrates the diagnostic challenges posed by co-existing tropical dermatoses. In regions where syphilis and leprosy are endemic, clinicians must maintain a high index of suspicion, utilize multidisciplinary diagnostic modalities, and adapt evidence-based management strategies.

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