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Case Report

Tuberculosis verrucosa cutis presenting as a chronic verrucous foot plaque: a diagnostic quandary

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ABSTRACT

Cutaneous tuberculosis (CTB) is a rare manifestation of extra-pulmonary tuberculosis; tuberculosis verrucosa cutis (TBVC) presents as a slowly enlarging verrucous lesion, often misdiagnosed due to its atypical presentation. A 22-year-old male driver presented with a 2-year history of a pruritic, intermittently discharging, well-defined verrucous plaque with central depigmentation over the medial right foot, gradually enlarging to ~7×5 cm. KOH and fungal cultures were negative; Tuberculin skin test was strongly positive. Histopathology revealed pseudoepitheliomatous hyperplasia, mid-dermal well-formed tuberculoid granulomas with Langhans giant cells and neutrophilic microabscesses. No organisms were seen. Biopsy samples for cartridge based nucleic acid amplification test (CBNAAT) documented mycobacterium tuberculosis (MTB) genome. Imaging ruled out bone involvement. Diagnosis of TBVC was made, and anti-tuberculosis (ATT) therapy was initiated with clinical improvement. This case underscores the importance of considering TBVC in chronic verrucous skin lesions, particularly in endemic areas, and highlights the diagnostic value of histopathology and CBNAAT testing. The diagnostic puzzle was resolved using nucleic acid amplification testing of the biopsy sample, which should be considered in all skin lesions suspected of tuberculosis.

Keywords: Tuberculosis verrucosa cutis, Cutaneous tuberculosis, Histopathology, Tuberculin skin test, CBNAAT

INTRODUCTION

Cutaneous tuberculosis (CTB) is a rare manifestation of Mycobacterium tuberculosis infection, representing approximately 1–1.5% of extrapulmonary tuberculosis cases worldwide.[1] Among the clinical variants, tuberculosis verrucosa cutis (TBVC) is one of the rarer forms and occurs in individuals with a moderate to high degree of immunity following prior sensitization to *M. tuberculosis*.[2,3] TBVC usually results from exogenous reinoculation of bacilli into the skin of previously infected individuals, most often affecting exposed areas such as the hands, knees, or buttocks.[3] Histopathologically, TBVC is characterized by pseudo-epitheliomatous hyperplasia of the epidermis with marked hyperkeratosis, acanthosis, and the presence of well-formed dermal tuberculoid granulomas containing Langhans giant cells and peripheral lymphocytic infiltrates.[2,3] Although the upper limbs are the most common sites, foot involvement is less frequent but well documented, often occurring after minor trauma or occupational exposure, as in farmers, labourers, or drivers.[4,5] Rare presentations such as diffuse plantar keratoderma or multifocal verrucous plaques on the foot have also been described in the literature.[4,5] The paucibacillary nature of TBVC often leads to negative results in Ziehl–Neelsen staining, mycobacterial culture, and even PCR testing, which makes direct microbiological confirmation difficult.[6] Therefore, a combination of clinical evaluation, strongly positive tuberculin skin testing, and histopathology remains pivotal for diagnosis.[6,7] In cases with a high index of suspicion but negative microbiological tests, a therapeutic trial of antitubercular therapy (ATT) is justified and has been associated with favourable outcomes.[7] Here, we report a case of TBVC of the foot in a young driver with a slowly enlarging cauliflower-like lesion over two years,

demonstrating the classic histopathological features of TBVC despite negative microbiological studies.

CASE REPORT

A 22-year-old male driver presented with a two-year history of a progressively enlarging verrucous lesion over the medial aspect of his right foot. The lesion began as a pea-sized papule and gradually increased to approximately 7×5 cm, accompanied by nocturnal itching and intermittent clear to yellowish discharge occurring two to three times daily, the last episode occurring eight days before presentation. He reported occasional painless inguinal lymphadenopathy, most recently two months earlier. Previous symptomatic treatments from local practitioners provided only temporary relief. There was no history of systemic symptoms including respiratory system, prior tuberculosis treatment, or significant comorbidities.

Examination revealed a single, well-defined verrucous plaque over the medial aspect of the foot, with central depigmentation, atrophic scarring, erosions, and serosanguineous crusting. The lesion had irregular margins with marginal hyperpigmentation, central scabbing, and bleeding spots, without features of secondary infection (Figure 1). Laboratory investigations showed negative KOH preparation and fungal cultures, a strongly positive Mantoux test, and normal baseline blood work. Radiography of the foot demonstrated no bony or joint involvement (Figure 2). Chest imaging's were normal. Induced sputum examination for CBNAAT were negative for tuberculosis. Serological investigations such as QuantiFERON TB gold or IGRA (Interferon gamma release assay) were negative. Thus, we have ruled out pulmonary and disseminated tuberculosis in present case.

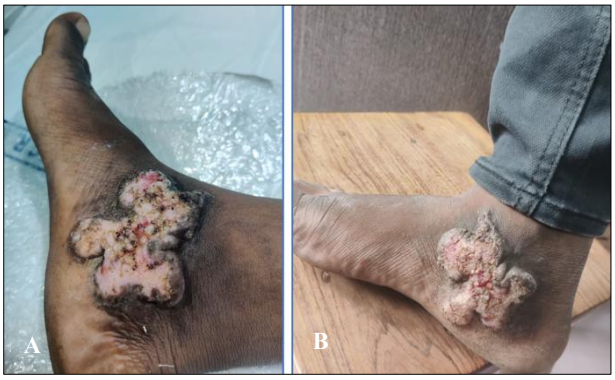

Figure 1 (A and B): Well-defined verrucous plaque with irregular nodular margines and central depigmentation with serosanguineous crusting over the medial foot.

The clinical differential diagnoses considered for the verrucous growth included squamous cell carcinoma, chromoblastomycosis, leishmaniasis, hypertrophic lichen planus, hypertrophic discoid lupus erythematosus, and cutaneous tuberculosis. Given the overlapping clinical features of these conditions, histopathological examination was essential for establishing an accurate diagnosis and guiding appropriate management.

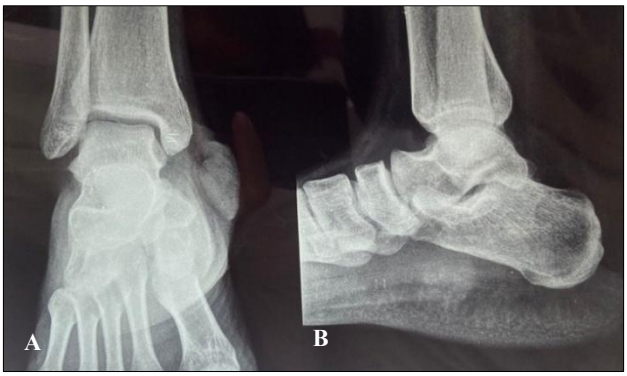

Figure 2 (A and B): No bony involvement secondary to chronic wound.

Skin biopsy samples were taken in formalin container for histopathology and normal saline container for CBNAAT. The biopsy shows moderately dense patchy infiltrate of lymphocytes and histiocytes in the mid dermis. Foci of well-formed tuberculoid granulomas are seen in the deep dermis. Mid dermis shows slight edema with interstitial infiltrate of lymphohistiocytosis, multiple Langhan's type of giant cells mixed with neutrophils. There is focal area of neutrophilic microabscesses in the deep reticular dermis surrounded by fibroplasia and granulomatous infiltrate. Superficial epidermis shows irregular epidermal hyperplasia. There is no organism. (Figure 3). CBNAAT testing documented MTB genome with rifampicin sensitivity.

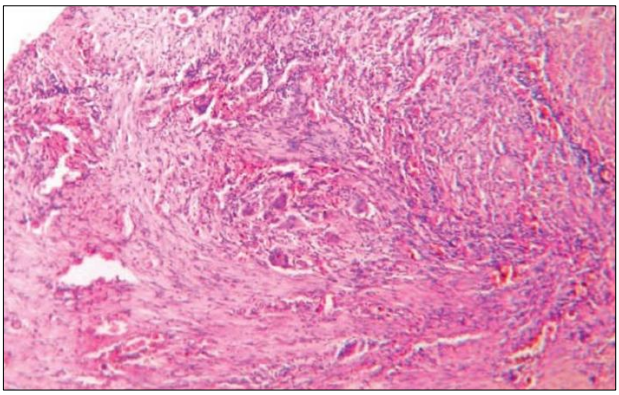

Figure 3: Histopathology showing tuberculoid granuloma, Langhan's giant cells with neutrophilic microabscesses (PAS 40X).

CBNAAT was preferred as it provides rapid, cartridge-based detection of Mycobacterium tuberculosis directly from clinical samples with high specificity. It simultaneously identifies rifampicin resistance, enabling early therapeutic decisions. In contrast, conventional PCR lacks standardized resistance detection and has limited validation for routine use in cutaneous tuberculosis. Based

on clinical presentation, CBNAAT results and histopathological findings, we have made a diagnosis of TBVC of the foot. We have initiated standard antitubercular therapy as per NTEP (National tuberculosis elimination program) with four drugs for two months and three drugs for six months.

Monthly follow-up was advised to assess the response to therapy. After two months of treatment, a significant improvement in the TBVC lesion was observed, with healing of the cauliflower-like plaque, a healthy base, and resolving nodular edges (Figure 4). Medication compliance and adverse events related to ATT were assessed at each visit. The patient was counselled during every follow-up regarding the importance of strict adherence to ATT.

Figure 4: Healing of verrucous plaque with healthy base and well-defined nodular edges after 3 months of ATT.

Patient tolerated ATT for six months without any adverse event and observed complete resolution of the skin lesion. The verrucous plaque had completely healed, with a shiny, healthy base and normal margins (Figure 5).

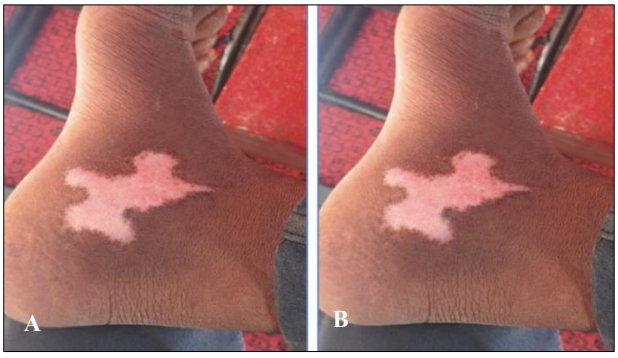

Figure 5 (A and B): Healing of verrucous plaque after 6 months of ATT (base, margines are completely healed and healthy).

DISCUSSION

TBVC is a form of cutaneous tuberculosis resulting from exogenous reinfection in previously sensitized individuals with moderate to high immunity, typically following minor trauma or inoculation.[1,2] The lesions tend to be slowly progressive verrucous plaques and are often asymptomatic, which contributes to diagnostic delays spanning years—or sometimes decades.[1,3] Lesional sites commonly include hands, knees, ankles, and buttocks, especially in individuals with occupational exposure; foot involvement, though less frequent, is well documented.[3,4] In the Indian context, lower extremities are more commonly affected, indicating regional variations in presentation.[5]

Histopathological features are pivotal in diagnosis. Typical findings include pseudo-epitheliomatous hyperplasia, hyperkeratosis (orthokeratosis/parakeratosis), acanthosis, and deep tuberculoid granulomas composed of epithelioid cells, lymphocytes, and Langhans-type giant cells, often without caseation.[2,6] In approximately one-third of TBVC cases, neutrophilic microabscesses may also be observed in the epidermis or mid-dermis.[6]

Given the paucibacillary nature of TBVC, conventional microbiological tests—including Ziehl–Neelsen staining and culture—often yield negative results, even when using PCR techniques.[5,7] Therefore, diagnosis relies on a triad of clinical suspicion, supportive histopathology, and strongly positive tuberculin reactivity, sometimes augmented by a therapeutic trial of ATT.[2,4,7]

Regional literature emphasizes these diagnostic challenges. For example, Ghosh et al described TBVC of the foot masquerading as diffuse keratoderma in a healthy farmer, with diagnosis ultimately confirmed histologically.[4] while Rajan et al described multifocal verrucous plaque involvement of the foot in an adolescent.[5] Similarly, Septiafni et al reported a rare multifocal unilateral TBVC involving the lower extremity and hand which was diagnosed based on a combination of morphology, histopathology, and Mantoux positivity, despite negative AFB staining in settings with suspected chromoblastomycosis.[6]

In our case, the cauliflower-like verrucous lesion on the medial foot, persistent over two years and associated with nocturnal itching and intermittent discharge, fits well within the TBVC spectrum. Histological examination showed pseudo-epitheliomatous hyperplasia, tuberculoid granulomas with Langhans giant cells, and neutrophilic microabscesses, paralleling published descriptions.[2,6]

As with other reports, microbiological tests were negative, emphasizing the pivotal role of histopathology and immunologic tests in reaching the diagnosis. Prompt initiation of ATT, while not detailed in our case follow-up, is widely supported as effective treatment. Literature documents rapid clinical resolution of TBVC lesions

following standard antitubercular regimens.[3-5] It is therefore critical to recognize TBVC early, especially in endemic regions, to reduce morbidity and prevent unnecessary delay.

Learning points and conclusions

Consider TBVC in chronic, verrucous, pruritic, discharging lesions—especially on lower extremities and in TB-endemic settings. Histopathology is pivotal: look for pseudoepitheliomatous hyperplasia, granulomas with Langhans cells, neutrophilic microabscesses—even if AFB and culture are negative. Neutrophilic microabscesses may be present in deeper dermis in TBVC. CBNAAT testing on biopsy samples offers a satisfactory diagnostic yield with high specificity for tuberculosis. Care should be taken during sample collection, ensuring the tissue is placed in a normal saline container rather than the formalin-based containers routinely used for histopathology. Tuberculin skin test (TST) aids diagnosis and its strong positivity in suspected cases corroborates clinical suspicion despite negative microbiology. Empirical anti-TB therapy may be both therapeutic and diagnostic where histopathology and TST suggest TBVC. Early recognition and treatment can prevent prolonged morbidity and deformity. Exclude other verrucous lesions, including fungal infections, neoplasms, and inflammatory dermatoses, before confirming TBVC.

CONCLUSION

This report highlights a prototypical case of TB verrucosa cutis on the foot of a young adult, misinterpreted for years until histopathological evaluation and CBNAAT testing clarified the diagnosis. In regions with a high TB burden, TBVC should remain in the differential for verrucous skin lesions. Early recognition and appropriate anti-tubercular therapy can prevent prolonged morbidity and complications. The diagnostic puzzle or quandary was resolved using nucleic acid amplification testing of the biopsy sample, which should be considered in all skin lesions suspected of tuberculosis.

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