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Case Report

Dermatology Section

An Unusual Presentation of Co-existence of Leprosy, Anetoderma and Abdominal Tuberculosis: A Case Report

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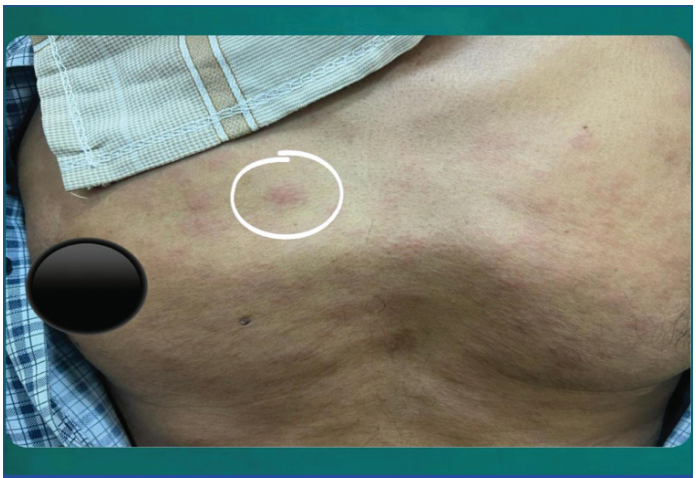
ABSTRACT

Leprosy and Tuberculosis (TB), both significant mycobacterial infections, often affect populations with lowered specific immunity. TB is a widespread and life-threatening mycobacterial infection. Co-infection of these diseases is uncommon in routine clinical practice, adding complexity to diagnosis and treatment planning. However, instances of co-existence suggest a potential cross-immunity theory. Leprosy, known for its varied presentations, can manifest as an asymptomatic secondary presentation of anetoderma, characterised by elastinolysis-induced loose sac-like appearances. This case report presents a middle-aged man in his late 30s undergoing Anti-Tubercular Treatment (AKT) for abdominal tuberculosis, who presented with signs of Erythema Nodosum Leprosum (ENL) and small asymptomatic atrophied macules on his trunk and back in the Dermatology department. Through comprehensive history, clinical examination, slit skin smear, and biopsy, authors elucidated a rare case of co-infection of leprosy and atypical cutaneous manifestations as anetoderma, concomitant with abdominal tuberculosis.

Keywords: Atrophied macules, Cutaneous manifestations, Reinfection, Relapse, Tuberculoid leprosy

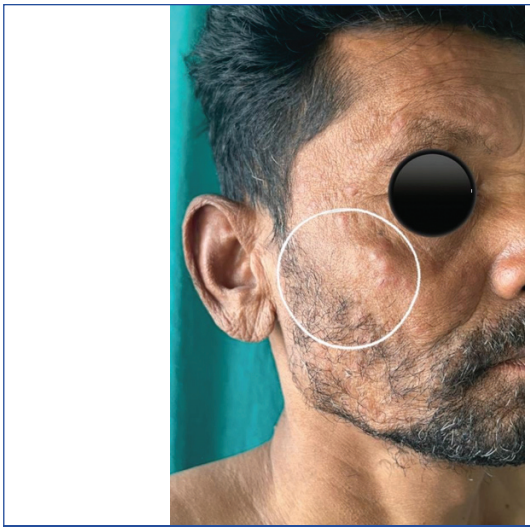
CASE REPORT

A 37-year-old male visited the Dermatology Outpatient Department (OPD) with complaints of fever, tingling, and asymptomatic red lesions over both limbs, back, and trunk for 15 days [Table/Fig-1]. In the past, the patient confirmed being a diagnosed case of Borderline Tuberculoid leprosy almost three years back and had completed a one-year treatment of Multibacillary Multidrug Treatment (MBMDT). Since then, he had not experienced any symptoms of Hansen's disease.

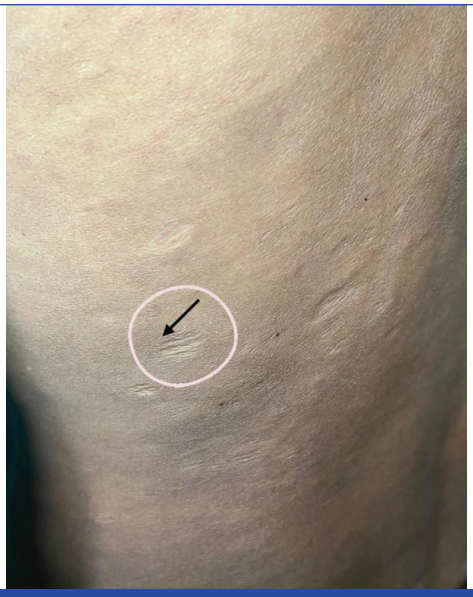


[Table/Fig-1]: Multiple well-defined erythematous macules and patches of various sizes approximately ranging from 0.3 cm×0.3 cm to 0.5 cm×0.5 cm present over the chest.

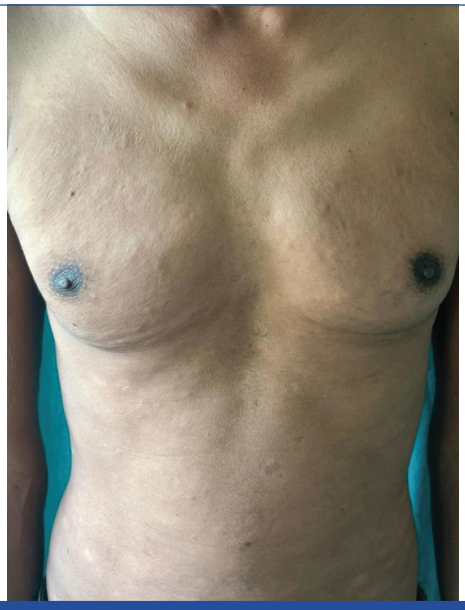
The current macular lesions, which appeared on new sites, were not involved when he was previously diagnosed with Hansen's disease. He was also a chronic alcoholic and had been diagnosed with abdominal tuberculosis, confirmed on Ultrasonography (USG) guided ascitic fluid cytology, showing raised Adenosine Deaminase (ADA) levels (86.77 IU/mL, cut-off titre: >40 IU/mL) [1,2]. He had been on Anti-Tubercular Drugs (AKT) for two months. A provisional diagnosis of lepra reaction was made, and he was prescribed oral steroids (prednisolone 20 mg daily) along with antacids (pantoprazole). The erythematous lesions resolved on follow-up after a week, but he still complained of tingling over limbs and sporadic fever episodes over the last two days. Upon general examination, new hypopigmented macules and papule lesions were observed over new sites [Table/Fig-2], along with old atrophied lesions on his back [Table/Fig-3]. Gyanecomastia was also noted [Table/Fig-4]. The clinical diagnosis was revised to Hansen's disease with relapse, along with abdominal tuberculosis and anetoderma. Further investigations were advised for confirmation of anetoderma and relapse. Sensory tests for leprosy examination, including pinprick tests, cold-hot differentiation tests, and motor examinations like card, book, and pen tests, were not positive. There were no signs of nerve thickening or neuritis presentation upon palpation. Slit skin smear and biopsy from the hypopigmented macular and atrophied lesions were advised for histopathological examinations. The slit skin smear revealed +2 and +1 (as per Ridley's logarithmic scale for Bacteriological index) [3] bacterial load from the earlobe and eyebrow, respectively. Histopathological findings from the atrophied lesion indicated fragmented elastic fibers with areas lacking elastic tissue, suggestive of anetoderma using Mason Trichrome stain [Table/Fig-5], and from the hypopigmented macular lesion, haematoxylin and eosin staining was consistent with Lepromatous leprosy [Table/Fig-6].



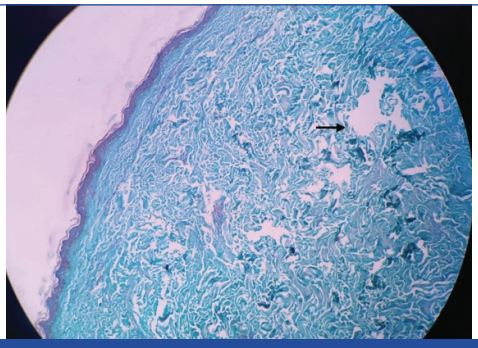
[Table/Fig-2]: Multiple well-defined skin colour macules and papules of various sizes ranging from 0.5 cm×0.5 cm to 0.8 cm×0. 8 cm present over the face.



[Table/Fig-3]: Multiple well-defined atrophied plaques of size 0.5 cm×0.5 cm present over the lower back.



[Table/Fig-4]: Gynecomastia of the bilateral breast observed.

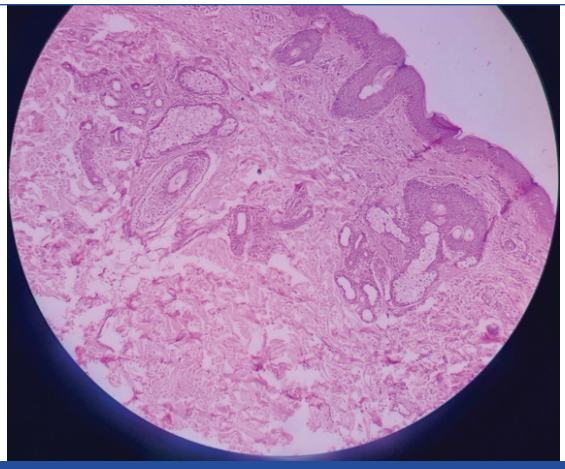


[Table/Fig-5]: Masson trichrome (10x view) showing fragmented elastic fibers and one or two places showing the absence of elastic fibers in the dermis.

The patient was started on MBMDT drugs, including Clofazimine 300 mg, Ofloxacin 400 mg, and Dapsone 300 mg on the first day, followed by Clofazimine 50 mg and Dapsone 100 mg for 28 days, along with ongoing AKT treatment and 20 mg of prednisolone.

The ongoing AKT for the past two months, targeting abdominal tuberculosis, consisted of the HRZE regimen (Isoniazid 75 mg, Rifampicin 150 mg, Pyrazinamide 400 mg, and Ethambutol 275 mg), with 4 tablets a day prescribed based on the weight range.

Based on the history, cutaneous examination, and guidelines provided by the National Leprosy Eradication Program (NLEP), which



[Table/Fig-6]: Section stained with haematoxylin and eosin (10x view) showing unremarkable lining epithelium. Deeper tissue shows fibrocollagenous tissue, foamy macrophages, and adnexal structures suggestive of Lepromatous Leprosy.

states that "Recurrence of disease at any time after completion of full treatment of MBMDT, irrespective of their clinical status [4,5], is a case of relapse," this case was diagnosed as a relapse of Hansen's disease and anetoderma co-existing with abdominal TB. However, whole gene sequencing is considered the gold standard for distinguishing reinfection from relapse of leprosy [6]. Due to the unavailability of molecular testing at the present institution, further subtype differentiation couldn't be obtained.

DISCUSSION

Leprosy represents one of the oldest mycobacterial infections, impacting large populations. It manifests as an immune-mediated condition, presenting with diverse neurocutaneous involvement. Another disease caused by the mycobacteria genus is TB, which is the most prevalent infection, posing a threat to nearly 10 million lives [7,8].

TB spreads through inhalation, causing both pulmonary and extrapulmonary manifestations. Research indicates potential cross-infections between Leprosy and TB, especially among populations of low socio-economic status or with limited access to healthcare services [9]. While encountering both TB and Leprosy in the same endemic setting is rare, evidence of their co-existence is documented in the literature. Leprosy, known as a great imitator, can mimic various diseases and also serves as a secondary cause for a specific loose skin condition termed anetoderma [9,10].

Anetoderma (relaxed skin in Greek) is an atrophic idiopathic condition mainly presenting as a loose wrinkled outpouching of skin. The reason for this is connective tissue weakening in the dermis and mid-dermal elastic tissue degeneration. It is classified into primary type, which is idiopathic, while secondary anetoderma is associated with an underlying pathology [11]. Primary anetoderma exhibits macules on normal skin, while secondary anetoderma involves an inflammatory and infiltrative dermatosis. Secondary anetoderma is further categorised based on the presence or absence of inflammation. a) Schweninger-Buzzi anetoderma lacks preceding inflammation, whereas b) Jadassohn-Pellizzari anetoderma shows atrophic lesions after inflammation, appearing as small round to oval lesions of 0.5 to 1 cm, typically seen in individuals aged 20 to 40 years [12]. Secondary anetoderma linked with dermatoses includes lupus erythematosus, acne vulgaris, tuberculosis, leprosy, and varicella. Though the exact cause remains unclear, evidence suggests elastin tissue breakdown. Diagnosis relies on clinical assessment, confirmed by histopathology, with no established treatment available.

The co-existence with active leprosy cases or misdiagnosis as leprosy necessitates histopathological confirmation [12]. The coexistence of leprosy and TB can influence the clinical presentation of both, posing challenges in treatment regimens [13]. Mangum L

et al., discussed co-infections, noting TB as a common finding in borderline and lepromatous leprosy cases. Impaired cell-mediated immunity in multibacillary leprosy patients may predispose them to TB co-infection [14]. A study proposed a cross-immunity link between TB and leprosy, emphasising the role of innate immunity in the broad-spectrum presentation of leprosy. Elevated proinflammatory cytokine responses like Interferon (IFN) gamma and Tumour Necrosis Factor (TNF) alpha are crucial in leprosy, also detected in TB cases. Different mycobacterial strains can trigger an inflammatory response on Interleukin mediators, establishing a potential link between them [15]. Individuals with immune TB might display some immunity to leprosy [13]. Stefani MMA et al., stated the use of Whole Genome Sequencing (WGS) distinguishes between relapse and reinfection in recurrent leprosy cases [6]. They stated that relapse and reinfection cannot be differentiated clinically, and molecular genotyping of a predefined set of loci has limited resolution due to exceptional *Mycobacterium leprae* genome conservation and low sequence diversity between strains from the same geographical area. The clear evidence for reinfection is an unrelated strain of bacilli in the first and second diagnosis whereas the true relapses are due to minor strain difference [14]. [Table/Fig-7] gives an overview of a comparison between the findings of the present case and cases reported in the past literature [16,17]. As per the NLEP, Disability Prevention, and Medical Rehabilitation Guidelines for Primary, Secondary, and Tertiary Care issued by the Central Leprosy Division (2023) [5], the criteria for relapse is that the time since completion of treatment is usually more than three years and for a reaction, it is less than three years. The presented case had lesions over new places after approximately three years of initial MDMDT completion. Thus, on comparative analysis between the published reports by various authors and findings of the presented case, it is a relapse case of lepromatous leprosy with atrophied lesions of anetoderma co-existing with abdominal tuberculosis.

Authors with year	Statement	Features present in present case
Shen et al., (2015) [16]	Clinical features of relapse after multidrug therapy for leprosy in China concluded that multibacillary relapse cases had new skin lesions. All multibacillary relapse cases had positive skin smears again, after previously becoming negative. They also stated that reinfection is a possible cause of relapse where the source of infection may have continued to exist near the patient which resulted in a relapse, so reinfection cannot be excluded as the cause of these relapse.	The patient had new lesions over new site and the slit skin smear was positive.
Chagas DF et al., (2021) [17]	The diagnosis of recurrence, as standardised by the Ordinance of the Ministry of Health, Nº. 15 of 2015, should meet clinical and laboratory criteria, that is, Bacilloscopic Index (BI), histopathological tests of skin lesions, and testing drug resistance via the extraction of bacillus DNA through molecular biology. A time frame of more than 15 years since the first and second diagnosis was considered and found recurrences resulting from hyperendemicity of the area or reinfection in patients continuously exposed to the bacillus and unstable immunity predominantly manifests as borderline infections.	Bacilloscopic index (BI was +1 , +2 , Histopathological tests of skin lesions confirmed the case to be of Lepromatous leprosy Patient was from area endemic for leprosy.

[Table/Fig-7]: Outcomes of different studies and findings seen in the present case [16,17].

CONCLUSION(S)

The significance of reporting this case is due to the rare co-existence of two mycobacterial diseases coupled with cutaneous degeneration of elastin fibers as a relapse of lepromatous leprosy, abdominal tuberculosis, along with anetoderma. This reporting will help treating physicians in diagnosing and planning the treatment for the same.

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