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Clinical profile of cutaneous tuberculosis at Nashik

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Abstract

Introduction: This study was conducted to determine the clinical pattern, nature and prevalence of cutaneous tuberculosis in Nashik, India.
Methods: We report 52 cases of cutaneous tuberculosis that were diagnosed at our outpatient department from January 2018 to December 2019. All the cases were diagnosed clinically, and biopsies were examined for histopathological evidence.
Results: Clinically, 26 (50%) cases of lupus vulgaris, 15 (29%) of scrofuloderma, six (12%) of tuberculosis verrucosa cutis, four (8%) of papulonectrotic tuberculid, and one (2%) of lichen scrofulosorum were observed in our department from 2018 to 2019. All the patients were between 5 and 65 years old. Five patients were children under 10, 29 (56%) were between 10 and 30 years old, 13 (25%) were between 30 and 50 years old, and five (10%) were over 50. There was a male (64%) predominance compared to female patients (37%). Histopathology of all the specimens showed granulomatous changes, in the majority of cases Langhans giant cells. Epithelioid cell infiltration and other inflammatory cells, such as lymphocytes, neutrophils, and eosinophils, were seen in ulcerated lesions.
Conclusions: The study had some limitations. The sample size was small and the study was carried out in a rural setting, where agriculture is the main source of income and most of the patients treated are farm laborers. Lupus vulgaris was the most common form of cutaneous tuberculosis in this area. The incidence was higher in working adult males, indicating that trauma may be one of the causes of cutaneous tuberculosis. The high rate of clinical-histological confirmation seen in this study emphasizes the importance of skin biopsy in patients with cutaneous TB.

Keywords: cutaneous tuberculosis, lupus vulgaris, scrofuloderma

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Introduction

Tuberculosis (TB) is the typical disease of poverty (1). Although improved hygiene and living standards, introduction of Bacillus Calmette–Guérin (BCG) vaccine, and timely treatment have greatly reduced the incidence and prevalence of TB in developed countries, the burden of TB, especially in developing countries like India, still remains an important challenge for global and national health programs (1, 2). According to data provided by the World Health Organization (WHO), approximately 18% of newly detected TB cases in India in 2015 were extrapulmonary, whereas cutaneous TB, a form of extrapulmonary TB, accounts for approximately 0.9% of patients attending dermatology outpatient clinics (3).

Cutaneous TB has a varied clinical presentation, determined by factors such as the route of infection and the cellular immune status of the host. Cutaneous lesions can present as papules, plaques, nodules, ulcers, veracious lesions, cicatricial infiltrations, papillomatous tumors, or vegetative reactions (4, 5). Differential diagnoses usually include atypical mycobacterial infections, leprosy, sarcoidosis, cutaneous leishmaniasis, and deep fungal infections, including sporotrichosis and chromoblastomycosis.

There are two differing classifications of cutaneous TB. Tappeiner and Wolff proposed the most widely accepted classification according to the route of infection. The classification system 1 thus differs between exogenous (tuberculous chancre, tuberculosis verrucosa cutis, lupus vulgaris) and endogenous cutaneous TB. Endogenous cutaneous TB is further divided into contiguous (scrofuloderma, orificial tuberculosis), hematogenous (scute miliary tuberculosis, metastatic tuberculosis abscess [gummatous tuberculosis], papulonecrotic tuberculid, lupus vulgaris), and lymphatic (lupus vulgaris) cutaneous TB (6).

An additional classification system, similar to Ridley and Jopling's classification in Hansen's disease and designed to enhance the Tappeiner and Wolff system, includes distinction based on the bacterial load. According to the Classification system 2, cutaneous TB can be classified as multibacillary (tuberculous chancre, scrofuloderma, tuberculosis orificialis, acute miliary tuberculosis, gummatous tuberculosis) or paucibacillary (tuberculosis verrucosa cutis, lupus vulgaris, tuberculids). In multibacillary forms, mycobacteria can easily be detected on histological examination using the Ziehl–Neelsen staining method and cultivation. On the contrary, in paucibacillary forms of the disease, sparse bacilli are seen on histological examination and cultivation rarely yields isolation of mycobacteria (6). Because recovery of the bacilli from culture media generally requires at least 6 to 8 weeks and a positive culture is not always obtained, the clinical diagnosis of skin TB should be supported by histopathology (7).

This study was carried out to determine the incidence and clinical profile of cutaneous TB in and around Nashik.

Materials and methods

The study was conducted in the outpatient clinic of the Department of Dermatology at SMBT Medical College in Nashik, Maharashtra, India. The study was approved by the institutional board of SMBT Medical College. A total of 52 cases were enrolled in our department between January 2018 and December 2019.

Newly diagnosed patients with cutaneous TB attending the

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Dermatology Outpatient Department of a tertiary care hospital over a period of 2 years were included in the study. All the patients were included serially after providing consent. Patients not willing to participate in the study or not agreeing to investigation were excluded. A detailed history was taken, with particular reference to occupation, trauma, and family history of TB and BCG vaccination, and a thorough general physical, cutaneous, and systemic examination was carried out. All cases were subjected to hemogram, hepatic function tests, renal function tests, and chest X-ray. A sputum smear examination for acid-fast bacilli (AFB), and enzyme-linked immunosorbent assay (ELISA) for human immunodeficiency virus (HIV), and other radiological investigations were performed in relevant cases. A skin biopsy and the Mantoux test were performed in all cases. Fine needle aspiration cytology and lymph node biopsy were performed whenever clinically indicated. The histopathological findings of all the patients were examined by an experienced consultant histopathologist. Due to a lack of facilities, cultivation of pathogens was not attempted.

Results and discussion

The study was conducted on clinically diagnosed cases of cutaneous TB. We sought to determine the clinical profile of various forms of cutaneous TB, their relative prevalence, and their age and sex distribution.

A total of 52 cases of cutaneous TB were observed in a patient population of 50,700 (incidence 0.1%). Of these, 33 patients were male and 19 were female (Table 1). Our findings are in line with those of Ramesh et al. (8). The fact that males are predominantly affected could be explained by their outdoor work and greater exposure to environmental hazards.

Patients from all age groups were affected by cutaneous TB: five (9%) patients were in their first decade, 16 (30%) in their second decade, 13 (25%) in their third decade, eight (15%) in their fourth decade, and five (9%) cases each in their fifth decade and over 50. Thus 37 cases were in the second to fourth decades. The higher incidence of cutaneous tuberculosis in the second to fourth decades was most likely due to our patients being laborers and having a greater risk of sustaining an injury and thus dermal inoculation of bacilli.

Out of the 52 cases, 26 (50%) were lupus vulgaris, 15 (28%) were scrofuloderma, six (11%) were tuberculosis verrucosa cutis (TVC), and five (9%) were tuberculid, including four papulonecrotic tuberculid and one case of lichen scrofulosorum (Table 2, Figs. 1 and 2). The findings in our study are similar to those of Ramesh et al., who observed lupus vulgaris (59%), scrofuloderma (27%), and TVC (14%) (8). Singh reported lupus vulgaris (74%), tuberculosis verrucosa cutis (18.5%), and scrofuloderma (5.6%) among 54 patients studied (9). Bhutto observed lupus vulgaris (41.2%), scrofuloderma (35.3%), and TVC (19.5%) in Pakistani children (10). Kumar observed lupus vulgaris in 81.8% of patients (11). These

Figure 1 | Patient presenting with scrofuloderma.

Figure 2 | Patient with lupus vulgaris lesion on the hand.

Table 1 | Lesion types by sex.

Sex	Lupus vulgaris	Scrofuloderma	Tuberculosis verrucosa cutis	Papulonecrotic tuberculid	Lichen scrofulosorum	Total	%
Male	15	9	5	3	1	33	63
Female	11	6	1	1	0	19	37
Total	26	15	6	4	1	52	100

Table 2 | Lesion types by age.

Age	Lupus vulgaris	Scrofuloderma	Tuberculosis verrucosa cutis	Papulonecrotic tuberculid	Lichen scrofulosorum	Total	%
0–9	3	1	0	0	1	5	10
10–19	12	2	1	1	0	16	30
20–29	6	4	1	2	0	13	25
30–39	0	5	2	1	0	8	15
40–49	1	2	2	0	0	5	10
› 50	4	1	0	0	0	5	10
Total	26	15	6	4	1	52	100

findings are similar to our study. The most prevalent form of cutaneous TB may vary among different continents; lupus vulgaris is the most common form of cutaneous TB in our community. The second most common type was scrofuloderma followed by TVC, but Wong found TVC to be the most common type (12). Tuberculid was uncommon in our study, and it was also found to be negligible by Singh and Satyanarayan (9, 13).

In studying the distribution of lupus vulgaris by site, we noted that, out of 26 cases of lupus vulgaris, 14 had lesions on the face and neck, two had lesions on the trunk, and eight patients had lesions on the extremities (Table 3). According to previous reports, lupus vulgaris most commonly affects the lower part of the body in Indian children (i.e., lower trunk, buttocks, thighs, lower leg, and feet). This pattern can be explained by the widespread habit of spitting and defecating in open areas and the children squatting and playing poorly dressed and barefoot, which occurs more commonly in children with lower socioeconomic backgrounds (1). However, due to improved hygiene and clothing, this pattern has changed. In our study, lupus vulgaris was found most commonly on the face and neck. These findings contrast with those of other Indian studies.

Out of 15 patients with scrofuloderma, nine patients had cervical lymphadenopathy, five had axillary lymphadenopathy, and one had parasternal lymphadenopathy (Table 4). Scrofuloderma is caused by direct extension of the infection from an underlying tuberculous focus into the skin. Most common foci of infection are lymph nodes with cervical node infection and scrofuloderma of the neck region as the most commonly affected region. This could be due to the very common habit of drinking unboiled or unpasteurized milk in many parts of the country, causing subsequent mycobacterial infection of the cervical lymph nodes (14).

Out of six cases of TVC, four had lesions on the lower extremity and two patients had lesions on the upper extremity (Table 5). Lower extremity sites of predilection were the dorsum of the foot and knee. On upper extremities, lesions mainly occurred on the dorsum of the hand and elbow joints. Most Indian people walk barefoot and work with bare hands, and so extremities are more prone to injuries, and this is probably why all the TVC lesions were observed on limbs.

One patient with a papulonecrotic tuberculid had a lesion on the glans penis in the form of a worm-eaten scar, and the other had necrotic papule on the extensors of the upper extremity.

In studying morphological variants of lupus vulgaris, out of 26 cases, seven were the plaque type, 17 hypertrophic, and two the ulcerative type of lupus vulgaris (Table 6). Our findings are similar to previous reports (15). The tendency of skin TB patients to seek late treatment due to the disease's asymptomatic nature may be responsible for long-standing lesions with a hypertrophic appearance.

In histopathology, Langhans type giant cells and tubercular epithelioid cell granulomas with lymphocytes are the hallmark of cutaneous TB. Characteristics such as the nature of cellular infiltrate and distribution of granuloma in the dermis are important for classifying variants of cutaneous TB (16). Hence, the role of a detailed evaluation of biopsy cannot be overemphasized. Caseation necrosis was a feature in 70% patients with scrofuloderma; however, it could only be demonstrated in 30% of cases of lupus vulgaris. Nevertheless, scrofuloderma displayed a relatively smaller number of lymphocytes and frequent giant cells, suggesting decreased local immunity. AFB were seen in exudates of three cases of scrofuloderma. In lupus vulgaris, predominantly epithelioid cells and lymphocytes, with occasional giant cells, suggest an augmented cell-mediated immunity. When clinically correlated, fibrosis in the dermis was seen in long-standing cases. Epidermal hyperplasia was observed in all cases of tuberculosis verrucae cutis. In other cases, a diffuse infiltrate of epithelioid cells and Langhans giant cells was seen. In a few cases, secondary changes such as epidermal thinning, atrophy, acanthosis, and hyperkeratosis were seen.

The result of the Mantoux test are presented in Figure 3. Lichen scrofulosorum cases showed a strong positive response to the Mantoux test. Our findings are similar to those of Shegal et al. (17). A strongly positive Mantoux test is seen in lupus vulgaris in comparison with other forms of cutaneous TB because there is higher cell-mediated immunity and hypersensitivity response in lupus vulgaris.

After pre-test counselling and consent, ELISA for HIV infection was performed for all cases included in study. Six patients with scrofuloderma and one patient with lupus vulgaris were found to be HIV-positive.

Table 3 | **Lupus vulgaris by site.**

Site	*n*	%
Face and neck	14	56
Trunk	2	7
Extremities	8	25
Genitalia	1	6
Widespread	1	6
Total	26	100

Table 4 | **Scrofuloderma by site.**

Site	*n*	%
Cervical lymph node	9	60
Axillary lymph node	5	33
Inguinal lymph node	0	0
Parasternal lymph node	1	7
Total	15	100

Table 5 | **Tuberculosis verrucosa cutis by site.**

Site	*n*	%
Face and neck	0	0
Trunk	0	0
Upper extremities	2	25
Lower extremities	4	75
Total	6	100

Table 6 | **Clinical variants of lupus vulgaris.**

Variant	*n*	%
Plaque type	7	25
Hypertrophic	17	69
Ulcerative	2	6
Vegetative	0	0
Papular	0	0
Total	26	100

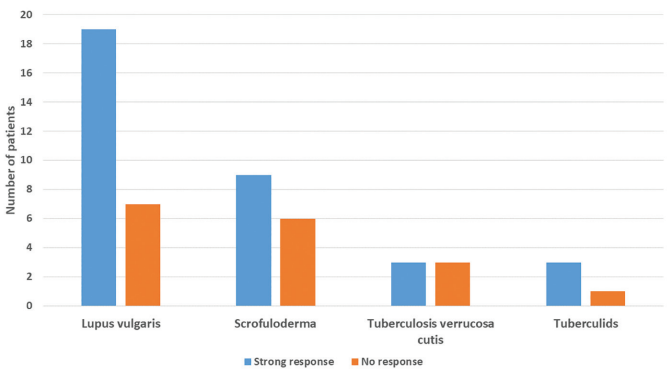

Figure 3 | Response to the Mantoux test with respect to the type of cutaneous tuberculosis.

Out of 52 cases, 41 were BCG-vaccinated, and in the remaining 11 cases a BCG scar was absent. BCG vaccination was found in 78% of cases, which reflects the incapability of vaccination to completely protect against cutaneous TB. Moreover, the role of BCG in preventing cutaneous TB is not well established. No difference in the incidence and clinical presentation of cutaneous TB was found between BCG-vaccinated and unvaccinated children in an earlier study (18). Lupus vulgaris, scrofuloderma, tuberculids, and erythema nodosum have been reported at the site of BCG vaccination. Cases of scrofuloderma were either unvaccinated or HIV-positive in our study.

There were some limitations to the study, including a small sample size and the fact that the study was carried out in a rural setting, where agriculture is the main source of income and most of the patients we treat are farm laborers. There could be also be other factors contributing to cutaneous TB besides trauma, such as immunosuppressive conditions, malnutrition, alcoholism, diabetes mellitus, and gastrectomy (19), which were not considered in this study.

Conclusions

Cutaneous TB is an important health problem, with a wide spectrum of clinical and histological patterns. The high rate of clinical and histological confirmation seen in our study reinforces the importance of skin biopsy in patients with cutaneous TB. It is of utmost importance for dermatologists and histopathologists to be familiar with varied patterns so that the diagnosis is not missed.

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