

Original Research Article

A clinicopathological study on cutaneous tuberculosis in a tertiary care teaching institution

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ABSTRACT

Background: Today tuberculosis is known to affect every organ, not forgetting the single largest organ of the body-the skin. The study on cutaneous tuberculosis is conducted with the modest aim of studying its epidemiology, clinical features, immunology, histology and treatment.

Methods: Patients with clinical diagnosis of cutaneous tuberculosis were included in study after thorough history, clinical examination, routine and special investigation like AFB staining, Mantoux test and histopathologic studies.

Results: Cutaneous tuberculosis constituted 0.11% of total cases. Lupus vulgaris (LV) topped the list followed by tuberculosis verrucosa cutis (TVC) and scrofuloderma (SFD). Commonest age group was in second to third decades. Males outnumbered females. Most of the LV and TVC lesions were confined to the extremities. SFD was confined to head and neck region. BCG vaccination did not confer immunity against cutaneous tuberculosis as observed in this study. HIV positivity was observed in only one patient in this series although this has been described to be associated commonly with cutaneous infections. Histopathological features were consistent with cutaneous TB in all the patients. All these cases responded well to ATT and those cases which could be followed did not show any recurrence.

Conclusions: This study highlights the incidence of cutaneous tuberculosis with male predilection. Early detection and treatment of lesions are crucial to decrease functional and cosmetic disfigurement, importance of assessing HIV status in patients with multicentric cutaneous tuberculosis and also this study highlights the importance of improving awareness among general practitioners, public health workers and general population.

Keywords: Cutaneous tuberculosis, Clinical variants, Acid fast bacilli, Histopathology

INTRODUCTION

Cutaneous tuberculosis is the chronic infection of skin caused by *Mycobacterium tuberculosis* of the human, bovine and very rarely, the avian type, of which human strain is the commonest to affect man.¹ Only 5-10% of infection leads to clinical disease. Though the organism has worldwide distribution, it is more prevalent in cold and humid climate but can also occur in tropics.² Exogenous exposure produces primarily tuberculous chancre and TB verrucosa cutis. Endogenous infection by

contiguity leads to scrofuloderma and by haematogenous spread to lupus vulgaris and miliary TB. Tuberculides include papulonecrotic eruption, lichen scrofulosorum and erythema induratum. Diagnosis of cutaneous TB can be done using clinical history, physical examination, presence of active proven TB elsewhere, demonstration of AFB, tuberculin test, histopathology, culture, PCR. In addition, Interferon- γ release assays such as QuantiFERON® TB Gold [In-Tube] and T-SPOT® can be used for diagnosis, the former may have slightly higher specificity and the latter marginally higher

sensitivity.³ The US Centers for Disease Control and Prevention guidelines state that the Interferon- γ release assay may be used in place of a tuberculin skin test in all situations where the latter would be employed. Cutaneous TB is treated with short course chemotherapy (6 to 9 months) in two phases' intensive phase and maintenance phase using isoniazid (INH), rifampicin (RMP), pyrazinamide (PYZ), ethambutol (EMB), streptomycin (SM).

Aim

The aim of the study was to find out the age and sex incidence of TB cutis, to study the clinical types, demonstration of acid fast bacilli (AFB) by direct smear and culture, the histopathologic correlation of TB cutis and response to antituberculous therapy.

METHODS

It was a retrospective study of patients suffering from cutaneous TB selected at random over a period of one year from October 2014 to September 2015 at Department of Dermatology, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai. Clinical diagnosis of various types of cutaneous TB were made on the basis of detailed history taking, clinical examination, morphology, chronicity and distribution of lesion and confirmed by histopathologic studies. Routine hemogram, erythrocyte sedimentation rate, intradermal test with PPD 1 in 1000, skiagram was done to rule out distant tuberculous focus. Touch smear for AFB, Leishman, gram stain and 10% KOH were done from ulcerative lesions and discharging sinuses. Special stain with Fite Faracco was done in cases with positive AFB smear. PAS stain was used in doubtful cases to exclude deep mycosis. Culture for AFB and non AFB was done for all cases. ELISA for HIV infection and VDRL were carried out in all cases. In view of financial constraints, majority of cases diagnosed with above

specified investigations and we have not included IFN- γ release assay and DNA PCR. Liver and renal function tests and ophthalmologic examination were carried out before starting anti-tuberculous therapy. Data was analysed using SPSS windows software version 17.0.

RESULTS

Data from medical records maintained in the department during the study period revealed that sixty cases were clinically diagnosed to be suffering from cutaneous TB with an incidence of 0.11%. 60% of these cases belong to low socio economic status.

Age and sex wise distribution

Out of sixty cases, 39 cases were males, 13 were females and 8 cases were children. Incidence was 2-3 times more in males than in females. The peak age group affected was 11-30 years (61.6%) (Table 1).

Table 1: The age and sex incidence in TB cutis.

Age group	Male	Female	Total
0-10	2	2	4
11-20	10	9	19
21-30	16	2	18
31-40	7	-	7
41-50	5	2	7
51-60	2	2	4
61-70	1	-	1
Total	43	17	60

Clinical types of cutaneous tuberculosis

Out of sixty cases, 43.3% cases were lupus vulgaris (LV), 31.7% were tuberculosis verrucosa cutis (TVC), 18.3% were scrofuloderma (SFD), 3.3% were lymphedema associated with TB cutis, TB gumma and erythema induratum each 1.7% (Table 2).

Table 2: Different types of cutaneous tuberculosis in relation to age group.

Types of TB cutis	Age and sex distribution														Total no. of cases
	0-10		11-20		21-30		31-40		41-50		51-60		61-70		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Lupus vulgaris	2	1	5	4	7	1	2	1	1	-	1	1	-	-	26
Tuberculosis verrucosa cutis	-	-	4	2	3	-	3	-	3	1	1	1	1	-	19
Scrofuloderma	-	-	1	2	6	-	2	-	-	-	-	-	-	-	11
Tuberculous gumma	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
Lymphedema with TB cutis	-	1	-	-	-	-	-	-	1	-	-	-	-	-	2
Erythema induratum of Bazin	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Total															60

Distribution of cutaneous tuberculosis according to site

In 53.84% of the cases in LV and 89.47% of cases in TVC lower extremities were commonly involved. In SFD

81.81% cases, the head and neck area were affected. Among 60 cases, 35 cases gave history of trauma.



Figure 1: Ill-defined ulcerated plaque over right forearm.



Figure 2: Atrophic scar over same area after antituberculous treatment.



Figure 3: Matted left submandibular nodes with draining sinuses.



Figure 4: Puckered scar after antituberculous treatment.

DISCUSSION

A brief review of the tuberculosis of the skin with regard to the incidence, cardinal features, pathogenesis, investigations and therapeutic response to antituberculous drugs were made.

In this study tuberculosis cutis only represented 0.11% of the total skin cases during a period of one year. The incidence rate was much higher compared to the study at Hongkong.⁴ However it was lesser in contrast to various other studies in India.^{5,7} Decline in the incidence of tuberculosis in Hongkong may be as a result of improvement in the socioeconomic status of the residents.⁴

Age distribution

The mean age was lesser in L) (24.8 years) and more in TVC (33 years) in contrast to an earlier observation where this was more in LV (40 years) and TVC (23 years).⁴ In cases of SFD the mean age group was found to be lesser in our patients compared in their observation.⁴

Sex distribution

Males outnumbered females in all the three clinical types in this series. The sex pattern however is similar with regards to TVC and SFD.⁴

Distribution of cutaneous TB according to site

The distribution of lesion in the extremities in cases of LV was similar to the previous studies conducted in India.^{5,6} The distribution was in contrast to the findings where lesions were mainly confined to the head and neck.⁴ The distribution of LV and TVC (84.2%) in the lower extremity and SFD (72%) in the head and neck regions coincide with previous observation.⁴

Clinical types

Cutaneous tuberculosis is broadly classified into multibacillary and paucibacillary forms. Multibacillary forms include TB chancre, scrofuloderma, orificial tuberculosis, miliary TB, TB gumma and paucibacillary forms include TB verrucosa cutis, lupus vulgaris and tuberculids (lichen scrofulosorum, papulonecrotic tuberculid and erythema induratum of Bazin).

The duration of the disease in cases of LV and TVC was from months to years indicating progressive evolution without crippling the patient. However the longest duration of 67 years has been reported earlier.⁸

History of trauma in more than half of our cases indicates trauma could be a precipitating factor in the onset of cutaneous tuberculosis. Lupus vulgaris was the most common type in our study which differs from other studies.^{5,7}

Commonest manifestation of LV was a plaque with crusting (Figure 1) and scaling and apple jelly nodules by diascopy could not be demonstrated in any of the cases. This negative sign in our cases would be explained because of the darker complexion of the individuals. Scaling in the plaque resembling psoriasis commonly found in the leg was observed in one of our cases.⁹

A differential diagnosis of sporotrichosis and atypical mycobacterial infection were thought of in an unusual case of LV presenting in a linear fashion. However the appropriate investigation and response to antituberculous therapy (ATT) (Figure 2) ruled out these infections. Another interesting case of LV presenting with nasal septal perforation (lupus vorax) incited the possibility of common causes of nasal perforation like various treponematoses, lepromatous leprosy, mucocutaneous leishmaniasis and deep mycoses. This patient also showed good response to ATT.

The presence of tenderness and purulent discharge on all cases of TVC suggest these signs to be diagnostic and could be differentiating features from verrucous type of LV.

Majority of our cases of SFD (90.91%) had originated from lymph node (Figure 3). Multicentric SFD arising from bones associated with LV is of interest because of its resemblance to deep mycoses such as cryptococcosis, African histoplasmosis which were however ruled out. Immunocompromised state due to HIV infection, diabetes mellitus were also ruled out. This patient also responded well to the treatment (Figure 4).

Regional lymphadenopathy although considered to be rare in LV and TVC were present in 7 cases- LV (1 case) and TVC (6 cases).⁹ Regression of lymph nodes with therapy proved them to be of tuberculous origin and not due to secondary infection.

None of the cases of TVC or LV had parenchymal tuberculosis whereas two cases of SFD revealed evidence of pulmonary tuberculosis indicating a higher immunity in the former two types.

Majority of the cases with LV and TVC had their onset following trauma producing a persistent ulcer or a scar. The dormant tubercle bacilli might have got reactivated inducing the lesion atleast in some of the cases though strict exogenous inoculation of bacteria could have occurred in TVC.

In a patient with multi centric SFD and LV might have had the initial bacilleemia at the height of previous infection could have remind latent and caused different type of osseous and the cutaneous lesion depending on the localised immunity peculiar to those sight.⁹ However this general immune status which could be consider to be better as evidenced by mantoux positivity could explain the absence of other systemic tuberculosis.

Leucocytosis with lymphocytosis and rise in ESR seen in majority of patients with SFD denoted the activity of the disease. Mantoux positivity with erythema and induration in all the patient with three clinical types namely LV, TVC and SFD indicated them to be immune tuberculosis. Mantoux positivity in majority of the cases of SFD in the present series also could be as a result of prevalence of active tuberculosis in the community and presence of BCG vaccination. However one case of SFD showing negative Mantoux was HIV infected and other patient with TVC didn't show any immune suppression. The negative Mantoux could probably be due to antigen deterioration of the PPD in the latter.

Absence of acid fast bacilli (AFB) in tissue smear of all the cases of TVC and LV indicates lesser number of bacilli and its presence in the majority of SFD (81.82%) indicates its infectious nature. Positive culture for AFB in only one of the cases of LV and TVC and in 7 cases of SFD also indicates higher infectivity of SFD. However a previous observation⁴ showed positive culture not only in case of SFD but also in cases of LV. Although numerous bacilli were present in TVC than LV but occasionally demonstrable in lesion of TVC than LV.¹⁰

None of our section with Fite Faracco stain showed AFB. Histopathological changes in LV, TVC, SFD were similar to observation by others even though demonstration of AFB could not be possible in all the three types in section stained with Fite Faracco stain in contrast to the reports by others.^{4,10}

Even though INH monotherapy has been tried in the past for cutaneous tuberculosis like LV or TVC, present schedule of therapy involve initial four drug regimen [isoniazid (H)+rifampicin (R)+ethambutol (E)+pyrazinamide (Z)] for 2 months followed by two drugs (H+R) for four months to emphasize on prevention of drug resistance.⁹ We found very good response with above said regimen.^{11,12}

Follow up study revealed 100% cure rate in LV, TVC, SFD of our series and reactivation or recurrence was not observed.

Tuberculous gumma in 17 year old female patient with fixed painful ulcer and sinuses in the right gluteal region with bilateral PT was second recorded case in this department. The previous one described by Premalatha et al showed a sporotrichoid form of the TB gummatous lesion unlike the present case.¹⁴ Although tissues smear and culture was positive in the present case, AFB could not be demonstrable in histopathological section with special stain but it was possible in the previous case. The patient was responded well with ATT with initial four drug regimen for two months followed by two drug regimen for four months.

Lymphoedema with TB cutis seen in two patients is of interest and need special mention. In 8 year old female

patient with all forms of cutaneous TB like LV, TVC and SFD with bilateral hilar lymphadenopathy, lowered resistance and bacilleemia could be the factors responsible for onset of SFD. The discharged AFB from the sinuses of SFD could have been the source of infection in LV and TVC through exogenous contact. Lymphoedema in this case could be explained by ulceration in the course of lymphatics, recurrent lymphangitis, tuberculous granulomatous process involving lymph node with resulted scarring and protein exudation from lymph stasis resulting in excess fibrous tissue proliferation.

In the second case with SFD and lymphoedema the granulomatous process in the lymph node and the fibrosis in the inguinal lymph node alone could be the probable factor for the lymph stasis. These patients also responded excellently with multidrug therapy with complete regression of lymph node, however lymphoedema was persistent.

A patient with renal transplant manifesting erythema induratum of Bazin (EI) did not have either tuberculous foci elsewhere or any evidence of renal tuberculosis. However the EI of Bazin has been described with renal tuberculosis.¹⁵

Mechanism of production of EI of Bazin, a nodular tuberculid, in renal transplant patient is surprising in the presence of immunosuppressive therapy. According to Morale et al, EI of Bazin should be reserved for those cases in which tuberculous origin can be proved or if the proof is inconclusive TB is the most reasonable cause.¹⁵ Tuberculous infection can present in the form of EI when it is associated with marked alteration of T-lymphocytes as well as accessory cells of patients' immune system resulting in immune complex deposition. Though clinically site was unusual histopathological features of panniculitis, tuberculoid granuloma and caseation necrosis made us to fix this case under tuberculous entity. Negative Mantoux in this case could be as a result of immunosuppressive therapy.

CONCLUSION

Cutaneous tuberculosis constituted 0.11% of total cases. LV topped the list followed by TVC and SFD. Commonest age group was in second to third decades. Males outnumbered females. Most of the LV and TVC lesions were confined to the extremities. SFD was confined to head and neck region. The following cases are of interest and not so far been described in the centre. These are sporotrichoid form of LV, multicentric SFD arising from bones along with LV lesion, lymphoedema associated with TB cutis, erythema induratum of Bazin in renal transplant recipient. An unusual case of TB gumma associated with PT was also described. BCG vaccination did not confer immunity against cutaneous tuberculosis as observed in this study. HIV positivity was observed in only one patient in this series although this has been described to be associated commonly with cutaneous

infections. Histopathological features were consistent with cutaneous TB in all the patients. All these cases responded well to ATT and those cases which could be followed did not show any recurrence. None of these patients showed any untoward or unwanted side effects to the schedule of therapy followed. In many occasions the varied clinical presentation makes the diagnosis of the disease difficult. Clinicopathological correlation is essentially useful in these cases where clinical presentation poses diagnostic difficulties. As cutaneous tuberculosis sometimes reflect the presence of pulmonary tuberculosis, its incidence should not be ignored.

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