Original Article
DOI: https://doi.org/10.70749/ijbr.v3i4.757

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://induspublishers.com/IJBR
ISSN: 2960-2793/ 2960-2807

Frequency of Various Clinico-pathological Variants of Cutaneous Tuberculosis

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ARTICLE INFO

Keywords
Cutaneous Tuberculosis, Scrofuloderma, Lupus Vulgaris, Histopathology.

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Declaration
Authors' Contribution: All authors equally contributed to the study and approved the final manuscript.
Conflict of Interest: No conflict of interest.
Funding: No funding received by the authors.

Article History
Received: 03-12-2024, Revised: 28-02-2025
Accepted: 22-03-2025, Published: 10-04-2025

ABSTRACT

Background: Cutaneous tuberculosis falls into the category of rare extrapulmonary tuberculosis manifestations which occur throughout the world. The multiple clinical-pathological versions of this condition require diagnosis through histopathological examination. **Objective:** This study aimed to determine the frequency of various clinico-pathological variants of CTB in patients presenting to a tertiary care hospital. **Methods:** Researchers assessed patients at the Dermatology Department of Civil Hospital, Karachi during six months starting from April 20, 2018 to October 20, 2018. The researchers included fifty patients who received CTB diagnosis after getting approval from the ethical board and patient consent. For CTB variant diagnosis medical experts conducted history acquisition alongside clinical assessment while performing histopathological examinations. **Results:** Fifty patients comprised the sample group with 25 males and 25 females divided equally and had an average age of 42.90 ± 12.59 years. Scrofuloderma appeared as the primary clinico-pathological form of tuberculosis (21 cases, 42%) while lupus vulgaris (13 cases, 26%) stood as the second most observed variant and tuberculosis verrucosa cutis (10 cases, 20%) along with tuberculids (6 cases, 12%) followed as the remaining types. **Conclusion:** The clinical form scrofuloderma presented most often in CTB patients while lupus vulgaris, tuberculosis verrucosa cutis and tuberculids appeared less frequently. Proper diagnosis together with management of CTB demands extensive clinical analysis combined with pathological findings since CTB can exist alongside systemic tuberculosis. Timeous detection along with better understanding between medical professionals remains essential for avoiding serious CTB outcomes.

INTRODUCTION

Tuberculosis (TB) remains an important worldwide public health issue especially in developing nations because progress made in diagnosing and treating it has failed to reduce its substantial impact on these regions. Pulmonary tuberculosis exists as the main type yet extrapulmonary tuberculosis (EPTB) develops into substantial cases by spreading to non-lung tissues and organs [1, 2]. Cutaneous tuberculosis (CTB) exhibits an extremely rare manifestation compared to other EPTB types without losing its medical importance because it presents itself in various clinical features resembling different skin conditions. Diagnosis of CTB needs cross-examination through clinical evaluation together with histopathological examinations and microbiological tests for Mycobacterium tuberculosis confirmation [3, 4].

The different clinical-pathological types of CTB present distinct morphological and histological signatures in their unique forms. The primary CTB manifestations consist of scrofuloderma from tuberculous lymphadenitis skin extension and lupus vulgaris with apple-jelly nodules alongside atrophic scarring and tuberculosis verrucosa cutis (TVC) due to skin contact with the pathogen and tuberculids representing skin hypersensitivity reactions to TB foci [5, 6]. These variants often present diagnostic challenges due to their varied clinical morphology and resemblance to other dermatological disorders, such as fungal infections, leprosy, and sarcoidosis. The identification of proper dermatological diagnosis coupled with appropriate clinical recognition demands immediate attention in order to deliver effective treatment [7].

The global prevalence rates of CTB show diverse results because they are affected by multiple factors including regional situations and economic conditions as well as

tuberculosis prevalence statistics among the general population. The regions of South Asia serve as endemic areas where tuberculosis exists at high levels thereby increasing the chances of encountering CTB [8, 9]. CTB remains mainly undetected because healthcare facilities lack proper awareness and service providers frequently fail to provide correct diagnoses. The field of molecular diagnostics has evolved in recent times yet histopathology stands as the essential base for CTB variant diagnosis to differentiate it from other skin diseases [10, 11].

The understanding of CTB remains important but Pakistan lacks sufficient data about the prevalence rates and distribution patterns of its different clinical-pathological forms within the region. The existing literature about tuberculosis primarily concentrates on pulmonary tuberculosis but studies on the cutaneous manifestations of the disease tend to obtain less recognition. This research fills the knowledge gap through investigations about different CTB variations which occur among patients who visit a tertiary care medical center. The study delivers important data about what CTB presents as in the local patient population which can enhance medical care identification methods.

Objective: A six-month observational study at Karachi Civil Hospital Dermatology Department will determine the occurrence rates of different cutaneous tuberculosis clinical-pathological forms in visiting patients.

METHODOLOGY

Study Design and Setting

The research took place at the Dermatology Department within Civil Hospital in Karachi from April 20, 2018 until October 20, 2018.

Sampling Technique and Sample Size

The research adopted non-probability consecutive sampling as the selection method for patients. The study researchers calculated their sample size according to predicted 7–8 monthly cases at their research site because cutaneous tuberculosis occurs infrequently. Fifty patients who matched the eligibility requirements received inclusion into the research.

Inclusion and Exclusion Criteria

Researchers included patients meeting two eligibility requirements before they received a histopathological diagnosis of CTB. Patients ranging from 14 to 65 years old of either gender were admitted into the study after they provided informed consent. The study excluded patients who had CTB as a previously diagnosed condition together with other dermatological conditions that potentially affected diagnosis.

Data Collection Procedure

The evaluation took place for eligible patients with CTB indicator signs after receiving ethical validation and study purpose explanation. New Wales Medical Service doctors obtained complete medical history records that included tuberculosis-related background and contact situations and Mantoux test outcomes. After conducting systematic and skin-based assessments the doctor carried out the examination. Medical professionals carried out clinical classification of patients based on the distribution and features exhibited by their body lesions. The examination of tissue specimens through pathology lead to diagnosis confirmation and recorded results appeared in the pre-designed format. The research involved studying Dermatology Department both inpatients along with outpatients.

Ethical Considerations

Ethical approval was obtained from the institutional review board before initiating the study. All participants were informed about the purpose, procedure, potential risks, and benefits of the study. Informed written consent was taken from each patient before data collection. Confidentiality of patient information was strictly maintained, and personal identifiers were not included in the data analysis. Patients were assured that their participation was voluntary, and they had the right to withdraw from the study at any stage without any consequences on their treatment.

Data Analysis

Data was analyzed using SPSS version 17. Frequencies and percentages were calculated for gender, number of lesions, lesion presentation, past tuberculosis history, Mantoux test results, and presence of different clinico-pathological variants of CTB. Mean and standard deviation were determined for age and duration of symptoms. To control the effect of confounding variables, stratification was performed for age, gender, lesion presentation, and symptom duration. Post-stratification, a Chi-square test was applied to assess statistical significance, with a p-value ≤ 0.05 considered significant.

RESULTS

A total of 50 patients with cutaneous tuberculosis were selected to conduct this study. Table 1 presents the demographic and clinical characteristics of the study population. The mean age of the participants was 42.9 ± 12.6 years, with an average duration of symptoms of 37.6 ± 11.9 days. The mean number of lesions observed was 6.2 ± 3.2. The gender distribution was equal, with 50% males and 50% females. The majority of participants were married (74%), and a significant proportion was either government employees or unemployed (60%). Clinically 52% presented with plaque, sinuses, or scarring while 48% had papules, nodules, or ulcers. A positive family history of tuberculosis (TB) was found in 38% of cases, whereas 26% had a past history of TB. Pulmonary or extrapulmonary TB was observed in 24% of cases, and

22% had a history of trauma, with 18% reporting trauma to the head, trunk, or limbs.

Table 1

Summary of Demographic and Clinical Characteristics (n=50)

Variable	Categories/Statistics	n (%)
Age (Years)	Mean ± SD	42.9 ± 12.6
Duration of Symptoms (Days)	Mean ± SD	37.6 ± 11.9
Number of Lesions	Mean ± SD	6.2 ± 3.2
Gender	Male	25 (50%)
	Female	25 (50%)
Marital Status	Single	13 (26%)
	Married	37 (74%)
Occupation	Farmer/Businessman	20 (40%)
	Govt. Employee/Unemployed	30 (60%)
Clinical Presentation	Papule/Nodule/Ulcer	24 (48%)
	Plaque/Sinuses/Scarring	26 (52%)
Family History of TB	Yes	19 (38%)
Past History of TB	Yes	13 (26%)
Type of TB (if any)	Pulmonary/Extrapulmonary	12 (24%)
History of Trauma	Yes	11 (22%)
Trauma Site (if any)	Head/Trunk/Limbs	9 (18%)

Table 2 provides an overview of the clinical, investigative, and histopathological findings in the study population. The distribution of lesions was categorized into three groups: 1–4 lesions (34%), 5–8 lesions (44%), and more than eight lesions (22%). Lymph node enlargement was observed in 40% of cases, while bone tenderness was present in 22%. Mantoux test results indicated that 44% of participants had a positive result, and another 44% had a strongly positive result. Chest X-ray findings showed that 38% had infiltrates, 26% had lymphadenopathy, and 36% had other findings. The HIV-positive rate was 8%, with 4% having a CD4 count below 200. Tissue culture for acid-fast bacilli (AFB) was positive in 96% of cases, and histopathology revealed granulomas and caseation in 96% of participants. Various clinico-pathological variants were observed, with scrofuloderma (42%) being the most common, followed by lupus vulgaris (26%), warty TB (20%), and tuberculids (12%).

Table 2

Clinical, Investigative, and Histopathological Findings (n=50)

Variable	Categories	n (%)
Age (Years)	Mean ± SD	42.90 ± 12.59
Duration of Symptoms (Days)	Mean ± SD	37.62 ± 11.9
Number of Lesions	1–4 / 5–8 / >8	17 (34%) / 22 (44%) / 11 (22%)
Lymph Node Enlargement	Yes / No	20 (40%) / 30 (60%)
Bone Tenderness	Present / Absent	11 (22%) / 39 (78%)
Mantoux Test	No Induration / Positive / Strongly Positive	6 (12%) / 22 (44%) / 22 (44%)
Chest X-ray Findings	Infiltrates / Lymphadenopathy / Others	19 (38%) / 13 (26%) / 18 (36%)
HIV Status	Positive / Negative	4 (8%) / 46 (92%)
CD4 Count (<200 if HIV+)	<200 / >200	2 (4%) / 2 (4%)
Tissue Culture for AFB	Positive / Negative	48 (96%) / 2 (4%)
Histopathology Findings	Granuloma / Caseation / Bacilli / Chronic Infiltrate / Acute Infiltrate	48 (96%) / 48 (96%) / 31 (62%) / 30 (60%) / 20 (40%)
Clinico-Pathological Variants	Scrofuloderma / Warty TB / Lupus Vulgaris / Tuberculids	21 (42%) / 10 (20%) / 13 (26%) / 6 (12%)

Table 3 examines the distribution of clinico-pathological variants among the study participants. Age was not significantly associated with different variants (p=0.15), while gender distribution remained equal across groups. Marital status showed a significant association (p=0.000), with married individuals more commonly affected. Occupational status was also significant (p=0.006), with a higher prevalence among government employees and the unemployed. The mode of clinical presentation varied, with papules (20%), ulcers (18%), and draining sinuses (30%) being the most common. Other factors, such as the duration of symptoms, family history, and past history of TB, were not significantly associated with specific variants.

Table 3

Clinico-Pathological Variants of Cutaneous Tuberculosis (n=50)

Variable	Scrofuloderma	Warty TB	Lupus Vulgaris	Tuberculids	P-value
Age (Years)	14–40: 23 (46%)	41–65: 27 (54%)	0.15 (NS)		
Gender	Male: 25 (50%)	Female: 25 (50%)	NS		
Marital Status	Married: 37 (74%)	Single: 13 (26%)	0.000 (Sig.)		
Occupation	Farmers: 10 (20%)	Businessmen: 10 (20%)	Govt. Employees: 15 (30%)	Unemployed: 15 (30%)	0.006 (Sig.)
Presentation	Papule: 10 (20%)	Ulcer: 9 (18%)	Draining Sinuses: 15 (30%)	Others: 16 (32%)	0.294 (NS)
Duration of Symptoms	≤30 Days: 21 (42%)	31–60 Days: 29 (58%)	0.492 (NS)		
Family History of TB	Yes: 19 (38%)	No: 31 (62%)	0.296 (NS)		
Past History of TB	Yes: 13 (26%)	No: 37 (74%)	0.258 (NS)		

Table 4 provides a comparative analysis of various factors associated with different cutaneous TB variants. Pulmonary TB was more frequently observed in scrofuloderma (8%) and lupus vulgaris (6%), while extrapulmonary TB was more prevalent in warty TB (6%). A history of trauma was reported in 22% of cases, with no significant differences between the variants. The number of lesions was highest in patients with lupus vulgaris, where 10% had more than eight lesions. Lymph node enlargement was seen in 40% of cases, while bone

tenderness was present in 22%. The Mantoux test was strongly positive in 44% of cases, with infiltrates being the most common chest X-ray finding (38%).

Table 4
Clinico-Pathological Variants of Cutaneous Tuberculosis (n=50)

Factor	Scrofuloderma (42%)	Warty TB (20%)	Lupus Vulgaris (26%)	Tuberculids (12%)	Total (%)	P-value
Type of TB	Pulmonary: 4 (8%)	0 (0%)	3 (6%)	0 (0%)	7 (14%)	0.304
	Extrapulmonary: 1 (2%)	3 (6%)	1 (2%)	0 (0%)	5 (10%)	
	No TB: 16 (32%)	7 (14%)	9 (18%)	6 (12%)	38 (76%)	
History of Trauma	Yes: 4 (8%)	3 (6%)	2 (4%)	2 (4%)	11 (22%)	0.159
	No: 17 (34%)	7 (14%)	11 (22%)	4 (8%)	39 (78%)	
Trauma Site	Head & Neck: 1 (2%)	1 (2%)	0 (0%)	0 (0%)	2 (4%)	0.237
	Trunk: 1 (2%)	1 (2%)	0 (0%)	0 (0%)	2 (4%)	
	Upper Limb: 1 (2%)	0 (0%)	2 (4%)	1 (2%)	4 (8%)	
	Lower Limb: 1 (2%)	1 (2%)	0 (0%)	1 (2%)	3 (6%)	
Number of Lesions	1-4: 9 (18%)	2 (4%)	2 (4%)	4 (8%)	17 (34%)	0.556
	5-8: 9 (18%)	5 (10%)	6 (12%)	2 (4%)	22 (44%)	
	>8: 3 (6%)	3 (6%)	5 (10%)	0 (0%)	11 (22%)	
Lymph Node Enlargement	7 (14%)	3 (6%)	6 (12%)	4 (8%)	20 (40%)	0.236
Bone Tenderness	Present: 5 (10%)	1 (2%)	4 (8%)	1 (2%)	11 (22%)	0.177
	Absent: 16 (32%)	9 (18%)	9 (18%)	5 (10%)	39 (78%)	
Mantoux Test	No Induration: 2 (4%)	1 (2%)	1 (2%)	2 (4%)	6 (12%)	0.236
	Positive: 11 (22%)	3 (6%)	7 (14%)	1 (2%)	22 (44%)	
	Strongly Positive: 8 (16%)	6 (12%)	5 (10%)	3 (6%)	22 (44%)	
Chest X-ray Findings	Infiltrates: 8 (16%)	4 (8%)	5 (10%)	2 (4%)	19 (38%)	0.152
	Lymphadenopathy: 5 (10%)	2 (4%)	3 (6%)	3 (6%)	13 (26%)	
	Other Findings: 8 (16%)	4 (8%)	5 (10%)	1 (2%)	18 (36%)	

Table 5 summarizes the clinico-pathological findings among patients with cutaneous TB. HIV positivity was noted in 8% of cases, with only one participant having a CD4 count below 200. AFB positivity was remarkably high, with 96% of cases testing positive. Granulomas were observed in 96% of cases, while bacilli were present in 62%. Acute inflammatory infiltrates were seen in 40% of patients. Although variations in these findings were observed across the different clinico-pathological variants, no statistically significant associations were found between them and specific forms of cutaneous TB.

Table 5
Clinico-Pathological Findings in Cutaneous Tuberculosis (n=50)

Factor	Scrofuloderma (42%)	Warty TB (20%)	Lupus Vulgaris (26%)	Tuberculids (12%)	Total (%)	P-value
HIV Positive (8%)	1 (2%)	1 (2%)	2 (4%)	0 (0%)	4 (8%)	0.192
CD4 <200 (2%)	0 (0%)	0 (0%)	1 (2%)	0 (0%)	1 (2%)	0.274
AFB Positive (96%)	21 (42%)	10 (20%)	11 (22%)	6 (12%)	48 (96%)	0.244
Granuloma Present (96%)	20 (40%)	9 (18%)	13 (26%)	6 (12%)	48 (96%)	0.188
Bacilli Present (62%)	13 (26%)	7 (14%)	8 (16%)	3 (6%)	31 (62%)	0.133
Acute Infiltrate (40%)	7 (14%)	4 (8%)	6 (12%)	3 (6%)	20 (40%)	0.130

DISCUSSION

The findings of this study provide valuable insights into the demographic, clinical, and pathological characteristics of cutaneous tuberculosis. The mean age of patients was 42.9 years, with an equal gender distribution. Most patients presented with chronic symptoms, with a mean duration of 37.6 days. There were several varieties in clinical and pathological aspects. Scrofuloderma was the most often occurring; lupus vulgaris came second, then warty tuberculosis and tuberculids. Many of the patients showed positive Mantoux tests, tissue cultures for acid-fast bacilli (AFB), and histological features of granulomas and caseation necrosis, according to the researchers. Forty percent of patients also experienced swollen lymph nodes and twenty-two percent experienced sore bones.

This study's demographic distribution conforms to other studies demonstrating that CTB predominantly affects middle-aged persons, with no evident gender preference when compared to other studies [12, 13]. Although the duration of the symptoms was somewhat less than what has been recorded in other investigations, it was nevertheless the same amount of time as in others, indicating that the condition is chronic [14]. The prevalence of scrofuloderma as the most common variant is in agreement with several studies, though variations exist based on geographic and epidemiological factors [15, 16]. The frequency of positive Mantoux tests and AFB cultures was comparable to prior findings, supporting the notion that these tests remain crucial for diagnosis [17]. However, the presence of histopathological features such as

granulomas and caseation were found at a slightly higher rate in this study, possibly due to variations in patient selection criteria and diagnostic protocols [18].

Limitations and future suggestions

Despite the valuable insights, this study has several limitations. The relatively small sample size may limit the generalizability of findings. Additionally, the study was conducted in a single institution, which may not fully represent the broader population. The lack of molecular diagnostic confirmation could also be considered a limitation. Future research should focus on larger multicenter studies incorporating advanced diagnostic techniques, such as polymerase chain reaction (PCR) and genetic profiling, to enhance diagnostic accuracy. Additionally, long-term follow-up studies are needed to evaluate treatment responses and recurrence rates among different CTB variants.

CONCLUSION

Our study highlights Scrofuloderma as the most prevalent clinicopathological variant of cutaneous tuberculosis in our setting, followed by lupus vulgaris, warty tuberculosis (TVC), and tuberculids. Given that cutaneous tuberculosis can coexist with internal organ involvement, a thorough systemic evaluation is crucial for timely diagnosis and management. Clinicopathologic correlation remains essential in confirming the diagnosis and guiding appropriate treatment strategies.

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