



Original Article

Cutaneous Tuberculosis: A Clinicopathological Study in A Tertiary Care Hospital

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ABSTRACT

Tuberculosis (TB) is a chronic disease that can affect multiple organs including, the skin. Cutaneous TB poses a great challenge to dermatologists due to its varied clinical presentations and non-specific histopathological findings. **Objective:** To determine the frequency of clinicopathological patterns of Cutaneous Tuberculosis in children and adults in a Tertiary Care Hospital. **Methods:** A descriptive cross-sectional study included 63 patients diagnosed with Cutaneous TB at the Department of Dermatology, Dr. Ruth KM Pfau Civil Hospital, Karachi, Pakistan from January 2020 to December 2022. All the patients were clinically evaluated and histopathological features were recorded. **Results:** The common age group was 21-30 years, with male predominance. Lupus Vulgaris was the most common clinicopathological type in 46 cases (73%), followed by Scrofuloderma in 9 cases (14.3%). Tuberculous Verrucosa cutis and Tuberculous Gumma accounted for 4.8% of cases, while Acute Military Tuberculosis and Tuberculous Panniculitis accounted for 1.6% of cases. The most predominant morphology of the lesion was Erythematous Plaque (36.5%) and the most commonly affected site was face (30.2%). Epitheloid Granuloma with langerhans giant cells were typically present in most of the cases, with Caseous Necrosis more predominantly seen in Scrofuloderma (44.4%), TB Gumma (66.6%) and Acute Military TB (100%). **Conclusions:** Lupus Vulgaris is the most common presentation of Cutaneous TB followed by Scrofuloderma. Epitheloid Granuloma with langerhans giant cells, with or without Caseous Necrosis is the predominant histopathological presentation. Clinical and histopathological assessment is crucial for an appropriate diagnosis.

INTRODUCTION

Tuberculosis stands the second most common cause of death from infectious diseases, leading to death of nearly 2 million people annually [1]. Every year approximately 8 million new T.B cases are reported, with 80% affecting young and middle-age adults. This not only impacts the productive economies of nations but also significantly influences the quality of life for individuals [1, 2]. In 2020, thirty countries accounted for about 86% of the new T.B cases. Amongst these, eight countries reported the highest number of cases. India tops the list followed by Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh and South Africa. Collectively, these countries contribute to half of the global disease burden and exhibit highest morbidity and mortality rates [3]. Extrapulmonary Tuberculosis (EPTB) is one of the major causes of morbidity and mortality in both under-developed and emerging

nations, comprising about 20-30% of all active TB cases [4, 5]. It can occur in organ systems other than the lungs and spreads hematogenously. Cutaneous TB constitutes 1.5% of all cases of Extrapulmonary Tuberculosis caused by Mycobacterium Tuberculosis but Mycobacterium Bovis and rarely bacilli Calmette-Guerin (BCG) are sometimes involved [6]. This disease exhibits varied clinical presentations influenced by factors such as the route of infection (endogenous or exogenous) and cellular immune status of the host. Cutaneous lesions manifest in various forms, including papules, plaques, nodules, ulcers, hypertrophic and verrucous lesions [7]. According to the recent classification, TB has been categorized into paucibacillary forms (few mycobacteria, difficult to isolate, like Lupus Vulgaris, Tuberculosis Verrucosa Cutis) and multibacillary forms (numerous mycobacteria, like

Scrofuloderma, Tuberculous Chancre, Acute Miliary Tuberculosis) [8]. The diagnosis of cutaneous TB is established based on clinical features and confirmed through histopathology and culture with or without molecular testing. A comprehensive assessment of systemic involvement is essential in every instance [9].

The objective of the study was to identify the different clinical patterns of cutaneous TB that are histopathologically confirmed in skin biopsy specimens.

METHODS

A descriptive cross sectional study, that included 63 patients of Cutaneous Tuberculosis. This study was conducted at the Department of Dermatology, Dr. Ruth KM Pfau Civil Hospital, Karachi, Pakistan from January 2020 to December 2022. The study included patients newly diagnosed with Cutaneous Tuberculosis, irrespective of gender and age. While patients with incomplete or missing clinical or pathological data related to Cutaneous TB, or who had a previous diagnosis/treatment for Cutaneous TB were excluded from the study. The sample size was calculated by taking estimated frequency of Tuberculosis Gumma 8.23% and desired margin of error 7% [10]. Permission from the ethical committee of our institute, Dow University of Health Sciences (IRB-3435/DUHS/EXEMPTION/2024/96, Dated; 28 March 2024) was taken and consent was obtained from all patients included in the study. All the patients underwent a detailed clinical history, local lesion assessment, physical and systemic assessments, and a series of diagnostic tests including hematological tests, chest X-ray, sputum culture (for those exhibiting positive chest symptoms). Additionally, Mantoux test and HIV testing by ELISA method were performed. Biopsies were conducted in all clinically suspected cases, with formalin-fixed tissues were processed and stained with hematoxylin and eosin stain, as well as Ziehl-Neelsen stain. Determination of clinicopathological type of Cutaneous TB was the main study objective. Data were analyzed using SPSS version 23.0.

RESULTS

Total 63 cases of Cutaneous TB were clinically diagnosed and subsequently confirmed through histopathology. Of these cases, 32 (50.8%) were male and 31 (49.2%) were female, out of which 11 (17.4%) were children. The age range was 6-70 years, with the most predominant age group being 21-30 years in 31.7% of cases. Upon evaluating the patient's history, family history was present in 9 (14.3%) cases, trauma history in 16 (25.4%) cases, fever was documented in 9 (14.3%) cases, weight loss in 6 (9.5%) cases, and lymphadenopathy in 16 (25.4%) cases. Additionally, 5 (7.9%) patients had a history of Pulmonary Tuberculosis, and Pott's Disease was present in only 1 (1.6%) patient (Table 1).

Table 1: Age-Wise Distribution of Cases (n=63)

Age Group (Years)	Frequency (%)
0-10	7 (11.1%)
11-20	15 (23.8%)
21-30	20 (31.7%)
31-40	7 (11.1%)
41-50	6 (9.5%)
51-60	5 (7.9%)
61-70	3 (4.8%)

The majority of patients presented with a single lesion, observed in 35 (55.6%) cases. In the overall cases, 23 cases (36.5%) had erythematous plaques, 19 cases (30.2%) had ulcerated plaques and 7 cases (11.1%) had draining sinuses. Hyperkeratotic plaques were seen in 6 cases (9.5%), nodules in 4 (6.3%) cases, and abscesses in 4 cases (6.3%). The most common site involved was the face (30.2%) followed by the foot (25.4%). The most common site involved was the face (30.2%) followed by the foot (25.4%). Less common sites included the forearm/arm and neck (11.1% each), as well as the gluteal/perineal region and abdomen (4.8% each). Knee injuries represented (3.2%), while the axilla was the least common site at (1.6%). (Figure 1).

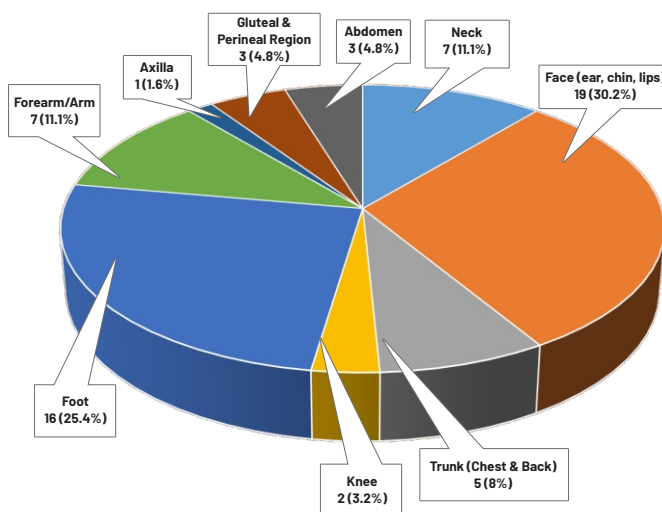


Figure 1: Site of Involvement in Cutaneous Tuberculosis. (n=63)

Lupus Vulgaris was the most common type of Cutaneous TB, observed in 46 patients (73%), and followed by Scrofuloderma in 9 cases (14.3%). Tuberculous Verrucosa Cutis and Tuberculous Gumma were each observed in 3 cases (4.8%), while Acute Miliary Tuberculosis and Tuberculous Panniculitis were diagnosed in 1 case (1.6%) each. Out of 11 cases of Cutaneous TB in children, 8 cases (72.7%) were Lupus Vulgaris, 2 cases (18.2%) were of Scrofuloderma, and 1 case (9.1%) of Tuberculous Verrucosa Cutis (Figure 2).

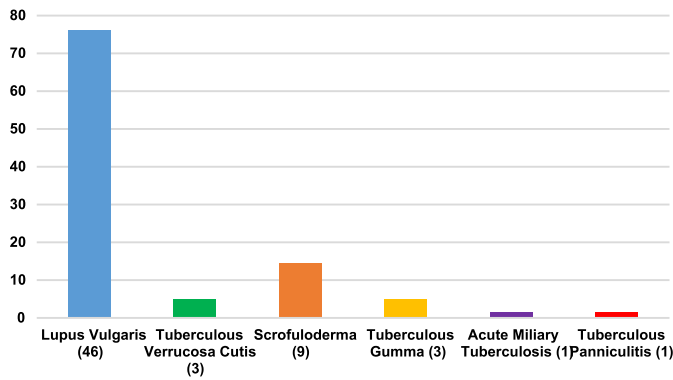


Figure 2: Distribution of Different Clinicopathological Subtypes of Cutaneous Tuberculosis. (n=63)

Lupus Vulgaris was the most common variant of our study followed by Scrofuloderma. Other less common variants were Tuberculous Verrucosa Cutis (TVC), Tuberculous Gumma, Acute Miliary Tuberculosis, and Tuberculous Panniculitis. In Lupus Vulgaris, the face (19/46, 41.3%) was

Table 2: Distribution of Demographic, Clinical, and Histopathological Findings According to the Cutaneous Tuberculosis Clinicopathological Subtypes

Features	Lupus Vulgaris n (%)	Scrofuloderma n (%)	Tuberculous Verrucosa Cutis n (%)	TB Gumma n (%)	Acute Miliary TB n (%)	TB Panniculitis n (%)
Number of Cases	46(73%)	9(14.3%)	3(4.8%)	3(4.8%)	1(1.6%)	1(1.6%)
Male	26	3	2	1	-	-
Female	20	-	7	2	1	1
Most Common Lesion Observed	Erythematous plaque	Draining sinus	Hyperkeratotic plaque	Nodule	Ulcerated plaque	Draining sinus
Most Common Site Involved	Face 41.3%	Neck 66.6%	Foot 66.6%	-	-	-
Epidermis						
Intact	27(58.7%)	4(44.4%)	-	-	1(100%)	1(100%)
Focal Ulceration	8(17.4%)	4(44.4%)	-	-	-	-
Pseudoepitheliomatous Hyperplasia	10(21.7%)	1(11.1%)	3(100%)	3(100%)	-	-
Atrophy	1(2.2%)	-	-	-	-	-
Dermis						
Granuloma Type	Well-formed 58.7%	Well-formed 66.6%	Well-formed 6.6%	Well-formed 66.6%	Well-formed 100%	Ill-defined 100%
Langerhans Giant Cells	37(80.4%)	8(88.8%)	3(100%)	3(100%)	-	1(100%)
Chronic Inflammatory Infiltrate	9(19.6%)	1(11%)	-	-	1(100%)	-
Caseation Necrosis	10(21.8%)	4(44.4%)	1(33.3%)	2(66.6%)	1(100%)	Absent

DISCUSSION

Cutaneous TB is prevalent in Pakistan, but the exact incidence and prevalence remain unknown due to the paucity of literature. However, an older study from Pakistan demonstrated a frequency of 3.69% for cutaneous tuberculosis, as diagnosed by skin biopsies [11]. In our study, 31.7% of patients fell within the second and third decades of life, with a male predominance, aligning with findings in existing literature [12]. Skin trauma due to increased physical activity during younger age and early exposure to active TB cases may underlie this age-related predilection. In our study, the face was the most commonly affected site (30.2%), followed by the foot. Interestingly, these results contrast with studies from India and Indonesia, where the lower limb was frequently involved

the most commonly involved site, while in Scrofuloderma, the neck (6/9, 66.6%) was the predominant site. Among the three cases of Tuberculous Verrucosa cutis, the most frequently observed site was the foot (2/3, 66.6%). On histopathology, all 63 cases (100%) showed epithelioid granulomas surrounded by lymphocytes. Out of these cases, 38 patients (60.3%) exhibited well-formed epithelioid granuloma, whereas 25 patients (39.7%) demonstrated ill-defined epithelioid granuloma. Langerhans giant cells were observed in 52 cases (82.5%), while chronic inflammatory cells in 11 cases (17.5%). Caseous necrosis was absent in 36 cases (78.2%) of Lupus Vulgaris. However, it was present in 18(28.6%) cases out of the total, which included 10(21.8%) cases of Lupus Vulgaris, 4 (44.4%) cases of Scrofuloderma, 2 (66.6%) cases of Tuberculous Gumma, 1 case (33.3%) of Tuberculous Verrucosa cutis, and in all cases (100%) of Acute Miliary Tuberculosis (Table 2).

[13-15]. However, some literature reports indicate the head, neck, and face as common sites [16, 17]. This disparity may stem from variations in the prevalence of different clinical variants of cutaneous TB across diverse regions. In our study, LV emerged as the predominant clinical type in both children and adults, accounting for 73% of the cases, consistent with findings in existing literature [18-20]. Notably, Hammami *et al.*, and Maghwal *et al.*, had previously reported scrofuloderma as the most common type; however, in our observations, it constituted the second most frequent clinical type at 14.3% [12, 21]. In cases of LV among our patients, it typically manifests as an erythematous plaque on the face. Conversely, patients with scrofuloderma exhibited discharging sinuses on the

neck. Diagnosing cutaneous TB is intricate and demands a high index of suspicion. Several concurrent laboratory investigations are often required, encompassing culture, histology, demonstration of acid-fast bacilli (AFB) on stains, a positive tuberculin skin test (TST), evidence of systemic TB, and response to treatment. While a positive culture provides a definite diagnosis, its sensitivity is low due to a paucity of mycobacteria in skin lesions. Furthermore, nonspecific histology presents an additional challenge in rendering a diagnosis [9]. Nonetheless, it remains crucial to employ histopathologic assessment, mycobacterial stains, and culture from skin biopsy samples for the accurate diagnosis of cutaneous TB. The classical histopathological presentation in the current study comprised epithelioid granuloma with Langerhans giant cells. Noteworthy variations in histopathological features were observed among different clinical variants, including the presence or absence of caseous necrosis and the formation of well-formed (tuberculoid) or poorly formed granulomas. In our study, 18 (28.6%) cases exhibited caseous necrosis, with the highest percentages found in scrofuloderma (44.4%), TB gumma (66.6%) and acute military TB (100%). This picture represents low host immunity, particularly in the context of these multibacillary TB types.

CONCLUSIONS

In current study, Lupus vulgaris constituted the majority of cutaneous TB cases, with the face being the most frequent location. The majority of patient fell within 21-30 year age group, with male predominance. Establishing a proper diagnosis necessitates a clinic-histopathological assessment. It is important to examine for concurrent tuberculous infections in other organs since cutaneous TB may be associated. There is an urgent need for additional multi-centered studies to gather comprehensive clinical, epidemiological and histopathological data on cutaneous tuberculosis in Pakistan.

Authors Contribution

Conceptualization: HU, NR

Methodology: HU, NR

Formal analysis: HU, NR, WS, BUR, RM

Writing-review and editing: HU, NR, WS, BUR, RM, ZS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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REFERENCES

- [1] Jilani TN, Avula A et al. Active Tuberculosis. In: StatPearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2024.
- [2] Netikul T, Palittapongarnpim P, Thawornwattana Y, Plitphongaphim S. Estimation of the global burden of Mycobacterium tuberculosis lineage 1. *Infection, Genetics and Evolution*. 2021 Jul; 91: 104802. doi: 10.1016/j.meegid.2021.104802.
- [3] Chakaya J, Khan M, Ntoumi F, Aklillu E, Fatima R, Mwaba P et al. Global Tuberculosis Report 2020—Reflections on the Global TB burden, treatment and prevention efforts. *International Journal of Infectious Diseases*. 2021 Dec; 113: S7-12. doi: 10.1016/j.ijid.2021.02.107.
- [4] Gopalswamy R, Dusthacker VA, Kannayan S, Subbian S. Extrapulmonary tuberculosis—an update on the diagnosis, treatment and drug resistance. *Journal of Respiration*. 2021 May; 1(2): 141-64. doi: 10.3390/jor1020015.
- [5] Tahseen S, Khanzada FM, Baloch AQ, Abbas Q, Bhutto MM, Alizai AW et al. Extrapulmonary tuberculosis in Pakistan—A nation-wide multicenter retrospective study. *PLoS One*. 2020 Apr 28; 15(4): e0232134. doi: 10.1371/journal.pone.0232134.
- [6] Brito AC, Oliveira CM, Unger DA, Bittencourt MD. Cutaneous tuberculosis: epidemiological, clinical, diagnostic and therapeutic update. *Anais Brasileiros de Dermatologia*. 2022 Apr; 97: 129-44. doi: 10.1016/j.abd.2021.07.004.
- [7] Nguyen KH, Alcantara CA, Glassman I, May N, Mundra A, Mukundan A et al. Cutaneous Manifestations of Mycobacterium tuberculosis: a literature review. *Pathogens*. 2023 Jul; 12(7): 920. doi: 10.3390/pathogens12070920.
- [8] Roelan T. Practical Review of diagnosis and management of cutaneous tuberculosis in Indonesia. *European Journal of Medical and Health Sciences*. 2021 Sep; 3(5): 25-30. doi: 10.24018/ejmed.2021.3.5.1042.
- [9] Kaul S, Jakhar D, Mehta S, Singal A. Cutaneous tuberculosis. Part II: Complications, diagnostic workup, histopathologic features, and treatment. *Journal of the American Academy of Dermatology*. 2023 Dec; 89(6): 1107-19. doi: 10.1016/j.jaad.2021.12.064.
- [10] Sharquie KE and Jabbar RI. The picture of cutaneous tuberculosis today: New diverse clinical manifestations in the absence of the old lupus vulgaris in a series of 72 patients. *Journal of Pakistan Association of Dermatologists*. 2023 Mar; 33(1): 9-17.
- [11] Zafar MN, Memon MA, Agha MA, Agha SA, Hashim Y, Mirza T et al. Pattern of cutaneous tuberculosis as

- identified by morphological study of skin lesions at Jinnah postgraduate medical center, Karachi. *Gomal Journal of Medical Sciences*. 2010; 8(1).
- [12] Maghwal N, Jain VK, Chouhan C, Rao P, Choudhary P. A clinicopathological pattern of cutaneous tuberculosis and HIV concurrence in western Rajasthan. *The International Journal of Mycobacteriology*. 2020 Oct; 9(4): 429-34. doi: 10.4103/ijmy.ijmy_183_20.
- [13] Sediadini A, Gunawan H, Hidayah RM. Clinicodemographic and Laboratory Characteristics of Cutaneous Tuberculosis at Tertiary Referral Hospital in West Java, Indonesia. *Journal of General-Procedural Dermatology & Venereology Indonesia*. 2022; 6(2): 2. doi: 10.7454/jdvi.v6i2.1001.
- [14] Ramya DN, Kumar VK, Kumari AV, Sreedevi L, Begum J. A Clinico-Epidemiological Study on Cutaneous Tuberculosis in a Tertiary Care Hospital in the Era of Decreased Incidence. *European Journal of Cardiovascular Medicine*. 2024 Jan; 14(1).
- [15] Patil SB, Dhage SM, Kangate SV, Umap PS, Khan S, Rudra P. Clinico-Histological Correlation of Cutaneous Tuberculosis–A Two Years Study of a Rare Dermatological Lesion. 2020 May; 11(5): 38605-38608. doi:
- [16] Supekar BB, Wankhade VH, Singh RP, Ghanate TD, Bhat D. Clinical spectrum of cutaneous tuberculosis in Central India: A retrospective study. *Indian Dermatology Online Journal*. 2021 Nov; 12(6): 826-33.
- [17] Parajuli N, Karki A, Dhungana A. Cutaneous Tuberculosis among Patients Presenting to Dermatology Outpatient Department of a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA: Journal of the Nepal Medical Association*. 2023 Jan; 61(257): 1. doi: 10.31729/jnma.7930.
- [18] Brito AC, Oliveira CM, Unger DA, Bittencourt MD. Cutaneous tuberculosis: epidemiological, clinical, diagnostic and therapeutic update. *Anais Brasileiros de Dermatologia*. 2022 Apr; 97: 129-44. doi: 10.1016/j.abd.2021.07.004.
- [19] Singal A, Kaur I, Jakhar D, Pandhi D, Grover C, Gandhi V. Clinicoepidemiological characteristics of cutaneous tuberculosis in 1458 Indian patients: a retrospective analytical study from a tertiary care center. *International Journal of Dermatology*. 2022 Aug; 61(8): 1012-22. doi: 10.1111/ijd.16267.
- [20] Saha PK and Prakash KS. Clinical profile of cutaneous tuberculosis in a tertiary care teaching hospital in Eastern Bihar. *International Journal of Contemporary Medical Research*. 2020; 7(4): 1-3. doi: 10.21276/ijcmr.2020.7.4.25.
- [21] Hammami F, Koubaa M, Rekik K, Smaoui F, Marrakchi C, Jemaa MB. Cutaneous tuberculosis in Southern Tunisia: clinical and therapeutic particularities. *Sri Lankan Journal of Infectious Diseases*. 2022 Mar; 12(1). doi: 10.4038/sljid.v12i1.8426.