

Clinical Spectrum of Cutaneous Tuberculosis in Central India: A Retrospective Study

Abstract

Introduction: Extrapulmonary tuberculosis (EPTB) is a significant health problem in both developing and developed countries. In India, cutaneous TB constitutes about 0.1% to 2% of the total skin diseases attending outpatients. **Aim and objectives:** To study the clinical spectrum and therapeutic outcome in cutaneous TB. **Material and Methods:** Medical records of diagnosed cases of cutaneous TB from June 2015 to June 2018 were analyzed retrospectively with respect to epidemiology, clinical features, investigations, and treatment outcome. Statistical analysis was done using mean, median, and proportion. **Results:** Fifty-two patients with cutaneous TB were recruited. Females (61.53%) outnumbered males. The most common age group affected was 21–30 years (32.69%) followed by 41–50 years (30%). Lupus vulgaris was the most common clinical type with head and neck being the most common site of involvement. Mantoux positivity was reported in 67.30% of patients while raised ESR in 71.15% of patients. Two patients had serology positive for HIV. Conclusive evidence of TB on histopathology was reported in 86.53%. Excellent response was observed in cases of lupus vulgaris, scrofuloderma, and tuberculosis verrucosa cutis. **Conclusion:** This retrospective analysis emphasizes the importance of clinicopathological correlation and therapeutic response in cutaneous TB. Although positive results of ESR, Mantoux reactivity, and TB cultures facilitate the clinical diagnosis, negative results should not exclude the diagnosis of cutaneous TB. This prominent case detection in the era of the Revised National TB Control Programme, in short period of time signifies health burden of cutaneous TB in this part of Maharashtra.

Keywords: Central India, cutaneous tuberculosis, multifocal lesions, sporotrichoid pattern

Introduction

India has a high incidence of tuberculosis (TB) with 40% of population being infected with *Mycobacterium tuberculosis*. Pulmonary TB is the most common form of TB, that being infectious, attracts global attention for its adequate control. In the latter half of the 20th century, TB burden showed a declining trend with the advent of effective chemotherapy and improvement in living standards.^[1]

Extrapulmonary tuberculosis (EPTB) is a significant health problem in both developing and developed countries and prevalence of disease in India accounts for 8.3% to 13.1%^[2,3] The infective mechanisms of cutaneous tuberculosis are direct inoculation, local invasion, or hematogenous dissemination, and these infections are classified as multibacillary and paucibacillary.^[4] Cutaneous TB

presents with varied clinical presentations ranging from papules, nodules, ulcers, and papillomatous lesions depending on the route of entry of the bacilli and immune status of the host.^[5] Various classification systems have been proposed for cutaneous TB such as Tappeiner and Wolff, Ridley Jopling like and Beyt *et al.* The most widely accepted is by Beyt *et al.*^[6] Lupus vulgaris (LV) is the most common clinical type of cutaneous TB in adults and scrofuloderma is the most common type seen in children.^[7-9] Another system of classification was designed to include further distinction based on bacterial load. This system is similar to Ridley and Jopling's description of *Mycobacterium leprae* in Hansen's disease. In the multibacillary forms, a plethora of mycobacteria can easily be identified on histological examination utilizing the Ziehl-Neelsen staining (AFB) method and culture. In the paucibacillary forms, sparse bacilli are seen on histological

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examination and culture isolation of mycobacteria is the exception rather than the rule.^[10]

Material and Methods

It was a retrospective analysis of all clinical and/or histopathologically diagnosed cases of cutaneous TB from the period June 2015 to June 2018. Institutional ethical committee clearance was taken. (No. 1592EC/Pharmac/GMC/NGP dated 18/9/2018) Case records of all patients were analyzed with respect to age, gender, site of involvement, clinical presentation, and bone involvement. Clinical details were reviewed for the duration of lesions, site, morphology, progression, and lymphadenopathy. Detailed general and systemic examination were done in all cases. The basis of diagnosis was clinical, histopathological, and microbiological. Patients were classified based on Beyt's classification system. All investigation details including haemogram, erythrocyte sedimentation rate (ESR), Mantoux test, Chest, and local X-ray, HIV screening (ELISA), Fine-needle aspiration cytology, sputum smear examination, histopathology were retrieved. All clinical and histopathological images were retrieved. All cases were treated with standard treatment protocol as per the Revised National TB Control Programme (RNTCP) according to age and weight bands. Up to year 2017, 25 cases were treated as per category III (intensive phase: 2H₃R₃Z₃ and continuation phase: 4H₃R₃). After 2017, 27 cases with category I (intensive phase: 2H₃R₃Z₃E₃ and continuation phase: 4H₃R₃). The treatment outcome details were also analyzed. Statistical Analysis was done using mean, median and proportion.



Figure 1: (a-d) Sites of involvement of Lupus Vulgaris Face (a), neck (b), hand (c), back (d)

Results

Total 52 patients with cutaneous tuberculosis were enrolled. Females (32, 61.53%) outnumbered males (20, 38.47%) with M: F ratio of 0.55. A maximum number of patients belonged to the age group of 21–30 years (n = 17, 32.69%) followed by the age group of 41–50 years (9, 17.30%). The total number of pediatric patients (below the age of 18 years) was 12. The youngest patient with cutaneous TB reported in our study was 6 years old while the oldest patient was 73 years old with a mean age of 33.05 ± 16.37 years.

The most common clinical type reported was lupus vulgaris (n = 27, 51.92%) followed by scrofuloderma (n = 13, 25%). Out of 12 pediatric patients, lupus vulgaris was found in 7 patients, while scrofuloderma in 3 patients. One case each of Tuberculosis verrucosa cutis (TBVC) and lichen scrofulosorum was reported in less than 18 years of age. The most common site of involvement was head, neck, and face (n = 23, 44.23%) followed by upper limbs (n = 15, 28.84%).

The sites of predilection of lupus vulgaris were face and neck. Other rare sites involved were the lower leg, thigh, abdomen, lower back, and breast [Figure 1a-d]. The neck was the most common site for scrofuloderma [n = 8 out of 13 (61.5%)]. Two cases of scrofuloderma were reported in the axilla, one case each involved the wrist and left breast [Figure 2a-d]. The lower limb was most commonly affected in 6 out of 9 patients with TBVC. The foot was the commonest site of TBVC (4/6). Other sites involved in TBVC were knee, forearm, and hand [Figure 3a-d]. One case each of PNT, lichen scrofulosorum, and erythema induratum of Bazin were reported [Figure 4a-c]. The site of involvement in various clinical presentations is depicted in Table 1. Multifocal involvement was seen in two cases. ESR was raised in 71.15% of patients of total cases, more commonly reported with lupus vulgaris (n = 21,



Figure 2: (a-d) Sites of involvement of scrofuloderma neck (a and b), axilla and forearm (c), axilla (d)

Table 1: Site-wise distribution in various clinical types of cutaneous TB

Site	LV	Scrofuloderma	TBVC	Erythema induratum of Bazin	PNT	Lichen scrofulosorum	Total n=52
Head, Face, Neck	15	8	-	-	-	-	23 (44.23%)
Trunk	3	1	-	-	-	-	4 (7.70%)
Upper Limb	7	4	3	0	1	0	15 (28.84%)
Lower Limb	2	0	6	1	0	1	10 (19.23%)



Figure 3: (a-d) Sites of involvement of TBVC: foot (a), elbow (b), hand (c and d)

77.77% %) followed by scrofuloderma (n = 10, 76.92%). Mantoux positivity was observed in 67.30% patients (n = 35) [Figure 4d and e] of total cases, more commonly with lupus vulgaris (n = 23.85.18%) followed by scrofuloderma (n = 6/13, 46.15%), as depicted in Table 2. Serology for HIV was positive in only 2 patients of scrofuloderma. Systemic tuberculosis was reported in three cases. Two patients had pulmonary TB and one had Pott's spine (Figure 5a and b). Chest X-ray of a patient with scrofuloderma over hand revealed bilateral diffuse nodular interstitial opacities with pleural effusion, probably infective etiology. There was a diminution of these opacities on chest skiagram after treatment with ATT for 9 months [Figure 5c and d]. Local X-ray of left wrist region revealed osteopenia involving carpal bones, lower ends of radius and metacarpals, suggestive of infective etiology which showed significant radiological improvement after 9 months of therapy with ATT [Figure 5e and f]. History of trauma and family history of TB was not reported in our study. Histopathological findings were consistent



Figure 4: (a-e) lichen scrofulosorum over trunk and back (a and b), Erythema induratum involving over left calf region (c), Mantoux positivity (d and e)

with clinical diagnosis of cutaneous tuberculosis in 86.53% (n = 45) patients [Figures 6a-f, 7a-d] although AFB was not detected on histopathology. *M. tuberculosis* was detected by PCR technique in pus discharge of scrofuloderma in two cases whose histopathology was not conclusive. Excellent response was observed in 22 cases of lupus vulgaris, 11 cases of scrofuloderma, and 8 cases of TBVC [Figures 8a-h, 9a-g, and 10a-f].

Discussion

Cutaneous TB is caused by *M. tuberculosis* in the majority of cases and, rarely, by *M. bovis*. It accounts for 0.1–0.9% of the total dermatology out-patients in India. In our study, females outnumbered males with M: F ratio was 0.55, similar to results by Spelta K *et al.*^[11] In India, most of the studies on cutaneous TB have reported males being more commonly affected than females.^[5,12-14] Maximum number of our cases belonged to the second and third decades. This result was consistent with studies conducted by Thakur BK *et al.*,^[12] Aruna C *et al.*,^[13] Punia RS *et al.*,^[14] and Shivanna R *et al.*^[15] However, few studies reported the most commonly affected age group as 41–50 years.^[16,17]

About 23.07% of patients belonged to the pediatric age group. The percentage of pediatric cutaneous TB

Table 2: Comparison of various characteristics with respect to the clinical type of cutaneous TB

	Lupus vulgaris (n=27)	Scrofuloderma (n=13)	TBVC (n=9)	Erythema induratum of Bazin (n=1)	PNT (n=1)	Lichen scrofulosorm (n=1)	Total (52 cases)
Mantoux positivity	23	6	4	1	0	1	35 (67.30%)
Raised ESR	21	10	4	0	1	1	37 (71.15%)
Positive HIV serology	0	2	0	0	0	0	2 (3.84%)
Confirmed Histopathology	24	10	8	1	1	1	45 (86.53%)

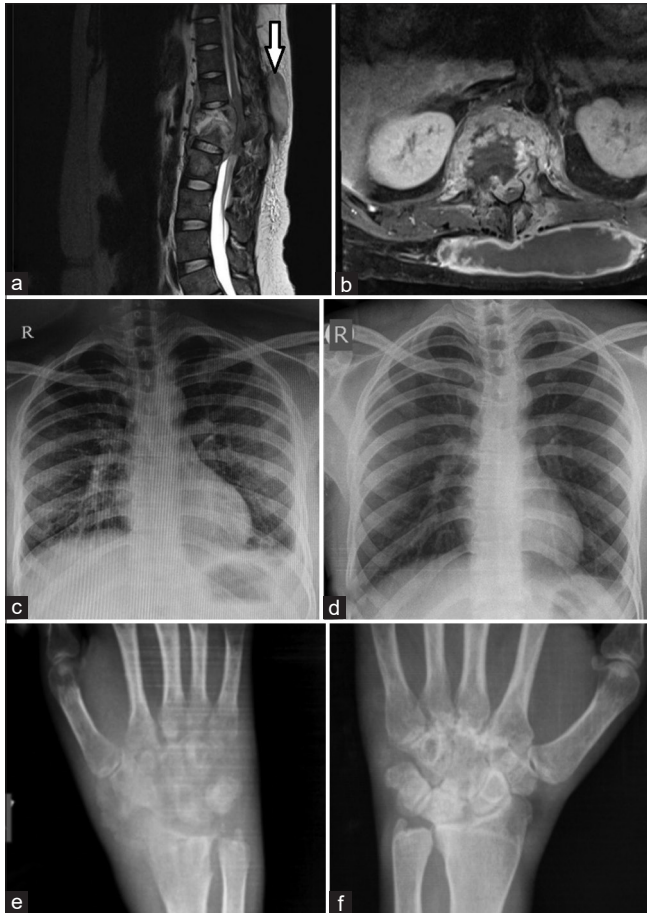


Figure 5: (a-f) Lupus vulgaris over chest with Pott's spine on MRI Spine (7a-b). Chest X-ray of a patient with scrofuloderma over left hand revealed bilateral diffuse nodular interstitial opacities (c) which showed diminution of these opacities (d) and Local X-ray revealed osteopenia involving bones of lower left hand (e), which showed significant radiological improvement after 9 months therapy with ATT (f)

in previous studies from India are 75/402 (18.7%),^[17] 68/142 (47.9%),^[18] and 103/191 (53.9%).^[19] The disparity in definition of “childhood” ranging from <14 years to <19 years might have attributed to the difference in prevalence among these studies.

The most common type reported was lupus vulgaris followed by scrofuloderma in adults and children with head and neck being the most common site of involvement of lupus vulgaris [Table 3]. Other rare sites involved in lupus vulgaris were the trunk, upper, and lower limbs. We also reported multiple lesions in a female child with lupus vulgaris, as described earlier by Sethuraman G *et al.*^[20]

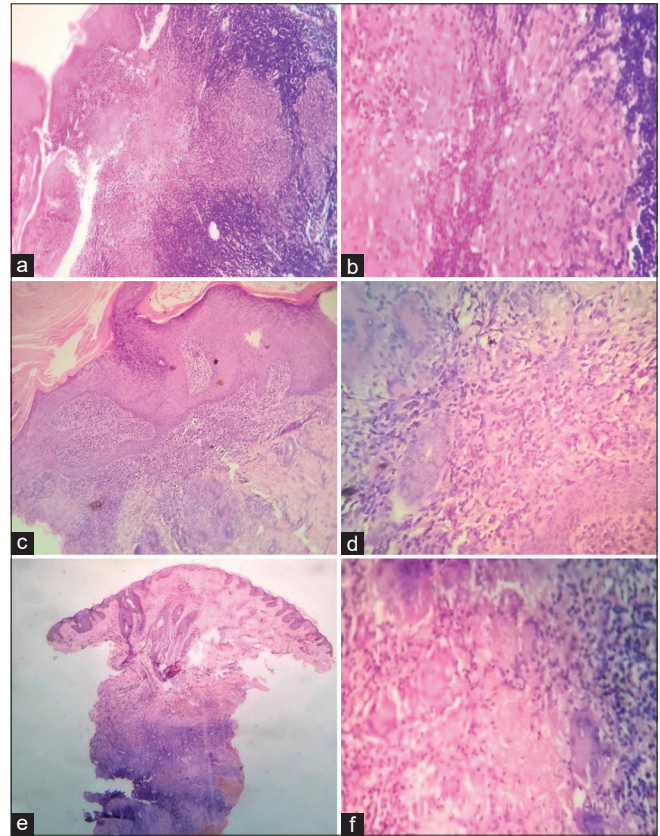


Figure 6: (a-f) Histopathology from plaque over neck revealed thinned out epidermis and multiple tuberculoid granulomas in dermis, suggestive of lupus vulgaris (a and b: H and E 10x, 40x). Histopathology from hyperkeratotic plaque over knee revealed hyperkeratosis with papillomatosis and underlying epithelioid granulomas in dermis, suggestive of TBVC (c and d: H and E 10x, 40x). Histopathology from lesion over neck revealed pseudoepitheliomatous hyperplasia and granulomatous inflammation with Langhans giant cells, suggestive of scrofuloderma. (e and f: H and E 10x, 40x)

Neck was involved in the maximum number of cases with scrofuloderma, as reported in various previous studies [Table 3]. Cervical lymph nodes were the most commonly involved. The habit of drinking unboiled or unpasteurized milk in rural areas may be one of the contributory factors for infection of cervical lymph nodes. Bones, joints, testes, breasts, and lacrimal glands are the other underlying foci of infections leading to scrofuloderma.^[21] One seropositive adult male with scrofuloderma had multifocal lesions.

Four atypical presentations were observed in scrofuloderma as sporotrichoid pattern, multifocal lesions, unusual sites of involvement of breast and hand. Sporotrichoid pattern is a

Table 3: Comparison of various statistics of our study with various Indian and foreign studies

	Aruna C et al. ^[13]	Acharya KM et al. ^[5]	Thakur BK et al. ^[12]	Punia RS et al. ^[14]	Singh EN et al. ^[33]	Shivanna R et al. ^[15]	Ranawaka RR et al. ^[16] (SL)	Spelta K & Diniz M ^[11] (Brazil)	Mathur M & Pandey SN ^[17] (Nepal)
Total patients	25	50	42	50	45	46	20	29	47
Study duration	3.5 yr	44 months	1 yr	7 yr	18 months	11 months		26 yr	4 years
M:F ratio	1.5:1	3:2	1.21:1	1.08	1.6:1	1.19	3:2	0.61	1.5:1
MC age (years)	25 yr	11-20	20-30	20-29	11-30	20-30	40-50	37	41-50
MC clinical type	LV	LV	Scrofulo-derma	LV	LV	LV	LV	EI of Bazin	LV
MC site	Lower limb	Face and neck	Head and neck	Neck	Lower limb and neck	Lower limb	Face	Lower limb	Extremities
Mantoux positivity	84.2%	68%	83.33%	-	66.7%	-	15%	79%	100%
Raised ESR	-	-	-	-	-	-	15%	-	-
HIV positivity	12%	0%	0%	-	-	-	-	14.3%	0%
Chest Xray Findings	4%	-	-	-	12.5%	-	-	-	0%
Conclusive Histopathology	90%	96%	42.2%:Scrofuloderma 72.22%:LV 100%: TBVC, Lichen scrofulosorum	92%	91.1%	89%	10%	51.4%	89%
Treatment Outcome	Effective in majority	-	-	-	-	-	Good	-	-

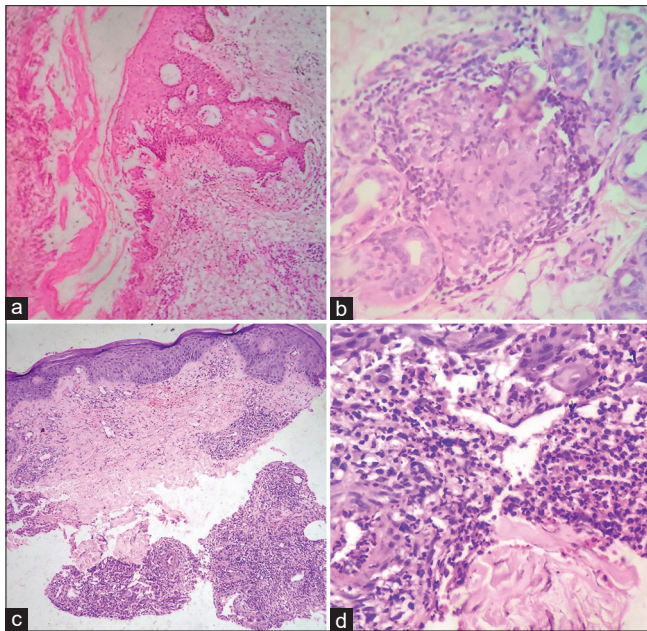


Figure 7: (a-d) Biopsy taken from follicular papule over back revealed periadnexal and perifollicular inflammation including epithelioid cells and occasional giant cells, suggestive of Lichen scrofulosorum (a and b: H and E 10x, 40x) Biopsy taken from lesion over calf revealed inflammation of subcutaneous fat with vasculitis and epithelioid cell granulomas, suggestive of erythema induratum (c and d: H and E 10x, 40x)

rare presentation of cutaneous TB. Lupus vulgaris has been more commonly reported with this pattern in literature.^[22-24] Ramesh V have reported scrofuloderma with sporotrichoid pattern over the upper limb in 20-year-old female.^[25] We reported the same in a middle-aged female with the



Figure 8: (a-h) Complete resolution of lupus vulgaris with mild scarring- cheek (a and b), neck (c and d), pinna (e and f), near eye (g and h)



Figure 9: (a-g) Sites of involvement of scrofuloderma: Right forearm (a), left wrist (b), left breast (c) and complete resolution of lesions over right forearm (d and e), left wrist (f), left breast (g)

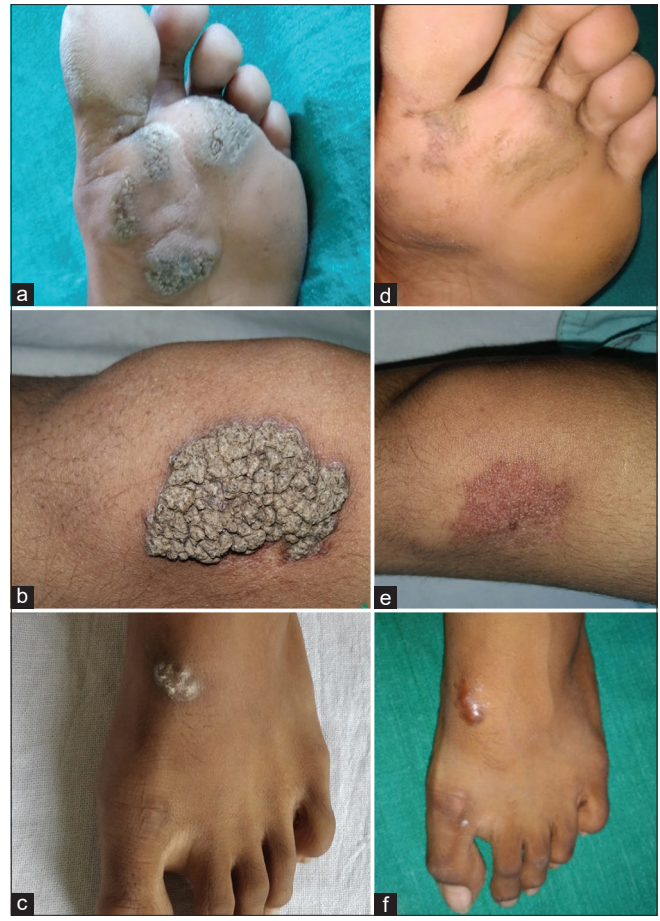


Figure 10: (a-f) Sites of involvement of TBVC: plantar aspect of left foot (a), Right knee (b), Dorsum of right foot (c) and complete resolution of lesions over plantar aspect of left foot (d), Right knee (e), Dorsum of right foot (f)

involvement of the forearm. Breast TB is an uncommon variant reported in the literature by Kao PT *et al.*,^[26] Wani I *et al.*,^[27] and Kar S *et al.*^[28] It has been classified as nodular, disseminated, and abscess variety with discharging sinuses, breast abscess being the most common type of presentation. We had diagnosed breast TB in a young female who presented with indurated swelling with discharging sinuses. The patient with scrofuloderma over hand also had pulmonary tuberculosis. Multifocal lesions of scrofuloderma were observed in a seropositive adult male.

The concomitant involvement of skin and skeletal TB is a very rare condition. Kumar B *et al.*^[7] reported that out of 75 patients of skeletal TB, four had scrofuloderma. We report a case of lupus vulgaris with concomitant skeletal TB in a young female.

In our study, the lower limb was the most common site of involvement of TBVC followed by upper limbs. This result is similar to a study conducted by Thakur BK *et al.*^[12] and Punia RS *et al.*^[14] The lower extremities are most commonly involved due to trauma. The sites of predilection of TBVC were reported as hands in adults and lower extremities in children.^[29]

ESR was raised in 71.15% of patients which is consistent with the study conducted by Varshney A, who reported raised ESR in 73.3% of patients.^[30] Mantoux positivity was reported in 67.30% of patients with lupus vulgaris, TBVC, scrofuloderma [Table 3]. The sensitivity of the Mantoux test for cutaneous TB ranges from 33% to 96% with a cut off of 10 mm. In the study by Ramam M *et al.*, the specificity of Mantoux with a cutoff of 10 mm was found to be 62.5%.^[31] The sensitivity of the Mantoux test varies widely among the different clinical presentations of cutaneous TB.^[32,33] While the Mantoux test is usually negative in tuberculous chancre, miliary TB and TB officialis, strongly reactive Mantoux positivity is usually seen in scrofuloderma, LV, TVC, and the tuberculids. Serology for HIV was positive in 2 patients. Different from other opportunistic illnesses, TB can occur in patients with HIV who have widely varying CD4 counts, from those with preserved immunity to different degrees of cellular immunity impairment. Histopathological findings were consistent with the clinical diagnosis of cutaneous TB in 86.53% of all patients, out of which 88.9% were of lupus vulgaris, 76.3% of scrofuloderma, and 88.9% of TBVC cases [Table 3].

Excellent response was observed in patients with lupus vulgaris, scrofuloderma, and TBVC after treatment with ATT for 6–9 months of duration according to clinical cure. Clinical cure was defined as the absence of active skin lesions. The standard duration of treatment was 6 months; however, if there were signs of clinical activity, the treatment was continued until clinical cure. The extended therapy for 9 months was required in three cases of lupus vulgaris and two cases of scrofuloderma in our study. Because of a lack of resources, IGRA tests and TB culture were not performed in our study. A total of 2419 cases of EPTB (47.84% of total TB cases) were reported during the study period as per data collected from RNTCP district cell, out of which 2.14% cases accounted for cutaneous TB. Up to June 2020, a total of 735 cases of tuberculosis were reported. The prevalence of EPTB and pulmonary TB is 49.38% and 50.61%, respectively.

Conclusion

There was a female preponderance in our study. Lupus vulgaris was the most common clinical type in adults and children. Face and neck was the most common site of involvement in children and adults. Our study also highlights the atypical sites and clinical presentations of cutaneous TB involvement. Excellent response was observed after treatment with ATT in cases with lupus vulgaris, TBVC, Scrofuloderma. This prominent case detection in the era of the Revised National TB Control Programme, in a short period, signifies the health burden of cutaneous TB in this part of Maharashtra. To the best of our knowledge, this is the first study on clinical-epidemiological aspects and treatment outcome of cutaneous TB from the central part of India.

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Conflicts of interest

There are no conflicts of interest.

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