Dermatology Practical & Conceptual

Dermoscopy of the Diverse Spectrum of Cutaneous Tuberculosis in the Skin of Color

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ABSTRACT

Introduction: Cutaneous tuberculosis is an uncommon form of tuberculosis, accounting for 1%-2% of all forms of extra-pulmonary tuberculosis. Knowledge of the dermoscopic characteristics of different clinical types of cutaneous tuberculosis can help timely diagnosis resulting in better outcomes.

Objectives: To characterize the Dermoscopy findings in different clinical types of cutaneous tuberculosis in dark skin phototypes.

Methods: All clinically suspected and biopsy confirmed cases of cutaneous tuberculosis seen from July 2019 through December 2021 were retrospectively recruited. Information including age, gender, disease duration, site and morphology of lesions, and presence of concomitant tuberculosis elsewhere was noted. Two investigators retrospectively reviewed the dermoscopic characteristics of these cases.

Results: Twenty-two patients comprised of 12 women and 10 men met the inclusion criteria. Lupus vulgaris was the commonest presentation of cutaneous tuberculosis seen in 13 patients. Five had scrofuloderma, 2 had tuberculosis verrucosa cutis and 1 patient each had lichen scrofulosorum and papulonecrotic tuberculid. Yellow-orange structureless areas (100%), linear/dot vessels (100%), white scales (92.3%), and white structureless areas (84.6%) were the predominant dermoscopy findings in lupus vulgaris. In scrofuloderma, linear vessels and white structureless areas were visible in all cases. Dirty white scales with a papillated surface were characteristically seen in tuberculosis verrucosa cutis, with 1 of the 2 patients each showing vessels and yellow-orange structureless areas. White globules with surrounding erythema were seen in lichen scrofulosorum and yellow-orange structureless areas with keratin plugs in papulo-necrotic tuberculid.

Conclusions: A thorough understanding of the characteristic dermoscopy of cutaneous tuberculosis can help suspect the diagnosis early resulting in better management opportunity.

Introduction

Dermoscopy is widely used for diagnosing various inflammatory, neoplastic and pigmentary dermatoses. Its utility in suspecting infective as well as granulomatous diseases is progressively established. Cutaneous tuberculosis is an uncommon form of tuberculosis, accounting for 1%-2% of all forms of extra-pulmonary tuberculosis, however the associated morbidity warrants prompt diagnosis and treatment [1]. In India, lupus vulgaris (LV) is the most frequent clinical type reported in adults and scrofuloderma in children [2]. Knowledge of the dermoscopy characteristics of different clinical types of cutaneous tuberculosis can help timely diagnosis resulting in better treatment outcomes.

Objectives

To characterize the Dermoscopy findings in different clinical types of cutaneous tuberculosis in dark skin phototypes. The available literature on the dermoscopy of diverse spectrum of cutaneous tuberculosis is limited; thus, the present study was planned to bridge this knowledge gap.

Methods

All clinically suspected and biopsy confirmed cases of cutaneous tuberculosis seen from July 2019 through December 2021 (2 and a half years) were retrospectively recruited. Detailed information regarding age, gender, disease duration, site and morphology of lesions, and presence of concomitant tuberculosis elsewhere was noted. The final analysis was done only for cases where a skin biopsy was performed and dermoscopy images were available. Dermoscopy was performed in these cases as a routine, and images were captured with iPhone 11 (12-megapixel camera; Apple Inc., Cupertino, California) attached to Dermlite DL200 hybrid (10x magnification, 3Gen, San Juan Capistrano, California). Two investigators (RJ, PC) retrospectively reviewed the dermoscopic characteristics of these cases. The dermoscopy findings were recorded following the standardized terminology according to the International Dermoscopy Society (IDS) consensus document on dermoscopy in general dermatology (3). Statistical analysis was performed using SPSS software (version 22; SPSS Inc.). Categorical variables were expressed as number and percentage, and numerical data were expressed as mean and standard deviation. Being a retrospective study institutional review board approval was not required.

Results

Twenty-two patients with cutaneous tuberculosis, 12 women and 10 men, met the inclusion criteria. LV was the commonest presentation of cutaneous tuberculosis seen in 13 patients. Five had scrofuloderma, 2 had tuberculosis verrucosa cutis (TVC) and 1 patient each had lichen scrofulosorum and papulo-necrotic tuberculid (PNT). The face was the most frequent site involved; 7 patients of LV and 4 of scrofuloderma had facial lesions (Table 1). A primary focus was identified in the patient with PNT; however, no focus could be recognized in the girl with lichen scrofulosorum despite an extensive search. None of the patients with LV, scrofuloderma, and TVC had concomitant tuberculosis elsewhere. Dermoscopy images were evaluated for the diverse morphology of cutaneous tuberculosis (Table 2).

Table 1. Clinical and demographic characteristics of patients with cutaneous tuberculosis.

Type of Cutaneous TB	Number of cases	Male: Female, N	Fitzpatrick skin type, N	Age Mean ± SD (years)	Duration Mean (range), months	Site, N
Lupus vulgaris	13	4:9	III: 3 IV: 5 V: 5	33.7±18.9	11 (2-30)	Face (7) Neck (1) Upper limb (3) Lower limb (2)
Scrofuloderma	5	3:2	III: 1 IV: 2 V:2	33.2±19.8	9.6 (6-12)	Face (4) Neck (1)
Tuberculosis verrucosa cutis	2	2:0	IV:1 V:1	17 and 42 years	24 and 36	Upper limb (2)
Lichen scrofulosorum	1	Female	IV	12 years	9	Trunk & Extremities
Papulonecrotic tuberculid	1	Male	IV	32 years	4	Legs and feet

SD = standard deviation; TB = tuberculosis.

Table 2. Dermoscopic characteristics of diverse morphology of cutaneous tuberculosis.

Dermoscopic characteristics	Number (%)
Lupus vulgaris (N = 13)	
• Yellow orange structureless areas	13 (100)
• Linear vessels with or without branches	11 (84.6)
• Dot vessels	3 (23.1)
• Black dot/ globules	5 (38.5)
• White lines	10 (76.9)
• White structureless areas	11 (84.6)
• Follicular plugging	8 (61.5)
• White scales	12 (92.3)
• Bluish hue	4 (30.8)
• Ulceration	3 (23.1)
• Perilesional white halo	7 (53.8)
Scrofuloderma (N = 5)	
• Yellow orange structureless areas	4 (80)
• Linear vessels with or without branches	5 (100)
• Sero-sanguineous crust	3 (60)
• White structureless areas	5 (100)
• Orange-brown scale	3 (60)
• Ulceration	2 (40)
Tuberculosis verrucosa cutis (N = 2)	
• Dirty white scale with papillated surface	2 (100)
• Dot and linear curved vessels	1 (50)
• Yellow orange structureless area	1 (50)
• Hemorrhagic crust	1 (50)
Lichen scrofulosorum (N = 1)	Single patient
• White globules with surrounding erythema	
• Peripheral pigment network	
• Focal white scale	
Papulonecrotic tuberculid (N = 1)	Single patient
• Yellow-orange structureless area	
• Keratin plug	

Lupus Vulgaris (N = 13)

Eight patients had plaque type of LV and the remaining nodular type. Women (9) outnumber men (4), and the mean age at presentation was 33.7 years. The mean duration of illness was 11 months (range 2-30 months). Yellow-orange structureless areas were consistently visualized in all cases of LV; these represent the epitheloid granulomas seen on histopathology (Figure 1, A-D). Linear vessels with and without branches were appreciated in 11 (84.6%) patients and dot vessels in 3 (23.1%) patients. The focal white scale was another frequent feature seen in 12 (92.3%) lesions. White lines (unspecified) and white structureless areas were seen in 10 (76.9%) and 11 (84.6%) cases, respectively (Figure 1, A, B and D). Follicular plugging was visible dermoscopically in 8 (61.5%), and a peri-lesional halo of hypopigmentation was observed in 7 (73.8%) patients (Figure 1, A and D).

Scrofuloderma (N = 5)

All patients presented with multiple discharging sinuses and scarring. The mean age of patients was 33.2 years, with a mean duration of lesions being 9.6 months (range 6-12 months). The most consistent dermoscopy findings were linear vessels with and without branches (100%), white structureless areas (100%), and yellow-orange structureless areas (80%) (Figure 2, A and B). Sero-sanguineous crust representing the sinuses and orange-brown scales were appreciated in 60% of patients each (Figure 2, A and B).

Tuberculosis Verrucosa Cutis (N = 2)

Tuberculosis verrucosa cutis was the morphology of cutaneous tuberculosis in two men aged 17 and 42 years. One of them had the lesion for 2 years and the other for 3 years. Both dermoscopically showed dirty white thick scales with a papillated surface (Figure 2, C and D). However, only 1 had the presence of dot vessels and curved vessels. Yellow-orange structureless areas were visible in one of the patients.

Lichen Scrofulosorum (N = 1)

The 12-year-old-girl with lichen scrofulosorum presented with multiple grouped skin-colored papules over the trunk and extremities. On dermoscopy, numerous uniform follicular and non-follicular white globules with surrounding erythema and peripheral pigment network were seen (Figure 3A). Some of the white globules had a central black dot. White scales were appreciated focally.

Papulo-necrotic Tuberculid (N = 1)

The patient was a 32-year-old man with a primary focus of tuberculosis in the brain as a tubercular abscess. He presented with multiple purpuric macules and hyperkeratotic papules and plaques over soles. Dermoscopy showed orange-brown structureless areas and keratin plugs (Figure 3. B and C).

Conclusions

The application of dermoscopy for granulomatous diseases is gaining recognition as it gives a swift clue to the diagnosis much before histopathology results are accessible. The most available literature is on dermoscopy of LV, including a significant case series from India of 19 cases [4]. For other clinical types, there are anecdotal reports or small case series. Here we report our experience with dermoscopy of distinctive morphological types of cutaneous tuberculosis seen over a 2 and a half year period. A total of 22 patients with a confirmed diagnosis of tuberculosis were seen over the study

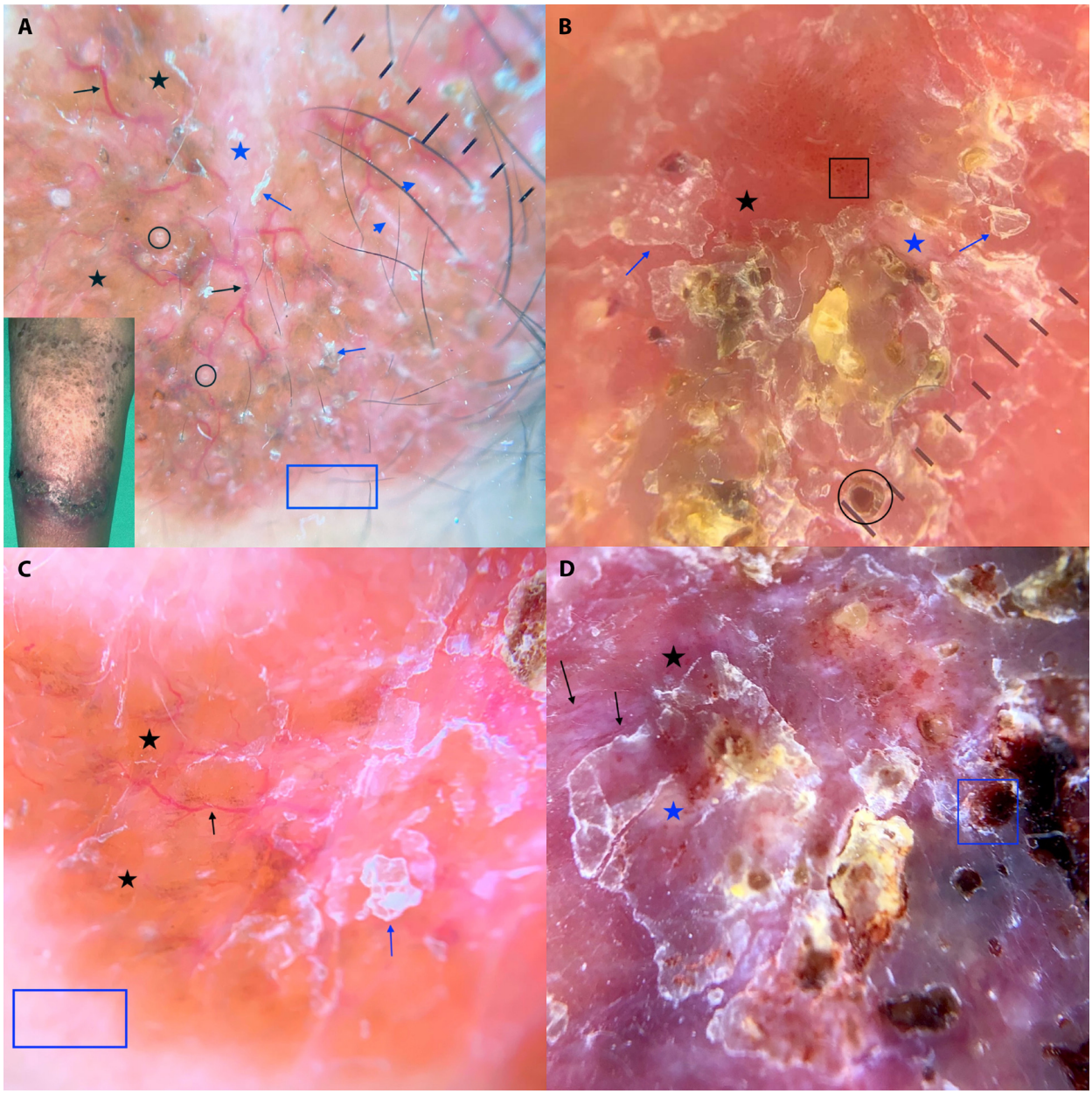

Figure 1. (A-D) Dermoscopy of lupus vulgaris showing yellow-orange structureless areas (black star), linear vessels with and without branches (black arrow), white structureless areas (blue star) and lines (blue arrowheads), follicular plugging (black circle), white scales (blue arrow), dot vessels (black square) and peri-lesional halo (blue rectangle). (A, inset) A well-defined plaque with atrophy and an advancing erythematous margin

period. LV was the most typical clinical type encountered, followed by scrofuloderma.

The hallmark of granulomatous disorders is yellow-orange structureless areas representing the dermal granulomas seen histologically (Table 3) [5-7]. All the patients with LV, the majority (80%) with scrofuloderma, and the single patient with PNT in the presented series showed yellow-orange structureless areas. Ankad et al, in their series of 19 cases with LV, reported the presence of yellow-white globules instead of the yellow-orange structureless areas explained due to a predominance of Fitzpatrick skin type IV/V in their patients [4]. Although most cases in the current series also had Fitzpatrick skin type IV/V, the yellow-orange hue was appreciable. A retrospective study by International Dermoscopy Society reports presence of an orange-yellow hue representing the dermal granulomas in patients with Fitzpatrick skin type V/VI. In their 12 reported patients with LV, focal bright areas were seen in a majority [8]. Similar yellow-orange structureless areas are reported in TVC; however, it was evident only in 1 of our patients [9]. The presence of thick white adherent scales and marked papillomatosis obscured their visibility in the other. Lichen scrofulosorum did not reveal yellow-orange structureless areas, possibly since the granulomas are more petite and centered on the hair follicles.

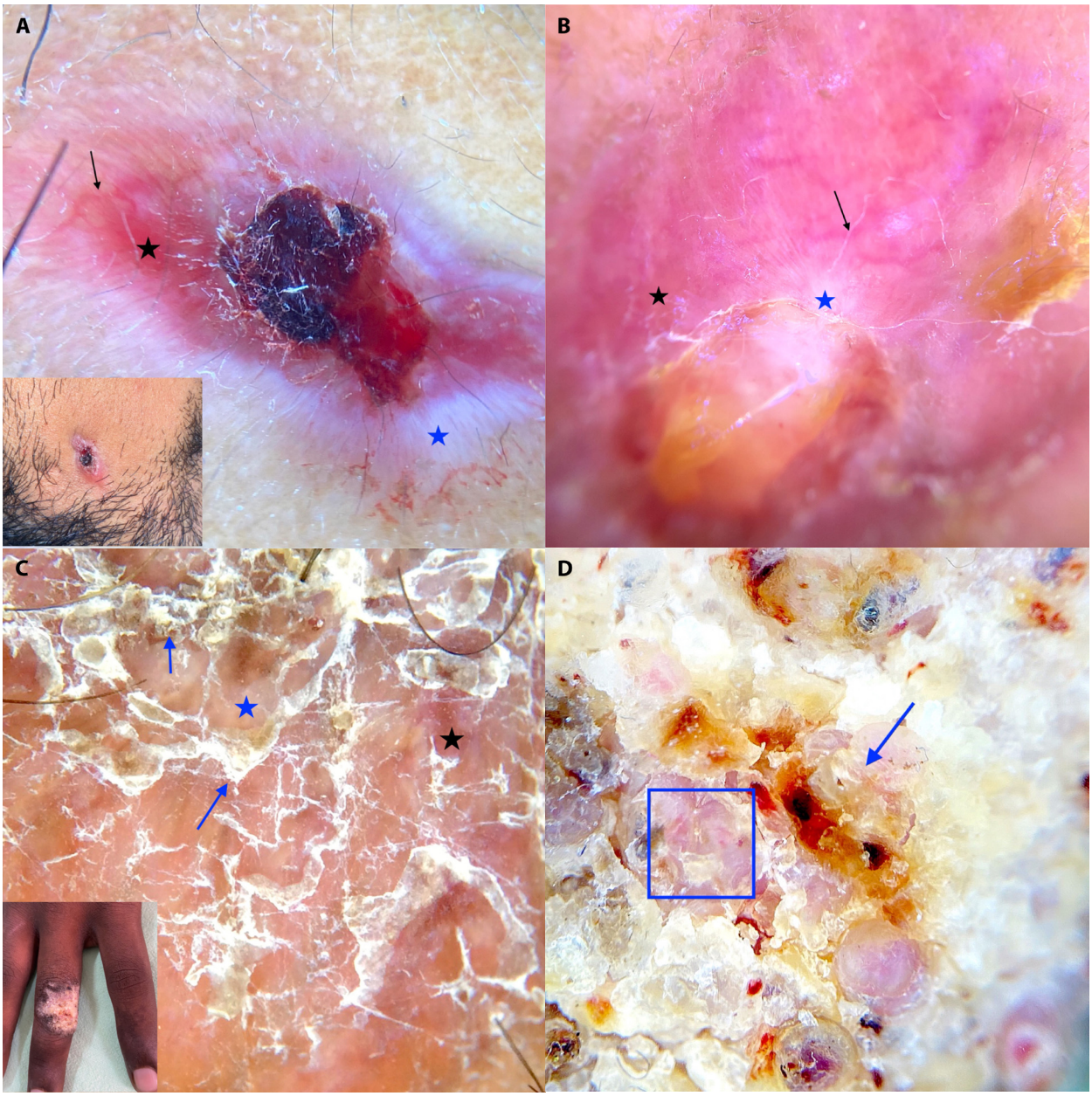

Figure 2. Dermoscopy of scrofuloderma showing sero-sanguineous crust representing the sinus with yellow-orange structureless areas (black star), white structureless areas (blue star) and linear vessels (black arrow) (A,B), clinical image showing a central sinus surrounded by erythema and scarring (A, inset). Dermoscopy of tuberculosis verrucosa cutis showing thick dirty white scales (blue arrow), yellow orange structureless areas (black star), white structureless areas (blue star) and dot/ curved vessels (blue square) (C,D), clinical image showing hyperkeratotic plaque over middle finger (C, inset).

Linear vessels with or without branches were frequently observed in LV and represent dilated capillary loops that appear well focused because of their displacement towards the epidermis by the underlying granulomas. Vessels were appreciated in all cases with scrofuloderma and TVC; however, PNT and lichen scrofulosorum lacked them. In lichen scrofulosorum, a few white globules showed peripheral erythema representing focal dilatation of the capillaries.

White structureless areas indicating the dermal fibrosis and acanthosis are well reported in LV and were seen in most LV lesions in the written series. 76.9% of patients also had linear white streaks arranged haphazardly and correlated histopathologically with proliferating collagen bundles distributed throughout the dermis. All cases of scrofuloderma also had white structureless areas corroborating the associated scarring evident clinically.

Follicular plugging in LV was reported to be higher in the present series than in literature and was also appreciated in PNT [4]. The serosanguineous crust was noticed in most patients with scrofuloderma and represented sinuses seen clinically; at places, there was an overlying hemorrhagic crust. Dirty white thick scales covered the lesions of TVC, making visualization of underlying structures difficult. The short curved and dot vessels were only visible in one case

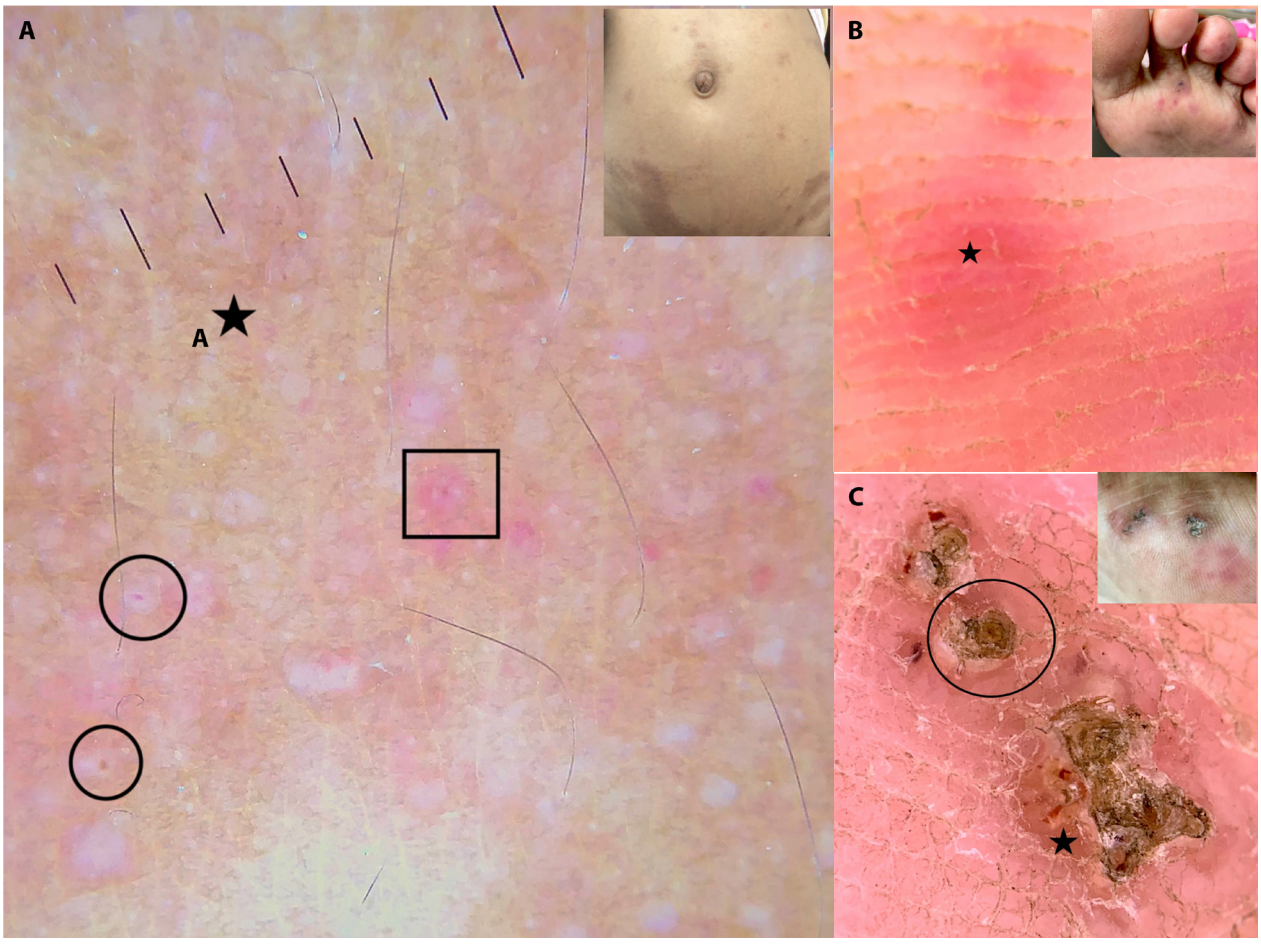

Figure 3. (A) Dermoscopy of lichen scrofulosorum with monomorphic white clods, some having a central black dot (black circle) and some peripheral erythema (black square) and increased surrounding pigment network (black star), inset showing grouped papules over trunk. (B,C) Dermoscopy of papulo-necrotic tuberculid showing yellow-orange structureless areas (black star), inset showing purpuric macules over soles and keratin plugs (black circle) with inset showing hyperkeratotic papules.

Table 3. Histopathological correlation for dermoscopy characteristics.

Dermoscopy characteristic	Histopathological correlate
Yellow-orange structureless areas	Dermal granulomas
Linear vessels	Dilated dermal capillaries pushed up by granuloma
White structureless areas	Dermal fibrosis and acanthosis
White lines	Dermal collagen bundles with a parallel orientation
Follicular plugs	Keratin in follicular infundibulum
Scales	Hyperkeratosis

focally. Inconspicuous vessels have been reported by Jakhar et al in TVC, with the prominent finding in their case being a yellow-red background, papillated surface, and dirty thick scales [9]. Pale monomorphic grouped white globules with peripheral erythema and hyperpigmentation seen in our patient with lichen scrofulosorum have been reported in the past [10,11]. However, we could not appreciate telangiectasias as reported in the literature.

Dermoscopy of various morphologies of cutaneous tuberculosis appears noteworthy. For LV, yellow-orange structureless areas, well-focused linear vessels, and white structureless areas and lines appear significant. In scrofuloderma additionally, serosanguineous crust representing the sinuses is noteworthy. Thick white scales and papillomatosis obscure sub-surface changes in TVC. Occasionally focal curved/dot vessels can be appreciated. Grouped monomorphic white globules with a central black dot and surrounding erythema and hyperpigmentation symbolize lichen scrofulosorum. Yellow-orange structureless areas and keratin plugs are appreciable in PNT. A thorough understanding of the characteristic dermoscopy of cutaneous tuberculosis seems necessary, especially for dermatologists working in the

endemic region. The written case series attempts to bridge the existing gaps in the knowledge about dermoscopy of various clinical morphologies of cutaneous tuberculosis.

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