Dermatology Practical & Conceptual

Dermoscopic Differentiation of Blister Beetle Dermatitis and Herpes Zoster: an Observational Study

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ABSTRACT

Introduction: Blister beetle dermatitis (BBD) and herpes zoster (HZ) manifest suddenly with vesicular lesions mimicking each other and progress rapidly. But a lack of definite differentiating criteria yearns the need for better investigating modality. Though histopathology persuades the need, is an invasive procedure, commonly deferred. Thus, dermoscopy, a non-invasive rapid diagnostic tool, can help in differentiating.

Objectives: To evaluate different dermoscopic patterns of BBD and HZ to differentiate both and to study dermoscopic features in early and late stages of lesions.

Methods: An observational cross-section study conducted in southern India. Nine patients with clinical features suggestive of BBD and HZ were recruited. Lesions were divided arbitrarily into early and late. Dermoscopic examination was performed with handheld dermoscope. Diagnosis was confirmed by skin biopsy and Tzanck smear wherever necessary. Statistical analysis performed using data in terms of frequencies and percentages.

Results: Dermoscopy of early BBD lesions showed multiple discrete and confluent yellowish-white structures, brown dots, roundish white globules, gray structures, 'targetoid pattern', brown areas over intense reddish pink background. Late BBD lesions revealed pinkish-white area, reduced gray structures and, dotted and globular vessels. Early HZ lesions showed poly-lobular gray and brown globules, bright pink background, gray globules covered by grayish veil-like structure with gray rim. Late HZ lesions revealed 'solar eclipse' pattern and 'crumpled fabric' patterns. The dermoscopic findings correlated with histopathology.

Conclusions: Dermoscopic patterns show peculiar features consistently pertaining to BBD and HZ, thus help in early diagnosis assisting in accurate treatment in both conditions.

Introduction

Paederus dermatitis, well known as dermatitis linearis or blister beetle dermatitis (BBD) is an irritant contact dermatitis following exposure of an insect belonging to the genus Paederus [1]. Accidental crushing of the beetle over the skin releases hemolymph containing a potent vesicant, paederine [2]. It is characterized with sudden onset of erythematous, edematous lesions in linear whiplash appearance over exposed areas or kissing lesions in opposing areas.

Herpes zoster (HZ) is a segmental eruption due to reactivation of latent varicella zoster virus from dorsal root ganglion which presents as closely grouped papules, rapidly becoming vesicular and pustular; develop in one or more contiguous dermatomes with sharp cut off at the midline [3].

BBD and HZ manifest suddenly with vesicular lesions and progress rapidly in the disease process. Lesions of both entity are associated with pain and burning sensation and hence they mimic each other morphologically and symptomatically [4,5]. Thus, both lesions should be diagnosed with accuracy. There are no defined criteria to differentiate both conditions clinically. However, histopathology plays an important role to distinguish. Many times, patients may not agree for the same.

Dermoscopy is a rapid, non-invasive tool which helps to visualize surface and sub surface features that are not visible to naked eyes [6]. Dermoscopy of BBD is explained in a single case report till date [7] and limited descriptions on dermoscopic patterns in HZ are present in the literature [8,9,10]. Furthermore, there is a hiatus in the dermoscopic distinction between the two. In this study, we evaluated the dermoscopic features of BBD and HZ.

Objectives

To evaluate different dermoscopic patterns in distinction of BBD and HZ.

To evaluate dermoscopic differences at early and late stages of evolution of lesions.

Methods

This study was conducted in southern India between January 2021 and May 2021. The approval from the institutional review board was taken and an informed written consent was obtained from patients. It was an observational cross-section analysis. The patients with clinical features suggestive of BBD and HZ were analyzed for demographic details in terms of age, sex and occupation. Vesicular lesions with classical features without history of previous treatment were included in the inclusion criteria. Exclusion criteria included lesions with super-added infection. Lesions were divided arbitrarily into early and late. Lesions with less and more than 3 days were considered as early and late lesions respectively. Physical examination and hematological investigations were done to assess the systemic involvement.

Dermoscopic examination of target lesion was done with handheld dermoscope with 10x magnification using ultrasound gel as interface medium. Care was taken avoid pressure on the lesions. Dermoscopic analysis was done by one of the authors (BSA). Diagnosis was confirmed by skin biopsy and Tzanck smear wherever necessary.

Results

This study included 9 patients with 6 (66.6%) males and 3 (33.3%) females. Age of patients ranged from 10 years to 70 years (mean age 35 years). Five (55.5%) patients had BBD with erythematous and linear lesions with crusting and vesicles with burning sensation over exposed body parts (Figures 1A, 2A, 3A, and 4A). One patient was followed up (5 days) for the healed lesion (Figure 5A). Biopsy was performed in two patients clinically diagnosed with BBD and in

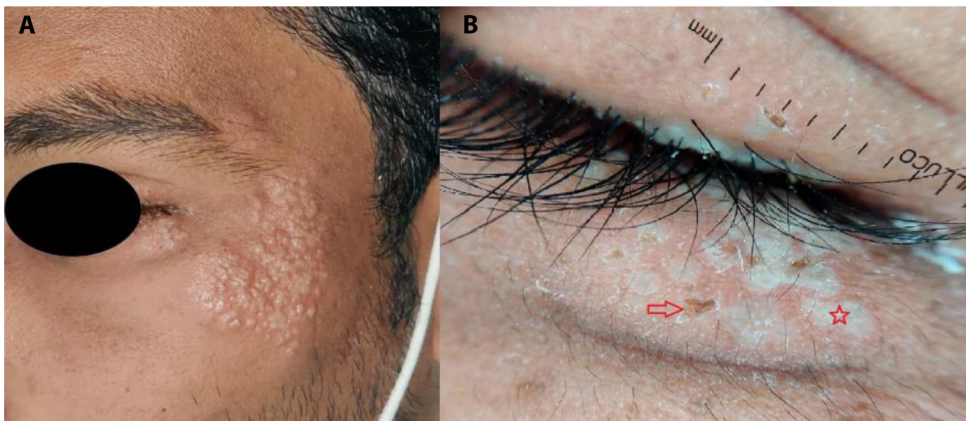

Figure 1. (A) Clinical image of early lesion of blister beetle dermatitis involving malar eminence and left eyelids unilaterally. (B) Dermoscopy reveals presence of multiple discrete and confluent yellowish-white structures (star) and brown globules (arrow) indicating excoriation with white scales.

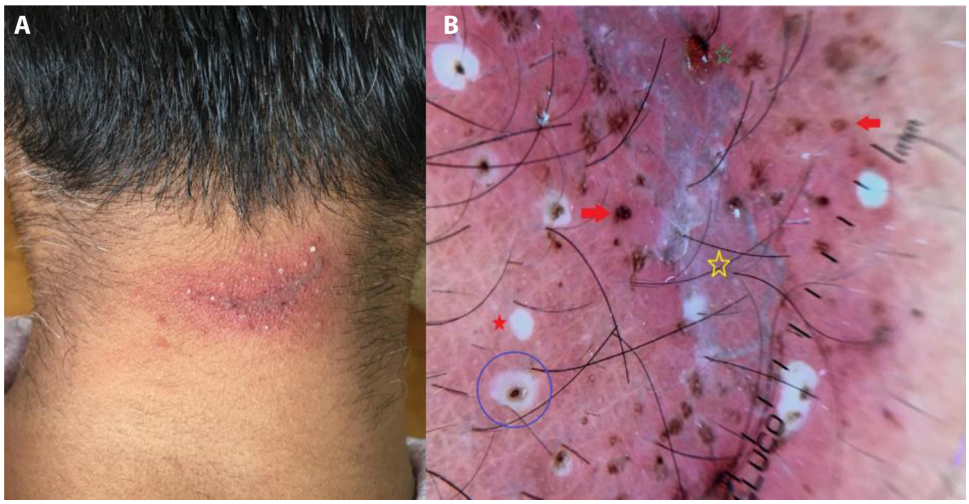

Figure 2. (A) Clinical image of early lesion of blister beetle dermatitis over nape of neck. (B) Dermoscopy shows gray structure (yellow star), multiple brown dots/ globules (red arrows), and brown areas (green star) with roundish white globules (red star) over the pink background. Few white globules show brown dots (blue circle) in the center in a targetoid pattern.

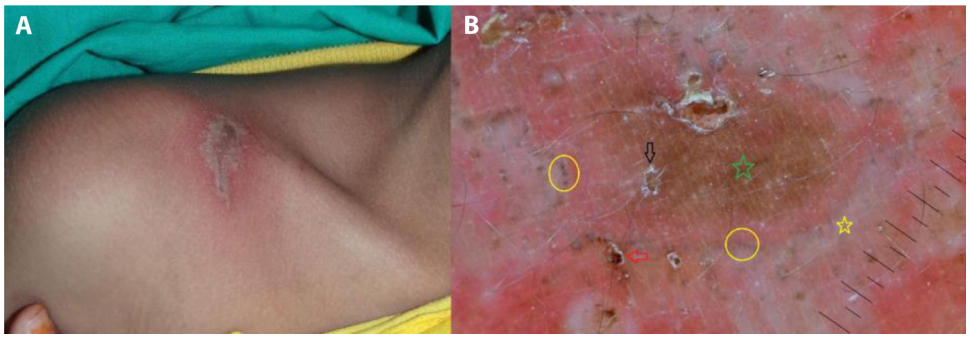

Figure 3. (A) Clinical image of early lesion of blister beetle dermatitis over right shoulder. (B) Dermoscopy of shows brownish structureless area (green star) in center surrounded by confluent gray structures (yellow star) with gray (yellow circles) and brown dots (red arrow) on pink background. Note the white scales (black arrow) surrounding the brown dots and globules.

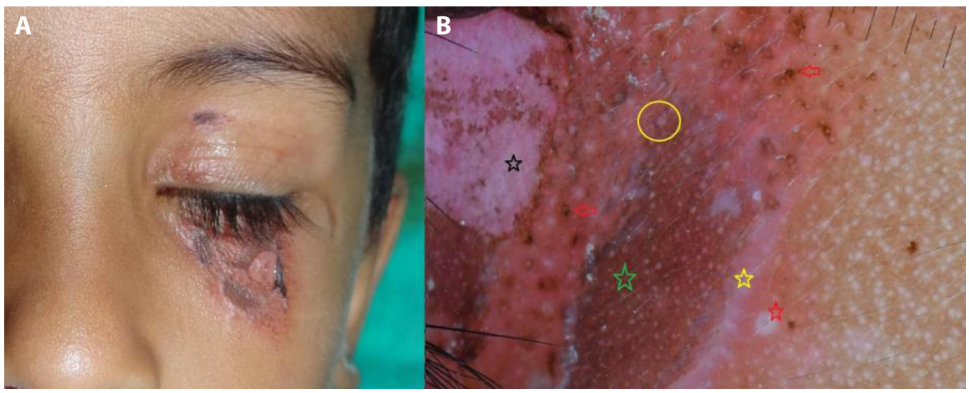

Figure 4. (A) Clinical image of late lesion of blister beetle dermatitis over peri-orbital region. (B) Dermoscopy reveals multiple confluent gray structures (yellow star), brown areas (green star) and white globules (red star) with brown globules (red arrow). Pinkish-white structureless area (black star) and gray globules (yellow circle) are well appreciated on a pinkish background.

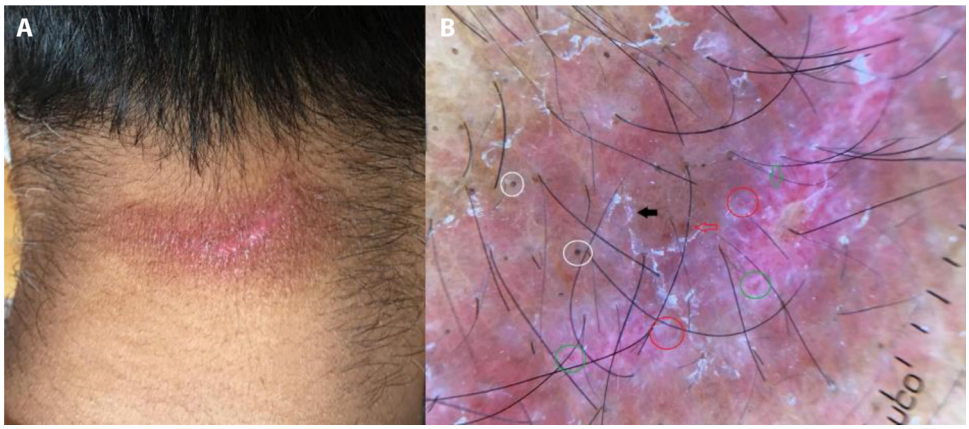

Figure 5. (A) Clinical image of healed lesion of blister beetle dermatitis over nape of neck. (B) Dermoscopy reveals dotted (red circles) and globular vessels (green circles) and scales (black arrow) on a pinkish-white background. White globules (green arrow) and multiple gray and brown dots (white circles) are noted.

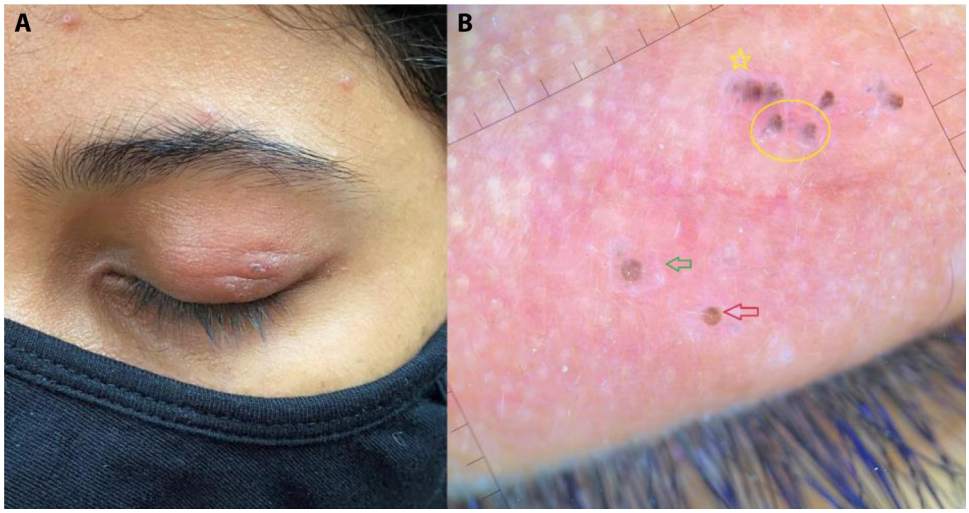

Figure 6. (A) Clinical image of herpes zoster involving left ophthalmic branch of trigeminal nerve. (B) Dermoscopy shows poly-lobular gray (yellow circles) and brown (red arrow) globules. Note the gray veil-like structure (yellow star) covering the pigment globules with gray rim (green arrow).

one patient with HZ. Tzanck smear was performed in two patients clinically suspecting with HZ to see for acantholytic cells and multinucleated giant cells.

Dermoscopy of Early BBD Lesions

Multiple discrete and confluent yellowish-white structures, brown dots (Figure 1B) with roundish white globules, gray structures and brown areas (Figures 2B and 3B) over intense reddish pink background. Few roundish white globules showed brownish pigmentation at its center (Figure 2B). White scales around the brown globules were other features (Figure 3B).

Dermoscopy of Late BBD Lesions

Similar pattern were observed but for the reduced gray structures in addition to pinkish-white areas (Figure 4B). Few lesions revealed dotted and globular vessels, scales on a pinkish-white background (Figure 5B).

HZ lesions were distributed in the ophthalmic branch of trigeminal nerve (Figures 6A and 7A) and thoracic, cervical nerves (Figures 8A and 9A), as closely grouped red papules and vesicles on erythematous background. Four (44.4%) patients with HZ were included in the study.

Dermoscopy of Early HZ Lesions

Polylobular gray and brown globules over a bright pink background were noted with gray globules were covered by grayish veil-like structure with gray rim. Yellowish-orange structure surrounding the pigment globules, red areas and scales were seen (Figures 6B, 7B and 8B).

Dermoscopy of Late HZ Lesions

Polylobular gray and brown structures surrounded by erythematous zone resembling a 'solar eclipse' pattern were observed with multiple brown and gray dots (Figures 9B and 9C). 'Crumpled fabric' appearance which describes

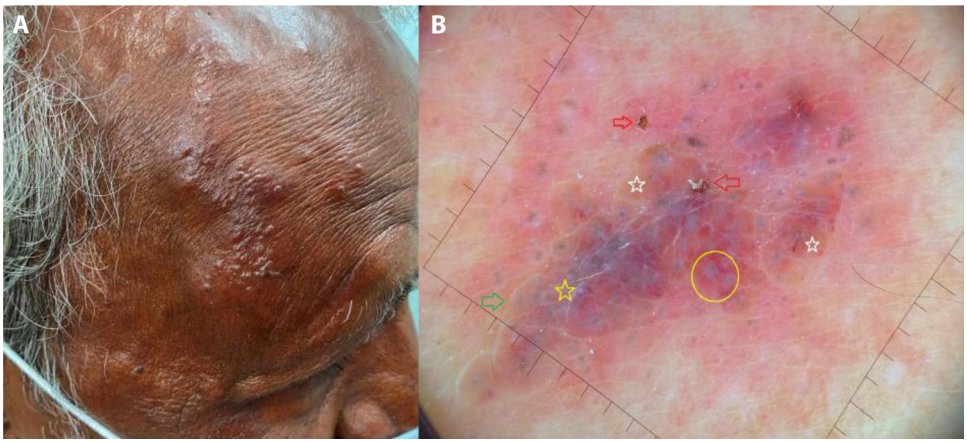

Figure 7. (A) Clinical image of herpes zoster involving right trigeminal nerve. (B) Dermoscopy shows poly-lobular gray (yellow circle) and brown (red arrows) globules. Gray globules are covered by grayish veil-like structure (yellow star) with gray rim (green arrow). Yellowish-orange structure (white star) surrounding the pigment globules is well appreciated. Note the bright pink background.

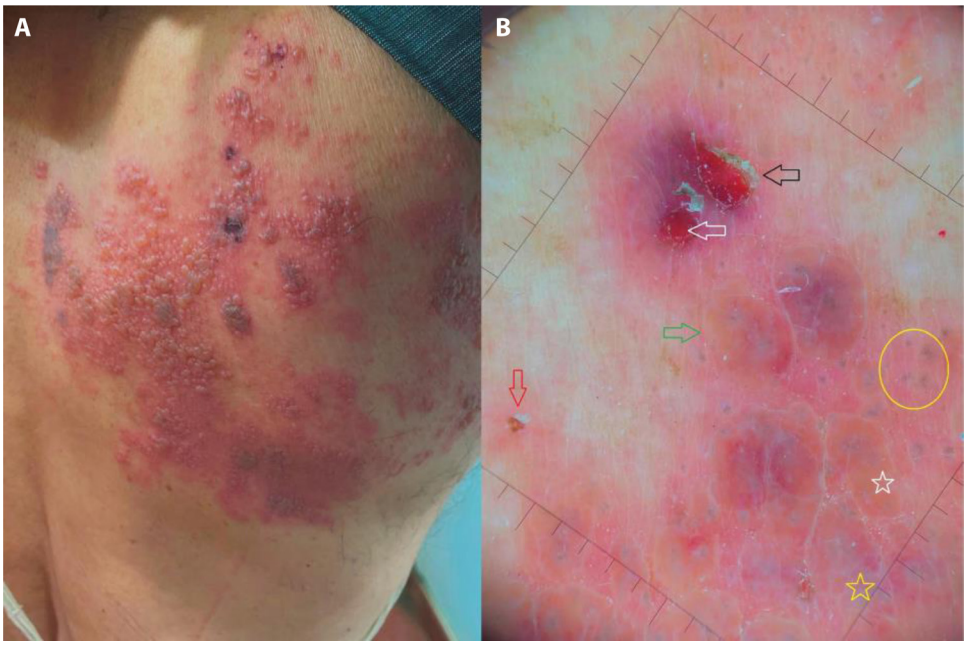

Figure 8. (A) Clinical image of herpes zoster involving right trunk in dermatomal involvement without crossing the midline. (B) Dermoscopy shows poly-lobular gray (yellow circle) and brown (red arrows) globules. Gray globules are covered by grayish veil-like structure (yellow star) with gray rim (green arrow). Yellowish-orange structure (white star) surrounding the pigment globules is well appreciated. Red areas (white arrow) and scales (black arrow) are seen. Note the bright pink background.

folding of roof of flaccid bullae in late lesions was noted (Figures 9B and 9C) [8]. There was increased intensity of gray structures observed in late HZ lesions when compared to late lesions of BBD. Dermoscopic differentiation between BBD and HZ is depicted in Table 1.

Conclusions

Dermoscopy being a rapid, non-invasive diagnostic tool, that demonstrates features which correlate well with histopathological changes. Furthermore it also reveals the changes that take place in the different layers of skin by which one can study the disease evolution process. This study is aimed at differentiating BBD from HZ in a dermoscopic perspective. Clinically BBD manifests as fluid filled and necrotic lesions with pain and burning sensation [11]. The differentials include herpes simplex, HZ or contact irritant dermatitis [12].

Dermoscopic analysis of BBD is very sparse in the literature and limited to a single case report. Authors noted

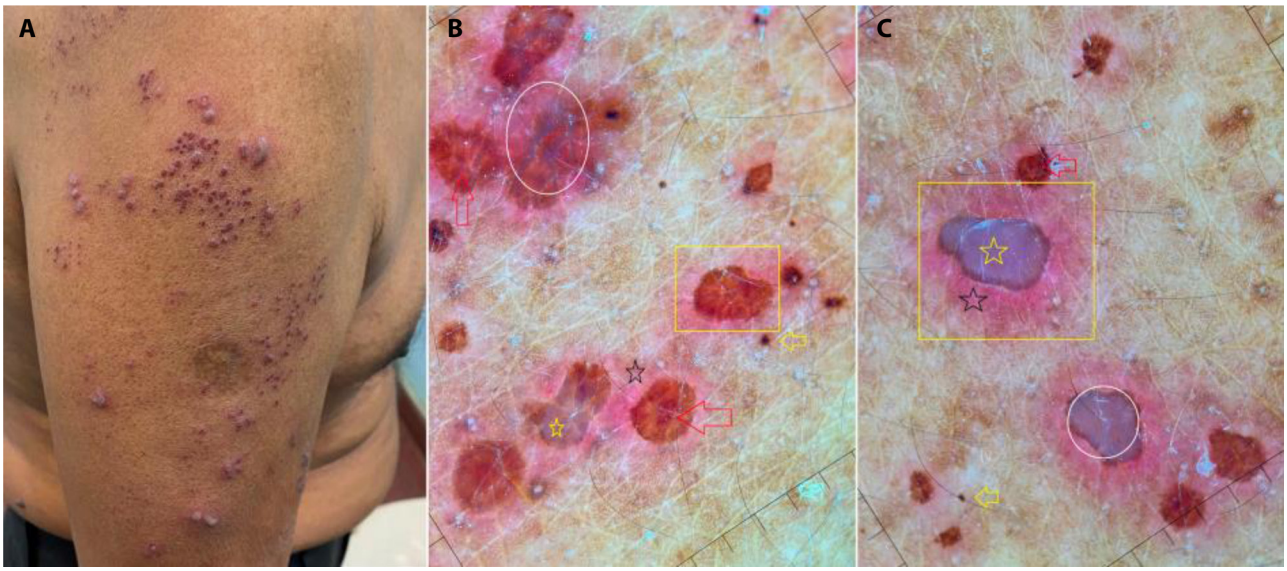

Figure 9. (A) Clinical image of late lesion of herpes zoster involving right shoulder and arm. (B and C) Dermoscopy shows poly-lobular gray (yellow stars) and brown (red arrows) structures surrounded by erythematous zone (black stars). Note the brown and gray dots (yellow arrows) and the 'crumpled fabric' appearance (white circle) and 'solar eclipse' pattern (yellow box).

Table 1. Dermoscopic differences between blister beetle dermatitis and herpes zoster.

Dermoscopic features	Blister beetle dermatitis	Herpes zoster
Early lesions	• Discrete and confluent yellowish-white structures. • Brown dots with roundish white globules, gray structures and brown areas. • White scales. • Background: intense reddish pink.	• Poly-lobular gray and brown globules. • Gray globules covered by grayish veil-like structure with gray rim. • Yellowish-orange structure surrounding the pigment globules and red areas. • Scales present. • Background: bright pink.
Late lesions	• Decreased amount of gray structures. • Vessel morphology: dotted and globular vessel. • Scales present. • Background: pinkish-white	• Increased intensity of gray structures. • 'Solar eclipse' pattern • Multiple brown and gray dots. • 'Crumpled fabric' appearance.

brown/black dots on a gray background surrounded by white halo and erythema in a case of BBD [7].

In the present report, the dermoscopic patterns varied on the basis of duration. Early lesions showed yellowish-white structures with roundish white globules and gray structures on intense reddish-pink background. Similar features were noted in late lesions with reduction in the gray structure. Brown dots/areas and scales were observed in both lesions. Interestingly, healed lesion showed vascular elements such as dotted and globular vessels.

Histopathology of BBD is characterized by destruction of epidermis with necrosis and separation of keratinocytes with formation of vesicles and infiltration of eosinophils and polymorphs. Perifollicular and inter-follicular inflammatory infiltrate is noted [13].

Yellowish-white globules indicate spongiotic vesicles with serum within the epidermis and white roundish globules are suggestive of micro-pustules (Figure 10). Gray structure is due to necrotic pigmented epithelium with non-pigmented regenerating epithelium. In contrast, brown dots are due to necrotic keratinocytes with retained melanin. Brown areas represent dried serum and necrotic keratinocytes with retained melanin. Scales and pink background correspond to hyperkeratosis and vasodilatation respectively. White globules with brown dots in the centre are suggestive of perifollicular micropustule.

HZ shows ballooning degeneration of necrotic keratinocytes within intra-epidermal blister and few multinucleated giant cells at the base of blister in histopathology. Dermal small vessel vasculitis is a characteristic feature [14].

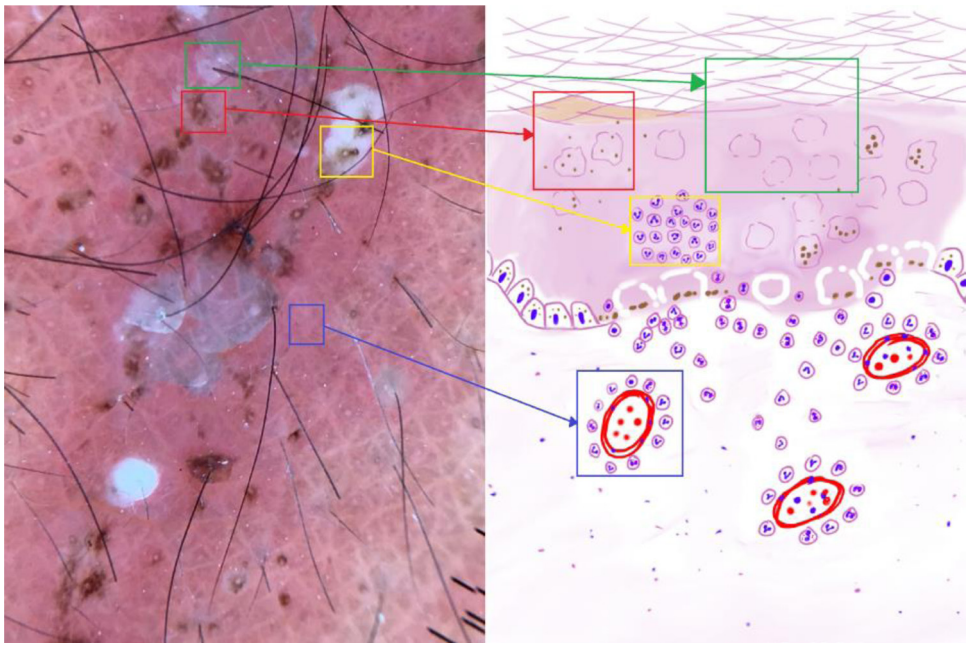

Figure 10. Schematic histopathological representation of dermoscopy of blister beetle dermatitis. White globules indicate micro-pustules (yellow box), scaling with grayish structures indicates hyperkeratosis and necrosis of pigmented epithelium (green box), brown areas indicate dried serum with necrotic keratinocytes with retained melanin (red box). Erythematous background indicates increased vascularity and vasodilation (blue box).

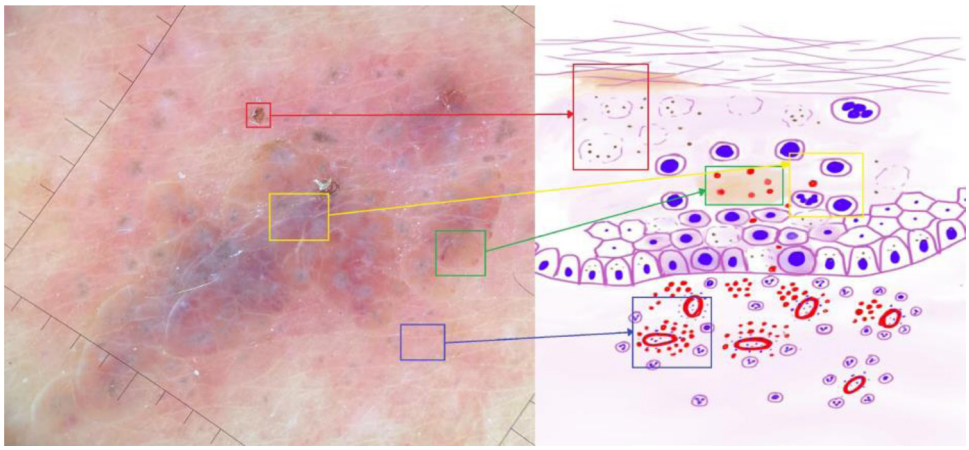

Figure 11. Schematic histopathological representation of dermoscopy of herpes zoster. Multiple poly-lobular gray globules indicates acanthosis and necrotic pigmented keratinocytes within intra-epidermal vesicle (yellow box), brown globules depicting serum, necrotic keratinocytes with retained melanin (red box), yellowish orange structure indicates serum with extra-vasated erythrocytes within the intraepidermal vesicle (green box). Intense erythematous background with red dots indicate increased vascularity and vasculitis in the superficial dermis (blue box).

Multiple poly-lobular gray globules correlated to the necrotic keratinocytes within the intra-epidermal vesicle. The grayish veil-like structure is due to the non-pigmented epithelium of the basal keratinocytes with overlying necrotic pigmented keratinocytes within the vesicular fluid. Gray rim is because of edge of vesicle that is seen vertically under dermoscopy. Yellowish-orange structure corresponds to serum and extra-vasated erythrocytes within the intra-epidermal vesicle. Erythematous background correlates with the increased vascularity and red dots with dilated vessels (Figure 11). The brown dots and globules are due to dried serum, necrotic keratinocytes and melanin retention. Scaling is due to hyperkeratosis [8,9]. The white linear folds / 'crumpled fabric' appearance were due to folding of superficial keratinocytes (roof) due to flaccidity was observed in late lesions of HZ. This was previously reported only in pemphigus vulgaris, pemphigus foliaceous and Hailey-Hailey disease (as 'crumpled fabric appearance') [8]. This appearance is expected in older bullous lesions with flaccidity of bullae.

Table 2. Dermoscopic histopathological correlation of blister beetle dermatitis and herpes zoster.

Conditions	Dermoscopic features	Histopathological correlation
Blister beetle dermatitis	Discrete and confluent yellowish-white structures.	Spongiotic vesicles with necrosis of the epidermis
	White globules	Micro-pustules in epidermis
	Gray structures	Necrotic pigmented epithelium with regenerating non-pigmented epithelium
	Brown areas	Dried serum and necrotic keratinocytes with retained melanin
	White scales	Hyperkeratosis
	Dotted and globular vessels. Intense reddish pink background.	Superficial peri-vascular infiltration with vasodilation of dermal vessels.
	White globules with brown dots in the centre	Perifollicular micro-pustule.
Herpes zoster	Multiple poly-lobular gray globules	Necrotic keratinocytes within intra-epidermal vesicle
	Greyish veil-like structure	Pigmented epithelium overlying the vesicle.
	Grey rim	Edge of the vesicle
	Yellowish orange structure	Serum and extra-vasated erythrocytes within the intra-epidermal vesicle
	Erythematous background	Increased vascularity
	Red dots	Dilated vessels and vasculitis
	Brown dots and globules	Dried serum, necrotic keratinocytes and melanin retention
	Crumpled fabric appearance	Roof of flaccid blister
	Scales	Hyperkeratosis

Thus, the dermoscopic features are fairly distinguishable in BBD and HZ (Table 1). They correlate well with corresponding histopathological changes (Table 2). The dermoscopic patterns observed in our study correlated well with the study by Narkhede et al [8], in evaluation of HZ, but the characterization of lesions into early and late lesions pertaining to duration of onset was not depicted. This is required as any intervention with antiviral therapy within 72 hours of onset of rash, reduces the risk of ophthalmic complications, has effect on severity of acute pain, faster healing of lesions and shortens the duration of post herpetic neuralgia [15,16]. As the lesions of BBD and HZ closely simulate each other, the dermoscopic differentiation thus helps in early diagnosis and management, as the line of management differs in the two and minimizes the morbidity and the social stigma associated with HZ. Limitations of this study include small sample size, histopathology was not done in all the lesions, and study was conducted in a single center.

Thus, the use of dermoscopy has spread its wings from infectious to inflammatory and to malignant conditions, and from being a diagnostic tool to a therapeutic monitoring tool. Here, we observed significant dermoscopic differences between BBD and HZ even at their earliest presentation, thus helping the dermatologists in further management of the conditions. It is thus a dermatologist's stethoscope.

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