Brief Report

Utility of Dermoscopy in Cutaneous Small Vessel Vasculitis: Preliminary Observations from a Study of 30 Cases

Abstract

Background: Dermoscopy is a non-invasive diagnostic technique that provides an added advantage to the routine clinical diagnostic exercise. Role of dermoscopy in cutaneous small vessel vasculitis has not been explored well. **Objective:** This study was intended to delineate the dermoscopic features of cutaneous small vessel vasculitis and to correlate them with histopathological findings of the disease. **Materials and Methods:** This was a cross-sectional study involving 30 patients with cutaneous small vessel vasculitis confirmed by histopathology and direct immunofluorescence. In each patient, dermoscopic features of early/evolving and established lesions were recorded. Dermoscopic-histopathological correlation was assessed for established lesions. **Results:** On dermoscopy, the early/evolving lesions showed a dull red background in all the 30 (100%) patients, red globules in 8 (26.7%), and red dots in 4 (13.30%) patients. The established lesions showed red background in 28 (93.3%) patients, white and yellow structureless areas in 19 (63.33%) patients each, red globules in 18 (60%), and red dots in 16 (53.3%) patients. A statistically significant association between red globules and red blood cell extravasation was noted (*P*-0.01). White and yellow structureless areas also showed a statistically significant association between sparse (*P*-0.023) and dense (*P*-0.007) perivascular infiltrates, respectively. **Conclusion:** Dermoscopy of cutaneous small vessel vasculitis exhibits fairly reliable and reproducible features correlating well with histopathological aspects of the disease. Hence, inclusion of dermoscopy in the clinical diagnostic protocol for cutaneous small vessel vasculitis is beneficial in complementing the clinical diagnosis and in differentiating from other inflammatory purpuras.

Keywords: *Cutaneous small vessel vasculitis, dermoscopy, histopathology*

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Introduction

Cutaneous vasculitis refers to inflammation of superficial dermal blood vessel walls constituted mainly of neutrophils. Cutaneous vasculitis involves the vessels alone or as a part of systemic disease.[1,2] Histopathology is confirmatory and direct immunofluorescence (DIF) further classifies cutaneous vasculitis.[3] Studies utilizing dermoscopy are limited to urticarial vasculitis. This study was undertaken to describe the dermoscopic findings in cutaneous small vessel vasculitis (CSVV) based on duration of the lesions and to correlate them with histopathological findings.

Materials and Methods

This was a cross-sectional study involving 30 CSVV patients confirmed by histopathology and DIF attending the authors' department between January 2021 and June 2022. Patients presenting with typical clinical feature of CSVV, i.e., palpable purpura with or without other lesions such as petechiae, erythematous papules, plaques, nodules, vesicles, bullae, ulcers, irrespective of age, sex, and duration of the disease, were enrolled after informed written consent.

A thorough history and clinical examination was performed and the findings were recorded. Patients belonged to the Fitzpatrick type IV-V skin phototype. For dermoscopy, only palpable purpuric lesions were considered. Such lesions were categorized as "early/evolving" and "established" lesions depending on whether they were less than or more than 48 hours old, respectively. Polarized dermoscopy was performed using DermLite™ DL3 (3Gen Inc., San Juan Capistrano, California, USA) and images captured using a digital camera attached to it. Dermoscopic features were recorded in

How to cite this article: Kavya RM, Adya KA, Inamadar AC. Utility of dermoscopy in cutaneous small vessel vasculitis: Preliminary observations from a study of 30 cases. Indian Dermatol Online J 2023;14:506-9.

Received: 01-Dec-2022. **Revised:** 04-Jan-2023. **Accepted:** 07-Jan-2023. **Published:** 25-May-2023.

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Access this article online

Website: http://journals.lww.com/IDOJ

DOI: 10.4103/idoj.idoj_648_22

Quick Response Code:

standard pattern analytical terminologies. Two punch biopsy samples, each from an established (identified as the most representative lesion by dermoscopy) and an early/evolving lesion, were obtained for histopathological and DIF studies, respectively. Dermoscopic-histopathological correlation was assessed and statistically analyzed.

Statistical analysis of the data was performed using Statistical Package for Social Sciences (IBM Corp. 2011 IBM SPSS Statistics for Windows, Version 20.0, Armonk, New York). Results were presented as mean (median) ±SD, counts, percentages, and diagrams. Pearson/Spearman's Correlation was used to find the correlation between quantitative variables. The association of categorical variables was computed using the Chi-square test. A P value of < 0.05 was considered statistically significant. All statistical tests performed were two-tailed.

Results

Patient characteristics

Study population comprised 17 male (56.7%) and 13 female (43.3%) patients. A mean (±SD) age of 34.60 (±15.44) years ranging from 10-80 years, and a mean (±SD) disease duration of 10.5 (±6.9) days were noted. Majority of the patients presented with palpable purpura and petechiae [Figure 1a]. Direct immunofluorescence categorized 14 (46.70%) and 16 (53.30%) patients as having CSVV and Henoch-Schonlein purpura (IgA type CSVV), respectively.

Dermoscopic findings

Early/evolving lesions showed a dull red background in all the 30 (100%) patients followed by red globules and red dots in 8 (26.7%) and 4 (13.3%) patients, respectively [Figure 2a and b]. A red to red-purple background was the commonest finding in established lesions seen in 28 (93.3%) patients [Figure 2c and d]. Yellow [Figure 3a] and white structureless areas [Figure 3a and b] in 19 (63.33%) patients each, red globules [Figure 2d] in 18 (60%), and red dots [Figure 2c and d] in 16 (53.3%) patients were other findings in established lesions. Perifollicular scaling in 12 (40%), follicular keratotic plugs in 11 (36.7%), and violaceous patches in 2 (6.7%) patients were less frequent findings in established lesions.

Histopathological findings

The predominant histopathological findings [Figure 1b and c] observed were leucocytoclasia in 27 (90%), dilated vessels in 21 (70%), sparse perivascular neutrophilic infiltrate in 17 (56.6%), red blood cell (RBC) extravasation in 16 (53.3%), fibrin deposits in 15 (50%), and dense perivascular neutrophilic infiltrate in 13 (43.3%) cases.

Dermoscopic-histopathological correlation

Dermoscopic-histopathological correlation and their statistical relation are presented in Table 1. A statistically significant correlation between red globules and RBC extravasation was seen (P-0.011) but not between the red

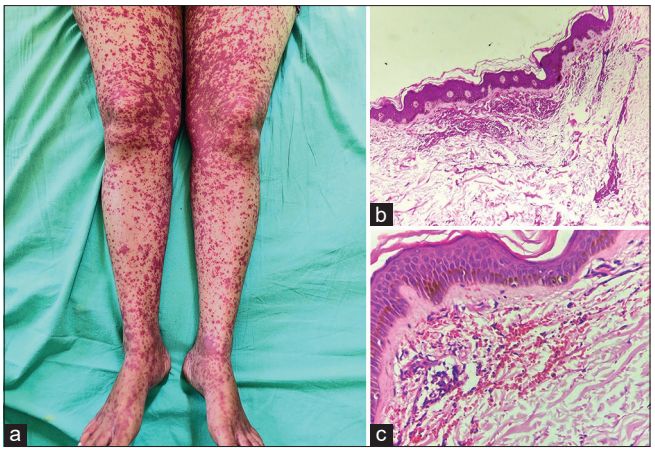

Figure 1: Multiple petechiae and palpable purpurae over bilateral lower extremities (a) Histopathology showing perivascular neutrophilic infiltrate, infiltration of the vessel walls, leucocytoclasia (b) and extravasated red blood cells (c). [H and E, x5 (b) and x10 (c)]

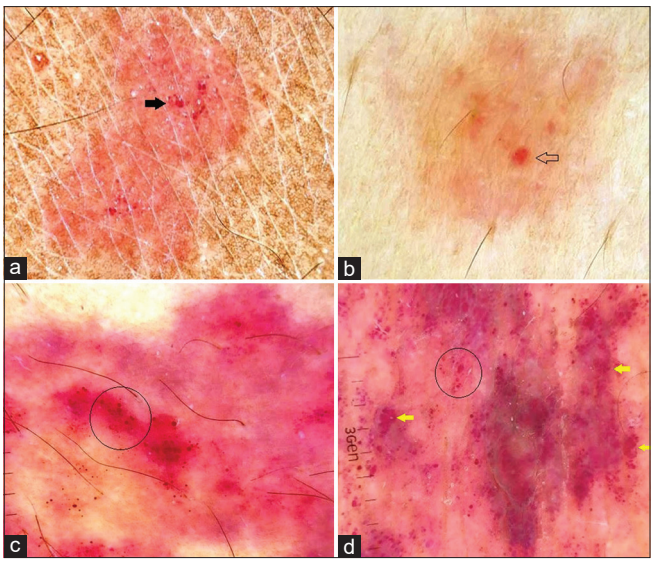

Figure 2: Dermoscopy of early/evolving lesion (a and b) showing a dull red background, red dots (a, black solid arrow), and red globule (b, black hollow arrow). Dermoscopy of established lesion (c and d) showing a red to red-purple background and multiple red dots (c and d, black circles) and red globules (d, yellow arrows) [× 10, DermLite™ DL3, polarized dermoscopy]

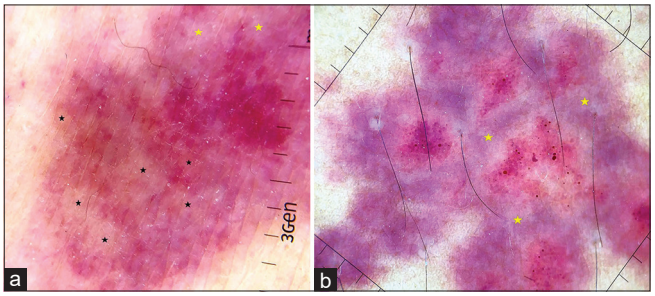

Figure 3: Dermoscopy of established lesions showing yellow structureless areas (a, black stars) and white structureless areas (a and b, yellow stars) over a red-purple background [x10, DermLite™ DL3, polarized dermoscopy]

Table 1: Dermoscopic-histopathologic correlation.

Dermoscopic features	Corresponding histopathological features	*P*
Red dots	Extravasation of RBCs	0.07
Red globules	Extravasation of RBCs	0.01*
Red background	Dilated vessels	0.5
White structureless areas	Sparse perivascular infiltrates	0.02*
Yellow structureless areas	Dense perivascular infiltrates	0.007*

*statistically significant correlation

dots and the latter (*P*-0.07). White and yellow structureless areas corresponding to sparse perivascular (*P*-0.023) and dense perivascular infiltrations (*P*-0.007), respectively, showed a statistically significant correlation. The red background did not statistically correspond to the dilatation of vessels (*P*-0.5).

Discussion

Dermoscopy is a non-invasive diagnostic technique enabling visualization of skin surface and sub-surface features. Dermoscopic findings of a lesion reflect its histological changes, allowing a more accurate clinical diagnosis in conjunction with clinical features.[4] Studies describing the role of dermoscopy in cutaneous vasculitis are limited to those on urticarial vasculitis.[5-7]

In this study, the early/evolving lesions exhibited a dull red background, red globules and red dots. Red to red-purple background, white and yellow structureless areas, red globules, and red dots were the commonest observations in established lesions. The red background is due to dilated blood vessels in histopathology. Statistically, however, the two did not correlate significantly, implying that the red color of the background may also be contributed to by other factors such as dermal edema and collagen. White and yellow structureless areas indicate a "mass effect" due to cellular aggregates in dermis.[8] Dense and compact cellular aggregate produces a yellowish or yellow-orange color. Infiltrate that is sparse and less compact may appear as yellow-white to white in color. A statistically significant correlation between white structureless areas and sparse perivascular infiltrate and between yellow structureless areas and dense perivascular infiltrate was noted. The red dots and globules histologically correspond to RBC extravasation. When assessed individually, red globules, but not the dots, showed a statistically significant correlation with RBC extravasation. However, the designations "dots" and "globules" merely indicate the size of structures and practically both represent the same thing.[4] Purpuric globules correlating with extravasated and degraded RBCs have also been described in urticarial vasculitis.[5-7] Vascular morphologic patterns noted in urticarial vasculitis, pigmented purpuric dermatoses (PPDs), and insect bite reactions were absent in our cases, possibly obscured by the purpuric areas.[9]

As to the differential diagnoses, Vazquez-Lopez *et al*., described four basic dermoscopic patterns of purpura—homogenous, mottled, perifollicular, and epidermal. The homogenous pattern is exhibited by non-inflammatory purpuras (e.g. bleeding disorders or steroid-induced purpura). Mottled pattern is exhibited by inflammatory purpura such as leucocytoclastic vasculitis and PPDs. Perifollicular pattern is seen in scurvy and epidermal pattern in subcorneal/sunungual hemorrhages and eczema. The mottled pattern of inflammatory purpura is characterized by red dots or globules over a purple background in early stage and orange-brown background in late stage.[9] Similarly, we noted red dots and globules over a red to red-purple background in established lesions. In necrotic lesions, the necrotic areas appear as whitish-blue patches.[9] The white structureless areas noted in our study correspond to inflammatory infiltrates as no clinical and/or histological evidence of necrosis in the lesions chosen for dermoscopy was seen.

Being inflammatory purpura,[9] PPDs are probably the main differential diagnosis for CSVV. Comparing our findings with the established dermoscopic features of PPDs,[10-13] we noted the following,

1. Red dots and globules were identical to those in PPDs. However, they were seen on a dull red (in early/evolving lesions) and red to red-purple background (in established lesions) compared to those of PPDs on a yellow-brown or coppery-brown background. The latter is attributable to lymphohistiocytic infiltrate and hemosiderin deposits along with RBC extravasation.[11] In our study, the infiltrate was predominantly neutrophilic and no hemosiderin deposits/siderophages were seen on histology. The yellow structureless areas noted correspond to dense infiltrates as described above.
2. Red background in PPDs reflects increased dermal vascular density.[11] Same appears to be the attribute for the red background seen in our study.
3. Vascular morphological patterns (twisted red loops, red circles, linear serpentine, and annular-comma) described in PPDs were not seen as described above.
4. Pigmentary elements of PPDs (brown patches and reticular lines) were not seen.

Hence, the background color, vascular morphological patterns, and pigmentary elements associated with PPDs help in differentiating from CSVV along with the clinical context.

Limitations

The following were the limitations of our study

1. The recommended sample size for our study was 50 based on the proportion of leucocytoclastic vasculitis of 85%[14] with 95% level of confidence and 10% absolute precision. However, the same could not be reached in the specified study period due to pandemic and we could collect only 30 cases.

2. Absence of a group of PPDs (the main differential diagnosis for CSVV) as control.
3. The most representative lesion identified by dermoscopy was biopsied and histopathology findings obtained were used for dermoscopic-histopathologic correlation. Sectioning the precise area of interest from the biopsy sample guided by *ex-vivo* dermoscopy would have been ideal for optimal dermoscopic-histopathologic correlation.

Hence, we believe our observations are preliminary and need to be validated with appropriate sample size and study design.

Conclusions

Our findings suggest that dermoscopy of CSVV exhibits fairly reliable and reproducible features correlating well with histopathological aspects of the disease. Although histopathology is gold standard for confirming the diagnosis, dermoscopy serves as a useful adjunct for verifying/complementing the clinical diagnosis as well as in differentiating from other causes of purpura, especially involving the dependent areas. Hence, inclusion of dermoscopy in the clinical diagnostic protocol of CSVV is beneficial.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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