Original article

Dermoscopy as a diagnostic tool in Psoriasis

Manmohan Gavvala, Madhulika Gavvala

Department of Dermatology, Bhaskar Medical College and Hospital, Yenkapally, Moinabad, Ranga Reddy-500075, Telangana, India.

Abstract

Dermoscopy allows visualizing vascular and non-vascular structures and aids in making an accurate diagnosis of pathological skin lesions. The aim of the present study was to observe and report the dermoscopic patterns of psoriatic lesions and correlate the dermoscopic diagnosis with the clinico-histopathological diagnosis. This was a prospective, observational study conducted over a period of 18 months in 44 patients who presented with psoriasis to the outpatient clinic of our department. Psoriatic skin lesions were evaluated clinically and subjected to dermoscopy and histopathological examination and the resulting diagnoses were correlated to establish the diagnostic utility of dermoscopy in psoriasis. The resultant findings were predominantly vascular i.e. red globules (RG-75%), glomerular like vessels (GLV-22.72%), red dots (RD-2.27%), in regular distribution (100%) and the non-vascular findings were white scales (93.18%) in a diffuse arrangement (79.54%) and a light red background (56.18%). A combination of these vascular and non-vascular features predicted psoriasis accurately and was found to be significant. A positive correlation between the clinico-dermoscopic-histopathological diagnosis was possible in 75% of the cases. In conclusion, dermoscopic examination is a good auxiliary to strengthen the clinical diagnosis of psoriasis and may help evade the necessity of a biopsy on further standardization of the dermoscopic features in literature.

Key words: Dermoscopy, Psoriasis, Red globules, Scales, Vascular

DOI: 10.5455/jmas.125691

Dermoscopy / epiluminescence microscopy facilitates in vivo visualization of diagnostic patterns within skin lesions that are not normally visible to the unaided eye. Videodermoscopy is a newer modification of the same which allows not only capture of images but also of videos, and provides considerably higher optical magnifications. The images or videos thus obtained can be stored, processed, and analysed as and when required. Psoriasis is a common, chronic, immune mediated, inflammatory papulosquamous skin condition which is varied in its morphology and distribution. The characteristic clinical features of psoriasis have been described in litera-
ture as multiple, salmon pink to erythematous, papules and plaques associated with easily removable micaceous scales. Although histopathology remains the undisputed gold standard diagnostic test for psoriasis, it is an invasive procedure. Therefore, further efforts are warranted to substantiate the clinical diagnosis non-invasively. Dermoscopy has an established value in evaluating skin tumours and is gaining growing interest regarding its application in the field of general dermatology especially in inflammatory conditions like psoriasis, where the features noted are representative of the underlying microscopic pathology.

**Material and methods**

This is a prospective, observational study conducted over a period of 18 months in 44 patients with psoriatic skin lesions who attended the outpatient clinic of the Department of DVL in our institute. Patients were selected by the convenience sampling method. Patients who have used topical or systemic medications for a period of ≥1 month, undergone any invasive procedure over the lesions, secondarily infected lesions or debilitating conditions were excluded from the study. Informed written consent of participating patients was taken and necessary demographics were noted. A detailed clinical history and examination aided in a clinical diagnosis of psoriasis, based on standard definitions and features known as per the literature. The clinical photographs of the lesions were captured with a digital camera. A videodermoscope (Ultracam TLS, Dermaindia) equipped with providing a high optical magnification, three light sources (white light, polarized light, ultraviolet light) and an inbuilt camera was used to evaluate the lesions. The dermoscopic screening of the lesions was carried out according to a systematic approach specified by Zalaudek et al., which takes into consideration the number of lesions, vascular morphology, arrangement of the vasculature and other salient dermoscopic features, all of which aid in reaching a diagnosis. Images of these findings were captured and stored in the system along with patient details for future reference. Then a 4-5 mm punch biopsy of the lesion was done under local anesthesia and sent for histopathological examination (HPE). Hematoxylin and Eosin (H&E) staining was done, and histopathological features were noted. The clinical and dermoscopic findings were compared and contrasted with the histopathological features and a conclusive diagnosis was reached. All the data obtained was tabulated and statistically analyzed at the end of the study using SPSS version 20.0, to obtain valid conclusions. Continuous variables are presented as mean ± SD and discrete variables are shown as percentages.

**Results**

In psoriatic patients included in the study (as shown in table 1), the most common age group affected was 21-40 years (52.27%) with a mean age of 38.52 ±15.3 years, 79.54% of the total patients were males indicating a male preponderance (Male:Female ratio = 3.88:1). The duration of disease ranged from 10 days to 4 years, with 45.45% belonging to the 3-6 months group. The morphological patterns observed were erythematous (90.90%), hyperpigmented (6.81%), scaly (100%), papules (31.81%) and plaques (86.36%) and the commonest sites involved were trunk (77.27%), upper limbs (72.72%), lower limbs (70.45%). Lesions were also present on the scalp (36.36%) and face (4.54%).

44 patients of different morphological variants of psoriasis were included in our study of which 29 (65.9%) had plaque psoriasis, 5 (11.36%) had guttate psoriasis, 3 (6.81%) had palmo-plantar psoriasis, 4 (9.09%) had scalp psoriasis and 1 case (2.27%) each of flexural, erythrodermic and elephantine psoriasis. Table 2 shows distribution of dermoscopic vascular features in psoriasis. Red globules (RG) were seen in 33 patients (75%), glomerular like vessels (GLV) in 10 patients (22.72%) and red dots (RD) in 1 patient (2.27%). In all 44 patients (100%) these dilated vessels were arranged in a homogenous or regular pattern.

**Table 1: Distribution of psoriasis patients according to age group, gender, duration of the disease**

| Variables | Psoriasis (N=44) |
|-----------|-----------------|
| Age       | n (%)           |
| 1-20 years| 5 (11.36)       |
| 21-40 years| 23 (52.27)     |
| 41-60 years| 14 (31.81)     |
| >60 years | 2 (4.54)        |
| Gender    |                 |
| Male      | 35 (79.54)      |
| Female    | 9 (20.54)       |
| Duration  |                 |
| <1 month  | 3 (6.81)        |
| 1-2 months| 11 (25)         |
| 3-6 months| 20 (45.45)      |
| 7 months-1 year| 3 (6.81) |
| >1 year   | 7 (15.9)        |
Table 2: Distribution of vascular features on dermoscopy in variants of psoriasis

| Parameter          | Plaque n(%) | Guttate n(%) | Scalp n(%) | Palmoplantar n(%) | Flexural n(%) | Erythrodermic n(%) | Elephantine n(%) | Total n(%) |
|--------------------|-------------|--------------|------------|-------------------|---------------|--------------------|------------------|------------|
| Vascular morphology| Red dots    | -            | -          | 1 (33.33)         | -             | -                  | -                | 1 (2.27)   |
|                    | (RD)        |              |            |                   |               |                    |                  |            |
|                    | Red globules| 20 (68.96)  | 4 (80)     | 2 (66.66)         | 1 (100)       | 1 (100)            | 1 (100)          | 33 (75)    |
|                    | (RG)        |              |            |                   |               |                    |                  |            |
|                    | GLV         | 9 (31.03)   | 1 (20)     | -                 | -             | -                  | -                | 10 (22.72) |
| Distribution       | Regular     | 29 (100)    | 5 (100)    | 4 (100)           | 3 (100)       | 1 (100)            | 1 (100)          | 44 (100)   |
|                    | Patchy      | -            | -          | -                 | -             | -                  | -                | -          |
|                    | In rings    | -            | -          | -                 | -             | -                  | -                | -          |

Table 3: Distribution of patients according to scale color and arrangement on dermoscopy in variants of psoriasis

| Parameter         | Plaque n(%) | Guttate n(%) | Scalp n(%) | Palmoplantar n(%) | Flexural n(%) | Erythrodermic n(%) | Elephantine n(%) | Total n(%) |
|-------------------|-------------|--------------|------------|-------------------|---------------|--------------------|------------------|------------|
| Scale color       | White       | 28 (96.55)  | 5 (100)    | 3 (75)            | 2 (66.66)     | 1 (100)            | 1 (100)          | 41 (93.18) |
|                   | White+Yellow| 1 (3.44)    | -          | 1 (25)            | 1 (33.33)     | -                  | -                | 3 (6.81)   |
|                   | Yellow      | -            | -          | -                 | -             | -                  | -                | -          |
| Arrangement       | Patchy      | 3 (10.34)   | 1 (20)     | -                 | 2 (66.66)     | 1 (100)            | -                | 7 (15.9)   |
|                   | Diffuse     | 26 (89.65)  | 2 (40)     | 4 (100)           | 1 (33.33)     | -                  | 1 (100)          | 35 (79.54) |
|                   | Peripheral  | -            | 2 (40)     | -                 | -             | -                  | -                | 2 (4.54)   |
|                   | Central     | -            | -          | -                 | -             | -                  | -                | -          |

Fig 1. Clinical photographs of patients showing [A], [B]: Plaque psoriasis with multiple erythematous scaly plaques on upper limb and trunk, respectively.

Fig 2. Clinical photographs of patients with [A] Flexural psoriasis, [B] Guttate psoriasis, [C]: Scalp psoriasis, [D]: Plaque psoriasis.
Fig 3. Videodermoscopic images of psoriatic lesions in polarizing mode showing: [A]: Silvery white scales distributed uniformly throughout the lesion, [B]: Red globules arranged in a homogeneous pattern on a light red background, [C]: Uniformly distributed dilated/bushy capillaries.

Fig 4. Videodermoscopic images of psoriatic lesions in polarizing mode showing [A]: Uniformly distributed glomerular like vessels, [B]: Red globules in a homogenous distribution, [C], [D]: Red dots/globules arranged linearly along the furrows of dermatoglyphics in a case of palmo-plantar psoriasis.

Fig 5. Videodermoscopic images of psoriatic lesions in polarizing mode showing [A], [C]: White scales with homogeneously arranged red globules on a dull red background, [B]: Grey blue background with regularly arranged red globules in hypertrophic psoriasis, [D]: Homogenously arranged red globules in a case of scalp psoriasis.

Fig 6. Image of histopathology slide of psoriasis (40x magnification, Hematoxylin & Eosin staining) showing hyperkeratosis, parakeratosis, hypergranulosis, acanthosis, suprapapillary thinning, elongation of rete ridges, dilated dermal capillaries, dermal lymphocytic infiltration.
Of the 33 patients in whom RG were seen, 20 belonged to the plaque variant, 4 patients each to the guttate and scalp variants, 2 patients to the palmoplantar type and 1 patient each to flexural, erythrodermic and elephantine types. 10 patients presented with GLV, of which 9 patients belonged to the plaque variant and 1 patient to the guttate variant. Table 3 shows that of the 44 patients, 93.18% had white scale color, while white+yellow scale color was seen in 6.81% of cases, 79.54% had diffuse arrangement of scales, patchy arrangement was seen in 15.9% and peripheral arrangement in 4.54% of the cases. As shown in table 4, light red background was seen on dermoscopy in 25 patients (56.81%), dull red in 18 patients (40.9%), and grey blue background was seen in 1 patient (2.27%) belonging to the elephantine variant. In the 37 patients in whom biopsy was performed the following features were noted: Hyperkeratosis (75.67%), parakeratosis (89.18%), diminished/absent granular layer (86.48%), acanthosis (81.08%), micro-abscesses (70.27%), supra-papillary thinning (86.48%), dilated capillaries (97.29%), lymphocytic infiltrate (100%) and spongiosis (24.32%). Of the 37 cases, 33 patients (89.18%) had typical psoriasis histopathology, spongiosis (24.32%). Of the 37 cases, 33 patients (97.29%), lymphocytic infiltrate (100%) and acanthosis (81.08%), micro-abscesses (70.27%), supra-papillary thinning (86.48%), dilated capillaries (97.29%) showed a dull red background. Lallas et al<sup>8</sup> studied 139 lesions in 85 patients with psoriasis and found that while the vascular features were the same in all variants, the frequency of white scales varied according to the different body sites. They noted that white scales were detected in all scalp and palmoplantar lesions, while flexural and genital psoriasis showed little to no scaling. A similar pattern was noticed in our patients, with patchy, white, minimal scales in flexural psoriasis, more hyperkeratotic scales in palmoplantar psoriasis and diffuse, white scaling in rest of the variants. Background color is also an important feature to consider while making a dermoscopic diagnosis. In this series, different background colors were noted (as shown in table 4) in psoriasis patients of which 56.81% showed a light-red background and 40.9% showed a dull red background. Lallas et al<sup>8</sup> noted the background colors of light red in 41% and dull red in 58% cases in their study, while Pan et al<sup>9</sup> found a predominance of light red color (78%). Grey blue background was found in a single case in our study (i.e. in the elephantine variety); this observation was previously noted only by Chandravathi et al<sup>10</sup>.

As stated earlier, the dermoscopic vascular findings observed in this study were Red globules/RG (75%), Glomerular Like Vessels/GLV (22.72%) and Red dots/RD (2.27%) arranged in a homogenous regular pattern in 100% cases. 20 (68.96%) of the 29 plaque psoriasis cases showed RG and 9 (31.03%) showed GLV. 80% of guttate psoriasis cases showed RG, while remaining 20% revealed GLV. 100% of scalp, flexural, erythrodermic and elephantine psoriasis cases showed RG. RD was seen only in a single case (33.33%) and RG in 66.66% cases of palmoplantar psoriasis.

| Background color | Plaque n(%) | Guttate n(%) | Scalp n(%) | Palmoplantar n(%) | Flexural n(%) | Erythrodermic n(%) | Elephantine n(%) | Total n(%) |
|-----------------|------------|-------------|-----------|------------------|--------------|------------------|-----------------|------------|
| Light red       | 17(58.62)  | 4(80)       | 1(25)     | 2(66.66)         | 1(100)       | -                | -               | 25(56.81)  |
| Dull red        | 12(41.37)  | 1(20)       | 3(75)     | 1(33.33)         | -            | 1(100)           | -               | 18(40.9)   |
| Yellowish       | -          | -           | -         | -                | -            | -                | -               | -          |
| Gray-blue       | -          | -           | -         | -                | -            | -                | 1(100)         | 1(2.27)    |

Discussion

Psoriasis is a relatively common papulosquamous disorder which bears clinical overlap with other inflammatory conditions like pityriasis rosea, dermatitis, lichen planus, etc. Histopathology helps in the definitive diagnosis of these conditions but is invasive and may not always be feasible to perform. Dermoscopy is a suitable alternative for this purpose and shows characteristic combination of features in different diseases<sup>4</sup>. In our study, on dermoscopy, scaling was seen in all the cases (100%) and silvery white scales were observed in 93.18% with a diffuse distribution (79.54%). Atypical features like white+yellow scales (6.81%), patchy (15.9%) and peripheral (4.54%) distribution of scales were seen in a relative minority. Surface features like scale morphology were better visible in the white light mode and the vascular features like vessel morphology, background color were better appreciated with the polarized light. Lallas et al<sup>8</sup> studied 139 lesions in 85 patients with psoriasis and found that while the vascular features were the same in all variants, the frequency of white scales varied according to the different body sites. They noted that white scales were detected in all scalp and palmoplantar lesions, while flexural and genital psoriasis showed little to no scaling. A similar pattern was noticed in our patients, with patchy, white, minimal scales in flexural psoriasis, more hyperkeratotic scales in palmoplantar psoriasis and diffuse, white scaling in rest of the variants. Background color is also an important feature to consider while making a dermoscopic diagnosis. In this series, different background colors were noted (as shown in table 4) in psoriasis patients of which 56.81% showed a light-red background and 40.9% showed a dull red background. Lallas et al<sup>8</sup> noted the background colors of light red in 41% and dull red in 58% cases in their study, while Pan et al<sup>9</sup> found a predominance of light red color (78%). Grey blue background was found in a single case in our study (i.e. in the elephantine variety); this observation was previously noted only by Chandravathi et al<sup>10</sup>.

As stated earlier, the dermoscopic vascular findings observed in this study were Red globules/RG (75%), Glomerular Like Vessels/GLV (22.72%) and Red dots/RD (2.27%) arranged in a homogenous regular pattern in 100% cases. 20 (68.96%) of the 29 plaque psoriasis cases showed RG and 9 (31.03%) showed GLV. 80% of guttate psoriasis cases showed RG, while remaining 20% revealed GLV. 100% of scalp, flexural, erythrodermic and elephantine psoriasis cases showed RG. RD was seen only in a single case (33.33%) and RG in 66.66% cases of palmoplantar psoriasis.

Table 4: Distribution of patients according to background color on dermoscopy in variants of psoriasis

| Background color | Plaque n(%) | Guttate n(%) | Scalp n(%) | Palmoplantar n(%) | Flexural n(%) | Erythrodermic n(%) | Elephantine n(%) | Total n(%) |
|-----------------|------------|-------------|-----------|------------------|--------------|------------------|-----------------|------------|
| Light red       | 17(58.62)  | 4(80)       | 1(25)     | 2(66.66)         | 1(100)       | -                | -               | 25(56.81)  |
| Dull red        | 12(41.37)  | 1(20)       | 3(75)     | 1(33.33)         | -            | 1(100)           | -               | 18(40.9)   |
| Yellowish       | -          | -           | -         | -                | -            | -                | -               | -          |
| Gray-blue       | -          | -           | -         | -                | -            | -                | 1(100)         | 1(2.27)    |
Lallas et al⁴ noted that most cases of plaque psoriasis showed red dots, which were distributed regularly. They concluded that the combination of regularly distributed dotted vessels over a light red background along with diffuse white scales was highly predictive of psoriasis and that deviation from these findings significantly decreased the probability of a diagnosis of psoriasis⁴. In our study, we did not see red dots in a significant number of cases; instead there was a predominance of red globules followed by glomerular like vessels. In the studies by Vasquez-Lopez et al¹¹ and Chandravathi et al¹⁰ RG, GLV in homogenous distribution were the predominant vascular findings. Musumeci et al¹² described videodermoscopic findings in psoriasis and noted the presence of dilated capillaries with a bushy aspect distributed homogeneously throughout the lesions. As the magnification of the device increases the diameter of the vessels appears more and shows the tortuosity of the vessels. The variations observed in different studies may be attributable to the use of different models of dermoscope / videodermoscope which provide variable magnifications. Dilated vessels on dermoscopy are not a standalone feature suggestive of psoriasis as they may occur in other inflammatory and neoplastic disorders. Therefore, they must be assessed in combination with vascular arrangement and other non-vascular findings⁴. In the present study, a combination of dermoscopic features, i.e. Red globules (RG) and glomerular like vessels (GLV) in a regular arrangement over a light red background, along with white scales in a diffuse distribution were found to be significant.

Once a clinico-dermoscopic diagnosis was made, biopsy was performed where feasible. Of the 37 patients (84.09%) in whom biopsy could be done, histopathology was suggestive of psoriasis in 33 (89.18%) cases. Remaining 4 (10.81%) cases showed psoriasiform / non-specific features. The most common histological features observed in classical cases of psoriasis were hyperkeratosis,
parakeratosis, decreased or absent granular layer, dilated blood vessels, supra papillary thinning, neutrophil abscesses, elongation of rete ridges. This was comparable to the findings of a study conducted by Gordon and Johnson\textsuperscript{10}. Dermoscopic features seen can be explained by these underlying microscopic histopathological changes in psoriatic skin. A positive clinicodermoscopic-histopathological correlation was seen in 75% cases of psoriasis. In 15.9% cases biopsy could not be done as patients were either not willing or not suitable for the procedure. There was a clinicodermoscopic-histopathological dissonance in only 10.81% cases. However, dilated capillaries and hyperkeratosis were seen on histopathological examination, in 97.29% and 75.67% cases respectively which explains the positive clinicodermoscopic correlation seen despite a non-specific histopathological diagnosis, since dilated capillaries in regular arrangement and diffuse white scales are major dermoscopic criteria for psoriasis.

In this study, dermoscopic assessment was done by a single observer with no appraisal of inter observer reproducibility, biopsy could not be done in all patients, not all variants of psoriasis were included. These limitations should be addressed in future studies.

Conclusion

Though histopathology remains the gold standard diagnostic test for psoriasis, based on the observations noted in the present study, it may be concluded that dermoscopy is a feasible, non-invasive test which provides another level of morphology between the macroscopic clinical and microscopic histopathological features. Further standardization of the relevant dermoscopic criteria in psoriasis may obviate the need for invasive procedures.

Declaration of patient consent: The authors certify that they have obtained appropriate consent forms in which the patients have given consent for their images and other relevant clinical information to be reported in the journal, with the understanding that their names or initials will not be published, and proper 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.

References

1. Nischal KC, Khopkar U. Dermoscope. Indian J Dermatol Venereol Leprol. 2005 Jul-Aug;71(4):300-3. doi: 10.4103/0378-6323.16633. PMID: 16394450.

2. Micai G, Lacarrubba F, Massimino D, Schwartz RA. Dermatoscopy: alternative uses in daily clinical practice. J Am Acad Dermatol. 2011 Jun;64(6):1135-46. doi: 10.1016/j.jaad.2010.03.010. Epub 2011 Feb 3. PMID: 21292346.

3. Burden AD, Kirby B. Psoriasis and related disorders. In: Griffiths C, JonathanB, Tanya B., RobertC, Daniel C, eds. UK: Wiley Blackwell, 2016; 35-1-35.48.

4. Lallas A, Kyrgidis A, Tzellos TG, Apalla Z, Karakyiou E, Karatolas A, Lefaki I, Sotiriou E, Ioannides D, Argenziano G, Zalaudek I. Accuracy of dermoscopic diagnosis of psoriasis, dermatitis, lichen planus and pityriasis rosea. Br J Dermatol. 2012 Jun;166(6):1198-205. doi: 10.1111/j.1365-2133.2012.10868.x. PMID: 22296226.

5. Soyer HP, Argenziano G, Chimenti S, Ruocco V. Dermoscopy of pigmented skin lesions. Eur J Dermatol. 2001 May-Jun;11(3):270-6; quiz 277. PMID: 11358742.

6. Lallas A, Zalaudek I, Argenziano G, Longo C, Moscarella E, Di Lernia V, Al Jailout S, Apalla Z. Dermoscopy in general dermatology. Dermatol Clin. 2013 Oct;31(4):679-94, x. doi: 10.1016/j.det.2013.06.008. Epub 2013 Jul 16. PMID: 24075553.

7. Zalaudek I, Argenziano G, Di Stefani A, Ferrara G, Marghoob AA, Hofmann-Wellenhof R, Soyer HP, Braun R, Kerl H. Dermoscopy in general dermatology. Dermatology. 2006;212(1):7-18. doi: 10.1159/000089015. PMID: 16319467.

8. Lallas A, Apalla Z, Argenziano G, Sotiriou E, Di Lernia V, Moscarella E, Longo C, Sidirooulos T, Zalaudek I. Dermoscopic pattern of psoriatic lesions on specific body sites. Dermatology. 2014;228(3):250-4. doi: 10.1159/000357914. Epub 2014 Feb 15. PMID: 24556706.

9. Pan Y, Chamberlain AJ, Bailey M, Chong AH, Haskett M, Kelly JW. Dermatoscopy aids in the diagnosis of the solitary red scaly patch or plaque-features distinguishing superficial basal cell carcinoma, intraepidermal carcinoma, and psoriasis. J Am Acad Dermatol. 2008 Aug;59(2):268-74. doi: 10.1016/j.jaad.2008.05.013. Epub 2008 Jun 11. PMID: 18550207.

10. Chandravathi PL, Awake P, Kota M. A cross-sectional analysis of dermoscopic patterns distinguishing between psoriasis and Lichen planus: A study of 80 patients. Journal of Evolution of Medical and Dental Sciences. 2015 Dec 31; 4(105):17017-17022. doi: 10.14260/jemds/2015/2574.

11. Vázquez-López F, Kreusch J, Marghoob AA. Dermosscopic semiology: further insights into vascular features by screening a large spectrum of non-tumoral skin lesions. Br J Dermatol. 2004 Feb;150(2):226-31. doi: 10.1111/j.1365-2133.2004.05753.x. PMID: 14996092.

12. Musumeci ML, Lacarrubba F, Verzi AE, Micai G. Evaluation of the vascular pattern in psoriatic plaques in children using videodermatoscopy: an open comparative study. Pediatr Dermatol. 2014 Sep-Oct;31(5):570-4. doi: 10.1111/pde.12283. Epub 2014 Jan 3. PMID: 24383819.

13. Gordon M, Johnson WC. Histopathology and histochemistry of psoriasis. I. The active lesion and clinically normal skin. Arch Dermatol. 1967 Apr;95(4):402-7. PMID: 6023045.