

# Vascular pattern in psoriasis - A dermoscopic study

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## Abstract

**Background:** Psoriasis is a common human skin disease which is seen worldwide, in all races, and in both sexes. It is a complex, chronic, multifactorial, inflammatory disease that involves hyperproliferation of the keratinocytes in the epidermis, with an increase in the epidermal cell turnover rate and dilatation of dermal papillary blood vessels. Classic presentation is well-circumscribed, reddish and scaly papules and plaques typically on the elbows, knees and scalp, in addition to other cutaneous sites. A Dermoscope is a non-invasive, diagnostic tool which visualizes subtle clinical patterns and subsurface skin structures not normally visible to the unaided eye. Dermoscopic patterns of inflammatory skin diseases could be a valuable addition for the clinical assessment. **Aim:** To study various Vascular pattern of Dermoscopy in psoriasis. **Materials and Methods:** A total of sixty nine lesions of 51 patients with a definite diagnosis of psoriasis, based on either a typical clinical presentation of the disease or on his topathologic confirmation were enrolled. Cases diagnosed clinically were included only in the availability of clinical images justifying a definite clinical diagnosis of psoriasis and the availability of a dermoscopic image of the lesions. **Results:** A total of fifty one patients were included in the study. Homogenous and regular vascular pattern was common among all the patients. Red dots (98.03%) were the most commonest dermoscopic findings followed by cork-screw patterned vessels (33.33%). Regularly distributed dotted vessels represented a constant finding in all psoriatic skin lesions in all body sites. **Conclusion:** Psoriasis shows specific Dermoscopic patterns that may aid their clinical diagnosis and certain combinations of dermoscopic features can reliably predict the diagnosis of psoriasis. In this study homogenous regular red dots were the constant feature observed among 50(98.03%) patients.

**Key Word:** Red dots, Cork-screw shaped vessels, Red-globules, Comma-shaped vessels, Hairpin-like vessels.

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## INTRODUCTION

Psoriasis is a common human skin disease which is seen worldwide, in all races, and both sexes<sup>1</sup>. It is estimated that psoriasis affects around 2-3% of the Western populations<sup>2</sup> and the etiology is still unknown. It has been recognized from the ancient times, although it was sometimes mistaken for leprosy. It is a chronic condition with a variable course, periodically improving and

worsening and it is not contagious. It occurs when the immune system sends out faulty signals that speed up the growth cycle of epidermal skin cells. As a consequence there is an excessive growth and abnormal differentiation of keratinocytes, which macroscopically results to increased redness and scaling of the skin. Until recently it was believed to be incurable. However, recent studies show that there are new therapies emerging which target the molecular origin of the disease and could lead to its cure<sup>3</sup>. The diagnosis of psoriasis is usually established on clinical grounds, based on the characteristic morphology and distribution of the lesions. However, cases with less typical clinical presentation do exist, particularly when the psoriatic lesions are distributed on unusual body sites. In such occasions, the clinical discrimination of the disease from other erythematous-squamous dermatoses might be challenging<sup>4</sup>. A Dermoscope (Dermatoscope) is a non-invasive, diagnostic tool which visualizes subtle clinical patterns of skin lesions and subsurface skin structures not

normally visible to the unaided eye. It has also been called as Skin Surface Microscope, Epiluminescence Microscope or Episcopes. Some Dermoscopic pattern are observed consistently with certain diseases and these then could be used for their diagnosis. Hence, this office procedure may obviate the need for a skin biopsy for diagnosis and for follow-up. The facility of storage of images and the results being immediately available are added advantages. Basically, a Dermoscope is functionally similar to a magnifying lens but with the added features of an inbuilt illuminating system, a higher magnification which can be adjusted, the ability to assess structures as deep as in the reticular dermis, and the ability to record images. The basic principle of Dermoscopy is transillumination of a lesion and studying it with a high magnification to visualize subtle features<sup>5</sup>. Light incident on skin undergoes reflection, refraction, diffraction and absorption. These phenomena are influenced by physical properties of the skin. Most of the light incident on dry, scaly skin is reflected, but smooth, oily skin allows most of the light to pass through it, reaching the deeper dermis. This principle has been harnessed to improve the visibility of subsurface skin structures by employing application of linkage fluids over the lesions to be studied to improve the translucency of the skin. Various linkage fluids used are oils (immersion oil, olive oil and mineral oil), water, an antiseptic solution and glycerin. Immersion oil is not used because it contains chlorinated paraffin and dibutyl phthalate which have teratogenic, fetotoxic, and carcinogenic effects<sup>6</sup>. Water or antiseptic solutions evaporate quickly and hence are less preferred than oils. We have used ultrasound gel, which is inexpensive, safe and easily available, with good results. Glass has a refractive index (1.52) similar to that of skin (1.55) and hence when placed over gel-applied skin, further enhances transillumination of the lesion. Dermoscopy can be done by either the non-contact or the contact technique. In the contact technique, the glass plate of the instrument comes in contact with the surface of the linkage fluid applied on lesion. In contrast, in the non-contact technique, there is no contact of the lens with the skin; the cross-polarized lens absorbs all the scattered light and hence allows only light in a single plane to pass through it. While the non-contact technique ensures that there is no nosocomial infections<sup>7</sup>, this advantage is overshadowed by the disadvantages of decreased illumination and poor resolution<sup>8</sup>. The color seen through a Dermoscope depends on various factors. The two main chromophores detected are melanin, which appears as a black, brown, bluish or greyish color depending on its depth in the skin and hemoglobin which can exhibit red, bluish, or even purple tones,

depending in its depth, degree of oxidation, and the presence or absence of thrombosis<sup>9</sup>. Recently, dermoscopy was assessed as an accurate method to differentiate between psoriasis and other inflammatory skin diseases commonly included in the differential diagnosis, namely dermatitis, lichen planus and pityriasis rosea<sup>10</sup>.

## MATERIALS AND METHODS

### Study Design and Subjects

This study was designed as a prospective observational clinical study of one year duration in the Department of Dermatology in H.S.K Hospital Bagalkot Karnataka, India, their mean ages were 40years with standard deviation of  $\pm 13$  years. A total of 69 lesions of 51 patients present at different body sites [Table/Fig-1] with a definite diagnosis of psoriasis, based on either a typical clinical presentation of the disease [Table/Fig-2] or on histopathologic confirmation in clinically equivocal cases were enrolled. Written informed consent was obtained from all subjects prior to enrollment. Subjects were not allowed to use any systemic, topical or phototherapy based psoriatic treatment during the course of this study. Inclusion criteria were:<sup>1</sup> a definite diagnosis of psoriasis, based on either a typical clinical presentation of the disease or on histopathologic confirmation in Clinically equivocal cases—cases diagnosed clinically were included only in the availability of clinical images justifying a definite clinical diagnosis of psoriasis;<sup>2</sup> the presence of one or more psoriatic lesions located on one or more of the following body sites: hands, legs, back, knees, elbows, scalp, face, palms, soles, genitalia and folds (inverse psoriasis); and 3 the availability of a dermoscopic image of each included lesion. Exclusion criteria were topical or systemic treatment within 1 and 6 months prior to dermoscopic examination, respectively, as well as the presence of clinical signs indicative of steroid-induced atrophy. The study was approved by the Ethical Committee of S. Nijalingappa Medical College. **SAMPLE SIZE :** It was calculated by using reference article : Accuracy of dermoscopic criteria for the diagnosis of psoriasis, dermatitis, lichen planus and pityriasis rosea A. Lallas, A. Kyrgidis, T.G. Tzellos,–Z. Apalla, E. Karakyrriou, A. Karatolias, I. Lefaki, E. Sotiriou, D. Ioannides, G. Argenziano\_ and I. Zalaudek of British Journal of Dermatology dated on 24<sup>th</sup> January 2012. Prevalence of homogenous regular red dots = 95% and absolute precision = 6% by using Open Epi software and sample size = 51 (n=51).

### METHODS

For each study subject, one Dermoscopic image was extracted from the database. Dermoscopic images had

been captured with a DermLite-3N Equipment at 10 fold magnification. Minimal pressure was applied and ultrasound gel was used in order to preserve vessel morphology and ensure better visualization. In highly hyperkeratotic lesions where the scale impeded the visualization of the underlying structures, it had been focally removed with the use of an alcoholic solution. Two independent investigators evaluated the dermoscopic images for the presence of predefined criteria. The selection of dermoscopic variables was based on the available literature which included:<sup>1</sup> vascular morphology (dotted and/or linear); (2) vascular arrangement (regular: homogeneous distribution within the lesion; patchy: arranged in clusters in an irregular, nonspecific pattern; peripheral: arranged mainly at the periphery of the lesion; or in rings: red globules distributed in rings or polygons adjacent to each other).  
**Clinical Outcome Assessments:** Dermoscopy is useful for assessing the efficacy of treatment in psoriasis as clinicians can monitor changes in vascular patterns, which consist of a marked reduction in the density and length of vessels that is proportional to the clinical

improvement seen in the lesions. Evaluations included recording of homogenous regular red dots, cork-screw shaped vessels, red globules, comma-shaped vessels and hair-pin-like vessels [Table/Fig-3a-3d].

**Statistical Analysis:** Mean, Standard Deviation and Percentage were calculated as Quantitative data and Proportion was calculated as Qualitative data (P=95%).

**RESULTS**

Sixty nine lesions from fifty one patients diagnosed clinically based on the typical morphology and distribution of the lesions as psoriasis were included in the study [Table/Fig-2]. 18 out of 69 lesions were located on hands (26.1%), 16 (23.2%) on legs, 7 (10.14%) on nails, 5 (7.24%) on scalp, 4 (5.8%) over fingers, 4(5.8%) over palms, 3 (4.35%) over back, beard area, knees and feet, 1 (1.44%) over sacral region, ear pinna and elbows [Table/Fig-4]. The study included patients between 18-68 years of age, mean age being 40 ± 13 with 38(74.50%) males and 13(25.49%) females [Table/Fig-5].

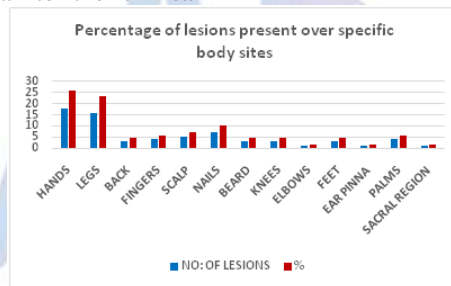


Figure 1: Here we are showing number of lesions in this study being 69 lesions of 50 patients present at different body sites.



Figure 2: A 45year old man presenting clinically as well-defined, erythematous scaly plaque over hands and legs which is typical of psoriasis.

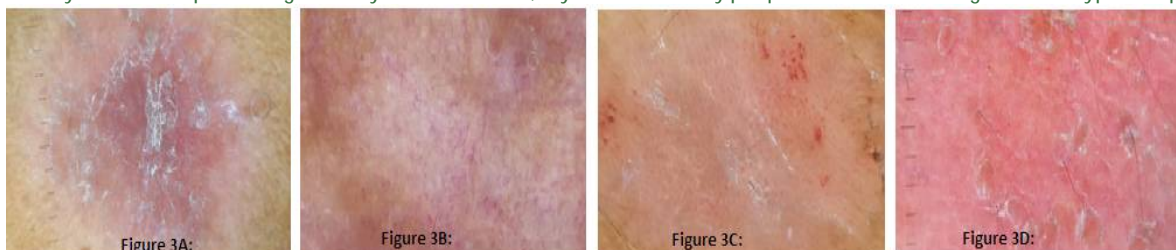


Figure 3A: Vascular pattern of Dermoscopy showing Homogenous regular Red dots; Figure 3B: Vascular pattern of Dermoscopy showing as cork-screw shaped vessels; Figure 3C: Vascular pattern of Dermoscopy showing as Red Globules; Figure 3D: Vascular pattern of Dermoscopy showing as Comma-shaped vessels.



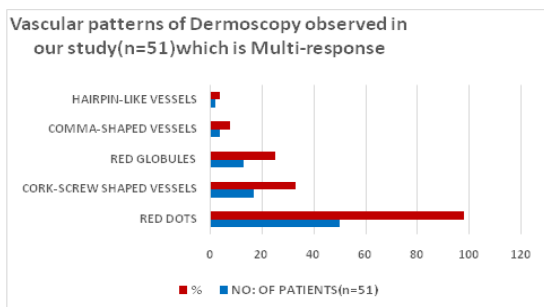


Figure 4

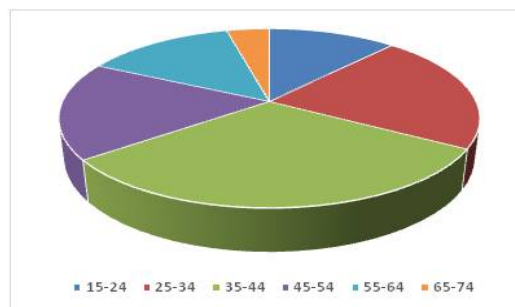


Figure 5

Figure 4: Different Vascular pattern of Dermoscopy observed in 51 patients in this study; Figure 5: Showing age of patients enrolled in this study where grey indicates that majority of patients were 35-44years old with mean age being 40 years.

## DISCUSSION

The present study demonstrates that the well-known Dermoscopic criteria of psoriasis highlights the diversity of the dermoscopic pattern of the disease in different locations. Homogenous and regularity of the vessels seen under dermoscope as vascular pattern was constant in all the patients in this study. Red dots were a constant finding in all body sites, although their presence is considered 'prerequisite' for the diagnosis of Psoriasis, dotted vessels do not represent a specific dermoscopic feature, since they can be seen in several other inflammatory skin diseases, including dermatitis and pityriasis rosea<sup>11-13</sup>. Our study has some limitations. First, the prospective design carries a certain risk of selection and evaluation bias, given that we included only cases with available dermoscopic images. However, the selection bias is limited by the fact that, in our department, patients with psoriasis are routinely examined dermoscopically and dermoscopic images are recorded in our database. Therefore the cases included are not preselected, but represent routine cases that met the inclusion criteria of our study. The evaluation bias was minimized by the assessment of two independent evaluators. Second, we did not include a control group. This is related to the study goal, which aimed to improve the knowledge on the dermoscopic vascular morphology of psoriasis at unusual locations rather than testing the diagnostic accuracy of dermoscopy for these lesions and sites. Third, although ultrasound gel was used for image capturing in order to preserve vessel morphology, we cannot exclude the possibility that the use of alcoholic solution and friction for scale removal in hyperkeratotic lesions might have influenced the morphology of superficial capillaries. Finally, the possibility that the dermoscopic pattern of the psoriatic lesions could have been affected by previous treatments cannot be ruled out, although cases with evident steroid-induced atrophy and patients with administration of topical or systemic treatments within 1 and 6 months prior to dermoscopic examination were excluded.

## CONCLUSION

In conclusion, the vascular pattern of Dermoscopy in psoriasis had constant feature of being homogenous and regular. Our results highlight that the most common Dermoscopic findings seen are as red dots (98.03%) followed by cork-screw pattern of vessels (33.33%). This helps physician diagnose the condition in routine basis avoiding for invasive procedures like skin biopsies and also treating the patient accordingly with all the ease.

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