



Original Research Article

Dermoscopic evaluation of psoriasis and its association with clinical and histopathological features – A cross-sectional analytical study

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Abstract

Background: Limited data on the effectiveness of dermoscopy in diagnosing psoriasis.

Aim and objectives: To document the dermoscopic findings and to determine the association between clinical, dermoscopic and histopathological features in psoriasis.

Materials and Methods: It is a hospital based cross sectional analytical study conducted among psoriatic patients during a period of 18 months. Sample size was calculated as 55. Clinical variables like morphology, character and color of scales, dermoscopic features like background color, pattern and distribution of vessels, scale color and distribution, and histopathologic parameters were documented. The data was analysed using SPSS software version 29.0. Chi square or Fisher's Exact test was used to find association between clinical, dermoscopic and histopathological features.

Results: The commonest morphology was plaque type psoriasis (63.64%). The scales were larger (83.6%) and white in color (100%) clinically. Dermoscopy demonstrated white scales in diffuse arrangement (89.1%) and dotted vessels (90.9%) arranged regularly in a light red background (60%). Biopsy showed parakeratosis, regular acanthosis and club shaped rete ridges in all participants. Other features demonstrated were agranulosis (80%), dilated blood vessels (86.6%), perivascular lymphocytic infiltrate (96.6%), Munro microabscess (66.6%) and spongiform pustules of Kogoj (36.6%). Statistically significant association was found between clinical morphology and vascular morphology ($p=0.011$), agranulosis and background color ($p=0.013$), dilated blood vessel and vascular morphology ($p=0.003$). Also, the red dotted vessels in dermoscopy was consistent with all the histopathological parameters.

Limitation: Larger sample size is required to strengthen the study.

Conclusion: Dermoscopy can be understandably within reason used to diagnose and differentiate psoriasis from other similar psoriasiform conditions.

Keywords: Chronic plaque psoriasis, Dermoscopy, Red dotted vessels, Munro microabscess, Spongiform pustules of Kogoj

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1. Introduction

Psoriasis is a chronic immune mediated disease characterized by erythematous scaly plaques. The world health organization recognized psoriasis to be a serious non-communicable disease in the year 2014. The prevalence of psoriasis in adults varies from 0.27% to 11.4% globally.¹ Dermoscopy is a non invasive technique which helps in evaluating structures as deep as reticular dermis.² The dermoscopy of psoriatic lesion shows regularly distributed dotted vessels and white scales in diffuse distribution.³ Histopathology shows parakeratosis, regular acanthosis, Munro's microabscess, hypogranulosis, dilated vessels and perivascular infiltrate. The diagnostic histopathological features of psoriasis are spongiform pustules of Kogoj and

Munro microabscess.^{4,5} Lesions of eczema, lichen planus and pityriasis rosea act as close differentials for psoriasis. Biopsy may be needed for diagnosis which can lead to delay in treatment. Dermoscopy is used as a complementary tool for diagnosis in such situations to differentiate psoriasis from other psoriasiform disorders. However, histopathological examination always remains the gold standard of diagnosis.^{3,6} Hence, this study was conducted to document the dermoscopic features of psoriasis and also assess its efficacy in diagnosing psoriasis.

2. Materials and Methods

It is a hospital based cross sectional analytical study conducted among psoriatic patients during a period of 18

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months from November 2022 to June 2024. Approval from Institute Research Committee and Ethics Committee was obtained. Based on a cross sectional hospital based study, the prevalence of red dots was reported to be 83.3%.⁷ With precision 10% and confidence interval 95%, sample size required for the study was calculated as 55. Consecutive sampling technique was followed. All patients with Psoriasis attending Dermatology OPD irrespective of age and gender were included in the study after obtaining informed consent. Patients with lesions only involving the nails or scalp or both, cases who had used topical or systemic treatment for a period of more than 1 month before recruitment and patients with secondary infection of the skin lesions were excluded from the study. The demographic details and history were collected in the form of interview. Active lesion in the patient was selected and clinically examined followed by dermoscopic evaluation with the help of Heine Delta 30 dermoscope. Biopsy of the same lesion was done using 4 mm skin punch in 30 patients who consented for the procedure. Clinical variables like Morphology, character and color of scales, dermoscopic features like background color, type of vessels, pattern of vessels, scale color and scale distribution and histopathologic parameters like parakeratosis, regular acanthosis, agranulosis, club shaped rete ridges, perivascular lymphocytic infiltrate, Munro's micro abscess, spongiform pustule of Kogoj and dilated blood vessels were documented. The data was analysed using SPSS software version 29.0. Descriptive statistics were summarized using mean and standard deviation for continuous variables and number and percentage for categorical variables. Chi square or Fisher's Exact test was used to find association between clinical, dermoscopic and histopathological features. P value less than 0.05 was considered to be statistically significant.

3. Results

The mean age of the disease participants was 45.95 ± 13.4 years. Male:Female ratio was found to be 1.8:1. The most common morphological type of psoriasis among the present study participants was plaque type (63.64%, n=35), followed by guttate type (18.18%, n=10) (**Figure 1**). One case of erythrodermic psoriasis and flexural psoriasis (inverse type) were reported among the present study participants. Pustular and elephantine type of psoriasis were not reported. The scales were larger in 83.6% participants clinically and white in color in all of them. **Table 1** shows the distribution of dermoscopic parameters among the study participants. **Figure 2** shows the dermoscopic image of chronic plaque psoriasis and guttate psoriasis. Among the 55 study participants, biopsy was taken only for 30 participants who gave consent for the procedure. All 30 specimens demonstrated the features of parakeratosis, regular acanthosis and club shaped rete ridges. Agranulosis was demonstrated in 80% of the participants. The characteristic Munro microabscess and spongiform pustules of Kogoj was demonstrated in 66.6% and 36.6% of the participants respectively (**Figure 3**). Dilated blood vessels were seen in

86.6% of the participants. Perivascular lymphocytic infiltrate was observed in 96.6% participants other features like exocytosis in 6 participants, melanophages in 4 participants and prominent granular layer in 4 participants were observed. Chi-square test or Fisher's Exact test was performed to evaluate the association between clinical, dermoscopic and histopathological parameters. Statistically significant association ($p < 0.05$) using Chi-square test was found between the following parameters:

1. Morphological type of psoriasis and vascular pattern ($p=0.01$)
2. Agranulosis and background color in dermoscopy ($p=0.01$)
3. Dilated blood vessels and vascular pattern ($p=0.003$)

Table 1: Distribution of dermoscopic parameters among the study participants (N=55)

Dermoscopic variables	Percentage (Frequency) N=55
Background color	
Light red	60(33)
Dull red	40(22)
Vascular morphology	
Dotted	90.9 (50)
Linear	5.5(3)
Both	3.6(2)
Vascular arrangement	
Regular	85.45(47)
Clusters	10.91(6)
Patchy	1.8(1)
Peripheral	1.8(1)
Scale color	
White	98.2(54)
Yellow	1.8(1)
Scale distribution	
Peripheral	10.9(6)
Diffuse	89.1(49)
Wickham striae	0

Table 2: Comparison of the dermoscopic features of psoriasis in various studies

Study	Year of the study	Sample size	Commonest vascular feature	Commonest scale feature	Commonest background color
Present study	2024	55	Regularly arranged (85.45%) red dotted vessels (90.9%)	White scales (98.2%) in diffuse distribution (89.1%)	Light red (40%)
Gavvala et al ³⁰	2021	44	Regularly arranged (100%) red globules (75%)	White scales (93.18%) in diffuse distribution (79.54%)	Light red (56.81%)
Awake et al ¹⁷	2020	98	Regularly arranged (90.81%) red dotted vessels (100%)	White scales (71.42%) in diffuse distribution (46.93%)	Light red (58.16%)
Nwako-Mohamadi et al ³	2019	148	Regularly arranged (46.6%) red dotted vessels (64.2%)	White scales (77%) in patchy distribution (55.4%)	Light red (43.9%)

Table 3: Comparison of the association between dermoscopic and histopathological features of psoriasis in the present study and the study conducted by Sailaja et al⁷

Histopathological features	White colored scales		Diffuse distribution of scales		Light red background color		Red dotted vessels		Regular arrangement		Wickham striae	
Study	Present study 2024 N=30	Sailaja et al 2020 N=24	Present study 2024 N=30	Sailaja et al 2020 N=24	Present study 2024 N=30	Sailaja et al 2020 N=24	Present study 2024 N=30	Sailaja et al 2020 N=24	Present study 2024 N=30	Sailaja et al 2020 N=24	Present study 2024 N=30	Sailaja et al 2020 N=24
Parakeratosis	98.2%	-	89.1%	-	60%	-	90.9%	94.11%	85.45%	94.11%	0%	20.58%
Acanthosis	98.2%	-	89.1%	-	60%	-	90.9%	95.12%	85.45%	95.12%	0%	36.58%
Agranulosis	80%	-	70%	-	83.33%	-	83.33%	100%	87.50%	100%	0%	0%
Club shaped rete ridges	98.2%	-	89.1%	-	60%	-	90.9%	95%	85.45%	95%	0%	32.5%
Perivascular lymphocytic infiltrate	93.3%	-	86.6%	-	70%	-	83.3%	94.28%	80%	94.28%	0%	5.71%
Munro’s microabscess	60%	-	63.33%	-	75%	-	80%	100%	75%	100%	0%	0%
Spongiform pustules of Kogoj	36.6%	-	33.33%	-	81.82%	-	81.82%	100%	81.82%	100%	0%	0%
Dilated blood vessels	86.66%	-	80%	-	73.08%	-	92.31%	91.66%	84.62%	91.66%	0%	0%

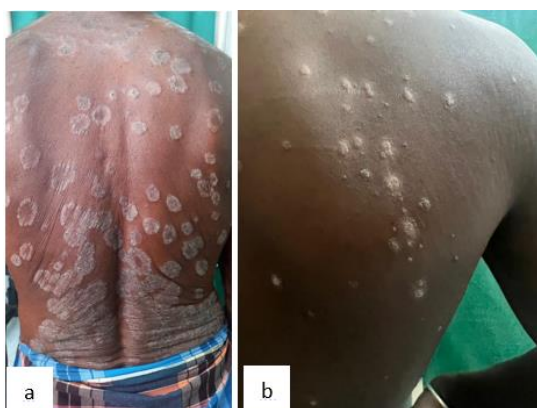


Figure 1: (a) Chronic plaque psoriasis; (b) Guttate psoriasis

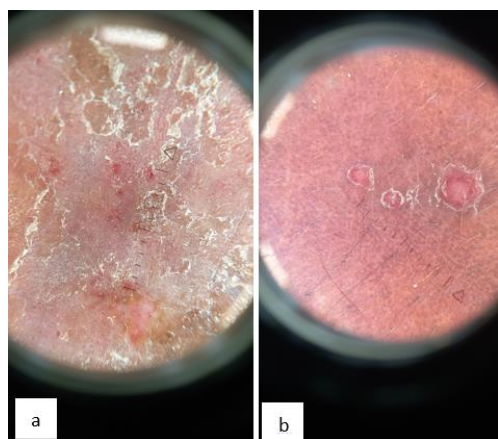


Figure 2: (a) Dermoscopic image of chronic plaque psoriasis showing regularly arranged red dotted vessels and diffusely arranged white scales on a light red background (Heine Delta 30, x10); (b) Dermoscopic image of guttate psoriasis showing peripherally arranged red dotted vessels and peripheral white scales (Heine Delta 30, x10)

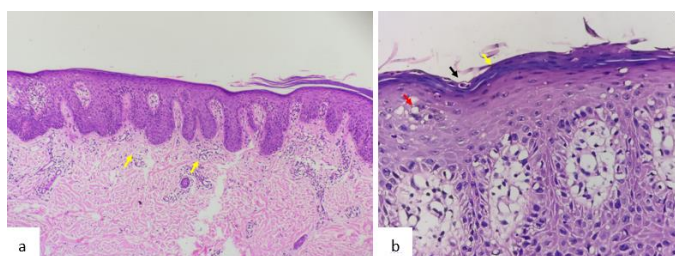


Figure 3: (a) Histopathology of psoriasis (H&E, x10) showing club shaped rete ridges (yellow arrow); (b) Histopathology of psoriasis (H&E, x40) showing parakeratosis (yellow arrow), agranulosis, munro's microabscess (black arrow) and spongiform pustules of kogoj (red arrow)

4. Discussion

Psoriasis is a chronic inflammatory condition with a waxing and waning course. The quality of life of the patients is affected both mentally and physically.⁸ Dermoscopy is a non-invasive tool used for in vivo diagnosis for various conditions. It aids in visualizing the subtle features which are

not visible to the naked eyes.⁹ It helps in differentiating clinically the erythematous squamous dermatosis – chronic dermatitis, pityriasis rosea and lichen planus. Currently, dermoscope is viewed as a necessary adjuvant diagnostic tool in the examination of dermatological patients.¹⁰ Histopathological examination or the biopsy is the gold standard investigation in the diagnosis of psoriasis.¹¹

The study participants were in their 4th and 5th decade at the presentation of the disease. The youngest study participant was 19 years old and the oldest was 80 years old. Thappa DM and Munisamy M in an article has mentioned that the disease affects the patients in their 3rd and 4th decade which is slightly earlier when compared to the present study.¹² Parisi et al has mentioned that the incidence of the disease was at peak at the end of 3rd decade and decreased thereafter in the 4th and 5th decade.¹ The disease was more common among the male study participants in the present study which was similar to the study done by Thappa M et al and Sekar et al.^{12,13} Khalid et al showed the incidence of the disease to be higher among women.¹⁴

The most common type of psoriasis encountered in the present study was chronic plaque type, followed by guttate and palmoplantar type. Earlier, Bedi et al in her study found chronic plaque psoriasis to be the commonest morphology (90%) followed by palmoplantar psoriasis and flexural psoriasis. Guttate psoriasis was one of the uncommon types in his study unlike the present study.¹⁵ Kaur et al also reported similar results to Bedi et al. White scales on examination are characteristic of psoriasis vulgaris.^{16,17} Typical scales in psoriasis is called silvery white scales.¹⁸

Regularly arranged red dotted vessels and white scales with diffuse distribution in a light red background were the commonest dermoscopic findings in the present study. Similar observation was made by Awake et al.¹⁷ Ring or hairpin vessels were not observed in the present study. Wu and sun also observed red dotted vessels in regular arrangement as the commonest finding in dermoscopy of psoriasis. Various studies also acknowledged similar findings in dermoscopy of psoriasis and estimated the diagnostic specificity to be 74%. They also observed ring or hairpin like vessels in 3.6%-44.1% of the cases and the diagnostic specificity was 94.6%-100% which is higher than the dotted vessels.¹⁹⁻²³ Nwako-Mohamadi et al noted red dotted vessels in 64.2% of the patients and regular arrangement was found in 46.6% of the patients. Also, in his study 35.8% of the cases had no obvious vascular differences.³ White scales with diagnostic specificity of 83.8% was the common observation in the study done by Xu et al.²⁴ The scales were arranged in diffuse distribution in 25%-70% of the cases and patchy in 13%-55% of the cases. In a study done by Golinska et al, patchy distribution of the scales was the commonest (55.6%) in the early lesion (<5 weeks) and diffuse distribution was commonest in older lesions (64.5%). Yellow scales were also observed in various studies in older patients due to decreased

skin turnover and orthokeratosis.^{3,20,21,22,25} The light red background was found in psoriasis and the specificity varied from 53%-75.7% in a study done by Xu C et al and Pan Y et al.^{23,24} **Table 2** compares the dermoscopic features of psoriasis in various studies.

In the present study, hyperkeratosis, acanthosis, hypogranulosis, elongated rete ridges, Munro microabscess, dilated capillaries and dermal infiltrate were significant features of psoriasis. Anupama YG et al retrospectively studied on the clinicohistopathological features which was similar to the present study. Like the present study, the diagnostic features of Munro microabscess and spongiform pustules of Kogoj were not present in all cases.²⁶ Kassi et al showed hyperkeratosis, agranulosis (100%) and supra papillary thinning (90.9%) in almost all cases, comparable to the present study. It also showed Munro microabscess (72.2%) and lymphocytic infiltrate (100%) as other prominent features.²⁷ The study by Mehta S et al demonstrated supra papillary thinning and absence of granular layer to be prominent and the findings were statistically significant. Both hypogranulosis and agranulosis were observed in the present study. Mehta et al opined that agranulosis could be added to the essential histopathological criteria, in addition to Munro's microabscess and spongiform pustules of Kogoj.²⁸ Agranulosis is attributed to the defective regulation of T cells resulting in defective proliferation of keratinocytes. The variations like hypogranulosis or normal granular layer or prominent granular layer which was found in the present study can be attributed to the treated or resolving plaques. In a study done by Enigbokan et al, melanophages was one of the atypical features found in 4.5% of the cases which was comparable to the present study.²⁹

To assess the value of dermoscopy in diagnosis of psoriasis, the dermoscopic parameters were associated with both clinical and histopathological parameters. Similar to the present study, Lallas et al showed that the vascular features in dermoscopy did not vary among various morphological types.²⁰ The association of various dermoscopic features and morphological types of psoriasis was done by Gavvala M and showed red globules in a regular distribution to be the common finding in all morphological variants unlike the present study where red dots was the commonest finding. The white colored scales in a diffuse distribution was the commonest finding among all morphological variants which was comparable to the present study.³⁰

It has been observed that agranulosis correlated with the background color and absence of Wickham striae in dermoscopy and dilated blood vessels correspond to the vascular pattern in dermoscopy.⁷ Sailaja KNS et al found vascular structures to be the one consistent feature associated with all histopathological parameters. In the present study, dotted vessels was found consistent with all the histopathological parameters (**Table 3**).

5. Limitations

A larger sample size is needed to strengthen the study and enhance the generalizability of the results to a larger population. Longitudinal studies would help to track changes over time and helps to determine the prognosis and response to treatment.

6. Conclusion

Histopathology is the gold standard investigation in diagnosis of psoriasis. But, it is an invasive and painful procedure. If the dermoscopic features are classical and consistent and correlates with the clinical and histopathological parameters, then the invasive biopsy could be avoided and spares the patient from trauma and cut shorts the expenses. Also, it obviates the time delay in processing and interpretation of the histopathological slides. The present study found the red dotted vessels to be that consistent feature. Hence, in the virtue of the present study, the diagnosis of psoriasis can be reasonably confirmed with the help of dermoscope and differentiate it from other similar psoriasiform conditions. A further step in the study would be to assess the changes in dermoscopic findings with the treatment and correlate them with clinical response to treatment.

7. Source of Funding

None.

8. Conflict of Interest

None.

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