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**Original research article**

# A study of dermoscopic evaluation and histopathological correlation of papulosquamous disorders

**[1]Megha Shankar,[2]C Raghuveer,[3]Lakshmipathi Y Pattar, [4]A Shashidhar**
[1]Senior resident, Department of DVL, VIMS, Ballari, Karnataka,India
[2,3]Associate Professor, Department of DVL, VIMS, Ballari, Karnataka, India
[4]Senior Specialist in Dermatology, Kushtagi Taluk Hospital, Karnataka, India

**CorrespondingAuthor:**A Shashidhar

**Abstract**

**Introduction:**Dermoscopy is a noninvasive diagnostic tool that provides visualisation of many morphological features which are not visible to the naked eye especially vascular and pigmented structures. Therefore it represents a link between macroscopic dermatology and microscopic histopathology. It has been proven to aid the clinical diagnosis of several papulosquamous disorders.
**Materials and methods:**A total of 210 successive cases, who attended the OPD with papulosquamous disorders were taken. A detailed clinical history, examination and skin biopsy were done.
**Results:**On dermoscopic examination, all psoriasis cases(n=93) had pinkish background, diffuse white scales and red dots(100%). Dermoscopy of lichen planus(n=77) showed violaceous background(100%), white scales(79.2%), pigmentation(81.9%) and wickham striae(92.2%). Dermoscopic examination of pityriasis rosea revealed pinkish background(100%) with peripheral white scaling(83.3%).
**Conclusion:**Dermoscopy should thus be regarded as a safe and rapid diagnostic tool that assists in the clinical diagnosis of papulosquamous disorders and differentiation between these highly confusing entities to minimize the need for lesional biopsies for histopathological diagnosis.
**Keywords:** Dermoscopy, papulosquamousdisorder, histopathology

## Introduction

Dermoscopy is a non-invasive, *in vivo* technique used for examination of various skin lesions. It is performed with a handheld instrument called "dermoscope", which allows visualisation of subsurface skin structures in the epidermis, dermoepidermal junction and upper dermis that are usually not visible to the naked eyes. Therefore it represents a link between macroscopic dermatology and microscopic histopathology[1].

Dermoscopy has significantly improved the diagnostic accuracy of pigmented and non-pigmented skin tumors. Clinical examination remains the undoubted mainstay of diagnosis of skin lesions, to which dermoscopic examination contributes additional morphologic information in a submacroscopic level thus completing the puzzle of clinical diagnosis[2].

Dermoscopy has been used in differentiating malignant pigmentary disorders, but the use has been extended in the diagnosis of non pigmentary lesions. It also aids in the clinical diagnosis of several papulosquamous disorders. Papulosquamous group of disorders are heterogeneous disorders which include psoriasis, lichen planus, pityriasis rosea, pityriasis lichenoides chronica, lichen nitidus, pityriasis rubra pilaris, pityriasis lichenoides et varioliformis acuta and others[3].

The term inflammoscopy is used for dermoscopic examination of inflammatory conditions. In inflammoscopy, accurate diagnosis can be made by considering criteria such as scale, type of vessels, vessel arrangement, pigmentation and background colour. Atypical presentations are common in papulosquamous disorders and dermoscopy can be utilised to differentiate between psoriasis, lichen planus, pityriasis rosea and dermatitis based on two main components:

1. Presence of scales.
2. vascular pattern.

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The gold-standard and confirmatory test for diagnosis of papulosquamous disorders is the skin biopsy and histopathological examination. However, this is an invasive technique and requires time for processing and reporting of results. Dermoscopic examination reveals characteristic patterns which are specific for a skin condition, thus aiding in an early and accurate diagnosis of the condition[4].

Dermoscopy is an important tool for diagnosis of inflammatory skin disorders especially papulosquamous disorders which can mitigate need for biopsy in many cases and can give important clue to diagnosis where clinical features are not typical[5].

It is prudent to study and report these dermoscopic features of papulosquamous disorders in Indian population to know the differences when compared to western population. The present study has been carried out to fill up the lacunae in existing knowledge about dermoscopic features of papulosquamous disorders in Indian skin[6].

**Methodology**

This was a descriptive cross-sectional study. A total of 210 successive cases, who attended the OPD with papulosquamous disorders were taken. Data was collected after obtaining a written informed consent from the patient. A detailed clinical history was taken and a complete examination of skin lesions was done. Dermoscopic examination was done using dermlite3 with polarized view. Skin biopsy was done from the lesion and sent for histopathological examination. Datawas entered in proforma and analysed using simple statistical methods like percentage, proportion, ratio, etc. and Chi square test (wherever applicable).

**Inclusion criteria**

Patients, more than 15 years, presenting with papulosquamous disorders to the Dermatology Outpatient Department at VIMS, Ballari were included in the study.

**Exclusion criteria**

1. Patients younger than 15 years.
2. Patients on topical therapy for more than 1 month and systemic therapy for more than 6 months.
3. Patients with infectious and neoplastic skin lesions.
4. Patients whose lesions are secondarily infected.

**Results**

Dermoscopic examination was done using dermlite 3 which has magnification of 10x and examined under polarized mode.

In this study, out of 210 cases 58.6% showed pinkish background. Violaceous background was seen in 36.7% and brown background in 3.8% of patients. Orange background was seen in 0.9% of patients.

**Table 1:** Distribution of background colour

| Colour | Number (n=210) | Percentage |
|---|---|---|
| Pinkish | 123 | 58.6 |
| Violaceous | 77 | 36.7 |
| Orange | 2 | 0.9 |
| Brown | 8 | 3.8 |
| Total | 210 | 100 |

In this study, scaling was seen on dermoscopy in 90% of patients. Among these, 86.8% had diffuse pattern whereas 13.2% of patients had peripheral distribution. Colour of scales seen were predominantly white which constituted 96.3% and yellow which was seen in 3.7% of patients.

**Table 2:** Presence of scaling on dermoscopic examination

| Scaling | Number(n=210) | Percentage |
|---|---|---|
| Present | 189 | 90 |
| Absent | 21 | 10 |
| Total | 210 | 100 |

**Table 3:** Distribution of pattern of scaling

| Pattern | Number(n=189) | Percentage |
|---|---|---|
| Diffuse | 164 | 86.8 |
| Peripheral | 25 | 13.2 |
| Total | 189 | 100 |

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**Table 4:** Distribution of colour of scales

| Colour of scales | Number(n=189) | Percentage |
|---|---|---|
| White | 182 | 96.3 |
| Yellow | 7 | 3.7 |
| Total | 189 | 100 |

In this study, 57.6% of cases showed vessels on dermoscopy, out of which majority were red globules constituting 92.6% out of 121 patients. Other vascular patterns seen were red globules(5.0%) and linear vessels(7.4%). Distribution of vessels were regular in 78.5% of patients and irregular in 21.5% of patients.

**Table 5:** Distribution of Presence of Vessels

| Vessels | Number(n=210) | Percentage |
|---|---|---|
| Present | 121 | 57.6 |
| Absent | 89 | 42.4 |
| Total | 210 | 100 |

**Table 6:** Distribution of morphology of vessels

| Morphology | Number | Percentage |
|---|---|---|
| Red dots | 112 | 92.6 |
| Red globules | 6 | 5.0 |
| Linear vessels | 9 | 7.4 |

**Table 7:** Distribution of pattern of vessels

| Distribution | Number(n=121) | Percentage |
|---|---|---|
| Regular | 95 | 78.5 |
| Irregular | 26 | 21.5 |
| Total | 121 | 100 |

In this study, pigmentation was seen in 65(31%) patients out which majority had greyish blue pigmentation (92.3%). Other types of pigmentation seen were brown(6.2%) and black(1.5%).

**Table 8:** Distribution of Presence of pigmentation

| Pigmentation | Number(n=210) | Percentage |
|---|---|---|
| Present | 65 | 31 |
| Absent | 145 | 69 |
| Total | 210 | 100 |

**Table 9:** Distribution of colour of pigmentation

| Colour | Number(n=65) | Percentage |
|---|---|---|
| Blackish | 1 | 1.5 |
| Brownish | 4 | 6.2 |
| Greyish blue | 60 | 92.3 |
| Total | 65 | 100 |

In this study, follicular changes were observed in 9 patients. Follicular plugging was the most common finding seen, about 78% of cases. Comedo-like opening and follicular pigmentation were seen each in 11% of cases.

**Table 10:** Dermoscopy of follicular unit

| Follicular changes | Number(n=9) | Percentage |
|---|---|---|
| Comedo-like opening | 1 | 11 |
| Follicular plugging | 7 | 78 |
| Follicular pigmentation | 1 | 11 |
| Total | 9 | 100 |

In this study, special structures were seen in 84 cases. Wickham striae was the most common special structure seen. It was present in 85.7% of patients. The next common special structure seen was white circular well defined area which was seen in 7.3% of cases. Leaf-like venetion was observed in 4.8% of cases. Orange-red areas were seen in 1.1% and structureless yellow area were seen in 1.1%.

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**Table 11:** Distribution of special structures on dermoscopy

| Special structure | Number(n=84) | Percentage |
|---|---|---|
| Wickham striae | 72 | 85.7 |
| White circular area | 6 | 7.3 |
| Leaf like venetion | 4 | 4.8 |
| Orange-red areas | 1 | 1.1 |
| Structureless yellow area | 1 | 1.1 |
| Total | 84 | 100 |

In this study, skin biopsy was done in all 210 cases and was sent for histopathological examination. The most common feature observed was acanthosis(73.8%) followed by hyperkeratosis(61.4%), elongation of rete ridges(38.1%) and basal layer vacuolation(38.1%). Other features which were observed on histopathological examination include, Parakeratosis (5.7%), hypogranulosis(5.7%), wedge-shaped Hypergranulosis (18.1%), suprapapillary thinning(11%), extravasation of red blood cells(8.6%), basophilic infiltration of dermoepidermal junction(33.3%), lymphohistiocytic infiltration of dermis(28.6%), dilatation of blood vessel(21%), spongiosis(5.7%), clutching of ball appearance(1%) and munro's microabscess(7.1%).

**Table 12:** Histopathological examination

| Feature | Number | Percentage |
|---|---|---|
| Hyperkeratosis | 129 | 61.4 |
| Parakeratosis | 12 | 5.7 |
| Hypo/agranulosis | 12 | 5.7 |
| Hypergranulosis | 38 | 18.1 |
| Acanthosis | 155 | 73.8 |
| Extravasation of RBC | 18 | 8.6 |
| Suprapapillary thinning | 23 | 11.0 |
| Elongation of rete ridges | 80 | 38.1 |
| Subepidermal basophilic infiltration | 70 | 33.3 |
| Clutching of ball appearance | 2 | 1.0 |
| Dilatation of blood vessel | 44 | 21.0 |
| Basal layer vacuolation | 80 | 38.1 |
| Spongiosis | 12 | 5.7 |
| Munro's microabscess | 15 | 7.1 |
| Lymphohistiocytic infiltrate in dermis | 60 | 28.6 |

**Table 13:** Correlation of clinical and dermoscopic diagnosis

| Papulosquamous disorder | Clinical diagnosis | Dermoscopic diagnosis | Percentage |
|---|---|---|---|
| Psoriasis | 93 | 93 | 100 |
| Lichen planus | 77 | 77 | 100 |
| Lichen nitidus | 6 | 6 | 100 |
| Lichen striatus | 2 | 2 | 100 |
| Pityriasis Rosea | 30 | 30 | 100 |
| Pityriasis lichenoides chronica | 2 | 2 | 100 |
| Total | 210 | 210 | 100 |

In this study, a total of 93 cases were diagnosed as psoriasis clinically and all cases showed features of psoriasis on dermoscopy. Lichen planus was diagnosed in 77 patients and on dermoscopy all 77 cases showed features corresponding to lichen planus. Pityriasis rosea was diagnosed in 30 cases clinically and their dermoscopic examination was correlating with that of features of pityriasis rosea. Similarly, 6 cases of lichen nitidus, 2 cases of lichen striatus and 2 cases of pityriasis lichenoides chronica were diagnosed clinically and their dermoscopic examination showed corresponding features only to show that there were no clinical and dermoscopic diagnostic variation.

**Table 14:** Correlation of clinical diagnosis and dermoscopic diagnosis with histopathological diagnosis

| Papulosquamous disorder | Clinical and dermoscopic diagnosis | Histopathological diagnosis | Percentage |
|---|---|---|---|
| Psoriasis | 93 | 92 | 98.9 |
| Lichen planus | 77 | 75 | 97.4 |
| Lichen nitidus | 6 | 6 | 100 |
| Lichen striatus | 2 | 2 | 100 |
| Pityriasis Rosea | 30 | 27 | 90.0 |
| Pityriasis lichenoides chronica | 2 | 2 | 100 |
| Total | 210 | 204 | 97.1 |

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In this study, there were 210 cases out of which 93 cases were diagnosed as psoriasis clinically anddermoscopically. Among these cases 92 cases were correlating with histopathological examination whereas one case showed features of pityriasis rosea. Lichen planus was diagnosed clinically anddermoscopically in 77 patients. On histopathological examination 75 showed lichen planus, one showed prurigo simplex and other one showed features of seborrhoeic keratosis.Clinical and dermoscopic diagnosis of pityriasis rosea was made in 30 cases among which 27 of them had histopathological features of pityriasis rosea; two cases were showing features of psoriasis and one case of lichen planus. Lichen nitidus was diagnosed in 6 cases clinically and dermoscopically, all of them were correlating with histopathological diagnosis. Similarly, two cases each of lichen striatus and pityriasis lichenoides chronica which were diagnosed clinically and on dermoscopic examination, which correlated with their respective histopathological diagnosis. Overall, clinical and dermoscopic diagnosis correlated with histopathological diagnosis in majority of the cases(97.1%) (p = 1.0).

**Discussion**

In this study, out of 210 cases 58.6% showed pinkish background. Violaceous background was seen in 36.7% and brown background in 3.8% of patients. Orange background was seen in 0.9% of patients. Pinkish background was observed in all 93cases of psoriasis and 30 cases of pityriasis rosea. Violaceous background was seen in all 77 cases of lichen planus. Orange background was seen in 2 cases of pityriasis lichenoides chronica. Brownish background was seen in 2 cases of lichen striatus and 6 cases of lichen nitidus.

In our study, scaling was seen on dermoscopy in 90% of patients. Among these, 86.8% had diffuse pattern whereas 13.2% of patients had peripheral distribution. Colour of scales seen were predominantly white which constituted 96.3% and yellow which was seen in 3.7% of patients.

In this study, 57.6% of cases showed vessels on dermoscopy, out of which majority were red globules constituting 92.6% out of 121 patients. Other vascular patterns seen were red globules(5.0%) and linear vessels (7.4%). Distribution of vessels were regular in 78.5% of patients and irregular in 21.5% of patients.

In our study, pigmentation was seen in 65(31%) patients out which majority had greyish blue pigmentation (92.3%). Other types of pigmentation seen were brown(6.2%) and black(1.5%).

In this study, follicular changes were observed in 9 patients. Follicular plugging was the most common finding seen, about 78% of cases. Comedo-like opening and follicular pigmentation were seen each in 11% of cases. All follicular changes were observed only in lichen planus.

In our study, special structures were seen in 84 cases. Wickham striae was the most common special structure seen. It was present in 85.7% of patients. The next common special structure seen was white circular well defined area which was seen in 7.3% of cases. Leaf-like venetion was observed in 4.8% of cases. Orange-red areas were seen in 1.1% and structureless yellow area were seen in 1.1%.

In our study, all psoriasis cases(n=93) had pinkish background with whitish scales which was diffusely present. Red dots were present in all cases and 4 lesions showed red globules in addition to red dots. Distribution of red dots was uniform and regular throughout the lesion. Dermoscopic features are similar to that observed in other studies.

Dermoscopic examination of lichen planus showedviolaceous background(n=77) in all cases. In the study done by Nwako-Mohamadi*et al*.[7], violaceous background was seen in 75% of cases. Other background colour that were observed include red, yellow and brown. Scales were present in 79.2% of cases with patchy distribution. White coloured scales were seen in most of the cases(95%) and yellow coloured scales in 5% of cases. Vessels were present in 23(29.9%) cases; red dots were the predominant vessels seen in 15(65.2%) cases followed by linear vessels seen in 6(26.1%) cases. Both red dots and linear vessels were seen in 2(8.7%) cases.

Vessels were present peripherally in most of the cases(91.3%) except for 2 cases which had central distribution. Pigmentation was seen in 63 cases out of which 95.2% were greyish blue colour, 3.2% were brownish and 1.6% were black in colour.

Follicular changes were seen in 11.7% of cases. Wickham striae was seen 92.2% of cases and leaf like venetion in 3.9% of cases. Both wickham striae and leaf-like venetion was seen in 1.3% of cases. In a study by Lallas*et al*. [8], wickham striae was seen in 96% of cases.

We encountered 30 cases of pityriasis rosea which on dermoscopic examination showed pinkish background in contrast to the study done by Lallas*et al*.[8]which showed yellowish background. Scales were present in all cases. White coloured scales were seen in most of the cases(86.7%) and yellow scales seen in 13.3% of cases. Peripheral scaling classically known as ‘collarette of scaling’ was seen in 83.3% of cases and rest of them showed diffuse scaling(16.7%). Peripheral scaling was seen in 100% of cases in another study[9].Only 3 cases(10%) showed vessels on dermoscopy; the morphology of vessels observed were globules(6.7%) and linear vessels(3.7%). Special structures like orange-red areas and structureless yellow areas were seen in one case each.

In our study, there were total of 6 cases of lichen nitidus, and all of them had brownish background. Only one out 6 cases had white scaling(16.7%). There were no vascular structures seen on dermoscopy. There was

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characteristic well circumscribed white circular area which was present in all cases(100%). Jakhar*et al*.[10]has mentioned additional features like starburst appearance with radial ridges and loss of dermatoglyphics on non-polarized dermoscopy. Features of polarized dermoscopy is similar to our study.

There were 2 cases of lichen striatus which on dermoscopy showed brownish background, whitish scaling and brownish pigmentation(100%).There were no vascular structures. No dermoscopic study was available to compare our results on lichen striatus.

Pityriasis lichenoides chronica was diagnosed in 2 cases and examined through dermoscopy showed orange background, diffuse whitish scaling, and red dots present at periphery of the lesions. Errichetti*et al.*[11]have also observed similar features in their study.

In our study, all papulosquamous disorders diagnosed clinically were correlating with dermoscopic diagnosis(100%). In psoriasis, dotted regular blood vessels in dermoscopy correlated with dilated tortuous capillaries within the elongated dermal papillae in histopathology. Diffuse thick white scales in dermoscopy correlated with hyperparakeratosis in histopathology, and light or dull red background in dermoscopy correlated with edematous dermal papillae with dilated capillaries in histopathology.

In lichen planus, Wickham's striae seen in dermoscopy correlated with compact orthokeratosis, hypergranulosis and acanthosis in histopathological sections. White scales in dermoscopy correlated with epidermal hyperkeratosis in histopathology. Dotted blood vessels in dermoscopy correlated with papillary dermal capillaries, whereas diffuse greyish blue pigment in dermoscopy correlated with epidermal melanin incontinence and dermal melanophages in histopathology.

In pityriasis rosea, white scales detected in dermoscopy correlated with epidermal hyperkeratosis and mounds of parakeratosis in examined histopathological sections. Dotted blood vessels in dermoscopy correlated with capillaries in the papillary dermis, whereas pinkish background in dermoscopy correlated with papillary dermal edema with perivascular infiltrate and focal spongiosis in examined histopathological PR sections.

In lichen nitidus, the dermoscopic features were found to correlate well with the histopathological features. The circular well defined white area correlated with the dense, "ball"-like inflammatory infiltrate. The peripheral scaling seen dermoscopically could correlate with the extensive parakeratosis present in histological sections. Jakhar*et al*. 10 studied 8 cases of lichen nitidus, using both polarised and non-polarised dermoscopy. The radial ridges of the sunburst appearance observed in NPD correlated with the downward extended or the elongated rete ridges at the edge of the lesion. The absence of dermatoglyphics correlated with flattening of the epidermis overlying the inflammatory infiltrate in histological sections[12].

There were no much studies available on lichen striatus and pityriasis lichenoides chronica to compare our results. We did not find any case of parapsoriasis and pityriasis rubra pilaris during our study period.

In our study, there were 210 cases out of which 93(100.0%) cases were diagnosed as psoriasis clinically and dermoscopically. Among them, 92(98.9%) cases were correlating with histopathological examination whereas one case showed features of pityriasis rosea. Lichen planus was diagnosed clinically and dermoscopically in 77(100.0%) patients. On histopathological examination 75(97.4%) showed lichen planus, one showed prurigo simplex and other one showed features of seborrhoeic keratosis. Clinical and dermoscopic diagnosis of pityriasis rosea was made in 30(100.0%) cases among which 27(90.0%) of them had histopathological features of pityriasis rosea; two cases were showing features of psoriasis and one case of lichen planus. Lichen nitidus was diagnosed in 6 cases clinically and dermoscopically, all of them(100.0%) were correlating with histopathological diagnosis.Similarly,twocaseseachoflichenstriatusandpityriasislichenoideschronica which were diagnosed clinically and on dermoscopic examination, which correlated with their respective histopathological diagnosis(100%). Overall, clinical and dermoscopic diagnosis correlated with histopathological diagnosis in majority of the cases(97.1%) (p value-1.0).

**Conclusion**

Dermoscopic features of papulosquamous disorders related well to their relevant histopathological findings. So dermoscopy should be regarded as a safe and rapid diagnostic tool that assists in the clinical diagnosis of papulosquamous disorders and differentiation between these highly confusing entities to minimize the need for lesional biopsies for histopathological diagnosis. Further studies on larger numbers of patients with different common, rare and atypical types of papulosquamous disorders are required to evaluate the real value of dermoscopy in fine diagnosis and differentiation of these diseases.

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