ORIGINAL RESEARCH PAPER

Dermatology

"EVALUATION AND COMPARISON OF CLINICAL AND DERMOSCOPIC NAIL FEATURES IN PSORIASIS-AN OBSERVATIONAL STUDY."

KEY WORDS: Dermoscopy, non-invasive, nail psoriasis, subtle nail changes

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ABSTRACT

Introduction: Nail involvement in psoriasis is common and may have an impact on the quality of life. Dermoscopy, also know as skin surface microscopy, is a newer, non-invasive, and in-vivo technique that can help in detecting subtle nail changes missed by the naked eye. **Aim:** To evaluate and compare the clinical and dermoscopic nail patterns in psoriasis. Method and Material: A total of 71 patients aged above 14 years, clinically diagnosed with psoriasis were included in this study. The patients nail were examined both clinically and on dermoscopy .Non-polarized mode of the dermoscope was used for nail plate examination to visualize nail plate surface changes whereas polarized mode was used for nail bed examination and color changes. Results were analysed. **Statistical analysis:** SPSS software 20.0 version, McNemar test were used for statistical analysis. **Result:** Pitting was the most common feature (90.1%) noted both clinically and demoscopically, followed by nail plate crumbling, subungual hyperkeratosis, and splinter hemorrhage seen in 67.6%, 59.2%, 56.3% clinically and 69%, 59.2%, 64.8% dermoscopically respectively. Most importantly dilated capillaries(21.1%), dotted capillaries(46.5%), and fuzzy lunula(5.6%) were visualized by a dermoscope only. **Conclusion:** Nail dermoscopy provide a better view of minute changes in psoriatic nail pattern which may be missed clinically.

INTRODUCTION

PsoriasisisaT-cell-mediatedchronicinflammatoryskindisease withkeratinocytehyperproliferationaffecting2-3%oftheworld populationwithequalsexincidence.[1,2]

Approximately 10-78% patients of psoriasis have concurrent nailpsoriasis,whileisolatednailinvolvementpresentsin5-10% patients.[3]Astrongcorrelationexistsbetweennailpsoriasisand psoriaticarthritis.Aftertheskinlesions,inflammationspreadsto thenailmatrixwithappearanceofspecificnailpatternsthatcan act as diagnostic markers for psoriasis in cases of diagnostic dilemmawithotherpapulo-squamousdisorders.Thenailbedor thenailmatrixisaffectedbypsoriasisofthenail.[4]Thevariousnail patterns in psoriasis include presence of coarse irregular pits, subungual hyperkeratosis, oil drop sign, onycholysis, splinter hemorrhages,etc.Thesefeaturescanalsobeobservedongross examination of nails, but by then damage to the nail unit usually occursandmanagementisdelayed.

Dermoscopy is a practical diagnostic technique, an effective non-invasive tool facilitating the clinical assessment of nail diseases.Weusedadermoscopetodetectspecificnailpatterns in psoriasis which can aid in diagnosis and see the utility of a dermoscopeindetectingthem.

MATERIALANDMETHOD

A prospective observational study aimed to evaluate and compare the clinical and dermoscopic nail features in psoriasis was conducted at Skin and V.D., OPD, MGM Medical College and Hospital, Aurangabad from January 2021 to January 2022. Institutionalethicalcommitteeapprovalwasobtainedforthis.

Formulatocalculatesamplesizeis:
$n=Z^{\wedge 2}\{P(1-P)\}/d^{\wedge 2}$
P:YourguessofpopulatdionP(anyvalue<1):0.1
1-α: Confidencelevelsetbyyou:0.95
Z:Zvalueassociatedwithconfidence:1.96
d:Absoluteprecision(valuelessthanP):0.07
n:Minimumsamplesize:71
Sourceofformula-LwangaSK,LameshawS.

Thus a sample size of 71 patients with psoriasis aged above 14 years, who gave written consent or assent taken from parents in case of minors (aged less than 18 years) for the observational study were included. The inclusion criteria included OPD and IPD patients with psoriasis aged above 14 years and excluded patientswithahistoryofnailtrauma.

Detailed history of patients was taken as per the predesigned proforma. Aggravating factors like seasonal aggravation, stressful events, alcohol intake, trauma at the site of lesion, history of sore throat or fever, and pregnancy were also recorded.

Statistical analysis:

The collected data was compiled in MS excel sheet 2007. For analysis SPSS software version 20.0 was applied. The qualitative data was represented in form of frequency, percentage and in the form of impressions like a bar diagram.The quantitative data was represented in the form of mean and standard deviation (SD). A comparison was made using various statistical tests. McNemar's test was used to test significant differences between ordinal variables.

Method of analysis:

Illuco IDS series dermoscope with polarized mode and magnification of 10X was used. Non-polarized mode was used for nail plate examination to visualize nail plate surface changes whereas polarized mode was used for nail bed examination and color changes. The dermoscope was kept below the nail plate to visualize subungual changes. The linkage fluid used was a gel-based hand sanitizer. All the nails were examined in a sequence of dermoscopic examinations of proximal nail folds, lateral nail folds, lunula, nail plate surface changes, nail bed changes, and then vascular examination. Photographs were taken and recorded.

RESULTS

Demographic profile

Seventy-one patients were recruited of whom 25 (35.2%) were males and 46 (64.08%) were females. Males-to-females (M: F) ratio was 1:1.84. The mean age was 43.6 years (Mean ± SD = 43.6 ± 14.59), the youngest being 16 years and the oldest being 75 years. Maximum patients (17/71= 23.9%) belonged to the age group of 35 to 44 years. The reported range of duration of disease was 2 months to 30 years with a mean average duration of disease of 5.89 years (Mean ± SD = 5.89 ± 7.06). Out of 71 patients, 61 (85.9%) were married and 10 (14.1%) were unmarried Majority of the patients (25.4%) were housewives followed by farmers (18.3%), office workers, shopkeepers, students, businessmen, retired individuals, drivers, and chefs. Joint pain was present in 42 patients (59.2%) with psoriasis. Amongst the aggravating factors, seasonal aggravation was present in 42 (59.2%) patients followed by history of stressful events in 38 (53.5%) patients.

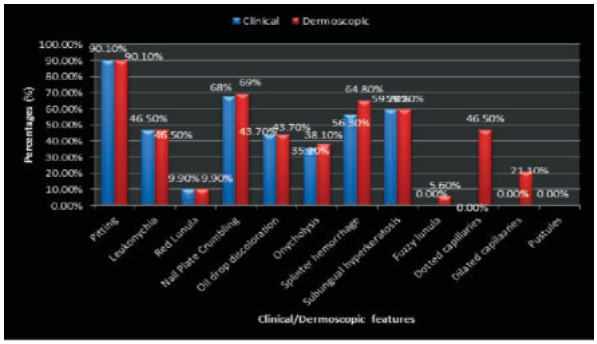
Clinical and dermoscopic features

Table 1 shows the comparison of clinical and dermoscopic features. Thorough clinical examination of patients nails revealed the commonest finding as pitting, observed in 64 patients (90.1%), nail plate crumbling in 48 patients (67.6%), subungual hyperkeratosis in 42 patients (59.2%), splinter hemorrhages in 40 patients (56.3%), leukonychia in 33 patients (46.5%), oil drop discoloration in 31 patients (43.7%), onycholysis in 25 patients (35.2%), and red lunula in 7 patients (9.9%) while on dermoscopy also the commonest finding was pitting seen in 64 patients (90.1%) followed by nail plate crumbling in 49 patients (69%), splinter hemorrhages in 46 patients (64.8%), subungual hyperkeratosis in 42 patients (59.2%), leukonychia in 33 patients (46.5%), onycholysis in 27 patients (38.1%), and red lunula in 7 patients (9.9%). Dermoscopic features like dilated capillaries were seen in 15 patients (21.1%), dotted capillaries in 33 patients (46.5%), and fuzzy lunula in 4 patients (5.6%). A statistically significant correlation was found between clinical and dermoscopic features in dotted capillaries, dilated capillaries, and fuzzy lunula as these features were not seen by the naked eye. Dilated capillaries and dotted capillaries were seen at the proximal and lateral nail folds.

Table 1: Comparison of Clinical Features and Dermoscopic Features

Condition	Number	Percentages	P Value
Pitting			
Clinical	64	90.1%	1.000**
Dermoscopic	64	90.1%	
Leukonychia			
Clinical	33	46.5%	1.000**
Dermoscopic	33	46.5%	
Red Lunula			
Clinical	7	9.9%	1.000**
Dermoscopic	7	9.9%	
Nail Plate Crumbling			
Clinical	48	67.6%	0.857**
Dermoscopic	49	69.0%	
Oil drop discoloration			
Clinical	31	43.7%	1.000**
Dermoscopic	31	43.7%	
Onycholysis			
Clinical	25	35.2%	0.538**
Dermoscopic	27	38.1%	
Splinter hemorrhage			
Clinical	40	56.3%	0.303**
Dermoscopic	46	64.8%	
Subungual Hyperkeratosis			
Clinical	42	59.2%	1.000**
Dermoscopic	42	59.2%	
Dotted capillaries			
Clinical	0	0%	≤ 0.05*
Dermoscopic	33	46.5%	
Dilated capillaries			
Clinical	0	0%	≤ 0.05*
Dermoscopic	15	21.1%	
Fuzzy lunula			
Clinical	0	0%	≤ 0.05*
Dermoscopic	4	5.6%	
Pustules			
Clinical	0	0%	-
Dermoscopic	0	0%	

Level of Significance P ≤ 0.05, * Significant, ** Non-Significant



Graph 1- Comparison of Clinical Features and Dermoscopic Features in nail psoriasis

DISCUSSION

Psoriasis is recurrent and chronic, with a worldwide prevalence of 1 to 3%.[5] It is associated with immune dysfunction and multifactorial etiology involving environmental and genetic factors. Its manifestations range from mild, localized lesions to severe erythroderma.[6] As dermal appendages, nails are often affected by psoriasis. 80-90% patients present with nail involvement. Clinical signs result from the involvement of the nail matrix and nail bed, each of which can lead to distinct clinical features.[4]

Dermoscopy is an adjunctive tool for examining nail changes associated with various dermatological conditions. It is important when the nail features are too minute to be appreciated clinically with a naked eye. Dermoscopy helps in better visualization of these nail changes and reveals new additional features specific to psoriasis.[7]

Table 2 compares these study results with other similar studies on nail changes in psoriasis. In our study, the mean age of 71 patients was 43.6 years which was nearly the same as **Wanniang N et al.**[8] (45.02 years) but higher than **Yadav and Khopkar**[9] (38.36 years) and **Daulatabad et al.**[10] (36.3 years), while studies from the West by **Marina et al.**[11] (51.89 years), **Van der Velden**[12] (48 years), **and Brazzeli et al**[13] (52.53 years) also showed a higher mean age of patients. We observed males are less than females (M:F= 1:1.84) which is in contrast to other studies, which showed the reverse ratios **Yadav and Khopkar**[9] (2.83:1), **Wanniang N et al.**[8] (3.1:1), **Daulatabad et al.**[10] (2.1:1), and **Brazzeli et al.**[13] (2.6:1)

In our study, the commonest finding was nail pitting observed in 90.1% of patients both clinically *(Figure 1a)* and on dermoscopy (*Figure 1b*). In a study involving 68 patients, **Yadav and Khopkar** [9] reported nail pitting as the commonest finding which is consistent with our study. **Wanniang N et al.**[8] also showed pitting in 84% of patients clinically and on dermoscopy. While in a study by **Yorulmaz A et al.**[14] of 67 patients, splinter hemorrhages were the commonest findings followed by pitting and onycholysis. The main histopathological feature is parakeratosis. In the nail matrix, parakeratotic cells interfere with the normal

keratinization process; as the nail grows, these cells slough off, leaving coarse, large, deep, and irregularly distributed pits and cupuliform depressions.

Figure 1 a-Nail pitting seen clinically.

Figure 1 b-Nail pitting seen with a dermoscope.

We found red lunula in 9.9% of patients clinically and on dermoscopy. These findings were comparable to a dermoscopic study conducted by **Yorulmaz A et al**.[14] where they found red lunula in 1.5% of patients and **Klassen KM et al.**[15] observed red lunula in only 6.5% of patients clinically. In their study on nail psoriasis, **Daulatabad et al.**[10] found red lunula in only 7.9% of patients clinically.

Leukonychia results from internal desquamation of keratinocytes that fail to flake off because of the parakeratosis of the distal nail matrix.[16] **Kyriakou et al**.[17] clinically observed leukonychia in 28.9% of patients. Clinically and on dermoscopy we observed leukonychia in 46.5% of patients. In our study, we ensured higher visibility for clinically undetectable leukonychia by dermoscopic magnification and thus the dermoscopy method was more efficacious than the clinical method, although not statistically significant.

Nail crumbling is related to thick, dystrophic, hyperkeratotic nail plate and nail bed causing visible devastation of the nail plate.[18] Crumbling may be present when extensive psoriatic changes affect the entire nail matrix.[19] In our study nail plate crumbling was seen clinically in 67.6% of patients and on dermoscopy in 69% of patients. These findings were comparable to a study conducted by **van der Velden et al**.[12] where they found the same in 42.9% of patients clinically while another study by **Wanniang N et al**.[8] showed only 14% of patients clinically and 16% of patients on dermoscopy and a study by **Polat et al.**[5] showed 17.5% of patients clinically and 20% of patients on dermoscopy. These study results show a contrast to our study.

Onycholysis refers to the separation of the nail plate from the nail bed.[20,21] **Tham et al**.[22] and **Kundakci et al**.[23] determined the incidence in psoriatic nails as 67% and 2%, respectively. Clinically, **Polat et al**.[5] found the incidence was 67.5%. We clinically observed onycholysis in 35.2% of patients. In their dermoscopic study, **Yadav and Khopkar**[9] reported onycholysis as the second commonest finding with the observation of onycholysis in 10 out of 46 patients. We observed that the incidence of onycholysis was 38.1% by dermoscopy, which was higher than clinical examination, but the difference was not statistically significant. A linear erythematous border around the onycholysis area can be detected, which can be observed via dermoscopy but is not always visible to naked eye. This finding was considered specific to onycholysis observed in nail psoriasis.[24] We believe that dermoscopy aids in viewing areas with minimal onycholysis during this period where keratotic cells have not started to flake off and the separation is invisible to naked eye. The oil-drop or salmon patch discoloration is a yellow/reddish-brown drop on the nail bed and/or hyponychium seen through the translucent nail plate[25]. **Kyriakou et al**.[17], **Salomon et al**.[26] and **Kaur et al**.[27] reported the incidence of oil drop spots as 79.6%, 12%, and 7%, respectively. **Yadav and Khopkar**[9] on dermoscopy observed it in 2 out of 46 patients. **Polat et al.**[5] found clinically and on dermoscopy oil drop discoloration was 42.5% and 47.5% respectively. Clinically and on dermoscopy, we found that the incidence of oil drop spots was 43.7%. Although not statistically significant, we believe that the oil drop spot, a specific sign of clinically missed psoriatic nail, can be observed more easily by dermoscopic examination because of its contrast with the surface.

Splinter hemorrhages are reddish-brown to purplish-black striae arranged longitudinally, usually visualized at the distal ends of the nails due to blood extravasation from dilated or ruptured capillaries along the grooves beneath the nail plate.[18] In a study by **Wanniang N et al.**[8] ,8% of patients clinically and 62% of patients on dermoscopy showed splinter hemorrhages while in another study by **Polat et al**.[5] showed 75% of patients clinically and 80% of patients on dermoscopy having splinter hemorrhages. In our study splinter hemorrhages were seen in 56.3% of patients clinically (*Figure 2a*) and 64.8% of patients on dermoscopy (*Figure 2b*) which is nearly similar to **Polat et al**.[5] study.

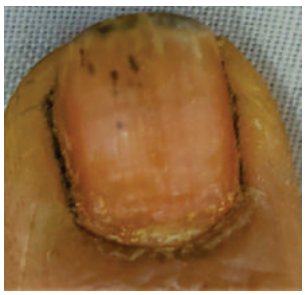


Figure 2 a- Splinter hemorrhages seen clinically

Figure 2 b-Splinter hemorrhages seen with a dermoscope

In subungual hyperkeratosis, there is accumulation of scales beneath the nail plate[28] involving the distal nail bed and hyponychium.[29] The pathogenesis includes thickening of the stratum corneum, parakeratosis, and loss of granular layer in the hyponychium.[30] In our study, it was observed in 59.2% of patients clinically and on dermoscopy both. It was comparable to studies conducted by **Polat et al**.[7] where they found subungual hyperkeratosis in 32.5% of patients clinically and 35% of patients on dermoscopy and **Wanniang N et al**.[8] observed it in 40% of patients clinically and 46% on dermoscopy. In a study by **Kaur et al.**[27] 89.5% of patients showed subungual hyperkeratosis clinically.

Dermoscopic examination of proximal and lateral nail folds, and hyponychium show red-colored regularly arranged dots (dotted capillaries). In our study, it was observed only on

dermoscopy (*Figure 3*) in 46.5% of patients at the proximal and lateral nail folds. This showed statistically significant differences between clinical and dermoscopic methods because we cannot visualize this with naked eye. Another similar feature is dilated capillaries (*Figure 4*) which can only be seen by dermoscopy. In our study 21.1% of patients showed this feature on dermoscopy at proximal and lateral nail folds while clinically it was not observed. This showed a statistically significant difference between the clinical and dermoscopic methods. In study by **Chauhan A et al.**[31]

regularly arranged red dots in proximal nail folds were seen in 35.8% of fingernails and 53.4% of toenails; dilated capillaries in proximal nail folds were seen in 5.8% and 0.9% of fingernails and toenails, respectively.

Regularly distributed red dots and dilated capillaries in lateral nail folds were seen in 35.8% of fingernails versus 45.5% of toenails and 3.16% of fingernails versus none of the toenails, respectively, in our study. Further, on dermoscopy, proximal and lateral nail folds of uninvolved nails did not reveal any findings suggestive of nail psoriasis.

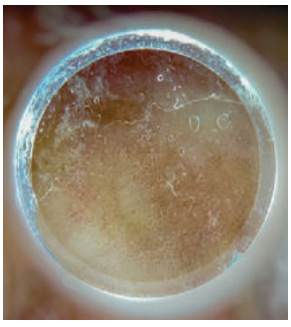


Figure 3--Dotted capillaries seen with a dermoscope

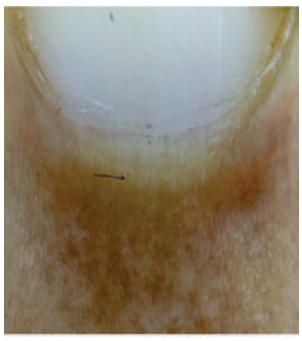


Figure 4-Dilated capillaries seen with a dermoscope

Fuzzy lunula was a novel dermoscopic nail matrix finding seen in 33.63% of involved fingernails and 4.95% of toenails reported by **Chauhan et al.**[31]. It appeared as an irregular, wide white lunula. In our study, it was seen with dermoscopy in 5.6% of patients which is statistically significant because there was no such finding appreciated clinically.

Chauhan et al.[31] reported pustules seen on dermoscopy in hyponychium, PNF and LNF 1.12% & 0.99%, 0.45% & 0.99% and 0.67% & 5.94% of fingernails and toenails respectively. While in our study no pustules were seen in any of the nails.

The pseudo-fiber sign was described by **Yorulmaz A et al.**[14] as a novel dermoscopic feature of nail psoriasis. They observed red-black filamentous structures along the cuticle representing bare capillaries, underneath the distal free edge on the hyponychium or nail plate detached areas. In our study, some patients showed pseudo-fiber, beau's lines, transverse, and vertical ridges.

Table 2: Comparison of the result of our study to other studies

Nail Features	This study		Wanniang N et al [8]		Polat et al [7]		Daulatabad et al.[10]
	Clinical %	Dermoscopic %	Clinical %	Dermoscopic %	Clinical %	Dermoscopic %	Clinical %
Nail Matrix Features							
Pitting	90.1	90.1	84	84	92.5	77.5	97.4
Leukonychia	46.5	46.5	20	22	82.5	92.5	63.2
Nail plate crumbling	67.6	69	14	16	17.5	20	-
Red lunula	9.9	9.9	0	8	5	5	7.9
Nail bed Features							
Subungual hyperkeratosis	59.2	59.2	40	46	35	32.5	89.5
Onycholysis	35.2	38.1	54	54	67.5	77.5	94.7
Splinter hemorrhage	56.3	64.8 .	8	62	75	80	36.8
Oil drop discoloration	43.7	43.7	32	44	42.5	47.5	55.3

Limitations

In this study, there was a small sized population of 71 participants which may make results inaccurate due to insufficiency of data.

CONCLUSION

From this study, it can be concluded that nail dermoscopy proved to be an easy, supportive, efficient, non-invasive, and novel method providing a better view of minute changes in psoriatic nails like dotted capillaries, dilated capillaries, and fuzzy lunula which may be missed clinically. Further studies are needed to find out other features of nail psoriasis and other uses of dermoscopy.

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Conflicts of interest: There are no conflicts of interest.

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