



CROSS-SECTIONAL OBSERVATIONAL STUDY OF NAIL DERMOSCOPY IN VARIOUS NAIL DISORDERS AT TERTIARY CARE CENTRE AT SOUTH GUJARAT.

Dermatology

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ABSTRACT

BACKGROUND: Diseases of nail comprise approximately 10% of all the dermatological conditions. Nail disorders often possess a diagnostic challenge and in recent years, nail dermoscopy (onychoscopy) has become increasingly appreciated as an effective tool to facilitate the clinical assessment of diseases; hence we conducted this study to evaluate onychoscopy findings in various nail disorders.

AIM: Aim of our study is to evaluate characteristic dermoscopy findings in various nail disorders and thereby to aid in diagnosis of nail diseases at an early stage.

METHODS AND MATERIAL: Descriptive cross sectional study was carried out at tertiary care hospital in Department of Dermatology, Venereology and Leprosy after the approval of Institutional Ethical Committee (IEC).

Patients who were presented with nail involvement were enrolled in the study after taking a written informed consent. Total of 200 patients were recruited. Dermoscopic evaluation of all nails was done and pictures were captured. The clinical and dermoscopy features were described according to the pattern analysis. All the data was compiled and entered in Microsoft excel and analysed.

RESULTS: Out of 200 patients, most common skin disease associated with nail involvement was onychomycosis (45.5%), followed by psoriasis (26%), and lichen planus (11%). Dermoscopic examination of distal and lateral subungual onychomycosis, showed jagged spike, aurora borealis and ruin pattern in 100%, 48%, and 26% patients respectively. In psoriasis, coarse irregular size and shape depressions (69.23%), red-orange stains (48.07%) and longitudinal red - brown streaks (46.15%) were most common findings. In lichen planus, longitudinal striations (81.81%), were most common findings.

CONCLUSIONS: Nail dermoscopy serves as an easier, non-invasive and cost-effective diagnostic procedure for diagnosis of nail diseases.

KEYWORDS

Dermoscopy, Onychoscopy, Dermoscope, Nail disorders

INTRODUCTION

Diseases of nail comprise approximately 10% of all the dermatological conditions.[1] Nail disorders are often possess a diagnostic challenge for treating dermatologists, hence additional diagnostic procedures may be required at times. Surgical intervention on nail unit including diagnostic biopsy is often perceived as a painful procedure. In addition, reluctance of most clinicians to perform biopsy for diagnosis and lack of expertise among pathologists in interpreting the nail histopathology further compound the problem.[2]

Currently, dermoscopy of nail (onychoscopy) is increasingly used by nail experts to magnify the clinical features of nail diseases that are not well visualized with naked eye; whereas, other times, it is helpful for a more accurate diagnosis and to avoid invasive methods. It may be a useful tool to elucidate common findings about specific nail diseases, to guide the management and prognosis of it.[3]

Keeping above in mind; we attempted to describe dermoscopic nail changes in various nail disorders.

MATERIALS AND METHODS

Study was conducted at Department of Dermatology, Venereology and Leprosy from August 2018 to December 2019, after the approval of Institutional Ethical Committee.

Patients with nail involvement were enrolled in the study after taking a written informed consent. Total of 200 patients were recruited. Each patient was subjected to a detailed history, clinical examination and necessary investigations were carried out.

Dermoscopic evaluation of all the nails was done; by using a USB dermoscope (400X) and images were captured. Polarized light was obtained via use of ultrasound gel. The parts of nail that were examined were the nail plate, proximal and lateral nail fold, cuticle, lunula, periungual and the sub-ungual region. The clinical and dermoscopy features were described according to the pattern analysis. The most frequent clinical and dermoscopic patterns were identified and their correlation with the clinical disease was done.

All the data was compiled in Microsoft excel and analysed. Continuous variables were described as means $\pm$ standard deviation. Discrete variables were shown as frequency and percentage.

RESULTS

Out of 200 cases, 99 were males and 101 were females. Patient's age ranged from 6 years to 80 years with mean age of 40.7 years. The number of patients involving nails had highest incidence in the age group of 41-50 (22.2%). Most common occupation was housewife (20%), followed by labourer (16%), businessman (13%) and textile worker (11%).

Out of 200 patients, onychomycosis was seen in 91 (45.5%) patients, followed by psoriasis, 52 (26%) and lichen planus 22 (11%) patients. Other diseases that were observed are depicted in Table 1.

In clinical examination of onychomycosis, there were 52 (57.14%) cases of distal lateral subungual onychomycosis (DLSO), followed by total dystrophic onychomycosis (TDO) 28 (30.76%), and 8 (8.79%) cases of superficial white onychomycosis (SWO).

Table 1: Distribution of various nail diseases

Clinical diagnosis	No. of cases (%)
Onychomycosis	91(45.5%)
Psoriasis	52(26%)
Lichen planus	22(11%)
Pemphigus vulgaris	06(3%)
Alopecia areata	04(2%)
Systemic sclerosis	04(2%)
Periungual wart	04(2%)
20-nail dystrophy	04(2%)
Darier disease	03(1.5%)
Drug induced nail pigmentation	03(1.5%)
Median canaliformis dystrophica	02(1%)
Atopic dermatitis	02(1%)
Pachynychia congenita	01(0.5%)
Reiter's disease	01(0.5%)
Pyogenic granuloma	01(0.5%)
Total	200(100%)

In dermoscopic examination of DLSO cases, yellow discoloration of nail plate and jagged spike (Figure 1a) was seen in 100% of cases, aurora borealis pattern (Figure 1b) in 48%, ruin pattern (Figure 1c) in 26% and rough texture in 19.2% of cases.

Figure 1a : Jagged Spikes in Distal and Lateral Subungual Onychomycosis (DLSO)



Figure 1b : Aurora Borealis in DLSO



Figure 1c : Ruin pattern in DLSO



In TDO cases, dermoscopic findings were black-brown discoloration of nail plate in 100% cases, jagged spike in 53.5%, aurora borealis in

64.2% and ruin pattern in 71.4% of cases. In SWO cases, transverse opaque friable patch (Figure 1d) on the nail plate was seen in 100% of cases.

Figure 1d : Opaque white plaque in Superficial White Onychomycosis



Dermoscopic finding in psoriasis were coarse irregular size and shape depressions (69.23%), red-orange stains (48.07%) (Figure 2a),

Figure 2a : Coarse irregular size and shape depressions in psoriasis



onycholysis with erythematous proximal border (46.15%) (Figure 2b), longitudinal red-brown streaks (46.15%) (Figure 2c), debris beneath distal edge of nail plate (30.76%) (Figure 2d) and irregular cuticle (17.30%).

Figure 2b : Onycholysis with proximal erythematous border of psoriatic nail

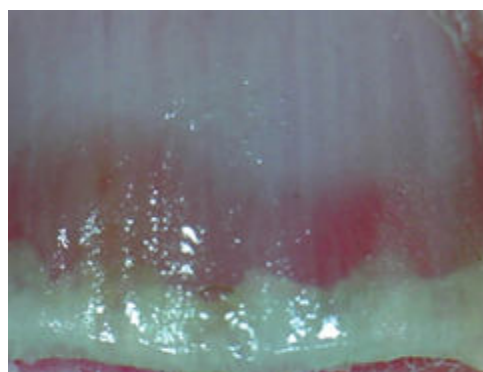


Figure 2c : Longitudinal red orange Streaks of psoriatic nail

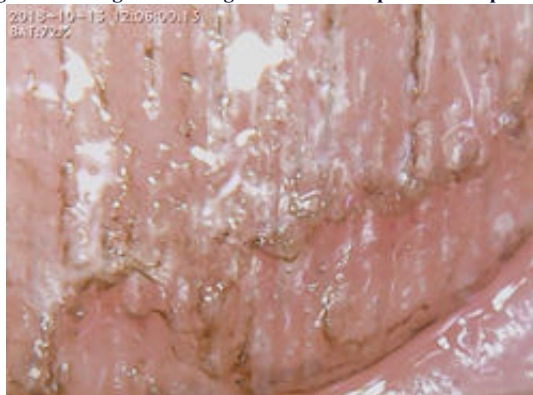


Figure 2d : Debris beneath nail plate in psoriatic nail

On dermoscopy of lichen planus, longitudinal striations and ridging was most common findings (81.81%) (Figure 3a),

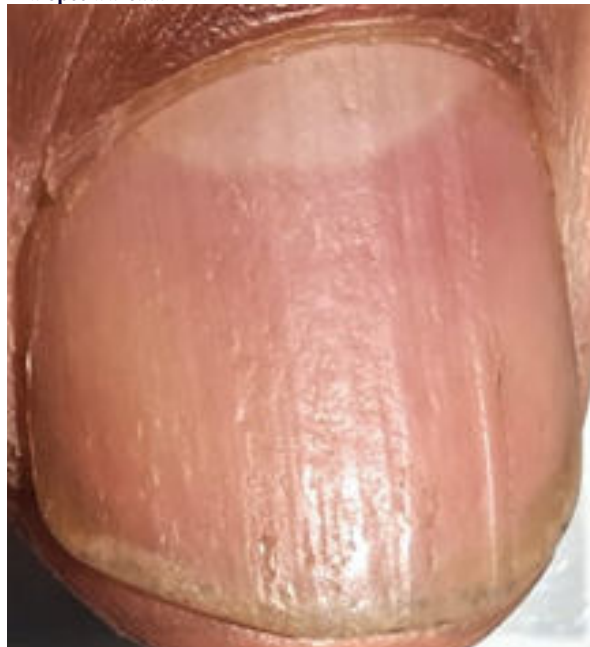
Figure 3a : Longitudinal striation and ridging in lichen planus

followed by irregular free edge with lamellar split (77.27%) (Figure 3b), rough texture of the nail plate (72.72%) (Figure 3c), coarse irregular size and shaped depressions (54.54%), linear triangular groove (27.27%) (Figure 3d) and longitudinal red-brown streaks (4.54%).

Figure 3b : Irregular free edge with lamellar split in lichen planus**Figure 3c : Rough texture of nail plate in lichen planus****Figure 3d : Triangular area at proximal nail fold in lichen planus**

In pemphigus vulgaris onychoscopy showed transverse groove of the nail plate in 66.6% cases and swollen cuticle and lateral nail fold in 50% of cases.

In alopecia areata, 50% of cases had longitudinal striations and rough texture and 50% of cases had fine and shallow depressions on the nail plate in regular manner (Figure 4).

Figure 4 : Regular shallow depression with longitudinal striation in alopecia areata

Onychoscopy of periungual wart showed well-demarcated hyperkeratotic and rough lesions with regular micropapules and small black dots (Figure 5).

Figure 5 : Multiple keratotic area

In four patients of systemic sclerosis, one patient had very few enlarged capillaries and well-preserved capillary distribution (Figure 6a); two patients had frequent giant capillaries, frequent hemorrhages (Figure 6b), with moderate loss of capillaries; one patient had few or absent giant capillaries and hemorrhages, and severe loss of capillaries with extensive avascular areas (Figure 6c).

Figure 6a : Enlarged capillaries in Ssc



Figure 6b : Giant capillaries and haemorrhage Ssc

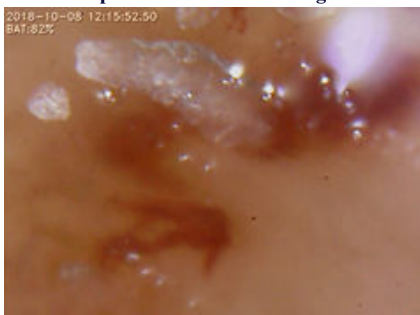


Figure 6c : Severe loss of capillaries Ssc



Dermoscopic finding in patients of twenty nail dystrophy, 2 cases (50%) had scaly nail plate with longitudinal striations. One case (25%) had scaly nail plate distal lamellar splitting and longitudinal striations and one case (25%) had linear midline triangular groove in all 20 nails.

In Darier's disease; longitudinal striations (33.3%), longitudinal red-white bands (100%) (Figure 7a), v-shaped nicking (66.6%) at the distal end (Figure 7b) was seen.

Figure 7a : Alternate red and white band in Darier's disease

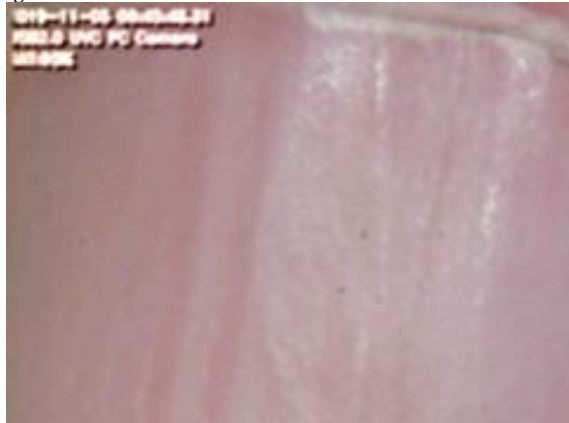


Figure 7b : V shaped nick at distal end in Darier's disease



DISCUSSION

Onychoscopy is a non-invasive and rapid office-based technique suited for a better understanding of nail pathologies, allows photographic documentation and monitoring of progression and response to treatment.[4]

According to result obtained in our study nail diseases were commonly observed in 4th decade and maximum cases were housewife. This finding was consistent with study done by Rathod et al.[5] The higher incidence among housewives can be attributed to their frequent contact with water, exposure to irritants and repeated trauma.

Most common nail disorder observed was onychomycosis followed by psoriasis and lichen planus. This finding was consistent with study done by Bhat et al[1]

Onychoscopy plays an important role in the diagnosis of onychomycosis. It demonstrates jagged edges with sharp whitish longitudinal indentations in the proximal portion of the onycholytic area termed as spikes. It is due to proximal progression of dermatophytes with progressive detachment of the nail plate along the horny layer of the nail bed. In our study jagged pattern with spikes was seen in 100% of patients. This finding were consistent with study done by Piraccini et al.[6] In his study he retrospectively analysed records of 37 DLSO patients and observed jagged edge with spikes in all 37 patients (100%). Ankad et al[7] also noticed this pattern in 90% of cases.

We observed longitudinal striate of different colours, thus giving an overall appearance similar to aurora borealis ('aurora pattern') in 48% of cases, It represents fungal invasion and subungual debris. However most of the other studies had reported higher cases of this pattern.[5],[6],[7],[8].

Another finding that was observed was subungual hyperkeratosis with ruin pattern, in 50 % of cases of DLSO. Ankad et al.[7] found 65% of cases with ruin pattern which was somewhat higher than our study. This pattern results from excessive proliferation of nail bed/hyponychium keratinocytes. As the fungus invades and progresses proximally, there are indentations on the ventral surface of nail plate by the keratinocytes resulting in accumulation of keratotic materials under nail plate and appears as "ruin pattern" in dermoscopy.[8]

The next common onychopathy in our study was psoriasis. Onychoscopy helps in the accurate diagnosis of nail psoriasis.

Splinter hemorrhages were observed in 46.15% of cases. This finding was consistent with study done by Rathod et al.[5] Splinter hemorrhages in psoriatic nail represent the extravasation of the red blood cells in the nail bed and appear as thin dark red to purplish longitudinal streaks.[9] However it may be present in onychomycosis also; so it suggests that splinter hemorrhages are not specific for psoriasis.[10]

In our study salmon patch, which also known as oil drop sign, revealed as red-orange stains in 36.53% cases of psoriasis. This finding was consistent with study done by Bhat et al.[1] who also observed it in 42.86% of cases. Salmon patch occurs due to psoriatic squames compressed under the nail plate as a result of nail bed parakeratosis.[9]

In our study salmon patches are not noted in any other nail disorder; hence, it is specific to nail psoriasis.

A distinctive erythematous rim was typically observed in nail psoriasis, which is proximal to onycholysis. This is inflammation and dilatation of capillaries in the nail bed at the onychodermal band. In our study, it was observed in 46.15 % of cases and observed only in nail psoriasis group, suggesting it is specific to psoriasis. Similar observation was made in the previous studies.[7],[11],[12]

Coarse irregular size and shape depressions were seen in 69.23% of patients corresponding to pits over the nail plate. This was consistent with other studies.[5],[11] Deep pits represent parakeratosis of the nail matrix. Parakeratotic cells interfere with normal keratinization and when cells fall off, they leave behind depressions in the nail bed.[9]

Subungual hyperkeratosis was observed in 30.76% of patients. This finding was comparable to study done by Rathod et al.[5] but discordant with Bhat et al.[1]

Tulika et al[13] investigated 68 patients chronic plaque psoriasis, where they found nail changes in 46 patients. They reported coarse pits (39%), onycholysis (21.7%), splinter hemorrhages (10.8%) and oil drop sign (4.3%) as common dermoscopic findings; however, their results were higher than our study.

In our study, linear longitudinal ridging was clinically detected in 23.07% of psoriasis cases but on dermoscopy 46.15% cases. Similarly, salmon patch was seen clinically in 36.53% of psoriasis patients, but, dermoscopically in 48.07% of patients. Splinter hemorrhages were seen clinically only in 19.23 % of psoriasis cases, but dermoscopically in 46.15% of cases. These differences indicate that onychoscopy enhances the recognition of subtle clinical findings and hence helps in early diagnosis of disease.

Nail lichen planus shows numerous changes in onychoscopy, and most of the changes are destructive in nature, producing deformities of nail unit as compared to other inflammatory diseases.[14]

Onychoscopy in lichen planus showed longitudinal fissures and ridging, clinical corresponds to onychorrhexis, lamellar splitting of distal free edge corresponds to onychoschizia, circular depression corresponds to pitting, longitudinal triangular area at proximal nail fold related to pterygium and reddish brown area corresponds to splinter hemorrhages.

Bhatt et al[1] investigated 27 patients of lichen planus where they found longitudinal streaks in 88.89% of patients, pitting 44.44%, pterygium 33.33%, splinter hemorrhage 11.11%. All these findings were consistent with our study.

Nakamura R et al.[15] found longitudinal streaks in 82.28% of patients, fragmentation of nail in 50.63%, trachyonychia in 40.51%, splinter hemorrhage in 35.44%, nail pitting in 34.18%. All these findings were higher than the findings of our study.

In our study, longitudinal ridging was seen clinically in 72.72% patients of lichen planus, but on dermoscopy these longitudinal striations were detected in 81.81% cases. Clinically, the splinter hemorrhages were not seen in any case of lichen planus, but detected dermoscopically in 1 patient of lichen planus. Moreover Elmas et al.[16] also concluded that statistically significant dermoscopic findings can be detected in 40% of the patients. Thus nail changes of lichen planus that are not visible by naked eye can be detected by onychoscopy.

In pemphigus vulgaris, paronychia developed either with the initial presentation or at the time of exacerbations. In some patients it may be the only indication of disease. When nail involvement presents initially, there will be a window of several weeks, before mucocutaneous symptoms of the pemphigus vulgaris sets in.[17] Hence onychoscopy may play important role in early diagnosis of disease. Onychoscopic findings of pemphigus vulgaris observed in our study include transverse groove of the nail plate corresponding to Beau's line, swollen cuticle and lateral nail fold corresponding to paronychia and onychomadesis.

The pits in alopecia areata (AA) are shallow and arranged regularly in a geometric fashion giving rise to the "Scotch Plaid" pattern. Similar pattern found in our study. Our findings were comparable with study

done by Rathod et al[5] who also observed punctate depression in 75% of patients and longitudinal fissure in 50% of patients.

In periungual wart, all 4 cases were presented with well demarcated hyperkeratotic and rough lesions with regular micropapules and multiple, blackish-brown spots/globules which represent the dilated capillaries of papillary dermis. Similar findings were observed by Piraccini et al[18] and Rathod et al.[5]

According to onychoscopic approach, in systemic sclerosis three stages can be classified based on the morphology. Early changes (few enlarged capillaries and few hemorrhages); active disease (frequently enlarged capillaries and frequent hemorrhages); and late changes (branching vessels and disorganized architecture, severe loss of capillaries and avascular areas).[19] In our study out of four patients of systemic scleroderma, one patient had (25%) early changes, two patients (50%) had active stage and one patient (25%) had late stage. These findings were consistent with study done by Ankad et al[19] and Ohtsuka et al.[20]

Darier's disease shows red or white longitudinal bands often ending in a pathognomonic notch at the free margin of the nail. Our findings in Darier's disease were consistent with other study.[21]

CONCLUSION

Onychoscopy helps in capturing nail changes that are not visible through naked eye. By detecting characteristic findings of nail disease, onychoscopy helps in confirming the diagnosis of disease. It is beneficial in differentiating between the various causes of onycholysis, e.g., psoriasis, trauma, onychomycosis (DLSO), periungual verruca, etc. It helps in differentiating between the nail pits of psoriasis and alopecia areata. In patients of systemic sclerosis; it is effective tool for evaluation of nailfold capillary abnormalities and correlates with disease severity.

Thus onychoscopy serves as an easier, cost- effective, office based non-invasive procedure for early diagnosis of nail diseases and monitoring their evolution and therapeutic response. It may assist in treating the nail ailments at an early stage before permanent dystrophy sets in. However, a good knowledge of nail anatomy and various nail diseases is essential for its interpretation. Dermoscopic nail findings may limit the differential diagnosis without the need for an invasive procedure. It is, therefore, advisable to regularly incorporate nail dermoscopy as a routine examination in every patient.

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