Study of Nail Disorders in Dermatology

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ABSTRACT

Introduction: The nail disorders comprise approximately 10% of all dermatological conditions. The nail unit may reflect dermatological disorder by its own and may show specific changes that are markers for a wide range of systemic disorders. Consequently, no physical examination is complete without a study of the nails. Study objective is to record the clinical spectrum of nail disorders including congenital, developmental, infectious, neoplastic, degenerative, dermatologic and systemic diseases.

Material and methods: A total of 157 patients with nail changes were studied over a period of 18 months. All cases were evaluated with detailed history and thorough examination. Investigations like potassium hydroxide mount, fungal culture, random blood sugar, skin biopsy, longitudinal nail biopsy were performed as per requirement.

Results: The age group of patients ranged from 1-86 years. Majority were seen between 31 and 40 years (22.30%). Male to female ratio was 0.8:1. Finger nails were predominantly affected in 56.70%. Nail changes associated with dermatoses were observed in 45.85%. Nail changes without associated dermatoses were observed in 33.75%, amongst which, onychomycosis (45.29%) was the commonest. Of the clinically diagnosed cases of onychomycosis, 54.3% were potassium hydroxide mount positive and 51.43% were culture positive. Most common fungal isolates detected on culture were dermatophytes (34.29%).

Conclusions: Psoriasis (41.66%) was the most common dermatoses associated with nail changes. Distal lateral subungual type of onychomycosis was the commonest cause of nail changes without associated dermatoses. Among dermatophytes, Trichophyton rubrum (66.67%) was the most common isolate in culture.

Keywords: Onychomycosis, Tinea Unguium, Distal Lateral Subungual Onychomycosis, Psoriatic Nail Changes, KOH Mount, Fungal Culture and Sensitivity

INTRODUCTION

Evolutionarily, as man developed and manual dexterity increased, nails became an appendage of the human anatomy. As civilization progressed and social interactions grew, nails, like hair, have also become objects of attention and adornment.

The chief function of the nail in man is that of protection, other functions include sensory perception, manual dexterity, scratching etc. Nail disorders include those abnormalities that affect any portion of the nail unit. The nail unit includes the plate, matrix, bed, proximal and lateral folds, hyponychium, some definitions include underlying distal phalanx. Nail disorders, although infrequent in children, increase in scope throughout life and affect a high percentage of the geriatric population. The nail unit may show specific changes that are markers for a wide range of systemic disorders.

The study aimed to record the clinical spectrum of nail disorders including congenital, developmental, infectious, neoplastic, degenerative, dermatologic and systemic diseases affecting the nail unit.

MATERIAL AND METHODS

One hundred and fifty seven patients attending the outpatient Department of Dermatology, Venereology and Leprosy of NRI Medical College and General Hospital (NRIMC and GH) Chinakakani, Guntur, Andhra Pradesh, with nail changes, were taken up for the study during the period from 1st January 2012 to 30th June 2013 after getting approval from Institutional Ethics Committee.

Inclusion criteria Patients of all age groups including children and both sexes with nail changes were taken up for the study.

History and examination

Detailed history was taken and a thorough clinical examination was done. A written informed consent was obtained from all the participants.

Investigations

The patients were subjected to the following investigations as per requirement: Complete blood picture, random blood sugar, liver and renal function tests, complete urine examination. Specific investigations like direct microscopy using potassium hydroxide mount (KOH), fungal culture, skin biopsy, longitudinal nail biopsy were done where ever necessary.

Statistical methodology

Descriptive statistics and percentages were used to analyze the data.

RESULTS

Age and sex wise distribution

In the present study, the nature of nail alterations were

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Figure-1: Proximal Subungual Onychomycosis

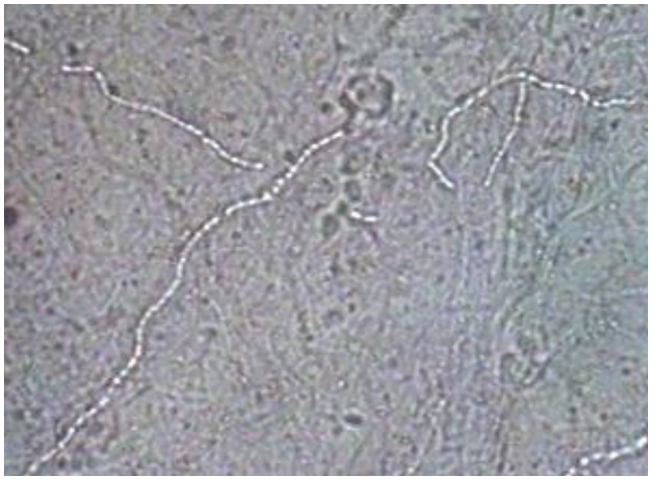

Figure-2: Photomicrograph of KOH mount showing refractile branched septate hyphae with spores

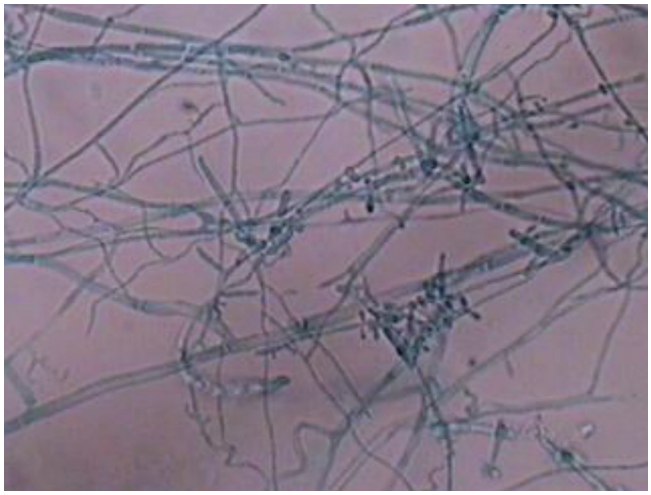

Figure-3: Photomicrograph showing Trichophyton rubrum grown in culture

seen in one hundred and fifty seven random dermatological patients with 71 males (45%) and 86 females (55%) with nail changes, attending the Dermatology Outpatient Department of NRIMC and GH, Chinakakani. Male to female ratio was 0.8:1. The minimum age at which the nail changes were observed was 1 year and the maximum 86 years. The majority of patients were between 31-40 years (22.30%).

Figure-4: Psoriasis with onycholysis and oil drop sign

Figure-5: Pachyonychia congenita with wedge shaped nails

Figure-6: Muehrcke's paired white bands

In the present study, 72 (45.85%) patients had associated dermatoses, 53 (33.75%) presented without associated dermatoses, and 9 (5.73%) were associated with geno dermatoses.

Finger nails (56.70%) were more commonly involved than toenails (9.55%) in this study. Both finger and toe nails were involved in 33.75%. Majority of the patients had 2-5 nails' (32%) involvement.

Figure-7: Pyogenic granuloma of the toe

Nail disorders in patients without associated dermatoses
Onychomycosis was the commonest nail change observed in 45.29% of patients without associated dermatoses followed by chronic paronychia in 32.07%; idiopathic twenty nail dystrophy and trauma in 7.55% each; nail psoriasis and ingrown toe nail in 3.77% each.

Onychomycosis
Age and sex wise distribution
Commonest age group affected was 21- 40 years (51.42%). More males (19) were involved than females (16).

Occupation wise distribution
Majority of patients were labourers (37.14%) and house wives (34.28%).

Morphological pattern
Distal lateral subungual onychomycosis (DLSO) was the commonest morphological pattern of onychomycosis (figure-1) observed in 62.86% of patients. Total dystrophic onychomycosis (TDO) was observed in 31.43%. Finger nails were involved in 57.14% of patients. Out of 35 cases of onychomycosis, 12 patients had cutaneous involvement in the form of, Tinea corporis in 4 cases, Tinea cruris in 3, Tinea manuum and Tinea pedis in 4, Tinea faciei in 1 patient.

KOH and culture characteristics
In this study, 54.3% were KOH positive and 51.43% were culture positive. The most common fungal isolates in culture were dermatophytes (34.29%), amongst which Trichophyton rubrum (66.67%) was grown frequently (figures-2,3).

Nail disorders in patients with associated dermatoses
In the present study, nail changes with associated dermatoses were present in 45.85% of patients. Among them, psoriasis (41.66%) was the commonest dermatoses followed by onychomychosis with cutaneous involvement in 15.27%, eczema in 13.88%, pemphigus vulgaris in 6.33%, alopecia areata in 4 cases, hansen's disease in 3 cases; two cases each of lichen planus, drug reaction and subungual warts; and one case of Discoid lupus erythematosus (DLE).

Psoriasis
Age and sex wise distribution
Most common age group affected with psoriasis was 41-50 years (31.25%). Males (62.50%) were most commonly affected than females.

Frequency of nail involvement
Finger nails (96.87%) were more commonly affected than toe nails (53.12%).
Frequency of nail changes
Pitting was the commonest nail change (71.88%) observed in patients with psoriasis followed by onycholysis (59.38%) (figure-4).

Nail disorders in patients with associated genodermatoses
Characteristic nail changes of genodermatoses were seen in 9 cases out of which 3 cases were Palmoplantar keratoderma (PPKD) which showed thickening, discoloration and Beau's lines. There were 2 cases of Pachyonychia congenita with pachyonychia, subungual hyperkeratosis (figure-5). There was one case of Darier White disease with white and red longitudinal bands, thickening and subungual hyperkeratosis; one case of Hailey Hailey disease with longitudinal ridges; one case of Xeroderma Pigmentosum with thickening of nail and melanonychia; one case of racket nail with short and broad distal phalanx.

Nails disorders in patients with systemic diseases
There were 28 (17.83%) patients with nail disorders associated with systemic diseases. Majority (21.44%) were associated with hypertension / diabetes / hypertension and diabetes.

DISCUSSION

Nail alterations were found almost equally in both sexes with a slight female preponderance. But according to Scher RK, Daniel CR et al,[1] there is no significant difference in distribution of nail disorders between sexes.
The number of patients who presented with nail changes with associated dermatoses was 72 and that of those without associated dermatoses was 53. Our study concurs with the study conducted by Alejandra Iglesias et al[2] who reported 59% of cases without associated dermatoses and 16% with associated dermatoses. However they reported higher prevalence (23%) with associated genodermatoses. We found 9 patients with associated genodermatoses. The difference may be because Alejandra Iglesias et al studied in pediatric age group where as our study included all age groups.

Nail changes without associated dermatoses
There were 53 patients without associated dermatoses. Commonest disease among them was found to be onychomycosis (45.28%).

Onychomycosis
Among 157 cases, 35 cases (21.87%) were Onychomycosis. This was the most common nail change in our study. According to Leyden JJ,[3] Onychomycosis accounts for 20% of all the nail disorders. In our study, majority of patients were in the age group of 21- 40 years (51.42%). This is in accordance with various studies by Garg et al[4] (20-40 years), Grover S et al[5] (20-40 years). Majority of cases in this study were among labourers (37.14%) and housewives (34.28%). According to Garg et al[4], onychomycosis was evenly

distributed among office workers, students, manual workers and housewives.

DLSO (62.86%) was the commonest morphological type of onychomycosis observed. Grover S[5] reported DLSO in 82%, and Garg et al[4] reported DLSO in 64.4% of patients.

In the present study of the 35 nail samples, 54.3% were KOH positive and 51.43% were culture positive. Studies by Garg et al,[4] Grover S,[5] Sujatha V,[6] Mohanty JC et al[7] revealed that the KOH positivity rate varied from 35.65% to 82.96% and culture rate from 36% to 70.2%.

In the present study of the culture positive isolates, Candida albicans was isolated in 8.57%. Among the non-dermatophyte moulds (NDM) isolated in 3 cases, 2 were Aspergillus niger and one was Rhizopus. Banerjee et al[8] reported Candida species as the second most common isolate (23.2%) causing onychomycosis. According to Greer D.L,[9] non-dermatophyte moulds were isolated in 2 - 22% of cases and yeasts in 17-66% of cases. According to Grover S[5] non- dermatophyte moulds were isolated in 22% of patients and among them Aspergillus niger was isolated in 18.4% of cases. Though NDM are often considered as contaminants, they have been reported to colonize damaged tissue and cause secondary tissue destruction. The primary pathogenic role of NDM is controversial.

Chronic paronychia

In the present study, chronic paronychia was seen in 17 patients (32.1%) with a male to female ratio of l: 5 and 82.35% of cases were house wives. Fingernails were involved in 82.4% of cases and 35.3% nail fold smears were culture positive for Candida. This is by and large in accordance with a retrospective study by Chow E et al.[10] Male to female ratio was 2.3:1 and peak age was 40-49 years and 48% were homemakers. 62% had involvement of right hand finger nails and 62% were culture positive for nail fold smears for candida. Esteves J[11], in his study reported that majority of cases of chronic paronychia occurred in the age group of 30 to 60 years. Tosti et al[12] and Morten RH et al[13] have concluded that chronic paronychia is predominantly a disease of domestic workers.

Nail psoriasis

In the present study, out of two patients who presented with nail changes suggestive of nail psoriasis, one patient had involvement of both finger and toenails with discoloration, subungual hyperkeratosis and onycholysis. In the other case, total nail dystrophy involving thumb of the hand with erythema and scaling of the surrounding skin was observed. No patient had palmoplantar pustulosis. KOH study and culture were negative for fungi. Piraccini BM et al[14] noted in their study of 46 patients that, 37 patients had involvement of only single digit and in 2 patients only two digits were affected. The thumb was affected in 25 cases. In seven patients, several fingers were involved including one patient with involvement of multiple fingernails and toenails.

Ingrown toe nail

Two cases had ingrowing toenail, one in either sex. Cambiaghi S et al[15] study showed that the main cause for deformity is compression of toes from the sides due to ill fitting footwear and the main contributory cause is cutting the toenail in a half circle instead of straight across.

In two cases of Onycholysis, it was observed that the cause was local trauma to the nail. One case each of anonychia and pterygium of a single fingernail were observed. Ray L[16] concluded that the etiological factor for onycholysis may be more due to factors acting at local level rather than systemic disease. In one study, pterygium most typically develops in trauma or lichen planus and its variants, including idiopathic atrophy of the nail.[17]

Nail changes with associated dermatoses

In the present study, nail changes with associated dermatoses were present in 45.85% of patients. Among them, psoriasis (41.66%) was the commonest dermatoses.

Psoriasis

In the present study, psoriasis accounted for 32 cases (20.4%). The most common age group observed was 41-50 yrs. Involvement of fingernails was observed in 96.87% of cases and that of both finger nails and toenails in 50%. Pitting was the commonest nail change seen in 71.9%, followed by onycholysis in 59.4% of cases. According to Ghosal A, Gangopadhyay et al[18] the involvement of fingernail was reported in 88.88% and pitting (90.23%) was the most common fingernail change observed. According to Kaur et al[19] pitting was seen in 72.5%.

Alopecia areata

In the present study, nail changes in association with alopecia areata were seen in 2.5% of patients. Pitting was the commonest presentation in all these patients. According to Gandhi V, Baruah MC et al,[20] nail changes were seen in 44% of alopecia areata patients. The commonest abnormality observed was superficial pits seen in 64% of patients.

Lichen planus

In the present study, nail changes with cutaneous lichen planus were found in two patients. Thinning, ridging and longitudinal striations were the commonest presentations which were in accordance with other reports by Francesco et al.[21]

Eczema

Nail changes associated with eczema were present in 10 patients. Among these, pitting was seen in one case. deBarker DAR et al[22] quoted that hand eczema is one of the causes for onycholysis and nail pitting.

Discoid Lupus erythematosus (DLE)

In the present study, DLE with associated melanonychia of fingernails was observed. Yang K.L.[23] observed similar changes.

Pemphigus vulgaris

In the present study, nail changes with pemphigus vulgaris were present in 6 patients. Onychomaedesis and paronychia with transverse ridging were observed in 2 cases each. One case each had melanonychia and paronychia. According to Engineer et al[24] most frequent nail alterations seen in pemphigus vulgaris were paronychia in 60% and

onychomaedesis in 33% of cases.

Hansens disease

In 3 cases of Hansen's disease, finger nails showed longitudinal melanonychia and longitudinal ridging. Kaur I et al[25] observed that in leprosy, most common change observed was longitudinal melanonychia (32.4%) in the finger nails and longitudinal ridging (46.3%) in the toe nails.

Drug reactions

Two cases of toxic epidermal necrolysis had onychomaedesis and one of them had paronychia in addition. Acharya S, Balachandran C[26] reported a case of onychomaedesis and temporary shedding of the nails following Steven Johnson syndrome.

Nail changes with associated genodermatoses

Nail changes with associated genodermatoses were present in 5.73% of cases. Darier's disease associated with nail changes was present in one patient with longitudinal white and red bands and with 'V' nicking of all finger nails. According to Burge and Willkinson, nail signs diagnostic of Darier's disease were found in 92% of cases.

Nail changes in systemic diseases

In 3 cases (1.9%) of clubbing, the most common cause was Pulmonary Koch's (2 cases) and chronic obstructive pulmonary disease (1 case). According to Baran R and Dawber RPR,[27] the causes of clubbing are thoracic organ disorder (80%), alimentary tract (5%) and other causes like endocrine, idiopathic forms etc.

Koilonychia was found in 3 cases (1.9%) and was due to iron deficiency anaemia. Bergaron JR et al[28] in his study described three main etiological factors like hereditary, acquired and idiopathic for koilonychia. He also confirmed that hypochromic iron deficiency anaemia is the most frequent cause.

Half and half nail was found in one case. A detail medical history, physical examination and laboratory evaluation failed to reveal any other abnormality. Agrawal SK et al[29] reported a similar observation of idiopathic half and half nail.

Two cases had nail discoloration and two cases were longitudinal melanonychia due to HIV on HAART. Cribier B et al[30] and Gupta AK et al[31] stated that longitudinal melanonychia is the most frequent finding in HIV positive cases. It may be due to HAART or due to the disease itself.

One case each of typhoid and pneumonia had Beau's lines over finger nails. According to Singh G et al[32], beau's lines have been described in systemic disorders like coronary thrombosis, measles, mumps, Kawasaki's disease, pneumonia, pulmonary embolism, and renal failure.

One case of primary systemic amyloidosis showed longitudinal striation, crumbling and partial anonychia of both finger nails and toe nails. These were observed along with macroglossia, periorbital purpura with cardiac involvement. These nail changes were consistent with those in the study of Moreno et al.[33]

Hyperpigmentation of the nail cuticle and nail plate of all the fingernails and skin was observed in a patient of testicular carcinoma on bleomycin chemotherapy. According to Kukla LJ et al,[34] hyperpigmentation has been documented in a patient treated with bleomycin with darkening of the nail cuticle and palmar creases.

Four cases (2.5%) of systemic sclerosis had capillary dilatation, ragged cuticle, thinning and longitudinal striations involving predominantly finger nails. Out of three cases (1.9%) of systemic lupus erythematosus, one case had muehrckes paired white bands (figure-6) and the other two cases had ragged cuticles. According to Raghavendra Rao et al,[35] in 7 females out of 38 cases with scleroderma, nail changes were observed in five patients (71.4%). The most common change noted was nail fold telangiectasia (57.1%), followed by ragged cuticle (42.86%), fingertip scars (42.86%), longitudinal ridging (28.6%). Out of 11 (61.1%) patients of SLE with nail changes, six had nailfold erythema (54.5%), followed by longitudinal ridging, ragged cuticle, chronic paronychia, nail-fold hyperpigmentation and depigmentation.

One case had pyogenic granuloma (figure-7) of the proximal nail fold with thinning and dystrophy of the toe of the right foot along with history of trauma and recurrent episodes of bleeding. According to Richert B[36], mild penetrating injury, friction and immobilization of the limb in a cast are physical causes.

In the present study, no malignant nail tumours could be documented as the majority of lesions in the nail area were inflammatory, infective or due to congenital or acquired deformity.

Strength of the study

- A variety of nail manifestations was noted in this study.
- All types of onychomycosis including proximal subungual type and superficial white onychomycosis were noted in the study.
- Nail changes in HIV, PPKD, Pachyonychia congenita, systemic amyloidosis and those with bleomycin were made note of.

Limitations of the study

- No malignant nail tumors could be documented in the study because of its short duration.

CONCLUSION

One hundred and fifty seven patients attending the Department of Dermatology, NRI Medical College, Guntur, with nail changes, were taken up for the study. Majority were between 31 and 40 years (22.30%) of age. Male: Female ratio was 0.8: 1. Finger nails were predominantly affected in 56.70% of patients compared to that of toe nails in 9.55% of patients. Onychomycosis (45.29%) was the commonest nail disorder without associated dermatoses. The most common morphological pattern observed in onychomycosis was distal lateral subungual onychomycosis (62.86%). Of the 35 nail samples, 54.3% were KOH positive and 51.43% were culture positive. Dermatophytes (34.29%) were the commonest isolate on culture. Trichophyton rubrum was the commonest dermatophyte isolated. Psoriasis (41.66%) was

the most common dermatoses associated with nail changes. Nail pitting (71.88%) was the commonest nail change in psoriasis. No malignant nail tumors could be documented in the study because of short duration of study period and majority of lesions in the nail area are inflammatory, infective or due to congenital or acquired deformity.

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