Original Research Article

A Hospital Based Study to Assess the Pattern of Nail Abnormalities and Their Correlation with Dermatological and Systemic Disease Among Children

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Abstract

Background: Nail disorders in infants and children are relatively uncommon. Their incidence is influenced by ethnic, environmental, and socioeconomic factors and varies in different populations and studies. The aim of this study to assess the pattern of nail abnormalities and their correlation with dermatological and systemic disease among children. **Materials & Methods:** This is a prospective study of done on 200 consecutive patients conducted in the outpatient clinic in the department of Dermatology Venereology and Leprosy & department of medicine at RVRS Medical College Hospital Bhilwara, Rajasthan, India with nail changes, were taken up for the study during the one-year period. Patients of pediatrics age groups and both sexes with nail changes were taken up for the study. **Results:** In the present study, the nature of nail alterations were seen in two hundred random dermatological patients with 110 males (55%) and 90 females (45%) with nail changes. Male to female ratio was 1.2:1. 100 (50%) patients had associated dermatoses, 88 (44%) presented without associated dermatoses, and 12 (6%) were associated with geno dermatoses. Fingernails (56%) were more commonly involved than toenails (10%) in this study. Onychomycosis was the commonest nail change observed in 45.45% of patients without associated dermatoses. Nail changes with associated dermatoses were present in 50% of patients. Among them, psoriasis (44%) was the commonest dermatoses followed by onychomychosis with cutaneous involvement in 18%. **Conclusion:** Psoriasis (44%) 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.

Keywords: Nail Changes, Dermatoses, Onchomycosis, Psoriasis, Fingernail, Toe Nail.

Introduction

As face is the index of the mind, so is nail the index to health. Nail is one of the epidermal derivatives that produce the hardest epithelial structure know in mammalian biology. Nails not only provide aesthetic beauty to hand and feet but also aid in providing protection, tactile sensation and social communication. During the 5th century Hippocrates described clubbing as a significant sign to the myriad of systemic manifestations.

Since then, many nail findings are identified in association with various diseases. Hence forth, nails examination should be an essential component of a complete dermatological examination. Furthermore, at times, various nail abnormalities can be a presenting feature before other signs of the disease become apparent.

Nail disorders in infants and children are relatively uncommon. Their incidence is influenced by ethnic, environmental, and socioeconomic factors and varies in different populations and studies.

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Few studies in Turkey have found the incidence of pediatric nail disorders varying between 0.7% and 4.4%[2]. Their presentation and management are different from adults. Physiological alterations are common in pediatric age and should be known to a clinician to differentiate from pathological conditions. The congenital nail disorders can be a part of major hereditary syndromes, requiring further evaluation. Several acquired causes may cause variable dystrophy of the nails. Meticulous and careful nail examination is, therefore, important in neonates, infants and children for early diagnoses, management and to prevent complications. There are no large epidemiological studies delineating nail changes in infants and children.Clinicians must acquaint themselves with these nail findings as they can provide a clue in diagnosing certain systemic diseases. Moreover, at times, some nail changes can be a presenting feature before other signs of a systemic disease become clinically evident. With the convenience with which all 20 nails can be examined; certainly, they serve as an important diagnostic tool. Fingernails usually provide more accurate information than toenails, because clinical signs on toenails are often modified by trauma[3].

Nails may be involved primarily or secondarily due to underlying systemic diseases and their examination may provide clues to establish the diagnosis and guidance regarding the management of these nail diseases. Several skin, hair, and nail diseases may result in severe nail abnormalities, which if not addressed, may cause functional interference and permanent dystrophy. Diseases of nail

comprise approximately 10% of all the dermatological conditions[4,5]. Clinicopathologic tools are time-consuming and give false negative results in up to 35% of patients. Although, the naked eye can appreciate majority of the macroscopic details of the nail unit apparatus, dermoscope furnishes details which may be easily missed. The aim of this study to assess the pattern of nail abnormalities and their correlation with dermatological and systemic disease among children.

Materials & methods

This is a prospective study of done on 200 consecutive patients conducted in the outpatient clinic in the department of Dermatology Venereology and Leprosy & department of medicine at RVRS Medical College Hospital Bhilwara, Rajasthan, India with nail changes, were taken up for the study during the one-year period. Patients of pediatrics age groups 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.

Statistical methodology

Descriptive statistics and percentages were used to analyze the data.

Results

In the present study, the nature of nail alterations was seen in two hundred random dermatological patients with 110 males (55%) and 90 females (45%) with nail changes. Male to female ratio was 1.2:1. The minimum age at which the nail changes were observed was 1 year and the maximum 18 years (table 1).

Table 1: Demographic profile of patients

Demographic profile	No. of patients (N=200)	Percentage
Age (Mean±Sd) (yrs)	10.23±2.60	
Gender		
Male	110	55%
Female	90	45%

In the present study, 100 (50%) patients had associated dermatoses, 88 (44%) presented without associated dermatoses, and 12 (6%) were associated with geno dermatoses (table 2).

Table 2: Distribution of patients according to Nail alteration

Nail alteration	No. of patients (N=200)	Percentage
With associated dermatoses	100	50%
Without associated dermatoses	88	44%
Associated Genodermatoses	12	6%

Fingernails (56%) were more commonly involved than toenails (10%) in this study. Both finger and toenails were involved in 34%. Majority of the patients had 2-5 nails' (36%) involvement (table 3).

Table 3: Distribution of patients according to Site of Nail

Site of Nail	No. of patients (N=200)	Percentage
Finger Nails	112	56%
Toe Nails	20	10%
Both finger & toe nails	68	34%

Nail disorders in patients without associated dermatoses

Onychomycosis was the commonest nail change observed in 45.45% of patients without associated dermatoses followed by chronic paronychia in 31.81%; idiopathic twenty nail dystrophy and trauma in 7.95% each; nail psoriasis and ingrown toenail in 3.40% each (table 4).

Table 4: Nail disorder in patients without dermatoses

Nail disorder	No. of patients (N=88)	Percentage
Onychomycosis	40	45.45%
Chronic paronychia	28	31.81%
Idiopathic twenty nail dystrophy	7	7.95%
Trauma	7	7.95%
Nail psoriasis	3	3.40%
Ingrown toe nail	3	3.40%

Nail disorders in patients with associated dermatoses

In the present study, nail changes with associated dermatoses were present in 50% of patients. Among them, psoriasis (44%) was the commonest dermatoses followed by onychomychosis with cutaneous involvement in 18%, eczema in 15%, pemphigus vulgaris in 8%, alopecia areata in 5cases, 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) (table 5).

Table 5: Nail disorder in patients with dermatoses

Nail disorder	No. of patients (N=100)	Percentage
Psoriasis	44	44%
Onychomycosis with cutaneous involvement	18	18%
Eczema	15	15%
Pemphigus vulgaris	8	8%
Alopecia areata	5	5%
Hansen's disease	3	3%
Lichen planus	2	2%
Subungual warts	2	2%
Drug reaction	2	2%
Discoid lupus erythematosus	1	1%

Nail disorders in patients with associated genodermatoses: Characteristic nail changes of genodermatoses were seen in 12 cases out of which 4 cases were Palmoplantar keratoderma (PPKD) which showed thickening, discoloration and Beau's lines. There were 2 cases of Pachyonychia

congenita with pachyonychia, subungual hyperkeratosis. 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 (table 6).

Table 6: Nail disorder in patients with associated genodermatoses

Nail disorder	No. of patients (N=12)	Percentage
Palmoplantar keratoderma	4	33.33%
Pachyonychia congenital	2	16.66%
Subungual hyperkeratosis	2	16.66%
Darier white disease	1	8.33%
Hailey Hailey disease	1	8.33%
Xeroderma pigmentosum	1	8.33%
Racket nail	1	8.33%

Nails disorders in patients with systemic diseases

There were 36 (18%) patients with nail disorders associated with systemic diseases. Majority (24%) were associated with hypertension / diabetes / hypertension and diabetes.

Discussion

Nail alterations were found almost equally in both sexes with a slight male preponderance. But according to Scher RK, Daniel CR et al,[6] there is no significant difference in distribution of nail disorders between sexes.

In the present study, 100 (50%) patients had associated dermatoses, 88 (44%) presented without associated dermatoses, and 12 (6%) were associated with geno dermatoses. Our study concurs with the study conducted by Alejandra Iglesias et al[1] who reported 59% of cases without associated dermatoses and 16% with associated dermatoses. However, they reported higher prevalence (23%) with associated genodermatoses.

Onychomycosis was the commonest nail change observed in 45.45% of patients without associated dermatoses followed by chronic paronychia in 31.81% in our study. According to Leyden JJ,[7] Onychomycosis accounts for 20% of all the nail disorders. Esteves J[8], in his study reported that majority of cases of chronic paronychia occurred in the age group of 30 to 60 years. Tosti et al[9] and Morten RH et al[10] have concluded that chronic paronychia is predominantly a disease of domestic workers.

In the present study, out of three 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. Piraccini BM et al[11] 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.

Three cases had in growing toenail in our study. Cambiaghi S et al[12] 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.

Nail changes with associated dermatoses

In the present study, nail changes with associated dermatoses were present in 50% of patients. Among them, psoriasis (44%) was the commonest dermatoses. According to Ghosal A, Gangopadhyay et al[13] the involvement of fingernail was reported in 88.88% and pitting (90.23%) was the most common fingernail change observed.

In the present study, nail changes in association with alopecia areata were seen in 5% of patients. Pitting was the commonest presentation in all these patients. According to Gandhi V, Baruah MC et al,[14] nail changes were seen in 44% of alopecia areata patients.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[15].Nail changes associated with eczema were present in 15 patients. Among these, pitting was seen in one case. deBarker DAR et al[4] quoted that hand eczema is one of the causes for onycholysis and nail pitting.In the present study, nail changes with pemphigus vulgaris were present in 8 patients. According to Engineer et al[16] most frequent nail alterations seen in pemphigus vulgaris were paronychia in 60% and onychomaedesis in 33% of cases.

In 3 cases of Hansen's disease, fingernails showed longitudinal melanonychia and longitudinal ridging. Kaur I et al[17] observed that in leprosy, most common change observed was longitudinal melanonychia (32.4%) in the fingernails and longitudinal ridging (46.3%) in the toenails.

Two cases of toxic epidermal necrolysis had onychomaedesis and one of them had paronychia in addition. Acharya S, Balachandran C[18] reported a case of onychomaedesis and temporary shedding of the nails following Steven Johnson syndrome.

Conflict of Interest: Nil Source of support: Nil

There were 36 (18%) patients with nail disorders associated with systemic diseases. Majority (24%) were associated with hypertension / diabetes / hypertension and diabetes in our study. According to Baran R and Dawber RPR[19] the causes of clubbing are thoracic organ disorder (80%), alimentary tract (5%) and other causes like endocrine, idiopathic forms etc. According to Singh G et al[20], beau's lines have been described in systemic disorders like coronary thrombosis, measles, mumps, Kawasaki's disease, pneumonia, pulmonary embolism, and renal failure.

Conclusion

Psoriasis (44%) 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.

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