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Clinical profile and severity of nail involvement in psoriasis

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Abstract

Introduction: Psoriasis is the skin disease that most frequently affects the nails. Depending on the very nail structure involved, different clinical nail alterations can be observed. Irritation of the apical matrix results in psoriatic pits, mid-matrix involvement may cause leukonychia, whole matrix affection may lead to red lunulae or severe nail dystrophy.

Material and Methods: This is prospective and observational study conducted in the Department of Dermatology. Dermatological examination specified the clinical form of psoriasis, nail alterations type, and number of fingernails involved, the Psoriasis Area and Severity Index (PASI) score assessing the severity of skin involvement, and based on PASI score, patients were classified into mild (PASI<10), moderate (PASI 10–20), and severe disease (PASI>20). Nail Area Psoriasis Severity Index (NAPSI) score assessing the severity of nail involvement (pitting, leukonychia, red spots in lunula, and nail plate crumbling) and for nail bed disease (oil drop [salmon patch] discoloration, onycholysis, nail bed hyperkeratosis, and splinter hemorrhage).

Results: A total of 70 patients were examined. Of the 70 cases, male preponderance was noted. Thirty-five had early-onset psoriasis and the other 35 had late-onset disease. 48/70 (73%) patients with psoriasis had nail involvement. Among patients with nail involvement as well as those without nail involvement, the patients with mild psoriasis (PASI<10) accounted for the majority (31/48 [64.2%] and 18/22 [81.8%], respectively). Patients with moderate psoriasis accounted for 33.3% (14/48) of those with nail involvement and 9.0% (2/22) of those without nail involvement. Those with severe psoriasis (PASI>20) accounted for 10.4% (5/73) of patients with nail involvement. The most common finding among those with nail changes was pitting (33/48, 89.5%). Other common changes were leukonychia (27/48, 56.2%), Red spots in lunula (3/48, 6.25%), Splinter hemorrhage (9/48, 18.7%), Beau's lines (6/48, 12.5%), and Rough nails (18/48, 37.5%).

Conclusion: The most frequent signs of nail matrix disease are pitting, leukonychia, crumbling, and red spots in the lunula, whereas salmon patches or oil spots, subungual hyperkeratosis, onycholysis, and splinter hemorrhages represent changes of nail bed psoriasis. The treatment of nail psoriasis is prolonged with both conventional and biologic therapies and the systemic side effects of the various therapies limit their use. Hence, it requires patience both on the part of the treating dermatologist and the patient.

Keywords: psoriasis, psoriasis area and severity index (PASI), nail area psoriasis severity index (NAPSI)

Introduction

Psoriasis is a common skin disease characterized by inflammation and a chronic course with exacerbation and remission episodes. The worldwide prevalence is approximately 1–2%^[1]. The most common involvement of the nail is encountered in psoriasis among all skin diseases. The nail changes may be accompanied by the skin lesions, but in some patients they occur alone. Isolated nail involvement is observed only in 1–5% of all psoriatic patients^[2]. There is no difference between the genders considering the prevalence of the nail involvement. The incidence of the nail involvement in children is between 7 and 17%. The cutaneous psoriasis has usually a more severe course in patients with the nail involvement^[3]. The changes affecting the nails are encountered in 90% of the psoriatic patients during their lifetime. The prevalence of the nail psoriasis is higher in patients with psoriatic arthritis. The nail involvement is between 75 and 86% in patients with arthropathic psoriasis^[4]. It was reported that nail psoriasis is more common in hands compared to the feet. The nail involvement in psoriasis is concomitant with insertion points of tendons and ligament

inflammation. Several studies focused on the co-occurrence of nail involvement, and psoriatic arthritis confirmed the anatomical connection between the nail matrix and the entheses of the distal interphalangeal (DIP) joint extensor. In the light of these observations, it is believed that the nail lesions are caused by a reaction, which is developing as a reaction to the abnormal tissue stress and inflammation in the nail-joint region, and not as an autoimmune response [5]. The etiology of psoriasis is not fully elucidated yet. The genetic susceptibility may play a role, but also environmental factors, drugs, infections, trauma, and psychogenic factors may trigger the disease [6].

Material and Methods

This is prospective and observational study conducted in the Department of Dermatology.

Inclusion criteria

Patients with psoriasis aged 18 years or older belongs to either gender was performed in the Dermatology Department. Patients suffering from psoriasis having joint involvement were also enrolled. Patients were enrolled irrespective of the duration and severity of their illness.

Exclusion criteria

Patients receiving systemic antipsoriatic medications or topical nail medications in the past 3 months.

Patients with systemic disease were also excluded.

For each patient, the following data were recorded: age, gender, family history of psoriasis, and personal predisposing factors for psoriasis. Duration of the disease, diagnosed psoriasis or psoriasis-related symptoms (history of joint, spine, or enthesal inflammatory arthritis), and were also specified for all patients.

Dermatological examination specified the clinical form of psoriasis, nail alterations type, and number of fingernails and toenails involved, the Psoriasis Area and Severity Index (PASI) score assessing the severity of skin involvement, and based on PASI score, patients were classified into mild (PASI<10), moderate (PASI 10–20), and severe disease (PASI>20).

Nail Area Psoriasis Severity Index (NAPSI) score assessing the severity of nail involvement (pitting, leukonychia, red spots in lunula, and nail plate crumbling) and for nail bed disease (oil drop [salmon patch] discoloration, onycholysis, nail bed hyperkeratosis, and splinter hemorrhage). Consenting patients with nail involvement underwent a mycological examination at the Mycology Department of the Dermatology. Samples of the involved fingernail, toenail, or both were collected.

A nail specimen analysis was performed for each patient using direct microscopy examination with KOH and culture

in two different types of Sabouraud dextrose agar: with chloramphenicol and with chloramphenicol and actidione. The mycological examination was considered as positive if direct examination showed the presence of typical fungal mycelia consistent with the presence of dermatophytes or when the culture was positive and isolated a fungus (*Candida* and/or dermatophyte).

Statistical analysis

Data analysis was performed using SPSS software 25th version. Student's *t* test was used for continuous variables and Pearson's χ^2 test or Fisher's exact test for categorical variables. *p* values<0.05 were considered to be statistically significant.

Results

A total of 70 patients were examined. Of the 70 cases, male preponderance was noted as shown in table 1.

Table 1: Sex distribution of patients

Sex	No. of patients	Percentage
Male	42	60
Female	28	40
Total	70	100

Table 2: Age distribution of patients

Age group	No. of patients	Percentage
<20	4	5.7
21-40	23	32.8
41-60	34	48.5
>61	9	12.8
Total	70	100

According to table 2, 41-60 years age group had the highest incidence of nail involvement the patients were arbitrarily divided into four groups and least one less than 20 years of age group.

Table 3: Association between nail involvement and age of the onset of psoriasis

	Early age of onset	Late age of onset
	No. of patients (%)	No. of patients (%)
Patients with nail involvement	19 (54.2)	29 (82.8)
Patients without nail involvement	16 (45.7)	6 (17.1)
Total	35 (100)	35 (100)

In table 3, thirty-five had early-onset psoriasis and the other 35 had late-onset disease. 48/70 (73%) patients with psoriasis had nail involvement.

Table 4: Comparison between mean nail psoriasis severity index and psoriasis area severity index

	Mild psoriasis (PASI<10)	Moderate psoriasis (PASI 10-20)	Severe psoriasis (PASI>20)
	No. of patients (%)	No. of patients (%)	No. of patients (%)
Patients with nail involvement	31 (64.5)	14 (33.3)	5 (10.4)
Patients without nail involvement	18 (81.8)	2 (9.0)	0
Total	35 (100)	35 (100)	70 (100)

Among patients with nail involvement as well as those without nail involvement, the patients with mild psoriasis (PASI<10) accounted for the majority (31/48 [64.2%] and 18/22 [81.8%], respectively). Patients with moderate psoriasis accounted for 33.3% (14/48) of those with nail

involvement and 9.0% (2/22) of those without nail involvement. Those with severe psoriasis (PASI>20) accounted for 10.4% (5/73) of patients with nail involvement.

Table 5: Distribution of specific psoriasis nail patterns in fingernails and toenails among patients with nail changes of psoriasis

Nail changes seen in psoriatic patients	No. of patients	Percentage
Pits	43	89.5
Leukonychia	27	56.2
Red spots in lunula	3	6.25
Crumbling of nail Plate	23	47.9
Onycholysis	28	58.3
Oil drop sign	19	39.5
Splinter hemorrhage	9	18.7
Subungual hyperkeratosis	26	54.1
Beau's lines	6	12.5
Rough nails	18	37.5

In table 5, the most common finding among those with nail changes was pitting (33/48, 89.5%). Other common changes were leukonychia (27/48, 56.2%), Red spots in lunula (3/48, 6.25%), Splinter hemorrhage (9/48, 18.7%), Beau's lines (6/48, 12.5%), and Rough nails (18/48, 37.5%).

Discussion

Nail psoriasis has a severe impact on quality of life and may interfere with professional and other activities. Management includes patient counselling, avoidance of stress and strain to the nail apparatus, and different types of treatment [7]. Topical therapy may be tried but is rarely sufficiently efficient. Perilesional injections with corticosteroids and methotrexate are often beneficial but may be painful and cannot be applied to many nails. All systemic treatments clearing widespread skin lesions usually also clear the nail lesions. Recently, biologicals were introduced into nail psoriasis treatment and found to be very effective. However, their use is restricted to severe cases due to high cost and potential systemic adverse effects [8].

In our study 70 patients enrolled in this study, 42 were male and 28 were female. According to studies by Papp KA *et al.*, and Bachelez H *et al.* also showed higher prevalence of nail changes in males [9, 10]. However, the study by Merola JF *et al.* did not show any difference in prevalence according to gender [11]. Our study showed a prevalence of 68.5%, 48/70 which is in line with the more recent studies. Johan *et al.* [3] have also reported a frequency of more than 50% in their patients as far as the nail changes in psoriasis are concerned. Other workers have also reported up to 2/3rd of their patients to be suffering from psoriatic nail disease. [12] However; results can vary from one study to another depending upon sample size, study design and population studied.

In our study, maximum age group were 41-60 years (48.5%). The mean age of the patients, mean duration of the disease, and the mean age of the onset of disease documented by us was comparable to the finding of Gniadecki R *et al.* [13] The study by Arnold T *et al.* had the majority of nail involved patients in the 40-59 years' category, which was consistent with our finding but unlike documented by us the majority of their patients without nail involvement fell in the ≥ 60 years' age group [14]. Puig L found the psoriasis patients with nail disease to be significantly older than the ones without nail disease [15]. The Langley RG *et al.* study also revealed a higher age of onset in those with nail disease, but the difference was not significant [16]. In contrast, the study by Blauvelt A *et al.*

observed a lower age of onset in psoriasis patients with nail involvement compared to those without nail findings [17].

In our study, most of patients had mild psoriasis (PASI<10) and least were severe cases. Correlating the skin disease, of the 48 patients with nails involved, frequency was the highest in patients with mild disease decreasing towards moderate and severe psoriasis respectively. Previous reports also suggest frequency of the nail disease to be more in patients with mild psoriasis [18]. Severity of nail psoriasis has been classified in the past using different scales [19]. We observed that with a decreasing frequency of nail involvement with skin disease the severity of nail psoriasis also decreases. This seems to be in agreement with the past reports [20].

The current study demonstrated a significantly higher mean PASI among psoriasis patients with nail involvement than in those without. This was concurrent with results from the previous studies which revealed a more severe disease in psoriatics with nail involvement [21]. Higher mean total NAPS score in those with early age of disease onset in comparison to those with late-onset psoriasis, though not significant, shows a trend toward more severe nail involvement in those with late-onset psoriasis. A similar finding was reported by Chaowattanapanit S *et al.* [22]. The study by Zargari O *et al.* showed a significant correlation between the psoriasis severity and the NAPS scores. They also found a fall in PASI and NAPS scores following treatment, though NAPS scores fell at a slower rate [23].

The most frequent nail finding was pits seen in 43 patients (93%) followed by Onycholysis, Leukonychia, crumbling of nail Plate, and least were Splinter hemorrhage, Red spots in lunula and Beau's lines. There is relative lack of data regarding nail changes in psoriasis as far as our population is concerned. However, different studies have been conducted in India from time to time [24]. Among our patients with nail involvement, all changes were not seen simultaneously. At least one nail change was present in each of these patients. Pits was the most common finding in our study while others have reported ridging and pitting to be the most common [25]. It can readily be appreciated that ridging and pitting themselves contribute towards roughening of nail plate [26]. Pitting of nail plate in psoriasis is due to a defective formation of nail plate in the proximal part of nail matrix. However, workers have reported this change to be common in their studies [27]. Leukonychia was another important finding with a comparatively low frequency to other changes, but the finding is in agreement with the reports in literature [28].

Subungual hyperkeratosis was also observed in our study with a lesser frequency and is usually associated with severe psoriasis vulgaris. However, it may be seen in any of these subjects irrespective of severity of the skin disease [29]. Subungual hyperkeratosis is an outcome of the collection of yellow keratinous material. Thickening and dystrophy of psoriatic nails have been reported in the past from time to time [30]. Such nail changes generally reflect an association with severe form of psoriasis vulgaris. Onycholysis i.e. complete or partial detachment of the nail plate has been reported with variable frequency in the past as far as psoriasis vulgaris is concerned. The detachment may be distal or lateral. We observed both partial and complete onycholysis but the frequency was comparable to the past reports [31]. Color change either diffuse or in the form of oil drop sign has been reported in psoriasis vulgaris. Such a

color change was noted with a lesser frequency in our study which in turn is consistent with past studies^[32].

Limitation of the study

Our study has some limitations such as the recruitment of patients has cases but the absence of a control group. Also, nail involvement was systematically considered as related to psoriasis and fungal infection was not considered as a secondary phenomenon. And psoriatic nail changes need to evaluate in larger studies.

Conclusion

Nail psoriasis is frequent in psoriatic subjects, with about 10-78% of psoriasis patients having concomitant nail changes at any time and a lifetime prevalence of up to 90%. The most frequent signs of nail matrix disease are pitting, leukonychia, crumbling, and red spots in the lunula, whereas salmon patches or oil spots, subungual hyperkeratosis, onycholysis, and splinter hemorrhages represent changes of nail bed psoriasis. The treatment of nail psoriasis is prolonged with both conventional and biologic therapies and the systemic side effects of the various therapies limit their use. Hence, it requires patience both on the part of the treating dermatologist and the patient. The presence of nail disease in a patient with psoriasis may indicate a severe form of the disease and must be taken into account when selecting a treatment option, with an aim to reduce pain, functional impairment as well as emotional distress. By managing the nail disease effectively, a dermatologist can effectively stop the underlying inflammatory process and limit the progression of the disease.

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