

Original Article

Psoriatic Arthritis: Interrelationships between Skin and Joint Manifestations Related to Onset, Course and Distribution

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Abstract: To assess the relationships between skin and joint disease, 70 patients with psoriatic arthritis were consecutively evaluated. Data were obtained regarding age, sex, duration of disease, age at onset, and flares of both skin and joint disease. Rheumatological assessment included morning stiffness, number of swollen, tender and deformed joints, involvement of distal interphalangeal joints (DIP), presence of dactylitis, Achilles tendinitis, and clinical lumbar and cervical involvement. Skin assessment included recording of the distribution of skin lesions and nail involvement, and grading of psoriasis severity using the PASI. The scalp was the most frequently involved site. Significant correlation was found between the PASI score and the number of deformed joints and Schober's test. The scalp score was found to correlate with the number of swollen joints, deformed joints, sausage finger and DIP involvement. Synchronous flares of skin and joint were significantly more frequent in the patients with onset of skin and joint diseases within the same year. Likewise, these patients showed a highly significant association between the PASI score and the number of tender, swollen and deformed joints, Schober's test and cervical involvement, whereas no such associations were found among patients with separate onset of skin and joint diseases.

Keywords: Arthritis; Correlation; Psoriasis

Introduction

Psoriasis is a common disease, affecting between 1% and 3 % of the population [1]. The association between psoriasis and joint diseases was probably first recognised by Alibert [2] and might be defined as an inflammatory arthritis, usually seronegative (for rheumatoid factor), associated with psoriasis [3]. Psoriatic arthritis (PsA) has been reported in 5%–42% of patients with psoriasis [4,5]. Several types of psoriasis have been defined, based upon the distribution and the characteristics of the skin lesions. Although it is accepted that all types of psoriasis may be found in patients with PsA [6], the relationships between skin and joint lesions are not clear. In earlier studies it was suggested that arthritis is more likely to occur in the more severe cases of psoriasis [7], and that on the whole there is no relationship between the severity of skin disease and the severity of the arthritis. On the other hand, a recent study on 221 patients with PsA has found that those with active PsA have generally mild skin disease and that baseline relationships between psoriasis and PsA tend to be weak, except for nail involvement and DIP joint activity [8]. Therefore, the exact relationships between onset, extent and distribution of the skin lesions, and the nature of joint involvement need to be clarified.

The aim of this study was to investigate the relationships between the clinical characteristics of the skin and joints manifestations in a cohort of 70 Israeli patients with PsA.

Materials and Methods

Seventy outpatients with PsA seen at the Department of Rheumatology during 1996–1997 were consecutively

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and unselectively recruited and evaluated. All fulfilled the currently accepted criteria for psoriasis – defined as the presence of typical skin lesions confirmed by a dermatologist – and PsA, which might be defined as an inflammatory arthritis, usually rheumatoid factor negative, associated with psoriasis [3]. Patients with evidence of other joint diseases, such as typical rheumatoid arthritis, gout and SLE, were excluded.

Information was obtained by interviewing the patients using a specially designed form including age, sex, duration of skin and joint disease, family history, age at onset of both skin and joint disease, and the time relation between flares of skin and joint disease.

Clinical Assessment of Articular Involvement

Patients were asked about the duration of morning stiffness. Clinical assessment included examination of the joints: number of tender, swollen and deformed joints defined as ankylosis; subluxation or decreased range of motion attributable to joint damage rather than active inflammation; dactylitis and plantar fasciitis or tendo-Achilles tendinitis. Clinical lumbar spondylitis was defined as the presence of clinical features of sacroiliac involvement found by testing for sacroiliac stress pain, using at least three techniques [9], and/or inflammatory spinal pain defined as low back pain and stiffness, not relieved by rest or limited lumbar flexion on modified (10 cm) Schober's test, with points of measurement 5 cm above and below the posterior superior iliac spine, and limited lumbar flexion defined as < 5 cm excursion between these points at maximal lumbar flexion. Cervical involvement was diagnosed if inflammatory symptoms attributed to the cervical spine were present, with evidence of tenderness and/or limitation on physical examination.

Based on the clinical features, patients were classified into one of the following patterns: oligoarthritis, defined as ≤ 4 joints; polyarthritis, defined as ≥ 5 joints; clinical axial involvement.

Clinical Assessment of Skin Disease

Psoriasis was classified by an experienced dermatologist as plaque (psoriasis vulgaris, guttate, erythrodermic or pustular). The distribution was recorded – scalp, trunk, upper limbs and lower limbs – and the current severity was graded according to the Psoriasis Area Severity Index (PASI) (max. score = 74) [10]. This score takes into account the grade of severity on a scale from 0 to 4 of different parameters such as erythema, infiltration and scaling, and the percentages of involved skin in each area, i.e. head, trunk, upper limbs and lower limbs [10]. Nail involvement was defined as the presence of 10 or more pits and/or onycholysis, dystrophy, subungual hyperkeratosis, discoloration, loss of nails or pustulation [11].

Relationship between Skin and Joint Diseases

Patients were asked about synchronous flares of skin and joint diseases. Correlations were sought between PASI score, scalp, trunk, upper limb, lower limb and nail score on the one hand, and parameters of joint disease such as morning stiffness, number of tender and swollen joints, deformed joints, presence of dactylitis, DIP involvement, presence of inflammatory neck and back pain and Schober's test on the other. These correlations were studied in the whole group of 70 patients and in subgroups according to the time of onset of joint and skin disease, family history of psoriasis, articular patterns of PsA and history of simultaneous onset of skin and joint disease.

Statistical Analysis

Statistical analysis was done using SPSS software. The χ^2 test was used for comparing discrete variables between subgroups and Student's *t*-test for comparing continuous variables for parametric data. Spearman's rank coefficient was used for correlation analysis.

Results

Patients Demographic and Clinical Characteristics

Seventy patients (31 women, 39 men) with PsA were included in the study. The mean duration \pm standard deviation of psoriasis and arthritis were 17 ± 13.2 years and 10.6 ± 10.3 years, respectively. The age of onset \pm standard deviation of psoriasis and arthritis were 30 ± 13.2 and 37 ± 12.2 , respectively. Twenty-six patients had a family history of psoriasis.

Characteristics of the Skin Involvement

Psoriasis vulgaris was by far the most prevalent skin manifestation, present in 65 out of 70 patients. Only four presented with psoriasis guttata and a single patient had erythroderma. The mean PASI of the entire group was 7.8 ± 9.6 . The distribution of the skin lesions was as follows: scalp, 89% of patients; trunk, 66%; upper and lower limbs 73% and 64%, respectively. Sixty three per cent of the patients presented typical nail changes.

Characteristics of Joint Involvement

Morning stiffness of more than 1 hour's duration was experienced by 44 patients (65%). The mean number \pm standard deviation of swollen and tender joints was 2 ± 2 and 5 ± 4 , respectively. Dactylitis was present in 23 of the patients, DIP involvement in 34 and Achilles tendinitis in 18. Deformed joints were found in 21 of the patients: five had one deformed joint, five had two, four had three, two had four, three had five, one had eight and another patient had 11 deformed joints.

Cervical or lower spinal involvement, characterised by inflammatory pain, was present in 28 (40%) of the patients, 21(30%) presented with limitation of neck movement, and 21 (30%) had a limited Schober test.

Interrelationships between Skin and Joint Diseases

Onset and Course

The onset of skin disease preceded the arthritis in 42 patients (group 1) (60%) (mean 7 ± 11 years), occurred within the same year in 22 (31%) (group 2), and in six (9%) arthritis preceded the skin manifestations (mean 4.5 ± 3 years).

The mutual course of both skin and joint affections was studied. Reported synchronous flares in both systems was significantly more prevalent (70%) in patients who presented a simultaneous onset (group 2), compared to 40% in the group in whom psoriasis preceded arthritis (P = 0.03).

Distribution and Extent

Whole Group. No significant correlation was found between PASI, scalp, trunk, upper limbs and lower limb score and the number of tender or swollen joints. On the other hand, a significant correlation was found between the degree of skin involvement, expressed by the PASI score, and Schober test (P = 0.02): higher PASI scores correlated with limited Schober tests. Deformed joints were associated with a high PASI score (P = 0.04) (Table 1). The scalp score was found to correlate positively with the number of swollen joints (P = 0.02). Deformed joints, dactylitis and DIP involvement were significantly associated with higher scalp scores (Table 1). Similarly, an association was found between nail involvement and deformed joints: 18 out of 44 patients with nail involvement had more than one deformed joint, whereas two out of 15 patients without nail involvement had deformed joints. Nail involvement was correlated with the number of tender and swollen joints: patients without nail involvement had a mean ± standard deviation of 1.1 ± 1.3 swollen joints and 4.3 ± 3.8 tender joints, whereas patients with nail involvement had 2.5 ± 2.8 swollen joints and 7.3 ± 4.4 tender joints (P =

0.05 and P = 0.02, respectively). Although patients with DIP arthritis presented more nail involvements (19 out of 24, 79%) than those without, (21 out of 46, 54 %.), these results did not achieve statistical significance.

Different Patterns of Onset. Patients with onset of skin and joint disease within the same year (group 2, n = 22), analysed separately, showed tight relationships between their skin and joint parameters. The PASI score, as well as the separate scores of the scalp, trunk, limb and nail psoriasis, presented a highly significant correlation with the number of tender and swollen joints (Fig. 1), as well as their Schober test, whereas patients with deformed joints, dactylitis, DIP involvement, cervical and back involvement presented with significantly higher PASI scores (Table 2). In contrast, except for a significant correlation between scalp score and the presence of more than one deformed joint, no such associations were found in patients with separate onset of their skin and joint manifestations (group 1) (Fig. 2) (Table 2).

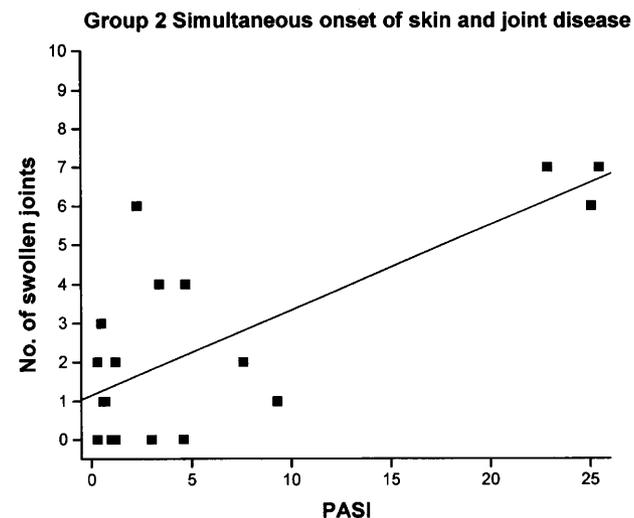


Fig. 1. Correlation between PASI and number of swollen joints in patients with onset of skin and joint disease within the same year (n = 22). A clear correlation between PASI and the number of swollen joints can be seen (P<0.01). Patients with low PASI had a small number of swollen joints, whereas those with a higher PASI had a large number of swollen joints.

Table 1. Association between PASI , scalp, trunk, upper limbs and lower limb scores and clinical parameters of joint involvement in 70 patients with PsA

	Deformed joints		Dactylitis		DIP involvement		Cervical involvement		Back involvement	
	0	>1	0	>1	0	>1	0 [#]	1 ^{**}	0 [#]	1 ^{**}
PASI	6.6±8	11±11*	7.9±9	8 ±12	7.1±9	9.7±12	6.8±6	7.4±3	6.7±7	9.3±9.
Scalp score	5.5±7	15±7*	6.1±6.5	2.8±15*	6.3±6	11.9±15*	7.2±2	8.1±3	8.1±2	7.9±1
Trunk score	5.2±7	11±13*	6.7±8.4	7.5±12	5.8±8	9.1±12	5.2±11	6.6± 2	5.2±7	8.7±11
Upper limbs	7.1±8	11±12	8.1±8.4	8.6±12	7.5±8.4	9.8±12	6.2±13	7.1±12	6.3±6	10 ±12
Lower limbs	8.1±11	11±12	9.4±11	8.3±12	8.5±11	10 ±12	8.2±1.4	7.9±1	7.8±9	10 ±12

[#], no cervical or back involvement; ^{**}, cervical or back involvement; *, P < 0.05.

Table 2. Correlation between PASI, scalp, trunk, UL, LL scores and the clinical parameters of joint involvement in the group of patients in whom skin disease preceded psoriasis (gr1) ($n = 42$), compared to the group with simultaneous onset of skin and joint disease (gr2) ($n = 22$)

	Deformed joints		Dactylitis		DIP involvement		Cervical involvement		Back involvement	
	0	>1	0	>1	0	>1	0 [#]	1 ^{**}	0 [#]	1 ^{**}
PASI in gr1	8.5	11	7.2	11	8.6	10.3	8.2	7.1	7.6	9.6
PASI in gr2	2	20*	4.6	6.8	2.3	10.8*	3.8	8*	4.9	8.4*
Scalp in gr1	3.9	10.6*	4.7	9.2*	5	7.8	4	5	5	6
Scalp in gr2	7	30*	9.4	16.4*	9.2	16*	9	9	12.4	12.5
Trunk in gr1	7	9.5	7.1	9.4	9.3	8.5	5.2	6.2	6.2	8.3
Trunk in gr2	1.2	18*	3.8	5.6	1	10*	4.2	8*	3.7	8.2*
Upper limb gr1	9.7	10.5	10	10.6	10.6	9.6	7	9	7	11
Upper limb gr2	3.8	19*	3.7	7*	1.2	11.2*	5	6	4.5	7.5
Lower limb gr1	9.8	10.6	9.2	12.2	9	12	6	8.1	8.9	10.1
Lower limb gr2	3.8	19*	8	5*	5	8.6*	5.2	6.1	6	12.5

[#], no cervical or back involvement; **, cervical or back involvement; *, $P < 0.05$.

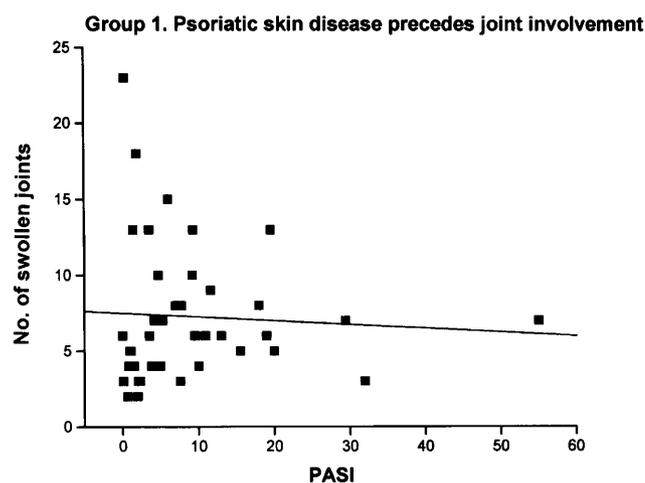


Fig. 2. Correlation between PASI and number of swollen joints in patients in whom onset of skin disease preceded arthritis ($n = 42$). No correlation between PASI and the number of swollen joints was found in this group of patients.

Different Arthritis Subtypes. Patients with various subtypes of joint manifestations were analysed with regard to their skin characteristics. Onset type did not seem to be associated with oligoarthritis, polyarthritis or axial involvement. As to the extent of psoriasis, it was found that patients with spinal involvement presented significantly higher scores of PASI, scalp, trunk and limb psoriasis than those with exclusively peripheral arthritis. A similar trend, although not reaching statistical significance, was found in patients with polyarthritis compared to those with oligoarthritis. Nail involvement was more commonly associated with polyarthritis ($P = 0.02$).

Family History of Psoriasis. Patients with a positive family history of psoriasis ($n = 26$) were analysed and compared to those without a familial history with regard to their different arthritis manifestations, skin scores and onset characteristics. No statistical differences between these two subgroups were found.

Discussion

The relationship between the severity of skin lesions and joint disease in PsA is a matter of controversy. It has been suggested that those with more severe psoriasis tend to develop arthritis. Leczinsky [7] has shown a 20 % frequency of arthritis in a group of patients with severe psoriasis, in contrast to 2 % in patients with mild skin disease. Others have reported a higher frequency of arthritis among hospital inpatients with psoriasis [12,13]. However, in larger studies of patients with PsA, as well as in the present series, a proportion of patients have developed arthritis before the skin lesions, suggesting that the arthritis is not uniformly related to the overt presence of skin lesions [3,14]. Moreover, simultaneous flares of skin and joint disease have been reported in only 35 % of patients [3]. Jones et al. [6] have studied the relationship between joint disease and skin and nail involvement in a cohort of 100 patients with PsA: they could find no association between the type and distribution of the skin involvement and the arthritis subgroups, nor was there any relationship between the activity of psoriasis and the severity, activity and functional status of the arthritis [6]. Cohen et al. studied 221 patients with PsA and found that baseline relationships between psoriasis and PsA tend to be weak, except for nail involvement and DIP activity [8]. Jones et al. prospectively evaluated a small group of 24 patients with PsA and found that only a minority of patients with PsA had simultaneous flares of peripheral, skin and nail disease, independently of the time of onset of joint disease in relation to skin disease [15].

In the present study the most striking finding was the clear correlation between skin and joint disease in the subgroup of patients in whom disease onset was synchronous. This group of patients reported a history of frequent simultaneous flares, compared to the group in which skin disease preceded joint involvement. Likewise, clinical evaluation of these patients disclosed a highly significant correlation between their parameters of skin severity and most of the clinical parameters of both their peripheral and their spinal disease. A similar

observation was suggested by Baker et al., who reported synchronous exacerbations and remissions of skin and joint disease in eight patients in whom skin and joint disease occurred simultaneously [16]. Other studies which have assessed the relationship between skin and joint disease have not addressed this issue [6].

Another emerging finding of our work concerns scalp involvement and its relationship to joint disease. Involvement of the scalp was the most frequent location (89%) in our PsA patients, whereas it has been reported in 50 % of patients with psoriasis only [17]. In the whole group of patients the extent of scalp involvement was the only parameter of skin disease that correlated statistically with all different parameters of peripheral joint disease, such as swollen and tender joints, deformed joints, dactylitis and DIP involvement. The significance of psoriatic lesions in the scalp of patients with PsA has not been emphasised except by Wright et al., who reported a higher frequency of scalp involvement in patients with distal joint disease [18].

With regard to nail involvement in PsA, it has been suggested that nail lesions are the only clinical features that identify patients with psoriasis who are destined to develop arthritis [3]. Nail lesions were found in about 63%–83% of patients [3,14], nearly always with DIP arthritis [3,18]. Our study confirms these findings. We have shown a significant correlation between nail involvement and the number of tender, swollen and deformed joints, this correlation being again more striking in the subgroup of patients with simultaneous onset of skin and joints disease. Our results are concordant with those of Baker et al. [16], who found that patients with more severe disease have a greater incidence of nail disease, although others could not confirm this observation [6].

It is currently accepted that psoriatic patients with a family history of psoriasis have extended skin involvement [20] and a higher frequency of arthritis [21]. We could not confirm this trend in our patients.

Concerning the articular subtypes of PsA, we could find no association between the severity or distribution of skin involvement and specific articular subgroups. There was a trend for a more severe skin disease in patients with spinal involvement and in those with polyarthritis: similar findings have been reported by Stern [21]. Our present clinical study, which did not include radiological evaluation, may have underestimated the rate of spondylitis [3]. Our results, however, are consistent with previous reports [6].

Conclusion

In 70 patients with PsA we have shown that an association between the degree of skin involvement

and the extent of severity of joint disease does exist. Scalp involvement was by far the most frequent skin manifestation and its score correlated with most of the joint manifestations. These associations were more pronounced in patients with a close temporal association between their skin and joint disease presentations.

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