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Spondylitis is the most common pattern of psoriatic arthritis in Korea

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Abstract We assessed the prevalence and clinical features of psoriatic arthritis (PsA) in Korean patients with psoriasis. The prevalence of PsA in patients with psoriasis was 9%. Patients with PsA were older and had a longer duration of skin disease than those with psoriasis alone (median age, 40 vs 35 years, $P = 0.03$, and 15.3 vs 11.7 years, $P = 0.04$, respectively). Spondylitis was the most common pattern of PsA (50%). Nail change, dactylitis, and enthesopathy were observed in 36%, 15.4%, and 15.6% of patients with PsA, respectively. Increased erythrocyte sedimentation rate (ESR), antinuclear antibody, and radiological sacroiliitis were more frequent in patients with PsA than in those with uncomplicated psoriasis (25.8% vs 10.3%, $P = 0.04$; 37.9% vs 16.7%, $P = 0.02$; and 37.8% vs 1.1%, $P < 0.01$, respectively). The onset ages of psoriasis and arthritis in the spondylitis group were significantly lower than those in the non-spondylitis group (median age, 21.5 vs 31 years, $P = 0.03$, and 28.5 vs 43.5 years, $P = 0.01$, respectively). HLA-B27 was prevalent in 8% of patients with PsA.

Key words Psoriatic arthritis · Psoriasis · Spondylitis

Introduction

Psoriatic arthritis (PsA) is an inflammatory arthropathy associated with psoriasis. The disease may present in a variety of forms, including asymmetric oligoarthritis, symmetric polyarthritis resembling rheumatoid arthritis, and spondyloarthropathy with or without peripheral arthritis. Several studies have reported a widely varied prevalence of PsA in patients with psoriasis, from 5 to 39% [1–4]. We assessed the prevalence and clinical features of PsA in Korean patients with psoriasis.

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Patients and methods

We examined 356 consecutive patients with psoriasis who visited the dermatology clinic in Seoul National University Hospital (tertiary referral center) between 1 January and 28 April 1997. Psoriasis was defined as the presence of typical skin lesions. A dermatologist (J.I. Youn) confirmed the diagnosis, the type and extent of psoriasis, and nail involvement. The extent of psoriasis was classified as mild (psoriasis affecting body surface area $< 5\%$), moderate (5–30%), or severe ($> 30\%$) [5]. The patients were assessed with careful history taking, physical examination, laboratory evaluation, joint X-ray, and bone scintigraphy by rheumatologists. The diagnosis of PsA was based on the presence of an inflammatory arthropathy accompanying psoriasis. Other diagnoses, such as rheumatoid arthritis, meeting the American Rheumatism Association (ARA) classification criteria [6], or osteoarthritis were excluded. The following clinical features were assessed: the age at the onset of skin and joint disease, family history of psoriasis, dactylitis, nail changes, back pain, morning stiffness (> 1 h), enthesopathy, and functional class according to the American College of Rheumatology (ACR) criteria [7]. Laboratory evaluation included complete blood counts, Westergren erythrocyte sedimentation rate (ESR), serum uric acid, serum creatinine, rheumatoid factor (RF), antinuclear antibody (ANA), and HLAB27.

PsA patients were divided into five arthritic patterns according to Moll and Wright's classification [8] – distal interphalangeal (DIP) joint predominant, arthritis mutilans, oligoarthritis, polyarthritis, spondylitis – and others. Spondylitis was diagnosed when at least one of the following was present in a patient with inflammatory back pain, with or without peripheral joint disease: (1) a tenderness on the spine or sacroiliac joint, (2) sacroiliitis on pelvis X-ray (anteroposterior view), (3) increased uptake of sacroiliac joint on bone scintigraphy, or (4) spinal syndesmophytes on spine X-ray. Polyarthritis was diagnosed when five or more peripheral joints were involved. Oligoarthritis was defined as having joint involvement of less than five joints. Symmetric joint disease was diagnosed when matched pairs of involved joints outnumbered unmatched pairs [9]. The differences in clinical and laboratory results were analyzed using the Student's *t*-test, chi-square test, or Fisher's exact test.

Results

In 356 patients with psoriasis, 60 complained of joint symptoms such as pain and stiffness. Out of 60 patients, 32 (9%) were determined to have PsA. The remaining 28 patients had osteoarthritis (6 patients), rheumatoid arthritis (1 patient), osteonecrosis (2 patients), suspected gout (1 patient), herniated intervertebral disc (1 patient), spinal posterior fusion (1 patient), and arthralgia without objective evidence for arthritis (16 patients).

Table 1 shows clinical features of 32 PsA patients compared with 296 psoriatic patients without arthralgia. The median age of PsA patients was 40 years (range, 20–68 years), and male to female ratio was 1.5:1.0 (19:13). The median age at the onset of psoriasis was 28 years (range, 5–58 years), and mean (±SD) duration of skin disease was 15.3 ± 11.7 years. The median age at the onset of PsA was 35 years (range, 9–58 years), and mean (±SD) duration of arthritis was 7.5 ± 6.2 years. Psoriasis patients with PsA were older than those with psoriasis alone (median age, 40 vs 35 years, $P = 0.03$ by Student's *t*-test). There was no significant difference in the male to female ratio and onset age of psoriasis between the two groups. The duration of psoriasis in the patients with PsA was longer than those with psoriasis alone (15.3 vs 11.7 years, $P = 0.04$ by Student's *t*-test).

PsA occurred between 20 and 59 years in 91% of the patients and most commonly in the third decade (Table 2). Psoriasis preceded arthritis in 68.8% of patients with a mean interval of 12.5 years (range, 6 months–43 years), whereas arthritis preceded psoriasis in 12.5% with a mean interval of 5.3 years (range, 2–7 years). Simultaneous onset of joint and skin disease was found in 18.8% of the patients (Table 3). There was a family history of psoriasis in 36% of PsA patients. Plaque was the most common type of skin disease, occurring in 96.9% of PsA patients (nummular, 53.1%,

Table 2 Onset age of psoriatic arthritis

Age (years)	Number of cases (%)
0–9	1 (3.1)
10–19	2 (6.3)
20–29	9 (28.1)
30–39	7 (21.9
40–49	7 (21.9)
50–59	6 (18.8)
Total	32 (100)

Table 1 Clinical, laboratory, and radiological comparisons between patients with psoriatic arthritis and those with psoriasis alone (*$P < 0.05$). Anemia is defined as hemoglobin < 13 g/dl (male), < 12 g/dl (female); leukocytosis as white blood cell > 10,000/mm^3; hyperuricemia as serum uric acid level > 7 mg/dl (male), > 6 mg/dl (female). (*ACR* American College of Rheumatology, *ESR* erythrocyte sedimentation rate, *AP* anteroposterior view)

	Psoriatic arthritis (n = 32)	Psoriasis alone (n = 296)
Age (years)[a]	40 (20–68)	35 (7–80)*
Sex (male:female)	1.5:1.0	1.2:1.0
Psoriasis onset age (years)[a]	28 (5–58)	22 (1–75)
Duration of psoriasis (years)[b]	15.3 ± 11.7	11.7 ± 9.4*
Arthritis onset age (years)[a]	35 (9–58)	–
Duration of arthritis (years)[b]	7.5 ± 6.2	–
Family history of psoriasis (%)	35.5	21.6
Type of psoriasis		
Plaque	96.9	82.0
Guttate	0	8.8
Others	3.1	9.2
Initial extent of psoriasis (%)		
Mild	38.7	35.3
Moderate	35.5	42.8
Severe	25.8	21.9
Nail changes (%)	36.0	30.1
Back pain (%)	62.5	–
Morning stiffness (> 1 h) (%)	23.1	–
Dactylitis (%)	15.4	–
Enthesopathy (%)	15.6	–
ACR functional class (%)		
I	65.2	–
II	34.8	–
III/IV	0	–
Anemia (%)	19.4	6.3
Leukocytosis (%)	12.9	5.0
Westergren ESR > 20 mm/h (%)	25.8	10.3*
Hyperuricemia (%)	12.9	8.5
Antinuclear antibody	37.9	16.7*
Rheumatoid factor (%)	6.6	3.4
HLA-B27 (%)	8.0	–
Sacroiliitis on pelvis X-ray (AP) (%)	37.8	1.1*
Increased uptake in sacroiliac joints on bone scan (%)	11.1	–

[a] Median (range)
[b] Mean ± SD

and large plaque, 43.8%), while guttate type was absent. Nail change, dactylitis, and enthesopathy were observed in 36%, 15.4%, and 15.6% of patients with PsA, respectively. There was no significant difference between PsA patients and those without arthritis in family history, nail involvement, and initial extent and type of psoriasis. Back pain was present in 62.5%, and morning stiffness of more than 1 h in 23.1% of patients with PsA.

Frequently involved joints in PsA were the sacroiliac joints (43.8%), knees (40.6%), proximal interphalangeal (PIP) joints of the hands (21.9%), and ankles (21.9%) (Table 4). All patients with PsA were included in the ACR functional class I/II.

There were 6.6% (2/30) of patients with a positive RF in our study (Table 1), none of them meeting the revised ARA criteria for RA. HLA-B27 was prevalent in 8% (2/25) of PsA patients. Increased ESR was more frequent in patients with PsA than those with uncomplicated psoriasis (25.8% vs 10.3%, $P = 0.04$ by Fisher's exact test). There was no significant difference in the prevalence of anemia and leukocytosis between the two groups. ANA and radiological sacroiliitis were more frequent in patients with PsA than those with psoriasis alone (37.9% vs 16.7%, $P = 0.02$ by chi-square test, and 37.8% vs 1.1%, $P < 0.01$ by Fisher's exact test, respectively) (Table 1). Radiographic abnormalities were found in 40.6% (13/32) of PsA patients (Table 5). Radiological sacroiliitis was the most common, occurring in 34.4% (unilateral 18.8% and bilateral 15.6%).

The patterns of PsA according to Moll and Wright's criteria were as follows: spondylitis in 50% of patients; oligoarthritis in 31.3%; polyarthritis in 6.3%; and predominant DIP involvement in 6.3% (Table 6). Spondylitis was accompanied by peripheral arthritis in 68.8% (11/16). Peripheral joint involvement was asymmetric in 50% and symmetric in 50%. One patient had only chest wall pain and was not included in the Moll and Wright's classification. One patient in the oligoarthritis group was also diagnosed as having SAPHO (synovitis, acne, pustulosis, hyperostosis, and osteitis) syndrome.

Table 7 shows the clinical, laboratory, and radiographic comparison between patients with spondylitis and those without spondylitis. The psoriasis patients with spondylitis were younger than those without spondylitis (median age, 35 vs 50 years, $P = 0.02$ by Student's *t*-test). The onset ages of psoriasis and arthritis in the spondylitis group were significantly lower than

Table 3 Temporal relationship between psoriasis and arthritis

Interval between psoriasis and arthritis (years)	Number of cases
Arthritis following psoriasis (12.5 ± 10.0[a])	22 (68.8)
0–5	8
6–10	2
11–15	6
16	6
Psoriasis following arthritis (5.3 ± 2.4[a])	4 (12.5)
0–5	2
6–10	2
Simultaneous onset	6 (18.8)
Total	32 (100)

[a] Years (mean ± SD)

Table 4 Frequently involved joints in psoriatic arthritis (*PIP* proximal interphalangeal, *DIP* distal interphalangeal)

Joint	Number of cases (%)
Sacroiliac joint	14 (43.8)
Knee	13 (40.6)
Hand PIP	7 (21.9)
Ankle	7 (21.9)
Hand DIP	6 (18.8)
Shoulder	5 (15.6)
Elbow	5 (15.6)
Wrist	5 (15.6)
Cervical spine	3 (9.4)
Lumbar spine	3 (9.4)
Hip	3 (9.4)
Metacarpophalangeal	2 (6.3)
Metatarsophalangeal	1 (3.1)
Other joints	2 (6.3)
Total	32 (100)

Table 5 Abnormal radiologic findings in psoriatic arthritis

Abnormal joint X-ray findings	Number of cases (%)
Sacroiliitis	11 (34.4)
Unilateral	6 (18.8)
Bilateral	5 (15.6)
Periarticular osteopenia	5 (15.6)
Deformity	3 (9.4)
Bony erosion	2 (6.3)
Atlantoaxial subluxation	2 (6.3)
Enthesopathy	2 (6.3)
Joint space narrowing	2 (6.3)
Syndesmophyte	1 (3.1)
Hyperostosis	1 (3.1)
Total	13 (40.6)

Table 6 Patterns of psoriatic arthritis (*DIP* distal interphalangeal)

Pattern	Number of cases (%)		
	Subtotal	Asymmetric distribution	Symmetric distribution
DIP predominant	2 (6.3)	1	1
Oligoarthritis[a]	11 (31.3)	6	5
Polyarthritis	2 (6.3)	0	2
Spondylitis	16 (50)	–	–
Spondylitis only	5 (15.6)	–	–
Plus oligoarthritis	7 (21.9)	6	1
Plus polyarthritis	4 (12.5)	0	4
Arthritis mutilans	0 (0)	–	–
Others	1 (3.1)	–	–
Total	32 (100)	13 (50)	13 (50)

[a] There was one case of SAPHO syndrome in the oligoarthritis group

Table 7 Clinical, laboratory, and radiologic comparison between spondylitis and non-spondylitis in psoriatic arthritis (* $P < 0.05$). Anemia is defined as hemoglobin < 13 g/dl (male), < 12 g/dl (female); leukocytosis as white blood cell > 10,000/mm^3; hyperuricemia as serum uric acid level > 7 mg/dl (male), > 6 mg/dl (female). (*ACR*, American College of Rheumatology, *ESR* erythrocyte sedimentation rate, *AP* anteroposterior view)

	Spondylitis ($n = 16$)	Non-spondylitis ($n = 16$)
Age (years)[a]	35 (20–66)	50 (29–68)*
Sex (male:female)	1.0:2.2	1.0:1.0
Psoriasis onset age (years)[a]	21.5 (5–49)	31 (9–58)*
Duration of psoriasis (years)[b]	15.2 ± 12.1	15.5 ± 11.8
Arthritis onset age (years)[a]	28.5 (10–47)	43.5 (9–58)*
Duration of arthritis (years)[b]	7.6 ± 6.0	7.4 ± 6.7
Interval between psoriasis and arthritis (years)[b]	7.6 ± 9.7	8.3 ± 12.1
Family history of psoriasis	33.3	37.5
Type of psoriasis (%)		
Plaque	100.0	93.8
Others	0	6.3
Initial extent of psoriasis (%)		
Mild	26.7	50.0
Moderate	40.0	31.3
Severe	33.3	18.8
Nail changes (%)	28.6	45.5
Back pain (%)	100.0	25.0*
Morning stiffness (> 1 h) (%)	26.7	16.7
Dactylitis (%)	7.1	25.0
Enthesopathy (%)	25.0	6.3
ACR functional class (%)		
I	78.6	40.0
II	21.4	60.0
III/IV	0	0
Anemia	12.5	20.0
Leukocytosis	12.5	13.3
Westergren ESR > 20 mm/h (%)	25.0	26.7
Hyperuricemia (%)	6.7	20.0
Antinuclear antibody (%)	33.3	42.9
Rheumatoid factor	20.0	0
HLA-B27	7.7	8.3
Sacroiliitis on pelvis X-ray (AP) (%)	68.8	0*
Increased uptake in sacroiliac joints on bone scan (%)	20.0	0

[a] Median (range)
[b] Mean ± SD

those in the non-spondylitis group (median age, 21.5 vs 31 years, $P = 0.03$, and 28.5 vs 43.5 years, $P = 0.01$ by Student's *t*-test, respectively). There were no differences in other clinical or laboratory parameters between the two groups, except for back pain and radiological sacroiliitis.

Discussion

The prevalence of PsA in patients with psoriasis varied widely, from 5 to 39% in previous reports [1–4]. In our study the prevalence of PsA (9%) was determined in patients with psoriasis who visited the dermatology clinic of the tertiary hospital. The differences in the prevalence of PsA may be associated with variable patient population, referral pattern, or different diagnostic criteria for PsA.

In our study, patients with PsA were older and had a longer duration of skin disease than those with psoriasis alone. There was little evidence suggesting any distinctive type of psoriasis in PsA [8]. We could not find any difference in the type of psoriasis between PsA patients and those with psoriasis alone either. While the prevalence of PsA was reported in up to 39% of the hospitalized patients with severe psoriasis [1], no significant association was observed between the initial extent of skin lesion and the frequency of PsA in our patients. Nail changes, which are often useful in diagnosing PsA, were found more frequently in patients with PsA than in those of psoriasis alone (53–84% vs 30–50%) in previous studies [8, 10–14]. In our PsA patients, however, nail changes were observed less frequently (36%) and were not significantly different from those in patients with uncomplicated psoriasis.

Although PsA involves any joint, those most commonly involved are reported to be the wrists and small joints of the hands and feet [9, 15, 16]. In our patients, however, most frequently involved joints were the sacroiliac joints, knees, hand PIPs, and ankles. Small joints of the hands and feet, apart from hand PIPs, were involved in less than 20%. Dactylitis and enthesopathy are the characteristic manifestations of PsA, occurring in 16–40% and 40–45% of cases, respectively [9, 11, 14, 17, 18]. Dactylitis (15.4%) and enthesopathy (15.6%) were less frequent in the present study. It is widely accepted that patients with PsA have a relatively benign course. All of our PsA patients were included in the ACR functional class I/II, which is comparable to other reports [12, 13, 15, 19, 20].

There is no diagnostic laboratory test for PsA. Gladman reported that ESR was elevated in 41% of patients, anemia in 14%, and leukocytosis in 17% [11]. Elevation of ESR was found in 25.8% of our PsA patients, which was significantly more common than in the patients without arthritis and may reflect the inflammatory activity of PsA. About 13% of our patients had hyperuricemia, which may lead to an erroneous diagnosis of gout in patients with acute monoarthritis. In our study, the frequency of RF (6.6%) was comparable to previous results (3.3–9.0%) [1, 10–12, 18]. The prevalence of ANA (37.9%) in our PsA patients was higher than those with psoriasis alone and was also increased compared to previous reports (7.5–31.6%) [1, 10–12, 18]. However, ANA was weakly positive at a 1: 40 dilution in 73% of the patients.

The radiographic characteristics of PsA include unique combination of erosion and new bone formation, asymmetric joint involvement, maintenance of bone density, PIP and DIP involvement of hands, sacroiliac involvement, and spinal syndesmophytes [20]. The most common radiographic feature of our patients was sacroiliitis, which was observed in 34.4% of the patients. Bony erosions (6.3%) and spinal syndesmophytes (3.1%) were found less commonly than earlier reports (57–70% and 9–35%, respectively) [1, 11, 12, 20, 21].

Since Moll and Wright's classification was suggested for the evaluation of clinical patterns of PsA [8], there have been differing reports on the prevalence of each pattern. Many authors demonstrated that oligoarthritis was the most common pattern of PsA, occurring in 37–67% of patients [1, 12, 14, 17]. Recent studies indicated that polyarthritis was the most common, occurring in 39–68% of patients [2, 9, 11, 13], while some authors showed that spondylitis was predominant, occurring in 43% [4, 18]. In our patients, spondylitis was the most common pattern of PsA (50%). The broader definition of spondylitis, including the result of bone scan, might account for the higher prevalence of spondylitis in our study. However, only one patient with back pain was considered to have spondylitis by the result of bone scan alone. The variation in the prevalence of each pattern seems to be due to using different definitions of PsA patterns and different evolutions of arthritic pattern with the duration of arthritis. While oligoarthritis was predominant in patients with a short duration of arthritis [17], polyarthritis prevailed in patients with a longer duration of arthritis [9, 11]. According to Jones's study, in which the subjects had a mean duration of arthritis of 12.2 years, 63% of the patients with monoarticular or oligoarticular onset developed polyarticular patterns of PsA [13]. Since spondylitis was the predominant pattern of PsA in Oriental patients (the present study and 18), racial difference might be associated with the pattern of PsA. Our study included one case of SAPHO syndrome, which may be considered as another type of PsA [9]. In contrast to previous reports that spondylitic pattern of PsA tended to affect men and older patients [11, 21, 22], we showed that patients with spondylitis developed psoriasis and arthritis earlier than those with non-spondylitis and there was no difference in the sex ratio between the two groups.

Previous studies revealed that HLA-B27 was detected in some patients with PsA (5–55%), especially frequently in patients with spondylitis (23–83%) [3, 4, 10, 14, 22–24]. Although the sample size was small, the frequency of HLA-B27 in our PsA patients was relatively low compared with previous reports and was not different between the spondylitis and non-spondylitis group. The prevalence of HLA-B27 in healthy Koreans is known to be 5.7% [24]. HLA-B27 does not seem to be more prevalent in our PsA patients than in healthy Koreans.

It is known that the presence of isolated spondylitis in PsA is unusual and, in most cases, it occurs with peripheral arthritis [25]. However, previous studies showed a varied frequency of isolated spondylitis in PsA, from 3–7.2% [9, 11, 12, 17, 18] to 20.9–28.5% [2, 4, 21]. In our study, isolated spondylitis was found in 15.6% (5/32) of patients with PsA, whereas spondylitis with peripheral arthritis was found in 34.4% (11/32). The patients with spondylitis, with or without peripheral arthritis, had distinct features regarding onset age of psoriasis and arthritis compared to those without spondylitis.

In conclusion, PsA developed in 9% of patients with psoriasis in our study. Patients with PsA were older and had a longer duration of skin disease than those with psoriasis alone. The clinical features of our patients showed some differences from previous reports. Spondylitis was the most common pattern of PsA. Nail change, dactylitis, and enthesopathy were less common than previously reported. Increased ESR, ANA, and radiologic sacroiliitis were more frequent in patients with PsA than in those with psoriasis alone. Patients with spondylitis developed psoriasis and arthritis earlier than those with non-spondylitis.

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