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A prospective, clinical and radiological study of early psoriatic arthritis: an early synovitis clinic experience

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***Objective*. To determine the clinical presentation and clinical and radiological outcome of early psoriatic arthritis (PsA) at 1 and 2 yr.**
***Methods*. Patients with PsA were assessed at the St. Vincent's University Hospital Early Synovitis Clinic. Standardized clinical and laboratory assessment was performed at presentation and 1- and 2-yr follow-up. Radiographs of the hands and feet were evaluated in chronological order by two trained observers using the Sharp method modified to include the distal interphalangeal (DIP) joints.**
***Results*. A total of 129 (12.7%) of 1018 patients were diagnosed with PsA [mean age at onset of arthritis was 40.4 yr (range 11–76); mean duration of disease was 9.9 months (range 0.3–48); 52 oligoarticular, 77 polyarticular]. Means and standard deviations of indices of disease activity at presentation were: 10-cm visual analogue scale = 4.8 ± 2.7, HAQ score = 0.71 ± 0.64, ACR functional class III/IV = 41 (35%), Ritchie Articular Index = 5.6 ± 6, swollen joint count = 6.9 ± 8, erythrocyte sedimentation rate = 24 ± 26.4 mm/h, C-reactive protein = 27.6 ± 58.5 mg/l. At presentation, 49 (38%) patients had peripheral enthesopathy, 13 patients (10%) had inflammatory spine pain and 50 (39%) patients had DIP involvement. A total of 119 had psoriasis at the time of presentation [plaque psoriasis in 112 (94%), mean age of psoriasis onset was 29.8 ± 16.2 yr, nail dystrophy present in 78 patients (67%)]. At 1 yr of follow-up, 119 (92%) patients were reassessed and 70 (59%) were taking a disease-modifying anti-rheumatic drug (DMARD). At 2 yr, 97 (75%) patients were reassessed and 54 (56%) were taking a DMARD. Despite considerable improvement in inflammation and function scores, only 31 (26%) patients were in remission at 1 yr with 20 (21%) in remission at 2 yr. There was a low rate of DMARD-free remission [14 (12%) at 1 yr and 11 (11%) at 2 yr]. Radiographs of hands and feet were obtained for 117 (91%) patients at presentation and 86 (67%) patients at a median follow-up of 24 months (range 11–56); 47% of patients had joint erosions in hands or feet at follow-up with a mean Sharp erosion score of 3 (0) ± 5.2 (range 0–25) and a mean Sharp narrowing score of 3.2 (0) ± 7.5 (range 0–48).**
***Conclusion*. This study confirms that PsA is a chronic, progressive disease in the majority of patients. Despite clinical improvement with current DMARD treatment, PsA results in radiological damage in up to 47% of patients at a median interval of 2 yr.**

KEY WORDS: Psoriatic arthritis, Clinical presentation, Clinical outcome, Radiological outcome, Early synovitis clinic.

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Psoriatic arthritis (PsA) is a heterogeneous disease that occurs in 5–17% of patients with psoriasis [1]. Initially, PsA was considered to be a mild, non-progressive disease compared with rheumatoid arthritis (RA). However, accumulating evidence confirms that a substantial proportion of patients with PsA have persistent inflammation, develop progressive joint damage and disability and have reduced life-expectancy [2–5]. Clinical studies have identified a small number of potentially useful, prognostic markers in PsA [3, 6]. These include the association of a poor prognosis with late age of onset, the presence of five or more effused joints and high immunosuppressive medication use, and the association of a good prognosis with an erythrocyte sedimentation rate (ESR) $\leq$15 mm/h. In addition a number of time-varying clinical markers of prognosis have been identified [7].

One limitation to the application of these studies in clinical practice is that they are based on patients with established PsA who already have significant irreversible joint damage and who may have a different rate of disease progression. In RA, the evidence that radiological joint damage occurs maximally in the first 2 yr of disease [8, 9] has supported a shift in emphasis towards early diagnosis and aggressive treatment. This practice has already been extended to PsA, where there is increasing use of immunosuppressive treatment at an earlier stage of disease [10]. The confirmation that significant inflammation and damage is occurring at an early stage in the disease process and the identification of subsets of patients with early PsA who are at increased risk of joint damage and disease progression would allow rational targeting of immunosuppressive treatment before irreversible joint destruction occurs.

Two studies have addressed the prognosis of early-onset PsA in small groups of patients [10, 11]. Harrison *et al*. [11] evaluated 51 patients with early inflammatory polyarthritis and psoriasis in a primary care inception cohort and noted that 22% had joint erosions at 1 yr [11]. Patients with oligoarthritis and spondylarthropathy were not included in this analysis and the authors concluded that the presence of psoriasis did not significantly influence the presentation or short-term outcome of patients with early inflammatory polyarthritis. Punzi *et al*. [10] evaluated 66 patients with PsA of less than 1 yr duration and noted that the 2-yr radiological outcome was worse in patients with a disease onset of $>$60 yr of age. This subgroup of elderly-onset PsA (EoPsA) also had a significantly greater number of active joints at presentation and a significantly higher acute-phase response at presentation and at 2 yr. This was reflected in higher rates of disease-modifying anti-rheumatic drug (DMARD) and prednisolone prescription and a significantly higher number of joint erosions in the EoPsA group at 2 yr. The mechanism is not clear though the effect of increasing age on the occurrence and course of rheumatic diseases is well recognized in polymyalgia rheumatica, RA and spondylarthropathy [12, 13].

This study examined a cohort of 129 patients presenting with PsA to an early inflammatory arthritis clinic in order to determine the clinical presentation, natural history and prognosis of early PsA. In particular, radiological evidence of progressive disease was sought as a marker of disease outcome. Furthermore we examined whether the age of the patient at presentation was a prognostic marker of a worse disease outcome in PsA.

Patients and methods

Patients

Patients were assessed at the St. Vincent's University Hospital Early Arthritis Clinic (EAC). Referral criteria to the EAC were the presence of joint tenderness in association with either active joint swelling or an elevated acute-phase response, duration of disease being less than 2 yr. The diagnosis of PsA was confirmed by a consultant rheumatologist according to the criteria of Moll and Wright [14]. Patients with a rheumatoid factor titre $>$1/80 were considered to have rheumatoid arthritis with psoriasis and were excluded from this study. Patients attending the clinic were specifically questioned and examined for evidence of antecedent or current urogenital, intestinal or other infection in order to exclude patients with reactive arthritis. This study was approved by the St Vincent's University Hospital ethics committee.

Clinical assessment

Full demographic details and history of skin and joint disease and previous and current medications were recorded for each patient at the time of initial assessment. Clinical examination of all joints was carefully performed recording the pattern of peripheral and axial joint disease in addition to the presence of skin and nail disease. Patients were scheduled to be reassessed at 3-month intervals for the first year and at yearly intervals thereafter. Clinical assessment was performed for tenderness and swelling of each peripheral joint. Two composite measures of joint tenderness and swelling—the Ritchie Articular Index [15] and the European League Against Rheumatism (EULAR) swollen joint count (maximum of 44)—were calculated. Patients were asked to determine the duration of generalized joint stiffness present on awakening in the morning according to the following four categories: (i) $<$10 min, (ii) 10–30 min, (iii) 30–120 min or (iv) $>$120 min. Patients were asked to record the degree of joint pain they had experienced over the preceding week on a 10-point visual analogue scale (VAS), ranging from 0 (no pain) to 10 (worst pain ever).

Patients were asked to complete the pain and disability sections of the modified version of the Health Assessment Questionnaire (HAQ) [16]. Patients were questioned about the degree of impairment of self-care, work-related activities and leisure-related activities and were categorized according to the American College of Rheumatology (ACR) functional class [17].

Laboratory investigations

ESR was measured by the standard Westergren method (mm/h). C-reactive protein (CRP) levels were measured by standard nephelometry (mg/l).

Rheumatoid factor (RF) was measured by enzyme-linked immunosorbent assay (ELISA) and results are expressed in titres of 1/40 and higher. Antinuclear antibody (ANA) was measured using Hep-2 substrate and results are expressed in titres of 1/40 and higher. RF and ANA were measured using commercial standardized kits in a hospital diagnostic laboratory.

Serum amyloid A (SAA) measurement

Serum was obtained from all subjects at the time of assessment and stored at –70°C until analysed. Acute SAA (A-SAA) was measured using an ELISA technique specific for A-SAA and with no cross-reactivity for its constitutive counterpart C-SAA (Biotrin Ltd, Dublin, Ireland). The assay was calibrated against the National Institute for Biological Standards and Control and the World Health Organization standard for SAA and performed as already described [18, 19]. All samples were assayed in duplicate and repeated if there was a discrepancy in the paired results. The detection limit of the assay is 2.25 μg/l. The normal range for the assay has been previously reported as 1.2–15.2 mg/l in 20 healthy volunteers. An A-SAA of >20 mg/l was considered elevated.

Radiological assessment

Plain radiographs of the hands and feet were performed at the initial visit and were scheduled at annual intervals. Radiographs of other affected joints, including knees and sacroiliac joints, were obtained at baseline and follow-up visits when available. The radiographs were evaluated by two trained observers in agreement using the Sharp method [20] modified to include the distal interphalangeal (DIP) joints. Radiographs were analysed in chronological order with the observers blinded to the patient identity. In the Sharp method, erosions (0–5) and joint space narrowing (0–4) were graded separately. The DIP joints, proximal interphalangeal joints, metacarpophalangeal joints and the wrist joints were scored in the hands. The wrist was scored for erosions in seven areas and for joint space narrowing in eight areas. The metatarsophalangeal joints were scored in the feet. Using this score the maximum score for erosions in the hands is 210 and the maximum score for erosions in the feet is 50; the maximum scores for joint space narrowing in the hands and feet are 168 and 40, respectively. Periostitis of the hands and feet was also recorded when present.

Sacroileitis was determined from anteroposterior radiographs of the sacroiliac joints by two observers scoring in agreement. The New York radiological criteria for sacroileitis were applied [21].

Classification and clinical subgroups

Patients were classified according to the Veale criteria [22]. This classification defines patient groups according to joint involvement regardless of DIP disease. Patients were classified as follows: (1) an asymmetrical oligoarthritis with few erosions, infrequent deformity and good preservation of function; (2) a symmetrical polyarthritis, frequently erosive, but rheumatoid factor negative; and (3) predominant spondylitis.

Statistical analysis

Values are given as mean (median) ± standard deviation (S.D.). Analysis of the data was performed using non-parametric analysis in Statview™ software. The Mann–Whitney U-test was performed to compare the medians of groups. Simple regression and the Spearman correlation coefficient was used to test for correlation of variables.

Results

Presenting clinical features of early PsA

Patients. A total of 129 (12.7%) of 1018 patients presenting to the St. Vincent's University Hospital Early Synovitis Clinic between August 1994 and March 2000 were diagnosed with PsA; 68 (53%) were male and 61 (47%) were female. The mean age at presentation was 41.2 (39) ± 15.1 yr (range 13–76). The mean duration of disease at presentation was 9.9 (7) ± 15.1 months.

Clinical markers of arthritis activity. The duration of early morning stiffness (EMS) was recorded by 124 patients with 29 (23%) having EMS of less than 10 min, 33 (27%) with EMS of 10–30 min, 27 (22%) with EMS of 30 min–2 h and 35 (28%) with EMS of >2 h. The VAS was recorded at presentation by 122 patients and the mean VAS score was 4.8 (5) ± 2.7 (range 0–10). All 129 patients were assessed clinically. The mean Ritchie Articular Index was 5.6 (4) ± 6. The mean swollen joint count was 6.9 (4) ± 8.

Classification of PsA. At presentation, 52 (40%) had oligoarticular PsA and 77 (60%) had polyarticular PsA. As referral to the clinic required the presence of peripheral synovitis, no patient had predominant spondylitis/sacroileitis.

Functional impairment in early PsA. The ACR functional class was recorded at presentation for 117 patients; 39 (34%) were class I, 38 (32%) were class II, 33 (28%) were class III and seven (6%) were class IV. The HAQ for disability and pain (short HAQ) was completed by 74 patients. The mean HAQ score was 0.71 (0.63) ± 0.64.

Enthesopathy, DIP disease and inflammatory back pain. Of 129 patients, 49 (38%) had peripheral enthesopathy at the initial assessment; 37 (29%) had dactylitis of digits (18 fingers, 24 toes), 15 (12%) had plantar fasciitis, eight (6%) had Achilles tendonitis and two (2%) had tenosynovitis of the wrist; 13 (10%) had inflammatory spine pain at presentation. DIP involvement was present in 50 (39%) patients. Nail dystrophy was present in 37/46 (80%) of patients with DIP joint involvement and 43/74 (58%) of patients without DIP involvement ($P=0.02$). Enthesopathy—but not radiological sacroileitis—was present in 28/50 (56%) of patients with DIP joint involvement and 21/79 (58%) of patients without DIP involvement ($P=0.002$). Dactylitis was present in 24/50 (48%) of patients with DIP joint involvement and 13/79 (16%) of patients without nail involvement ($P=0.0003$).

Systemic features. Seven had mild symptoms of dry eyes and mouth, two had had uveitis, two had diarrhoea and three complained of dysuria, nine reported a rash other than psoriasis and three reported fevers. No specific diagnosis of infectious diarrhoea or urethritis was confirmed in any of the patients.

Laboratory indices of acute-phase response. The ESR was determined in 124 patients; the mean ESR was 24 (16) ± 26.4 mm/h (range 1–130). The CRP was determined in 112 patients; the mean CRP was 27.6 (10.2) ± 58.5 mg/l (range 0–534). Serum A-SAA was determined in 89 patients; the mean A-SAA was 144.9 (78.9) ± 213 mg/l (range 0.2–1587).

Autoantibodies. Rheumatoid factor was negative in 124 patients and positive with a titre of $\leq 1/40$ in five patients. A positive ANA was found in 28 patients: 24

were speckled in distribution, one was homogeneous and three were nucleolar. No patient fulfilled the criteria for the diagnosis of systemic lupus erythematosus, systemic sclerosis or Sjögren's syndrome.

Clinical features of psoriasis in PsA population. A total of 119 patients had psoriasis at presentation or during the period of follow-up, five had typical psoriatic nail dystrophy (pitting and onycholysis) without psoriasis and five had been previously diagnosed with psoriasis, which was in remission due to topical or systemic treatment. The exact date of onset of psoriasis was determined in 106 patients, but in the remainder the exact date was unknown. In three cases, psoriasis was first diagnosed at the initial consultation for PsA. A total of 77 patients had type 1 psoriasis (age of onset <40 yr) and 29 patients had type 2 psoriasis (age of onset ≥ 40 yr). The mean age of onset was 29.8 (27) ± 16.2 yr (range 1–74). Of the 119 with psoriasis at the time of assessment, 112 (94%) had plaque psoriasis, two had pustular psoriasis, one had erythrodermic psoriasis, one had plaque and pustular psoriasis, one had plaque and guttate psoriasis and two had plaque and erythrodermic psoriasis. Psoriatic nail dystrophy was found in 78 (67%) patients. Nail dystrophy was more frequent in patients with DIP joint involvement ($P = 0.02$).

Outcome of early PsA at 1- and 2-yr follow-up (Table 1)

Lost to follow-up. Patients were followed up by direct consultation only. If a patient did not attend, then at least two repeat appointments were made in addition to telephone reminders. Ten patients did not have a 1-yr assessment: four had not reached 1 yr of follow-up at the time of the study analysis, one was deceased, five were unaccounted for. Thirty-one patients did not have a 2-yr assessment: 20 had not reached 2 yr of follow-up, one was deceased, 10 were unaccounted for.

Clinical parameters of outcome. There was an overall decrease in all clinical and laboratory parameters of inflammation at 1 and 2 yr with a subsequent improvement in functional scores and remission rates. This probably resulted from the increase in DMARD prescription to 59% of patients at 1 yr and 56% of patients at 2 yr. Corticosteroid use was infrequent at presentation and subsequently further decreased. An initial decrease in dactylitis and enthesopathy was noted at 1 yr, but this had increased again at 2 yr.

DMARD prescription. At presentation, 15 patients (12%) were taking a DMARD [11 sulphasalazine (9%), four methotrexate (3%)]. At 1-yr follow-up, 70 patients (59%) were taking a DMARD [34 sulphasalazine (29%), 32 methotrexate (27%), two cyclosporin (2%), one methotrexate plus cyclosporin, one methotrexate plus azathioprine]. At 2-yr follow-up, 54 patients (56%) were taking a DMARD [25 methotrexate (26%), 24 sulphasalazine (25%), two cyclosporin (2%), one azathioprine, one methotrexate plus cyclosporin, one methotrexate plus sulphasalazine].

Remission. Remission—defined by absence of fatigue, stiffness <15 min, no joint pain, complete absence of joint tenderness or swelling (including dactylitis and enthesitis) on examination and ESR <20 mm/h (males) or ESR <30 mm/h (females)—occurred in 26% of patients at 1 yr and 21% at 2 yr. Spontaneous or 'drug-free' remission occurred in 14 (12%) patients at 1 yr and 11 (11%) at 2 yr.

Radiological features of PsA population (Table 2). Baseline radiographs of hands and feet were obtained for 117 (91%) patients. Follow-up radiographs of hands and feet were obtained for 86 (67%) patients. Where radiology was not available, this was due to failure to attend appointments, refusal or because radiographs were performed in rural hospitals and were unavailable for examination.

At baseline examination, 32 (27%) patients had erosions, 24 (21%) patients had joint space narrowing and 22 (19%) patients had periostitis. The mean Sharp erosion score of hands and feet at baseline was 1.2 (0) ± 2.9 (range 0–19). The mean narrowing score of hands and feet at baseline was 1.4 (0) ± 5.3 (range 0–47).

At follow-up examination at a median of 24 months (range 11–56), 40 (47%) patients had erosions, 32 (37%) patients had joint space narrowing and 25 (29%) patients had periostitis. The mean Sharp erosion score of hands and feet increased to 3 (0) ± 5.2 (range 0–25; $P = 0.002$). The mean narrowing score of hands and feet increased to

Table 1. Outcome of early PsA

	0 yr	1 yr	2 yr
No. of patients	$n = 129$	$n = 119$ (92%)	$n = 97$ (75%)
DMARD	15 (12%)	70 (59%)	54 (56%)
Corticosteroids	14 (11%)	6 (5%)	5 (5%)
VAS pain	4.8 (5) ± 2.7 ($n = 122$)	3.1 (2) ± 3 ($n = 119$)	3.4 (4) ± 2.7 ($n = 97$)
ACR class III/IV	40 (34%) ($n = 117$)	22 (19%) ($n = 118$)	16 (16%) ($n = 97$)
HAQ score	0.7 (0.6) ± 0.6 ($n = 74$)	0.4 (0.1) ± 0.6 ($n = 65$)	0.4 (0.1) ± 0.6 ($n = 58$)
Ritchie Index	5.6 (4) ± 6	2.4 (1) ± 3.8	1.9 (1) ± 3
Swollen joint count	6.9 (4) ± 8	2.9 (1) ± 5.2	2.4 (1) ± 4.1
ESR (mm/h)	24 (16) ± 27 ($n = 124$)	13 (7) ± 15 ($n = 112$)	12 (7) ± 14 ($n = 94$)
CRP (mg/l)	28 (10) ± 59 ($n = 112$)	10 (5) ± 14 ($n = 111$)	8 (4) ± 12 ($n = 94$)
Enthesopathy	29 (38%)	15 (13%)	25 (26%)
Dactylitis	37 (29%)	10 (8%)	16 (16%)
Remission	0	31 (26%)	20 (21%)

3.2 (0) ± 7.5 (range 0–48; $P = 0.04$). The percentage of joints assessed as having erosions and narrowing increased in the hands and feet with a greater increase in the small joints of the feet.

Sacroiliac radiographs were assessed in 94 (70%) patients at a median of 24 months follow-up (range 11–56). Sacroileitis was present in 16 (17%) patients, being unilateral in nine patients (four right, five left) and bilateral in seven patients.

Comparison with two reported early PsA series

In Table 3 the present series of patients is compared with details available from the two other reported series of early PsA patients [10, 11]. All three series report an equal sex distribution for early PsA. The median duration of arthritis at presentation is similar despite the probability of regional differences in referral practices to rheumatology services in Ireland, Italy and the UK. Our cohort and the UK cohort were drawn from an early arthritis clinic service. In our practice, this resulted in an assessment within 2 weeks of referral. In spite of this, there was a delay of a median of 5.75–7 months from symptom onset to rheumatology referral.

There was a younger median age of onset of PsA and a lower median number of swollen joints in the Irish cohort. DIP disease was more frequent in the Irish cohort with a similar frequency of dactylitis. HAQ scores were available for comparison with the UK cohort. A similar HAQ score was noted at baseline, but a lower HAQ score was noted in the Irish cohort at follow-up. DMARDs were prescribed more frequently in the Irish and Italian cohorts. No contemporaneous figures were available for radiographic evidence of joint erosions, but the Irish and UK cohorts demonstrate a significant frequency of joint damage at early stages in PsA.

Effect of age on clinical presentation and outcome (Table 4)

The mean age at the onset of arthritis was 40.4 (38) ± 15 yr. Nineteen (15%) patients were aged 60 yr or more at the time of PsA onset. These patients were

Table 2. Radiological features of PsA cohort at baseline and follow-up

	Baseline ($n = 117$)	Follow-up ($n = 86$)
Total number of joints with erosions		
Hands	75/3510 (2.1%)	100/2580 (3.9%)
Feet	26/1170 (2.2%)	53/860 (6.2%)
Mean no. of joints with erosions per patient ± S.D.		
Hands	0.7 ± 1.6	1.2 ± 2.5
Feet	0.2 ± 0.8	0.6 ± 1.6
Total number of joints with joint space narrowing		
Hands	71/3510 (2.0%)	62/2580 (2.4%)
Feet	14/1170 (1.2%)	35/860 (4.1%)
Mean no. of joints with joint space narrowing per patient ± S.D.		
Hands	0.6 ± 2.3	0.7 ± 1.7
Feet	0.1 ± 0.5	0.4 ± 1.4

Forty joints assessed in each patient: 30 in hands and 10 in feet.

Table 3. Comparison with other reported early PsA series [10, 11]

	Kane *et al.* ($n = 129$)	Punzi *et al.* ($n = 66$)[a]		Harrison *et al.* ($n = 51$)
		YoPsA ($n = 50$)	EoPsA ($n = 16$)	
Sex (M:F)	68:61	23:27	8:8	25:26
Median duration of arthritis at presentation	7 months	< 1 yr	< 1 yr	5.75 months
Median age at arthritis onset (yr)	38	44.2	65.1	52
Median age at psoriasis onset (yr)	27	–	–	–
Swollen joints	4	6.7[b]	12.2[b]	7
DIP swelling	50 (39%)	–	–	10 (20%)
Dactylitis	37 (29%)	6 (37.5%)	15 (30%)	–
HAQ at 0 yr	0.63	–	–	0.63
HAQ at 1 yr	0.13	–	–	0.44
DMARD at 0 yr	15 (12%)	0	0	0
DMARD at 1 yr	70/119 (59%)	–	–	21 (41%)
DMARD at 2 yr	54/97 (56%)	42 (84%)	15 (94%)	–
Remission at 1 yr	31/119 (26%)	–	–	3 (6%)
% erosions at 0 yr	32/117 (27%)			
% erosions at 1 yr	–	–	–	7/32 (22%)
% erosions at 2 yr	40/86 (47%)	–	–	–

[a]Values as means.
[b]Active joints (either swollen or tender).

Table 4. Comparison of young-onset PsA with elderly-onset PsA

	YoPsA ($n=110$)	EoPsA ($n=19$)	P
Male/female	56:54 (51:49%)	13:6 (68:32%)	0.24
Duration of arthritis (months)	10.1 (8) ± 8.8	9.4 (6) ± 8.4	0.4
ACR class III/IV	32 (32%) ($n=99$)	8 (44%) ($n=18$)	0.42
HAQ score	0.7 (0.5) ± 0.6 ($n=63$)	0.99 (0.81) ± 0.8 ($n=10$)	0.19
Ritchie Index	5.3 (4) ± 5.7	7.5 (4) ± 7.7	0.39
Swollen joint count	6 (4) ± 6.7	12.5 (8) ± 12	0.06
DIP involvement	42 (38%)	8 (42%)	0.95
Enthesopathy	42 (38%)	7 (37%)	0.88
Dactylitis	31 (28%)	6 (32%)	0.98
Nail dystrophy	68 (65%) ($n=105$)	12 (80%) ($n=15$)	0.38
ESR	21.2 (12) ± 24.7 ($n=106$)	40.4 (34) ± 30.4 ($n=18$)	0.002
CRP	26.8 (7.6) ± 62.4 ($n=94$)	31.7 (24.8) ± 32.9 ($n=18$)	0.03
A-SAA	130 (60) ± 212 ($n=76$)	234 (161) ± 203 ($n=12$)	0.005
Radiology			
Sharp score at baseline	1.8 (0) ± 3.8 ($n=101$)	8 (0) ± 17.3 ($n=16$)	0.67
Periostitis at baseline	22 (20%) ($n=101$)	0 (0%) ($n=16$)	0.08
Sharp score at follow-up	5 (1) ± 8.7 ($n=73$)	12.9 (1) ± 21.3 ($n=13$)	0.52
Periostitis at follow-up	25 (34%) ($n=73$)	0 (0%) ($n=13$)	0.03
Sacroileitis at follow-up	14 (17%) ($n=84$)	2 (20%) ($n=10$)	0.86

classed as elderly-onset PsA (EoPsA) and the remaining 110 patients had young-onset PsA (YoPsA). Patients with EoPsA had a higher male:female ratio (2.2) than patients with YoPsA (1.0) with a similar median age of onset of psoriasis in both groups.

Both EoPsA and YoPsA presented with a similar duration of disease and a similar rate of DMARD and corticosteroid use. Patients with EoPsA had higher VAS pain, Ritchie Index and swollen joint count at presentation, though this did not reach statistical significance. Significantly higher ESR, CRP and A-SAA at presentation were noted in the EoPsA group. Patients with EoPsA had a higher mean Sharp score, though this was not statistically significant. There was significantly more periostitis on radiographs of the hands and feet in the YoPsA group at follow-up. ACR functional class, remission and DMARD treatment rates were not significantly different in the two groups with 16 (19%) patients with YoPsA and four (31%) with EoPsA in remission at 2 yr. Characteristic seronegative disease features such as DIP disease, nail dystrophy, enthesopathy, dactylitis and radiological sacroileitis were equally distributed between the EoPsA and YoPsA groups.

Discussion

Most reported series of PsA are based on cross-sectional analysis of established cohorts [14, 22–29] and only two longitudinal studies of inception cohorts of early PsA are reported in the literature [10, 11]. Harrison *et al.* [11] evaluated 51 patients with PsA polyarthritis of less than 2-yr duration with a follow-up at 1 yr, while Punzi *et al.* [10] evaluated 66 patients with all classes of PsA of less than 1-yr duration with a follow-up at 2 yr. This study evaluated 129 patients with follow-up of 119 (92%) patients at 1 yr and 97 (75%) patients at 2 yr. This is the largest early PsA cohort reported and is similar in age of disease onset and sex distribution to previous established and early PsA cohorts. A referral criterion was that the presence of symptoms was less than 24 months and thus the median duration of disease was 7 months. However, at the initial consultation we confirmed a disease duration of 24–48 months in four patients. We chose to include these in the inception cohort as this was their first presentation with PsA and none had received prior DMARD treatment.

This study confirms that PsA is a chronic disease with significant functional impairment and radiological damage at an early stage in the course of the disease. Articular disease persisted in the majority of cases with only 26% in remission at 1 yr and 21% in remission at 2 yr with spontaneous (DMARD-free) remission occurring in only 11–12% of patients. In established PsA, remission is reported to occur in 17.6% of patients with a mean duration of remission of 2.6 yr [30]. The duration of remission in this cohort is being followed in long-term studies. Short term follow-up of all seronegative spondylarthropathy patients at the St. Vincent's University Hospital Early Arthritis Clinic indicates that the presence of psoriasis confers a poorer prognosis in terms of remission and radiological outcome [5].

Analysis of the ACR Steinbrocker functional classification demonstrated that 35% of patients had severe functional limitation at presentation (ACR functional class III/IV), reducing to 19% at 1 yr and 16% at 2 yr. The Health Assessment Questionnaire (HAQ) has been validated for the assessment of function in PsA [31, 32] and the HAQ also confirmed significant functional impairment at an early stage in PsA. The median HAQ score was similar to that reported by Harrison *et al.* [11] in patients with PsA polyarthritis of similar disease duration, though it was considerably lower than that reported in PsA with a median duration of 5 yr [31]. The median HAQ score decreased to 0.36 at 1 yr and to 0.42 at 2 yr, with Harrison *et al.* also reporting a decrease in the median HAQ to 0.44 at 1 yr, both studies using

DMARDs in 41–59% of patients. As all patients did not complete the HAQ in our cohort, a selection bias may have occurred in choosing patients who were more compliant with treatment resulting in an improved functional outcome. It is important to note that these data confirm that considerable improvement in functional status can be obtained with reduction of inflammatory joint disease in patients with PsA in the initial course of disease. Further longitudinal studies of this cohort will determine whether persistent DMARD treatment will prevent the severe functional deterioration reported in established PsA [32].

Cross-sectional and longitudinal studies of PsA have now established that radiological damage is more frequent than initially reported [2, 27]. Established PsA has been reported to have a degree of radiological damage comparable with RA patients matched for age, sex and disease duration [33]. In early PsA polyarthritis, 22% of patients develop erosions at 1 yr of follow-up [11]. This study determined that joint erosion was the most frequent radiological feature of PsA with erosions being present in 27% of patients at initial assessment and in 47% of patients at a median follow-up of 2 yr. These scores are higher than previously reported despite early use of DMARDs, confirming the need for early diagnosis and more optimal treatment. This figure may have been influenced by a selection bias whereby patients with more severe PsA were more likely to present for radiological follow-up. Radiological damage is a good surrogate for poor functional outcome. Conversely, progressive radiological damage despite significant improvements in function was noted in our PsA cohort. This may have a biological basis as has been proposed in RA [34]. Long-term follow-up of this PsA cohort will seek to address both of these issues and may confirm a delayed correlation of radiological damage with function.

The mean Sharp score was low at initial assessment and the rate of increase was small, but significant, over 2 yr. The radiological scores were lower than those reported in the Punzi group [10], possibly because our cohort had lower clinical indices of inflammatory joint disease. The small changes observed over 2 yr indicate that while plain radiographic scoring systems are validated in PsA they are unlikely to be sensitive in the detection of radiological damage over short periods of time, such as occur in clinical therapeutic studies. Newer imaging modalities such as ultrasonography and MRI [35], which are more sensitive than plain radiography in the detection of joint erosion, may be of more practical value as short-term radiographic outcome measures in studies of PsA.

Fifteen patients were taking a DMARD and/or corticosteroid at the time of initial assessment. Eleven were taking sulphasalazine, four were taking methotrexate and 14 were taking corticosteroid. This had been prescribed for less than 2 weeks in all cases, but may have ameliorated the clinical features of PsA in these patients at the initial assessment. None of the patients reported in the two early PsA studies appears to have been on DMARDs at the initial assessment. Significantly more DMARD and corticosteroid exposure is noted in the cohorts of established PsA. At 1 yr, 59% of patients were taking a DMARD and 5% were taking corticosteroid compared with 41% taking either a DMARD or corticosteroid in Harrison's study. At 2 yr, 56% of patients were taking a DMARD and 5% were taking corticosteroid compared with 86% of patients taking a DMARD and 18% taking corticosteroid in Punzi's study. These differences reflect differences in clinical practice, but taken together these data confirm that there is an increasing use of DMARDs in the management of early PsA. This is likely to be due to an increased awareness of the poor functional [32] and radiological [33] outcome in established PsA.

The most frequent DMARDs used in this study and in the Punzi study were sulphasalazine and methotrexate, no details being available for the Harrison study. Sulphasalazine is the most studied DMARD in PsA [36–38] with a clear therapeutic benefit in ameliorating inflammatory arthritis, but little or no effect on psoriasis. Methotrexate—either alone or in combination—was the most frequently used DMARD in this cohort at 2-yr follow-up. Methotrexate reduces synovitis in RA [39] and has a beneficial effect on psoriasis [40, 41]. Despite the widespread use of methotrexate in PsA there is limited clinical evidence of efficacy [42, 43] and there is a need for further clinical and immunological evaluation of methotrexate in PsA in order to confirm its benefit and to understand its exact anti-inflammatory mechanism.

As in previous studies of skin disease, psoriasis was predominantly of the vulgaris or plaque type and was generally mild with some patients in clinical remission at the time of presentation. It is estimated that arthritis precedes psoriasis in 20% of patients in established PsA cohorts [29] and these patients were not identified in our study, though we did include patients with nail dystrophy alone. The majority had type 1 psoriasis and the median age of psoriasis onset preceded arthritis onset by approximately 11 yr. This is a consistent feature of all PsA cohorts and it has been proposed that arthritis develops after a prolonged period of immune over-activation and/or antigen exposure from chronic skin psoriasis. Nail dystrophy was present in 67% of patients, which is increased when compared with psoriasis-only populations and is at the upper end of the range determined in other studies of nail dystrophy in PsA [29]. Nail dystrophy was significantly more frequent in patients with DIP joint involvement and this has been explained by the close anatomical proximity of the nail bed and the DIP joint, allowing inflammation at one site to affect the other [44].

Increasing age at disease onset has been associated with more severe clinical, radiological and laboratory parameters of RA, spondylarthropathy and PsA [10, 12, 13]. The mechanism is not known and dysregulation of the immune response with increasing age has been postulated [10]. This study found less EoPsA than the Punzi group. Significantly higher systemic inflammatory indices including ESR, CRP and A-SAA were noted in the EoPsA group at presentation, but remission,

function, radiological damage and treatment rates at follow-up were not significantly different. A trend to a higher Sharp score was noted in the EoPsA group and, given the slow rate of radiological progression in this cohort, a longer period of follow-up is required.

This study provides further evidence that PsA is a chronic, progressive disease at an early stage in the course of the disease and that PsA is associated with a higher rate of radiological joint damage than has been reported previously. Early assessment by rheumatologists and early DMARD treatment reduced inflammation and improved function. In spite of early treatment, a subgroup of patients will develop progressive damage and loss of function in the first few years of disease and clinicians require 'poor outcome markers' to identify these patients. Methotrexate was identified as the most frequently prescribed DMARD despite a lack of controlled evidence of a significant therapeutic benefit. Despite current DMARD strategies in PsA, progressive radiological damage occurred at an early stage of disease. Further controlled studies need to identify patients with severe, progressive PsA and evaluate more aggressive therapeutic strategies such as combination DMARDs or biological treatment.

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Conflict of interest

The authors have declared no conflicts of interest.

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