ORIGINAL ARTICLE

The diagnosis of early psoriatic arthritis in an outpatient dermatological centre for psoriasis

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Abstract

Background Most of the data currently available on early psoriatic arthritis (EPsA) derive from studies performed in rheumatological settings. However, in recent years, there has been an increase in the amount of data from dermatologic centres.

Objectives To describe the prevalence, clinical, laboratory and imaging characteristics of psoriatic patients with EPsA seen at a dermatological outpatient psoriasis centre.

Methods From January 2007 to May 2010, all patients with psoriasis who visited the psoriasis centre were asked about inflammatory joint involvement. A diagnosis of psoriatic arthritis was made on the basis of clinical, laboratory and imaging studies. The patients were diagnosed with early PsA (EPsA) if their inflammatory articular symptoms had been present for ≤1 year.

Results We diagnosed EPsA in 33 patients. Joint involvement was polyarticular (>5 joints involved) in 20 patients (60.6%) and oligoarticular (≤5 joints involved) in the remaining 13 patients. Quality of life due to skin involvement and the degree of functional impairment due to joint inflammation were only mildly affected, as measured by DLQI and HAQ, respectively. A direct correlation between the number of tender joints (ACR 68) and HAQ was found (r = 0.36; P = 0.04). Imaging studies showed that in spite of the absence of radiologic findings of peripheral joint damage, ultrasonography and contrast enhanced ultrasonography showed signs of articular inflammation in all patients.

Conclusions A diagnosis of EPsA can be correctly performed in a dermatologic outpatient facility. To do so, a close collaboration among dermatologists, rheumatologists and radiologists is necessary.

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Conflict of interest

None declared.

Introduction

From 6% to 30% of persons with psoriasis develop psoriatic arthritis (PsA), that is, inflammatory involvement of the peripheral and/or axial joints.[1] In most cases, psoriatic skin lesions precede the appearance of PsA.[1] According to recent studies, diverse imaging tools can be used to diagnose PsA at a very early stage in persons without clinical signs of arthritis.[2,3] However, in everyday clinical practice, it is not feasible to perform clinical and instrumental investigations for possible joint involvement for all persons with psoriasis. For this reason, different screening tests compiled by the patients themselves, have been recently proposed for suspected early PsA (EPsA), such as the Toronto Psoriatic Arthritis Screen (ToPAS),[4] the Psoriatic Arthritis Screening and Evaluation (PASE)[5] and the Psoriasis Epidemiology Screening Tools (PEST).[6]

Moreover, there do not exist universally accepted criteria for defining EPsA, and the definitions used to date have been generally extrapolated from studies on early rheumatoid arthritis.[7–9] The diagnosis of EPsA is in part based on the duration of the signs and symptoms; however, this duration varies greatly among different studies ranging from ≤12 weeks to <5 years.[10,11]

In the present study, which was conducted at a large psoriasis outpatient clinic in Rome Italy, we estimated the prevalence of EPsA based on the presence of joint signs and symptoms compatible with PsA that lasted no longer than 1 year.

Patients and Methods

We prospectively searched for possible inflammatory joint involvement in all persons with psoriasis who had visited the outpatient clinic for psoriasis at the San Gallicano Dermatologic Institute of Rome for the first time between January 2007 and May 2010. To do so, patients were systematically asked about inflammatory arthritic symptoms and previous diagnoses of arthritis performed

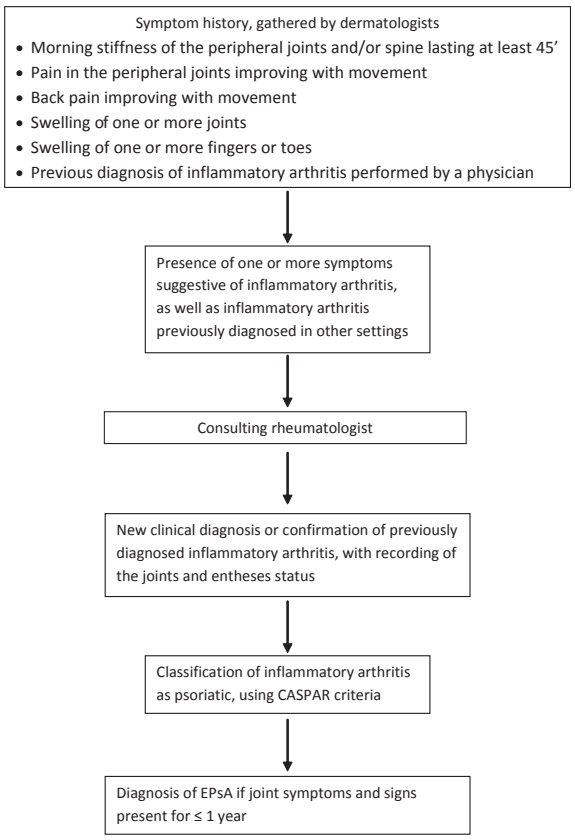

Figure 1 Work flow leading to final diagnosis of early psoriatic arthritis (EPsA).

by a physician (Fig. 1). Back pain was defined as 'inflammatory' following Rudweilet criteria.[12] Patients with a documented history or evidence of osteoarthritis without signs of joint inflammation were not included in the study.

Screened patients with either suspected or previously diagnosed inflammatory arthritis were referred to the consulting rheumatologist (FC) for further evaluation (Fig. 1). Inflammatory arthritis was diagnosed if the individual presented with joint tenderness in association with at least one swollen joint and/or enthesitis or dactylitis.

Arthritis was classified as 'psoriatic' using classification criteria for psoriatic arthritis (CASPAR).[13] An individual was diagnosed with EPsA if he/she had joint symptoms and signs compatible with PsA that lasted ≤1 year (Fig. 1); this duration was considered as a reliable criterion for diagnosis, given the absence of a universally accepted definition of EPsA.

Clinical measures

The severity of psoriasis was defined based on the Psoriasis Area Severity Index (PASI)[14] and the physician's global assessment (PGA).[15] The degree of joint involvement was measured by ACR 66 (number of swollen joints) and ACR 68 (number of tender joints).[16] Enthesitis was assessed at the level of both the Achilles tendon insertion and the plantar fascia insertion.

The impact of skin lesions on the quality of life was evaluated using the Dermatology Life Quality Index (DLQI).[17] The degree of impairment of functional status due to joint involvement was evaluated using the health assessment questionnaire (HAQ).[18] The responses to both the DLQI and the HAQ referred to the week before the first visit to the clinic. A visual analogue scale graded from 0 to 100 was used to measure the level of joint pain felt by the patients in the previous week (VAS pain).

Laboratory testing

Of the 283 patients with arthritis (see Results section), blood samples for routine analyses were collected from the 52 individuals (see Results section) with a new clinical diagnosis of arthritis. The routine analyses included: (i) blood count; (ii) blood protein levels; (iii) erythrocyte sedimentation rate (ESR); (iv) C-reactive protein (CRP); and (v) rheumatoid factor.

Imaging studies

Plain radiographs of hands, wrists, ankles and feet were performed for all 52 patients with a new clinical diagnosis of arthritis. Plain radiographs of the lumbar spine and sacroiliac joints were also performed if the patient complained of inflammatory lower back pain (five with EPsA; seven with PsA and two with reactive arthritis).

The radiological findings that were considered to be compatible with PsA were: (i) joint-space narrowing; (ii) erosions; (iii) periostitis; (iv) enthesitis; and (v) marginal or paramarginal syndesmophytes (lumbar spine). Sacroiliac joint involvement was evaluated for the presence of: (i) loss of definition of joint margins; (ii) erosions; (iii) joint-space narrowing; (iv) sclerosis; and (v) joint fusion or ankylosis. Sacroiliitis was graded using the New York scoring method.[19]

All patients with newly diagnosed PsA (43 individuals; see Results section) were also evaluated by ultrasound (US) before (basal ultrasound) and after (CEUS) intravenous bolus administration of US contrast agent (Sonovue Bracco, Milan, Italy), as previously reported.[20] In particular, in each patient examined, one of the most active or clinically suspicious joints was selected for US and CEUS studies. Synovial effusion, synovial hypertrophy and CEUS were graded using a 0–3 scale (0 = absent; 1 = mild; 2 = moderate; 3 = severe).

Statistical analysis

Data are presented as the median, minimum, maximum or absolute values and percent. Wilcoxon and Fisher's exact tests were used for comparisons, as necessary. Spearman's rank test was used for correlations. Statistical analyses were performed using the Analyse-it software for Microsoft Excel, version 2.20 (Analyse-it Software, Ltd. http://www.analyse-it.com/; 2009).

Results

Of the 2760 individuals who presented to the clinic for the first time in the above-specified period (see Patients and Methods section), 2684 (90%) were diagnosed with psoriasis. Among them, after screening, 385 patients with suspected or already diagnosed inflammatory arthritis were referred to the consulting rheumatologist for further clinical evaluation. Of these 385 patients, 335 presented to the rheumatological visit. After rheumatological consultation, 283 individuals (10.5% of the psoriatic patients screened) were considered to be affected with inflammatory arthritis (Fig. 2). Of these individuals, 273 (10.1%) were classified as affected with PsA (Fig. 2).

A total of 33 patients were diagnosed with EPsA [1.2% of the 2684 patients with psoriasis and 11.6% of those with inflammatory arthritis; 16 male patients (48%) and 17 female patients] (Fig. 2). These patients complained of the following symptoms: morning stiffness lasting ≥45′ (28 patients); pain in peripheral joints (33 patients); one or more swollen joints (20 patients); and inflammatory back pain (five patients).

Moreover, in 10 of the patients with symptoms and signs of inflammatory arthritis lasting >1 year (median: 5 years; range: 2–30 years; seven men, three women, median age: 50 years; range: 36–68 years), a new diagnosis of PsA was also performed. However, for seven of these patients, PsA had been previously suspected by a physician.

With regard to the EPsA patients, none of them reported that they had been previously diagnosed with inflammatory arthritis by a physician or that they had consulted a rheumatologist for articular complaints. The only drugs taken for the relief of articular symptoms were over-the-counter NSAIDs administered as self-medication.

The demographical, clinical, laboratory and CEUS data for EPsA patients are summarized in Table 1. As expected, the age of

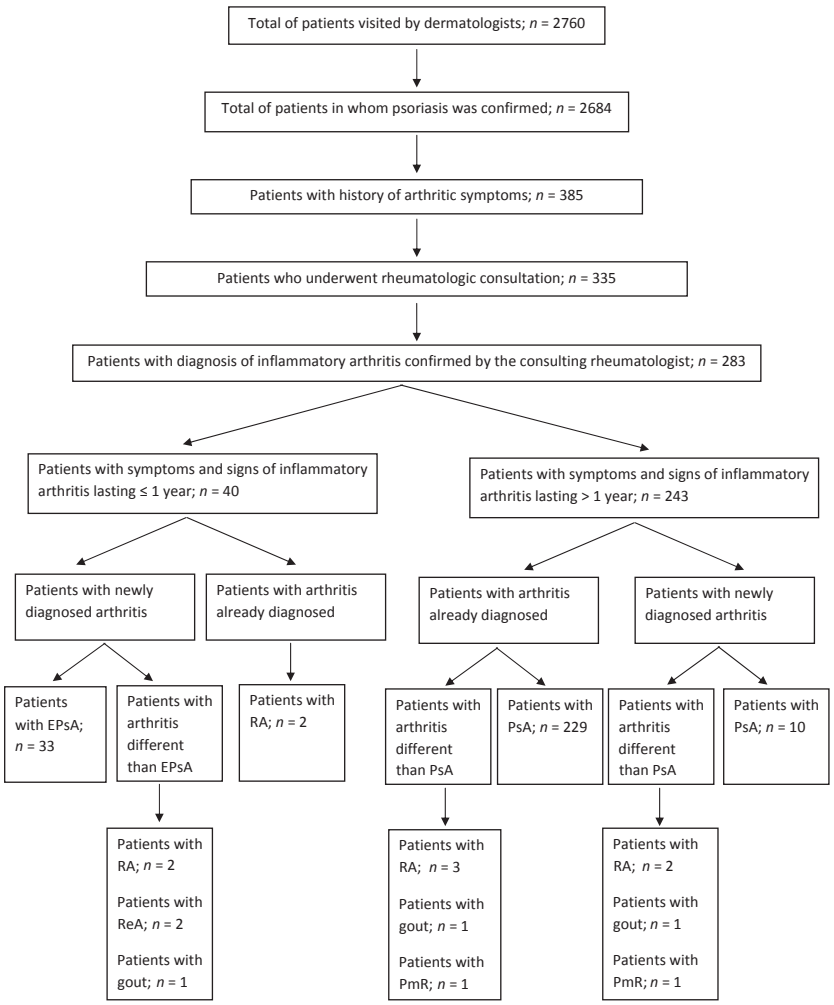

Figure 2 Flow chart of the results of patients screened. EPsA, early psoriatic arthritis; PmR, polymyalgia rheumatica; PsA, psoriatic arthritis; RA, rheumatoid arthritis; ReA, reactive arthritis.

Table 1 Demographical, clinical, laboratory and CEUS characteristics of patients (n = 33)*

Characteristic	Value
Sex M/F	16/17
Age at first diagnosis of psoriasis (in years)	38 (13–64)
Age at first diagnosis of psoriatic arthritis (in years)	48 (26–72)
Duration of psoriasis (in years)	9 (1–33)
Duration of articular symptoms (in months)	6 (2–12)
Family history of psoriasis and/or psoriatic arthritis, *n* (%)	6 (18.2)
Subset: oligoarthritis/polyarthritis, *n* (%)	13 (39.4)/20 (60.6)
Patients with DIP joint involvement, *n* (%)	12 (36.3)
Patients with enthesitis, *n* (%)	13 (39.4)
Patients with dactylitis†, *n* (%)	9 (27.3)
Patients with nail involvement, *n* (%)	28 (84)
PASI score, range 0–72	2.4 (0–15)
PGA score, range 1–7	2.0 (1–7)
Tender joint count (ACR 68), range 0–68	10 (1–45)
Swollen joint count (ACR 66), range 0–66	0 (0–4)
DLQI score, range 0–30	4 (0–20)
HAQ score, range 0–3	0.5 (0–3)
VAS pain, range 0–100	70 (10–100)
ESR (N.V. 2–25 mm/h)	17 (2–57)
CRP (N.V. 0.0–0.8 mg/dL)	0.5 (0–6)
CEUS score, range 0–3	2 (1–3)

*Data are shown as median (minimum–maximum), unless otherwise indicated.

†Six patients had swelling of one finger or toe; three patients had swelling of more than one finger and/or toe.

n, number; DIP, distal interphalangeal joints; PASI, Psoriasis Area and Severity Index; PGA, Physician Global Assessment; ACR, American College of Rheumatology; DLQI, Dermatology Life Quality Index; HAQ, Health Assessment Questionnaire; VAS, Visual Analogue Scale; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; CEUS, Contrast-Enhanced-Ultrasound.

the patients at first diagnosis of psoriasis was significantly lower than that at first diagnosis of PsA ($P < 0.0001$).

Clinical findings for EPsA patients

When the patients were stratified based on the number of peripheral joints affected by arthritis, polyarthritis (≥5 joints involved) occurred in 20 patients (60.6%) and oligoarthritis (<5 joints involved) in the remaining 13 (39.4%) patients, though the difference was not statistically significant. No differences were found between these two groups in terms of the characteristics of joint inflammation, such as enthesitis, dactylitis, HAQ, VAS pain, ESR, CRP or CEUS score (data not shown).

Involvement of the distal interphalangeal joints (DIP), which is considered to be typical of PsA,[21] was seen in 36.3% of the patients. However, none of the patients showed DIP involvement alone. Enthesitis and dactilitis, which are also typical of PsA,[21] were found in, respectively, 39.4% and 27% of the patients.

The majority of patients (84%) presented psoriasis of the nails of varying severity. Regarding skin involvement, as shown by the low median PASI and PGA scores (Table 1), the majority of patients were affected by mild psoriasis. As also reported in other studies,[22] there was a direct correlation between the PASI and PGA scores ($r = 0.80$; $P < 0.0001$).

Upon presentation, two patients did not show clinical signs of psoriatic skin lesions, but only nail involvement and a previous diagnosis of psoriasis of the skin. Regarding peripheral joint involvement, the number of tender joints was significantly higher than the number of swollen joints ($P < 0.0001$) (Table 1). In particular, all patients presented joint tenderness, whereas 16 (48%) patients presented swollen joints.

In the majority of patients, the quality of life due to skin disease was only mildly affected, with a median value of 4. A median value of 0.5 was found for functional impairment due to arthritis, which can also be considered as mild.[23]

No correlation was found between DLQI and either PASI or PGA scores (data not shown). HAQ was correlated with tender joint count (ACR 68) ($r = 0.36$; $P = 0.04$), but not with swollen joint count (ACR 66) (data not shown). HAQ was not correlated with DLQI or with PASI or PGA scores (data not shown).

The high median VAS pain score (Table 1) indicates that the majority of patients had experienced severe painful articular symptomatology in the previous week. No correlation was found between VAS pain and either ACR 66 or ACR 68 or between VAS pain and HAQ (data not shown).

Laboratory findings for EPsA patients

The search for rheumatoid factor was negative in all 33 patients. In most of them, both ESR and CRP values were within normal ranges (Table 2). ESR and CRP values exceeded the upper limits of normal ranges in 12 (36.3%) and 11 (33.3%) patients respectively.

Imaging findings for EPsA patients

According to the radiographic examination of peripheral articular joints, none of the patients showed any signs of articular damage. For four (12%) of the five patients with lower back pain, radiographic findings of sacroiliitis were found: three monolateral (grade 3) and one bilateral (grade 2). Eight (24.2%) patients showed typical radiological signs of peripheral osteoarthritis, such as osteophite formation and bone sclerosis.

The US at baseline showed synovial effusion at the level of targeted joints in all 33 patients, whereas synovial hypertrophy was seen in 24 patients (72.7%) (Table 2). CEUS was positive for the enhancement in all 33 patients (Table 2), confirming an active inflammation of the examined joints, with a median score of 2 (Table 1).

A typical finding of intra-articular enhancement of grade 2 (Pat. no 20) after contrast administration is shown in Fig. 3.

Table 2 Results of ultrasound studies of targeted joints before and after intravenous contrast administration

Pat. no	Joint	Basal US		CEUS
		US effusion	US hypertrophy	
1	MCF II finger left hand	1	0	2
2	MCF V finger left hand	2	2	2
3	Right wrist	1	0	2
4	IFD I finger right hand	2	2	1
5	MCF I finger right hand	2	1	1
6	MCF I finger left hand	2	2	3
7	III IFD finger left hand	1	0	1
8	MCF II finger right hand	2	2	1
9	MTF I toe left foot	2	3	3
10	Left knee	2	2	2
11	IFP IV finger right hand	2	0	1
12	MCF II finger left hand	1	2	1
13	MCF III finger right hand	2	0	2
14	Left ankle	1	2	2
15	MTF II toe right foot	1	0	1
16	IFP II finger left hand	2	2	2
17	IF I toe right foot	2	1	3
18	IF I toe right foot	1	0	1
19	Right wrist	2	2	2
20	MCF II finger right hand	2	1	2
21	Left wrist	2	1	2
22	MTF II toe left foot	1	1	2
23	Right wrist	2	1	3
24	IFD V finger left hand	1	0	1
25	IFD I finger right hand	1	1	2
26	IFP III finger left hand	2	1	2
27	Left ankle	2	1	2
28	Right ankle	1	1	2
29	MCF I finger right hand	2	1	1
30	IFD I finger right hand	1	1	3
31	Right knee	3	2	3
32	MCF IV finger right hand	1	1	1
33	MTF IV toe left foot	1	1	1

US, ultrasound; CEUS, Contrast-Enhanced-Ultrasound; MCF, metacarpal phalangeal joint; IFD, interphalangeal distal joint; IF, interphalangeal joint; MTF, metatarsal phalangeal joint; IFP, interphalangeal proximal joint.

Synovial effusion, synovial hypertrophy and CEUS scores were not correlated with the number of involved joints (ACR 66/68), HAQ or VAS pain (data not shown).

Discussion

We estimated the prevalence and report clinical and imaging findings for EPsA, diagnosed after performing screening on a large cohort of psoriatic patients seen for the first time at our outpatient centre. To screen patients for inflammatory arthritis, we used a 6-point questionnaire (Fig. 1) compiled by the physician during the dermatologic consultation. We could not use any of the recently developed screening tools for identifying PsA, such as ToPAS,[4] PASE[5] or PEST,[6] because when we began our study, these tools had not been available or were not yet validated.

The screening method we used is more time-consuming than the above-mentioned tools, which are compiled directly by the patient. However, it allowed us to perform screening for the possible presence of inflammatory arthritis for all of the psoriatic patients attending our centre for the first time.

Regarding the prevalence we found that 10.1% of the psoriatic patients had PsA, which is lower than the 20–30% prevalence of PsA among psoriatic patients reported in some studies.[24,25]

A number of factors may have contributed to the relatively low prevalence of PsA (and thus of EPsA) in our study. In particular in 50 of the 385 psoriatic patients with a history of inflammatory arthritis, we could not perform a definitive diagnosis of PsA because they did not present to rheumatological consultation (Fig. 2). This could have been avoided if a rheumatologist had been present during the dermatologic consultation; however, there are no rheumatologists on staff at our institute.

Another factor that probably contributed to our low prevalence was the use of CASPAR criteria[12] to classify arthritis as 'psoriatic'. A prerequisite for satisfying these criteria is the presence of 'inflammatory musculoskeletal disease', which could be subject to individual interpretation, even when applied by a rheumatologist. Moreover, in our study, sensitive imaging tools such as US and CEUS were only used for patients with a new diagnosis of PsA in whom the CASPAR criteria were satisfied. The exclusion of patients who did not meet these criteria would have reduced the probability of diagnosing inflammatory arthritis, particularly in an early phase. Another point to consider is that the sensitivity of CASPAR criteria in EPsA recently has been reported to be lower[26] than previously published.[27]

Although the above reported factors may have affected our results, the prevalence of PsA in our study is similar to the 11% reported by Gelfand *et al.* in the United States.[28] It is also similar to the 13.8% prevalence reported in the United Kingdom by Ibrahim *et al.*,[29] who also used the CASPAR classification.

In any case, estimating the exact prevalence of PsA in a population of psoriatic patients is quite challenging.[30] In fact, many factors have been implicated in the highly variable prevalence of PsA, such as: (i) selection biases; (ii) differences in the definition of PsA; and (iii) and prevalence in the population.[31]

Our data show that patients who have only mild psoriatic disease can be correctly diagnosed with EPsA, if EPsA is actively searched for. The first steps in the diagnosis are an accurate description of the patient's clinical history and a complete examination of the articular and entheseal apparatus in all suspected cases. Regarding the articular subsets of peripheral joint involvement, we found that polyarthritis was more common than olygoarthritis among EPsA patients, although the difference was not

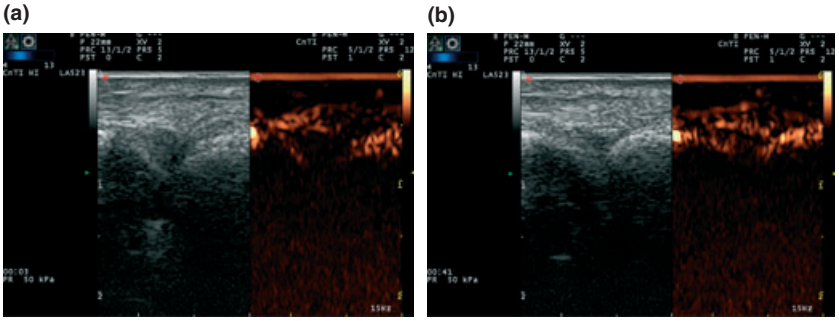

Figure 3 US image of the II MTF joint of the left foot at 3 s (a) and 41 s (b) after contrast administration. In B, an enhancement of grade 2 is shown.

significant. Defining the articular subsets in EPsA is important because polyarticular onset of PsA seems to be associated with more aggressive disease and with increased progression to joint damage.[32]

Regarding axial involvement, we diagnosed sacroiliitis in only four of our EPsA patients, by performing plain radiographic investigations of lumbar spine and sacroiliac joints only in subjects who complained of lower back pain. We are aware that this percentage probably does not reflect the actual prevalence of spondiloarthritis in our patients. In fact, axial involvement may often be silent in PsA and can be found in up to 20% of patients with EPsA if searched for with plain radiography.[33]

The finding that 36.3% of the EPsA patients had DIP arthritis (Table 1) is consistent with other studies that have shown that although DIP arthritis is a characteristic feature of PsA, it is found in fewer than half of PsA patients, including those with EPsA.[8]

Enthesitis, which is another typical manifestation of EPsA,[21] was detected in approximately 40% of our EPsA patients (Table 1). Although the physical examination of entheseal sites is mandatory for assessing persons with suspected PsA, the clinical evaluation of enthesitis is rather elusive.[21] In fact, many studies have shown that different imaging tools (ultrasonography, magnetic resonance, bone scintigraphy) are much more sensitive in detecting enthesitis in both symptomatic and asymptomatic patients.[2,3,10,34]

Our finding of dactilytis in 27% of the patients is consistent with other studies, in which dactilytis was found in approximately one-third of patients.[32] Determining whether or not dactylitis is present is important because it appears to be a marker of severity of inflammatory arthritis[35] and can be a marker of articular disease progression.[36] Due to its clinical importance, dactilytis has been included in the classification criteria developed by the CASPAR study group for PsA.[13] As expected, the number of joints involved influenced the articular functional status, as shown by the correlation between ACR 68 and HAQ (see Results section).

With regard to imaging studies, plain radiography was completely inadequate in detecting signs of peripheral entheso/articular damage in patients with EPsA. This finding is consistent with those of other studies showing that more sensitive techniques, such as magnetic resonance (MR), scintigraphy and US,[2,3,10,20] are necessary for detecting early signs of inflammatory arthritis. In particular, US should be considered as the first choice for the diagnosis of EPsA because it is reproducible, rapid and relatively inexpensiveness. In the present study, US revealed signs of joint inflammation in all of the patients. Moreover, as reported in another cohort of patients studied at our institute,[20] the use of CEUS allowed us to perform a grading of inflammation in the examined joints (Tables 1 and 2), which could be important in evaluating the activity of arthritis and monitoring its response to therapy over time.

The present study shows that a diagnosis of EPsA, even in patients with only mild skin disease, can be correctly performed as a result of a multidisciplinary approach involving dermatologists, rheumatologists and radiologists. It is also important to consider that psoriasis, in addition to PsA, can be associated with several comorbidities.[37] It is thus mandatory for dermatologists to search for, with an accurate medical history and clinical examination, the presence of comorbidites commonly associated with psoriasis and to refer all suspected cases to the appropriate specialists.

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