Prevalence and clinical characteristics of psoriasis in spondyloarthritis: a descriptive analysis of 275 patients

F. Roure[1,2], M. Elhai[1], V. Burki[1], I. Fabreguet[1], E. Koumakis[1], J. Payet[1], M. Dougados[1], L. Gossec[2]

[1]Paris Descartes University, Medicine Faculty; APHP, Rheumatology B Department, Cochin Hospital, Paris, France; [2]Sorbonne Universités, UPMC Univ Paris 06, GRC-08, Institut Pierre Louis d'Epidémiologie et de Santé Publique, Paris, France; Pitie-Salpétrière Hospital, AP-HP, Rheumatology Department, Paris, France.

Abstract

Objective

To assess the prevalence of psoriasis among a cohort of patients with spondyloarthritis (SpA), to describe the clinical characteristics of psoriasis and associations with other manifestations.

Method

This is a retrospective single-centre observational study. The patients were diagnosed with definite SpA (expert opinion), either axial or peripheral. Each patient underwent a direct interview by a physician. The data regarding history of psoriasis and its clinical characteristics were collected. Univariate and multivariate analyses of patients with versus without psoriasis were carried out.

Results

In all, 275 SpA patients were assessed: mean disease duration 16.7±11.8 years, 61.4% were men, 69.1% were diagnosed as axial SpA and 17.8% as peripheral SpA. In all, 84 patients (30.5%) had present or past psoriasis. The prevalence of psoriasis was high whatever the clinical presentation. Psoriasis was present before or concomitantly to diagnosis of SpA in 59/84 patients (70.2%). The most common types of psoriasis were plaque (66.7% of patients with psoriasis) and scalp psoriasis (65.5%). Other localisations were not rare, including palmoplantar pustulosis (20.2%) or nail psoriasis (19.1%). Patients with versus without psoriasis differed only through a lower proportion of radiological sacroiliitis (57.5% vs. 81.3 %, p<0.001).

Conclusion

With a prevalence of 30.5%, i.e. ten times higher than in the general population, this study confirms that psoriasis is a frequent and early manifestation in SpA and that a systematic search for psoriasis (e.g. scalp) is relevant in SpA for clinical practice, whatever the clinical presentation of SpA.

Key words

spondyloarthritis, psoriasis

Fanny Roure, MD
Muriel Elhai, MD
Vincent Burki, MD
Isabelle Fabreguet, MD
Eugénie Koumakis, MD
Judith Payet, MD
Maxime Dougados, MD
Laure Gossec, MD, PhD

Please address correspondence to:
Laure Gossec, MD, PhD,
Service de Rhumatologie,
Groupe Hospitalier Pitié Salpêtrière,
47-83 Bd de l'Hôpital,
75651 Paris Cedex 13, France.
E-mail: laure.gossec@aphp.fr

Received on March 5, 2015; accepted in revised form on September 2, 2015.

Competing interests: none declared.

Introduction

Psoriasis is a chronic, systemic, inflammatory, multigenic skin disease, with a variable prevalence, estimated between 0.6% and 4.8% (1, 2). Psoriasis is frequently associated with immune-mediated inflammatory disease, particularly in Crohn's disease and spondyloarthritis (SpA) (3). This strong link is present in the broad spectrum of SpA including axial SpA with (ankylosing spondylitis) or without structural damage observed on the sacroiliac joints on pelvic x-rays, peripheral SpA, SpA associated with inflammatory bowel disease, reactive arthritis and undifferentiated SpA.

Personal or family history of psoriasis is an important element in SpA classification criteria such as Amor's criteria (4), the European Spondylarthropathy Study Group (ESSG) (5) and more recently the Assessment of SpondyloArthritis (ASAS) international Society (6) criteria sets.

There is probably a large overlap between what is called "psoriatic arthritis", and "SpA with psoriasis" (7, 8); relatively little is known about the frequency of psoriasis in SpA. Some studies have reported a prevalence between 10% and 25%, but some of these patients were selected for clinical trials and may not be representative (9-14).

As regards the characteristics of psoriasis in the context of SpA (15-17), little is known regarding the clinical characteristics of psoriasis, and association to other extraarticular manifestations of SpA (18). Since psoriasis may be useful for diagnosis (4-6) and may have an impact on treatment decisions in SpA (19), it would be useful to have a more precise knowledge on elements such as the location and date of appearance of psoriasis in SpA. Moreover, it is unclear whether psoriatic SpA patients are different from those without psoriasis. This is important to better categorise SpA patients, since to date severity criteria and prognostic criteria are performing poorly in SpA (20).

The aims of this study were to determine (a) the prevalence of psoriasis in SpA, (b) the moment of appearance of psoriasis in the disease course and its clinical description and (c) to determine if SpA patients with psoriasis were different from patients without cutaneous manifestations.

Materials and methods

Study design

A cross-sectional retrospective observational study, COSPA (COchin SPondylArthritis), was performed between November 2009 and July 2010, in one tertiary referral centre (21). The study was in accordance with ethical standards in France in 2010; oral informed consent was obtained from each patient.

Patients

All patients living in Paris or in the suburb of Paris and seen in our department in the last four years were selected, if they had SpA according to the expert opinion of a senior rheumatologist, confirmed either by the Amor or the ESSG criteria. The selection was performed irrespective of the existence of psoriasis. Patients were selected from the unit database through the keywords "spondyloarthritis" or "spondylarthropathy". In all, 1237 patients were selected; a random sample of 590 were contacted (Fig. 1).

General data collection

Data were collected based on face to face interview completed with medical files. The interviews were conducted by 8 residents in 2009-2010. The patient was assessed and a pre-defined grid was completed, during a specific consultation by a medical fellow, based on questioning, medical examination and the medical file. General data collected were age, sex, disease duration, clinical presentation of SpA (axial versus peripheral), HLA B27 status, C- reactive protein elevation at diagnosis, radiographic sacroiliitis according to modified New York criteria (22) and treatments (23).

Psoriasis: data collection

Psoriasis was defined as erythematosquamous skin lesions and/or specific involvement (nail, inverse or palmoplantar) diagnosed as psoriasis, reported by a physician or by the patient himself. Psoriasis was assessed through patient questioning, and the diagnosis

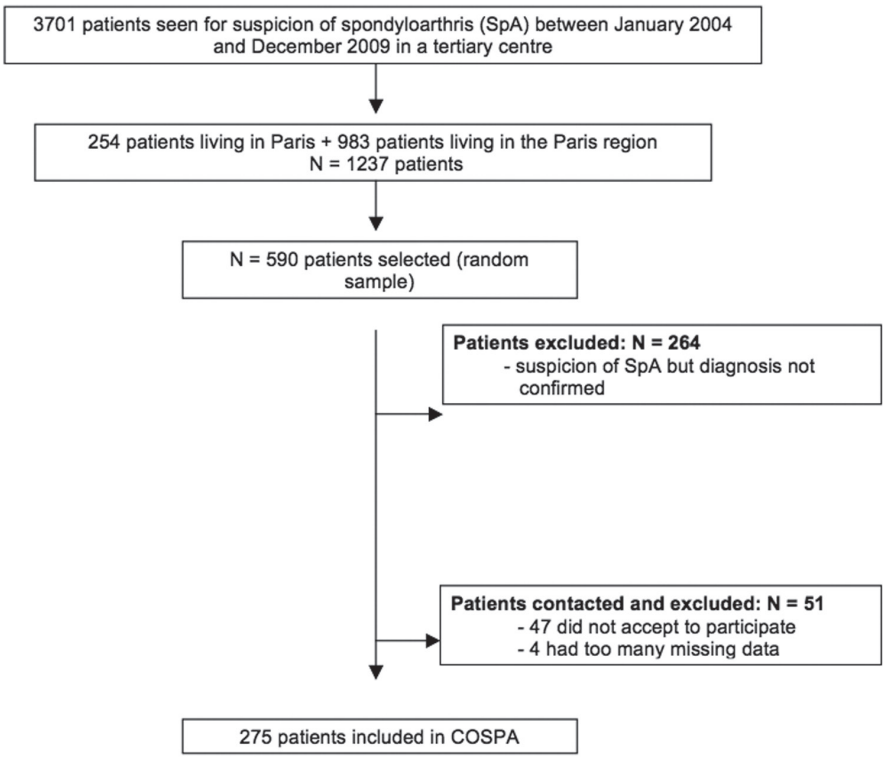


Fig. 1. Flow chart of patients selection.

had usually been confirmed in the medical file and by a dermatologist; in case of doubt, the rheumatologist resident confirmed or not the diagnosis based on the appearance and localisations of the lesions and previous treatments. Family history was defined as psoriasis of the first or second degree relatives.

Were collected: personal and, family history of psoriasis, date of appearance, dermatologic confirmation, natural history in relation with the rheumatic disease and clinical localisation (according to patient's opinion and medical file).

Comparisons between patients with and without psoriasis were performed, concerning demographic characteristics, SpA subtype, other manifestations of SpA and axial severity (defined arbitrarily as bamboo spine (assessed on the most recent radiographs), and SpA-related hip involvement).

Statistical analyses

Prevalence was defined as the number of patients with a past or present psoriasis, over the total number of patients. Descriptive statistics were used for clinical characteristics of patients and of psoriasis. Continuous variables were given as mean values (± Standard Deviation, SD). Time of appearance of the manifestation was analysed by Kaplan Meyer survival technique.

To compare SpA patients with versus without psoriasis, non-parametric tests (Fisher, Wilcoxon). *P*-values ≤0.05 were considered significant. Analyses were performed using the SAS statistical software v. 9.1.

Results

Patients (Table I)

A total of 275 patients were included (Fig. 1): mean±SD age was 44.6±13.5 years at the time of inclusion in the study; mean±SD disease duration was 16.7±11.8 years; 169 were men (61.4%). Among these 275 patients, 190 (69.1%) had a mainly axial presentation and 49 (17.8%) a mainly peripheral SpA. In all, 199 (79.3%) patients presented HLA B27, and 161 (58.5%) were treated at one time-point with a tumour necrosis factor (TNF) blocker.

Prevalence of psoriasis

In all, 84 patients (30.5%) had past or present psoriasis and 110 (40.0%) had a personal or familial history of psoriasis.

• *Prevalence over time*

At diagnosis of SpA, psoriasis was known or appeared the same year in 59 cases (59/84=70.2%, (Fig. 2). Psoriasis appeared before diagnosis of SpA in 47 patients (56%), the same year in 12 patients (13%) and developed after in 25 patients (30%). Compared to the time of diagnosis of SpA, psoriasis appeared a median of 1 year before (inter-quartile range, [9 yrs before; 1 yr after]).

• *Prevalence according to the underlying diagnosis*

The prevalence of psoriasis was high whatever the underlying disease. It was 19.9% in non-PsA patients and 79.6% in patients diagnosed as PsA (p<0.0001).

Clinical characteristics of psoriasis

• *Family history of psoriasis in patients with personal psoriasis*: it was noted in 27 (32.1%) patients.

• *Diagnosis*: psoriasis was confirmed by a dermatologist in 62 (75.6%) cases.

• *Natural history of psoriasis*: the cutaneous and rheumatic diseases had independent courses in 67 (79.8%) patients, according to the patient's opinion.

• *Localisation:* the most frequent types of psoriasis were: plaque psoriasis (n=56, 66.7%), scalp involvement (n=55, 65.5%), palmoplantar pustulosis (n=17, 20.2%), nail psoriasis (n=16, 19.1%), inverse psoriasis (n=12, 14.3%) and erythrodermic psoriasis (n=5, 6%). Palmoplantar pustulosis was less frequent on soles (n=11, 13.1%) than palms (n= 15, 17.9%) and was rarely observed alone (n=5, 6%). Among the 16 patients with nail psoriasis, feet involvement (n=11) was almost as frequent as hand involvement (n=13) and no patient had isolated nail psoriasis.

Comparison of patients with versus without psoriasis (Table I)

• *Univariate analysis*

Sacroiliitis (p<0.0001) and uveitis (p=0.013) were less often present in patients with psoriasis than without, whereas peripheral arthritis was more frequent (p=0.016), especially polyarthritis. Involvement of distal interphalangeal joints and dactylitis tended to be more frequent in the psoriasis

Table I. Clinical characteristics of patients with and without psoriasis.

		All patients n=275 (%)	With psoriasis n=84	Without psoriasis n=191	*p*-value*	*p*-value**
General characteristics	Age, years, mean (SD)	44.6 (13.6)	47.9 (13.5)	43.1 (13.4)	**0.009**	0.917
	Age at diagnosis, mean (SD)	32.9 (13.1)	35.4 (13.5)	31.8 (12.9)	**0.026**	**0.027**
	Disease duration, years, mean (SD)	16.7 (11.8)	17.1 (11.5)	16.5 (11.9)	0.592	**0.012**
	Men, n (%)	169 (61.5)	55 (65.5)	114 (59.7)	0.364	0.871
	Family history SpA, n (%)	116/269† (43.1)	39/83† (47.0)	77/186† (41.4)	0.747	0.640
	Radiologic sacroiliitis, n/n (%)	190/255† (74.5)	42/73† (57.5)	148/182† (81.3)	**<0.0001**	**0.001**
	HLA B27, n/n (%)	199/251† (79.3)	53/72† (73.6)	146/179† (81.6)	0.160	0.363
	C-reactive protein > 5mg/l, n/n (%)	175/246† (71.1)	56/77† (72.7)	119/169† (70.4)	0.710	0.769
Clinical manifestations	Inflammatory back pain, n (%)	116/269† (43.1)	39/83† (47.0)	77/186† (41.4)	0.747	0.239
	Hip involvement, n (%)	49 (17.8)	12 (14.3)	37 (19.4)	0.310	0.109
	Uveitis, n (%)	77 (28.0)	15 (17.9)	62 (32.5)	**0.013**	0.081
	Chest pain, n (%)	102 (37.1)	30 (35.7)	72 (37.7)	0.754	0.893
	Dactylitis, n (%)	59 (21.5)	24 (28.6)	35 (18.3)	0.057	0.770
	Heel pain, n (%)	130 (47.3)	43 (51.2)	87 (45.6)	0.388	0.447
	Peripheral arthritis, n (%)	127 (46.2)	48 (57.1)	79 (41.4)	**0.016**	0.899
	- Monoarthritis	34 (26.8)	11 (22.9)	23 (29.1)	0.444	0.641
	- Oligoarthritis	61 (48.0)	20 (41.7)	41 (51.9)	0.263	0.190
	- Polyarthritis	32 (25.2)	17 (35.4)	15 (19.0)	**0.039**	0.315
	- Distal interphalangeal involvement, n (%)	11/127 (8.7)	7/ 48 (14.6)	4/79 (5.1)	0.101	0.091

*p-value comparing patients with *vs*. without psoriasis by non-parametric tests: univariate; **p-value comparing patients with *vs*. without psoriasis: multivariate; †some missing data explaining the lower denominator.

group, however without reaching statistical significance. Presence of lumbar pain, heel pain, anterior chest wall pain, hip involvement and inflammatory bowel disease did not differ between the two populations. Furthermore, the severity of the rheumatic disease was similar in the two groups (data not shown).

• *Multivariate analysis*

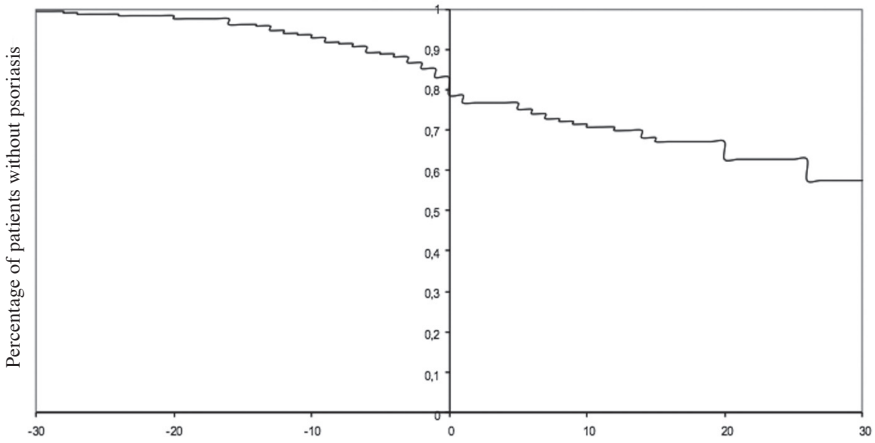
In multivariate analysis, the statistical differences found between the two populations were radiologic sacroiliitis, less frequent in the psoriasis group (57.5% *vs*. 81.3%, p=0.001); age at diagnosis and disease duration, slightly higher in the psoriasis group. Patients with psoriasis were not different from those without psoriasis concerning uveitis and peripheral arthritis in multivariate analysis.

Discussion

In the present study, psoriasis was a frequent extra-articular manifestation of SpA (30.5%), whatever the clinical rheumatological presentation (axial versus peripheral or extra articular). More than two thirds of patients with psoriasis had cutaneous manifestations prior to or simultaneously with the rheumatic diagnosis. The most common types of psoriasis were plaque (66.7%) and scalp psoriasis (65.5%). Twenty percent of patients reported palmoplantar pustulosis and nail psoriasis was noted in 19.1%. SpA patients with psoriasis differed from those without psoriasis only by an older age at diagnosis and a lower rate of radiological sacroiliitis, thus indicating that psoriasis is not a marker of a different phenotype in SpA.

This study has some limitations. There may have been memory bias, because the data was collected by questioning the patient (self-report) (24). However the patient interviews were very thorough (lasting around one hour) and medical files were consulted to confirm the data; furthermore the diagnosis of psoriasis was confirmed in most cases by a dermatologist. The second bias could be that this study was conducted in a tertiary care centre with probably more severe SpA, as suggested by the high rate of anti-TNF treatment. However, the patients were not selected based on severity criteria, but rather on geographic localisation (living near Paris, France) thus forming a quasi-randomised sample, and few patients refused to participate. Finally a large number of patients were included both with axial and peripheral SpA, therefore increasing the representativity of our sample.

Prevalence of psoriasis in our patients reached 30.5%, which is more than ten times superior to the prevalence of psoriasis in the general population (around 1.5%–2.2%) (1, 2). A recent meta-analysis investigating the prevalence of extra-articular manifestations in patients with ankylosing spondylitis (25), which included a total of 27,626 psoriasis patients, revealed a pooled prevalence of 9.3% for psoriasis (95% CI 8.1%–10.6%). This is quite different from the present study; this can be partly explained by differences in clinical as well as methodological characteristics. The present rate of 30.5% is much closer to what was observed in the Spanish registry REGISPONDER (25%) (11, 22, 26-27). SpA patients with psoriasis are not systematically classified as psoriatic arthritis patients, since psoriasis is frequently associated with SpA (3). In any case, classification of the patient into a definite entity is probably of little importance in clinical practice since therapeutic decisions depend more on the axial or peripheral presentation than on the nosologic entity.



Years	-30	-20	-10	0	10	20	30
n.**	273	270	257	228	99	46	13

**patients exposed to risk.

Fig. 2. Date of occurrence of the skin manifestations of psoriasis with regard to the date of diagnosis of SpA (Kaplan-Meyer survival technique).

Seventy percent of our patients with psoriasis had cutaneous manifestations before or the same year as the diagnosis of SpA, thus psoriasis occurs early in the natural history of SpA. In PsA, skin lesions appear before the first rheumatic symptoms in 60–70% of cases, typically with a delay of 10 years (28). This study confirms that a careful examination researching personal or family history of psoriasis and skin lesions (particularly nail change and typical sites of plaque psoriasis including scalp) may be of great help to the physician in his clinical practice, when facing a potential SpA patient. We suggest that history of psoriasis is very frequent in SpA and constitutes a relevant clue for diagnosis: in our study, 21.5% patients had past or present psoriasis at the time of SpA diagnosis, which is close to the results of a recent study in early axial SpA (16.6%) (18). Furthermore, most of the patients reported no correlation between course of the skin disease and the joint manifestations, which is also the case in PsA (29).

Concerning the distribution of psoriasis, several remarks are interesting: first, plaque psoriasis was the most common form, reported by two thirds of our patients, as frequent as scalp psoriasis. In population-based studies, *vulgaris* psoriasis accounted for approximately 80–90% of cases of psoriasis in adults. Flexural psoriasis, called inverse because it is reverse to the typical extensor surface involvement, was not rare (14%). The frequency of inverse psoriasis in adult psoriasis is not well established but was 4.6% in a German national survey of psoriatic patients (16). Palmoplantar psoriasis or pustulosis is still described in textbooks as a subtype of psoriasis and is associated with plaque psoriasis in 25% of cases, affecting predominantly women with a ratio of 9/1, more frequently in current or past smokers (28, 30. 31). In our study, 20.2% patients reported this localisation, affecting more palms than soles. This high rate is surprising compared to the Spanish registry (11) and the German study (16) in which respectively only 0.8% of patients with SpA and 1.5% of patients with psoriasis had this pustulosis. This difference can be explained in part by the mode of report (by the patient himself); we also cannot exclude some cases of over-diagnosis, *e.g.* by confusion with dyshidrotic eczema (also called pompholix). One other element is the high proportion of patients treated by anti-TNF (58.9% of all patients) with possibly some cases of induced-psoriasis in which palmoplantar pustulosis is very frequent (32, 33). In our study, we did not, however, collect specific data about anti-TNF-induced psoriasiform eruptions. Nail psoriasis is the most studied manifestation in SpA, affecting up to 80% of patients in some subtypes (34). We noted that fingernails were more affected than toenails, as is usually described. In our study, only 19% patients had nail psoriasis, which is a low percentage even when taking account that hyperkeratosis can be confused with onychomycosis (35).

When comparing patients with or without psoriasis, in multivariate analysis, there was a lower rate of sacroiliitis in the group with psoriasis; this confirms that psoriasis is not predictive of sacroiliitis, a hallmark of axial disease. Surprisingly, we did not evidence in multivariate analysis, an association of psoriasis with peripheral synovitis, or with enthesitis (10, 18). Probably this is because our population was very mixed in terms of subtypes, *i.e.* peripheral arthritis was very frequent in the whole population (46.2%). In any case, our results indicate that SpA patients with vs without psoriasis have a similar natural history and disease profile.

In conclusion, psoriasis is a frequent and early manifestation of SpA whatever the subtype. Careful examination of psoriasis certainly helps the physician in SpA diagnosis. However, psoriasis does not appear to modify the severity of disease, but its impact on quality of life remains to be determined.

Acknowledgements

We thank the patients who participated in this study.

References

1. GELFAND JM, WEINSTEIN R, PORTER SB, NEIMANN AL, BERLIN JA, MARGOLIS DJ: Prevalence and treatment of psoriasis in the United Kingdom: a population-based study. *Arch Dermatol* 2005; 141: 1537-41.
2. STERN RS, NIJSTEN T, FELDMAN SR, MARGOLIS DJ, ROLSTAD T: Psoriasis is common, carries a substantial burden even when not extensive, and is associated with widespread treatment dissatisfaction. *J Investig Dermatol Symp Proc* 2004; 9: 136-9.
3. DELAPORTE E: Immune-mediated inflammatory disease and psoriasis. *Ann Dermatol Venereol* 2008; 135 (Suppl. 4): S269-74.
4. AMOR B, DOUGADOS M, MIJIYAWA M: Criteria of the classification of spondylarthropathies. *Rev Rhum Mal Osteoartic* 1990; 57: 85-9.

5. DOUGADOS M, VAN DER LINDEN S, JUHLIN R *et al*.: The European Spondylarthropathy Study Group preliminary criteria for the classification of spondylarthropathy. *Arthritis Rheum* 1991; 34: 1218-27.
6. RUDWALEIT M, VAN DER HEIJDE D, LANDEWÉ R *et al*.: The development of Assessment of SpondyloArthritis international Society classification criteria for axial spondyloarthritis (part II): validation and final selection. *Ann Rheum Dis* 2009; 68: 777-83
7. GLADMAN DD, ANTONI C, MEASE P, CLEGG DO, NASH P: Psoriatic arthritis: epidemiology, clinical features, course, and outcome. *Ann Rheum Dis* 2005; 64 (Suppl. 2): ii14-17.
8. IBRAHIM G, WAXMAN R, HELLIWELL PS: The prevalence of psoriatic arthritis in people with psoriasis. *Arthritis Rheum* 2009; 61: 1373-8.
9. CASALS-SÁNCHEZ JL, GARCÍA DE YÉBENES PROUS MJ, DESCALZO GALLEGO MÁ, BARRIO OLMOS JM, CARMONA ORTELLS L, HERNÁNDEZ GARCÍA C; GRUPO DE ESTUDIO EMAR II: Characteristics of patients with spondyloarthritis followed in rheumatology units in Spain. emAR II study. *Reumatol Clin* 2012; 8: 107-13.
10. SKARE TL, LEITE N, BORTOLUZZO AB *et al*.: Effects of age disease onset in the clinical profile of spondyloarthritis: a study of 1424 Brazilian patients. *Clin Exp Rheumatol* 2012; 30: 351-7.
11. COLLANTES E, ZARCO P, MUNOZ E *et al*.: Disease pattern of spondyloarthropathies in Spain: description of the first national registry (REGISPONDER). *Rheumatology* 2007; 46: 1309-15.
12. VAN DER CRUYSSEN B, RIBBENS C, BOONEN A *et al*.: The epidemiology of ankylosing spondylitis and the commencement of anti-TNF therapy in daily rheumatology practice, *Ann Rheum Dis* 2007; 66: 1072-7.
13. VAN DER HEIJDE D, DA SILVA JC, DOUGADOS M *et al*.: Etanercept 50 mg once weekly is as effective as 25 mg twice weekly in patients with ankylosing spondylitis. *Ann Rheum Dis* 2006; 65: 1572-7.
14. BRAUN J, RUDWALEIT M, KARY S, KRON M, WONG RL, KUPPER H: Clinical manifestations and responsiveness to adalimumab are similar in patients with ankylosing spondylitis with and without concomitant psoriasis. *Rheumatology* 2010; 49: 1578-89.
15. MEASE P: Psoriatic arthritis and spondyloarthritis assessment and management update. *Curr Opin Rheumatol* 2013; 25: 287-96.
16. RADTKE MA, REICH K, BLOME C, RUSTENBACH S, AUGUSTIN M: Prevalence and clinical features of psoriatic arthritis and joints complains in 2009 patients with psoriasis: results of a German national survey. *J Acad Dermatol Venereol* 2009; 23: 683-91.
17. HAYEM G, BOUCHAUD-CHABOT A, BENALI K *et al*.: SAPHO syndrome: a long term follow-up study of 120 cases. *Semin Arthritis Rheum* 1999; 29: 159-71.
18. RICHETTE P, TUBACH F, BREBAN M *et al*.: Psoriasis and phenotype of patients with early inflammatory back pain. *Ann Rheum Dis* 2013; 72: 556-71.
19. GOSSEC L, SMOLEN JS, GAUJOUX-VIALA C *et al*.: EULAR recommendations for the management of psoriatic arthritis with pharmacological therapies. *Ann Rheum Dis* 2012; 71: 4-12.
20. VAN DER HEIJDE D, SIEPER J, MAKSYMOWYCH WP *et al*.: 2010 update of the international ASAS recommandations for the use of anti-TNF agents in patients with axial spondyloarthritis, *Ann Rheum Dis* 2011; 70: 905-8.
21. ELHAI M, PATERNOTTE S, BURKI V *et al*.: Clinical characteristics of anterior chest wall pain in spondyloarthritis: an analysis of 275 patients. *Joint Bone Spine* 2012 79: 476-81.
22. VAN DER LINDEN S, VALKENBURG HA, DE JONGH BM, CATS A: Evaluation of diagnostic criteria for ankylosing spondylitis. A proposal for modification of the New York criteria, *Arthritis Rheum* 1984: 27: 361-8.
23. KILTZ U, VAN DER HEIJDE D, BOONEN A, BRAUN J: The ASAS Health Index (ASAS HI) - a new tool to assess the health status of patients with spondyloarthritis. *Clin Exp Rheumatol* 2014; 32 (Suppl. 85): S105-8.
24. BRAUN J, KILTZ U, BARALIAKOS X, VAN DER HEIJDE D: Optimisation of rheumatology assessments - the actual situation in axial spondyloarthritis including ankylosing spondylitis. *Clin Exp Rheumatol* 2014; 32 (Suppl. 85): S96-104.
25. STOLWIJK C, VAN TUBERGEN A, CASTILLO-ORTIZ JD, BOONEN A: Prevalence of extra-articular manifestations in patients with ankylosing spondylitis: a systematic review and meta-analysis. *Ann Rheum Dis* 2015; 74: 65-73.
26. FOURNIÉ B, CROGNIER L, ARNAUD C *et al*.: Proposed classification criteria of psoriatic arthritis. A preliminary study in 260 patients. *Rev Rhum Engl Ed* 1999; 66: 446-56.
27. TAYLOR W, GLADMAN D, HELLIWELL P, MARCHESONI A, MEASE P, MIELANTS H; CASPAR STUDY GROUP: Classification criteria for psoriatic arthritis: development of new criteria from a large international study. *Arthritis Rheum* 2006; 54: 2665-73.
28. BRUNASSO AM, PUNTONI M, ABERER W, DELFINO C, FANCELLI L, MASSONE C: Clinical and epidemiological comparison of patients affected by palmoplantar plaque psoriasis and palmoplantar pustulosis: a case series study. *Br J Dermatol* 2013; 168: 1243-51.
29. WITTKOWSKI KM, LEONARDI C, GOTTLIEB A *et al*.: Clinical symptoms of skin, nails, and joints manifest independently in patients with concomitant psoriasis and psoriatic arthritis. *PLoS One* 2011; 6: e20279.
30. GRIFFITHS CE, BARKER JN: Pathogenesis and clinical features of psoriasis. *Lancet* 2007; 370: 263-71.
31. GRIFFITHS C, BARKER J: Pathogenesis and clinical features of psoriasis, *Lancet* 2007: 370: 263-71.
32. COLLAMER AN, BATTAFARANO DF: Psoriatic skin lesions induced by tumor necrosis factor antagonist therapy: clinical features and possible immunopathogenesis. *Semin Arthritis Rheum* 2010; 40: 233-40.
33. FIORINO G, DANESE S, PARIENTE B, ALLEZ M: Paradoxical immune-mediated inflammation in inflammatory bowel disease patients receiving anti-TNF-α agents. *Autoimmun Rev* 2014; 13: 15-9.
34. BARAN R: The Burden of nail psoriasis: an introduction. *Dermatology* 2010; 221: 1-5.
35. SCHONS KR, KNOB CF, MURUSSI N, BEBER AA, NEUMAIER W, MONTICIELO OA: Nail psoriasis: a review of the literature. *An Bras Dermatol* 2014; 89: 312-7.