Psoratic arthritis classification criteria: Moll and Wright, ESSG and CASPAR – a comparative study

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ABSTRACT

Objectives: To evaluate and compare Moll and Wright, ESSG and CASPAR criteria for psoriatic arthritis (PsA) classification.

Patients and Methods: Study comprised 356 patients (pts): 120 PsA pts in the investigated group, 123 pts with rheumatoid arthritis (RA) and 113 pts with non-inflammatory musculoskeletal symptoms (NIMS) in two control groups. Clinical diagnosis was the gold standard. Moll and Wright, ESSG and CASPAR criteria were applied to all pts. Sensitivity was calculated for each of the classification criteria sets; specificity was assessed in relation to RA and to NIMS groups, separately. Concordance between the investigated criteria sets was determined.

Results: Sensitivity was 91.7% for CASPAR, 85.8% for Moll and Wright and 63.3% for ESSG criteria. Specificity for Moll and Wright criteria was 100%, with relation to both RA and to NIMS group. Specificity of CASPAR criteria was 99.2% and 99.1%; specificity of ESSG criteria was 94.3% and 67%, with regard to RA and to NIMS groups, respectively. Significant fair concordance was found only between CASPAR and Moll and Wright criteria (k=0.379 p<0.001).

Conclusions: The highest sensitivity had the CASPAR criteria, followed by Moll and Wright and ESSG. The highest specificity showed Moll and Wright criteria, followed by CASPAR and ESSG. CASPAR criteria demonstrated high specificity when applied to both NIMS and RA group. The lowest specificity was found for the ESSG criteria in relation to NIMS group. The only significant concordance was shown between CASPAR and Moll and Wright criteria.

Keywords: Classification criteria; Psoriatic arthritis; Moll and Wright; ESSG; CASPAR

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INTRODUCTION

The psoriatic arthritis (PsA) has been recognized and evaluated as a separate disease since 1964 by the American College of Rheumatology-ACR (former ARA-American Rheumatology Association)[1]. Moll and Wright proposed the first and the most widely used PsA classification criteria (2), followed by a number of others[3-7]. In the last decade of the XXth century, European Spondyloarthropathy Study Group established the ESSG criteria for a group of diseases known as spondyloarthropathies (SpA), which included PsA[8].

There is a fundamental need to establish universal standards for rheumatic diseases nomenclature and classification in the present era of highly effective biological agents implementation[9,10].

CASPAR criteria (ClASsification criteria for Psoriatic ARthritis) are derived from a large international study, including not only the European and North American countries, but also the countries from Australasia and Africa. A total of 588 patients with PsA and 536 controls with other inflammatory arthritis were included[11]. Sensitivity and specificity of the CASPAR criteria, as reported from the original study, were 91,4% and 98,7%, respectively. CASPAR criteria are said to be the most robust and accurate classification criteria demonstrated for any rheumatic disease by now[12], but further validation is needed in other clinics, countries and patient populations, as stated by the authors[11,13,14,15].

PATIENTS AND METHODS

PATIENTS

Patients were taken consecutively from the hospital registry of the Institute of Rheumatology, University of Belgrade School of Medicine, in a three-year period. They were both patients with previously established diagnosis (hospitalized because of the actual flare of the

original disease, in order to be re-evaluated and given the appropriate therapy), as well as the first-time diagnosed patients, not treated yet.

Each patient was examined by two experienced rheumatologists-clinicians independently. They agreed upon diagnosis of every patient in a meeting, and this was accepted as the gold standard.

ANAMNESIS AND CLINICAL EXAMINATION

Data were collected according to the standard clinical protocol, including detailed anamnesis and physical examination required by the Moll and Wright, ESSG and CASPAR criteria.

Anamnesis comprised questions about duration of arthritis and psoriasis, personal and family history of psoriasis, other spondyloarthropathies and diseases, presence and characteristics of the inflammatory spinal pain (lumbar, thoracic or cervical), presence and characteristics of the buttock or the heel pain.

Psoriatic skin disease, psoriatic nail involvement and the entire digit involvement (dactilytis) were accepted either if verified at the time of examination, or if documented in medical records previously, signed by a rheumatologist or dermatologist.

Physical examination was done following recommendations for PsA[16]: 78 peripheral joints were examined for tenderness and 76 for swelling. Swollen joints count was defined as the number of joints with swelling, not due to bony overgrowth. Mobility of the spine was checked: neck flexion/extension, Schober's test, finger to floor distance and lateral flexion of the spine. Spondylitis (according to New York spondylitis criteria) was recorded. Enthesitis was recorded if present at patella, fascia plantaris, or at the Achilles tendon. Oligoarthritis was defined if less than 5 joints or joint areas were involved. Symmetry was accepted if more than 50% of joints were involved as matched pairs (grouping small joins of hands and feet). Laboratory tests for erythrocyte sedimentation rate-ESR, C reactive protein-CRP and serology test for rheumatoid factor-RF (turbidimetry) were done as well.

Antero-posterior radiographs of hands and feet (for structural damage and juxtaarticular new bone formation), and of pelvis (for unilateral or bilateral sacroiliitis, stage 1 to 4) were done, as well as the others on demand.

CLASSIFICATION CRITERIA FOR PSA

Moll and Wright criteria demand inflammatory arthritis (peripheral arthritis and/or spondylitis) and psoriasis and negative serology test for rheumatoid factor[2]. Spondylitis was assessed according to New York criteria for spondylitis, with a positive symptom (back pain), a clinical sign (restriction of back motion or chest expansion), and a radiological feature (unilateral sacroiliitis stage 3/4, or bilateral sacroiliitis stage 2/4).

ESSG criteria include at least one of the two major criteria: 1. inflammatory spinal pain or 2. asymmetrical synovitis or synovitis located predominantly on lower limbs, accompanied with at least one of the following minor criteria: sacroiliitis, alternating buttock pain, enthesopathy, positive family history for SpA, psoriasis, inflammatory bowel disease, urethritis or cervicitis or acute diarrhea occurring within one month before the arthritis[8].

CASPAR criteria are fulfilled if inflammatory articular disease (of joint, spine or enthesis) is presented and the minimum of 3 points out of the following items are collected: two points for current psoriasis (psoriatic skin or scalp disease present today as judged by rheumatologist), and one point for each of the following items: in case if current psoriasis is not present, Personal history of psoriasis obtained from patient, family doctor, rheumatologist or dermatologist; if psoriasis is not present currently or in personal history, positive Family history of psoriasis, Psoriatic nail dystrophy observed on current physical examination, A negative test for rheumatoid factor, Current dactylitis (swelling of the entire digit), history of dactylitis recorded by rheumatologist (if current dactylitis is not present) and Radiological evidence of juxta-articular new bone formation.

STATISTICAL ANALYSIS

Moll and Wright, ESSG and CASPAR criteria sensitivity was calculated as percentage of PsA patients who satisfied the criteria. Specificity was calculated as percentage of RA or NIMS patients who did not satisfy the investigated criteria sets. Differences between groups were determined by T-test and chi-square test. Concordance between the investigated criteria was assessed by Cohen's kappa test.

After the Ethical committee of the Institute of Rheumatology in Belgrade had approved this study; each patient signed the informed consent to participate.

RESULTS

A total number of 356 patients was included: 120 PsA patients in the investigated group and 123 RA patients

and 113 patients with non-inflammatory musculoskeletal symptoms-NIMS in two control groups (Table I).

Considering patients with non-inflammatory musculoskeletal symptoms, 28 had gonarthrosis (of one or both knees), 21 had coxarthrosis (of one or both hips), 19 had pain in the lumbar spine (with or without disc changes), 17 had lumboishialgia, 13 had pain in the cervical spine (with or without disc changes), 6 had osteoporosis (with or without vertebral fractures), 5 had enthesopathy and 4 had paresis of N. peroneus.

Patients in RA and NIMS groups were significantly older and there were significantly more women than in PsA group (p<0,01). RA and PsA groups were comparable with regard to disease duration, duration of arthritis and duration of psoriasis, with no statistical difference (Table I).

In PsA group, 94% had psoriasis (106 verified at the time of examination, 7 documented in their personal history only). Psoriasis was reported in family history for 14 patients with psoriasis, as well. Among patients without psoriasis, either currently presented or previously documented, there were no patients with positive family history. For psoriasis positive patients in PsA group, in 83.2% of patients psoriasis occurred 9,38 years before the arthritis, and in 16.8% of patients 3,14 years after.

Four RA patients (among them two at the time of examination) and three NIMS patients (among them one at the time of examination) had psoriasis (in each group one patient had positive family history of psoriasis as well). For all of them psoriasis occurred before the actual problems. Two patients in RA and three patients in NIMS group had a positive family history of psoriasis only (they did not have psoriasis presented either at the examination or in personal history).

CASPAR criteria were met by 110 out of 120 patients, of whom 108 with psoriasis (Table II). Two patients with PsA sine psoriasis (neither at the time of examination nor documented in personal anamnesis) met the CASPAR criteria (both of them with negative RF, current dactylitis and juxta-articular new bone formation).

Among 10 PsA patients not-satisfying CASPAR criteria, five did not have psoriasis either at the time of examination or in personal anamnesis (all of them were RF negative, and dactylitis was observed in two patients), one patient had only examination-verified psoriasis and four had psoriasis documented in their personal anamnesis, but not at the time of examination (plus negative RF).

TABLE I. DEMOGRAPHIC CHARACTERISTICS AND CLINICAL DATA OF THE EXAMINED PATIENTS

Patient characteristics	PsA (n=120)	RA (n=123)	PsA/RA p value	NIMS (113)	PsA/NIMS p value
Age (yrs), mean (SD)	52 (11.2)	58.6 (11.7)	<0.001	57.7 (11.1)	0.007
Female, number (N°), percent (%)	53 (44.2)	93 (75.6)	<0.001	81 (71.7)	<0.001
Disease duration-yrs (SD)	5.1 (5.9)	6.0 (5.9)	0.231	9.2 (6.4)	<0.001
Arthritis duration-yrs (SD)	5.78 (6.7)	7.02 (6.6)	0.151	/	/
Psoriasis duration-yrs (SD)	13.6 (9.7)	3.5 (3.5)	0.145	7.6 (4.1)	0.172
Tender joints count (N°) (SD)*	9.4 (4.2)	11.3 (4.8)	0.042	0.9 (0.8)	<0.001
Swollen joints count (N°) (SD)**	5.2 (4.2)	6.3 (4.0)	0.103	0.6 (0.3)	<0.001
Oligoarthritis N°(%)***	67 (55.8)	27 (22.0)	<0.001	58 (51.3)	0.647
Symmetrical arthritis N°(%)****	67 (55.8)	105 (85.4)	<0.001	22 (19.5)	0.007
DIP arthritis	41 (34.2)	4 (3.3)			
Radiographic sacroiliitis (N°), (%)	29 (24.4)				
Unilateral sacroiliitis (N°), (%)	13 (10.8)				
Bilateral sacroiliitis (N°), (%)	16 (13.3)				

PsA, psoriatic arthritis; RA, rheumatoid arthritis; NIMS, non-inflammatory musculoskeletal symptoms; DIP, distal interphalangeal joint; SD, standard deviation
*ACR (American College of Rheumatology) joint count, based on assessment of 78 joints for tenderness
**ACR joint count, based on assessment of 76 joints for swelling
*** <5 involved joints defined as oligoarthritis
****Symmetry:>50% of joints (grouping small joins of hands and feet), as matched pairs

TABLE II. PATIENTS WHO MET THE INDIVIDUAL ITEMS OF THE CLASSIFICATION OF THE PSORIATIC ARTHRITIS (CASPAR) CRITERIA[11]♦

Item	PsA (n=120)
CASPAR criteria number (N°), percent (%)	110 (91.7)
Evidence of psoriasis N°(%)	108 (98.2)
Current psoriasis N°(%)	105 (95.5)
Personal history of psoriasis N°(%)*	3 (2.7)
Family history of psoriasis N°(%)**	/
Psoriatic nail dystrophy N°(%)	67 (60.1)
Negative test for rheumatoid factor N°(%)	100 (90.9)
Evidence of dactylitis N°(%)	61 (55.4)
Current dactylitis N°(%)	43 (39.0)
History of dactylitis N°(%)***	18 (16.4)
Juxta-articular new bone formation N°(%)	63 (57.3)

♦For each of the classification item, for the CASPAR criteria positive patients
*Positive personal history of psoriasis if current psoriasis not present, documented in clinical records, signed by rheumatologist or dermatologist
**Positive family history of psoriasis if neither current psoriasis nor psoriasis in personal history present, reported by patient
*** History of dactylitis, recorded by rheumatologist, if current dactylitis not present

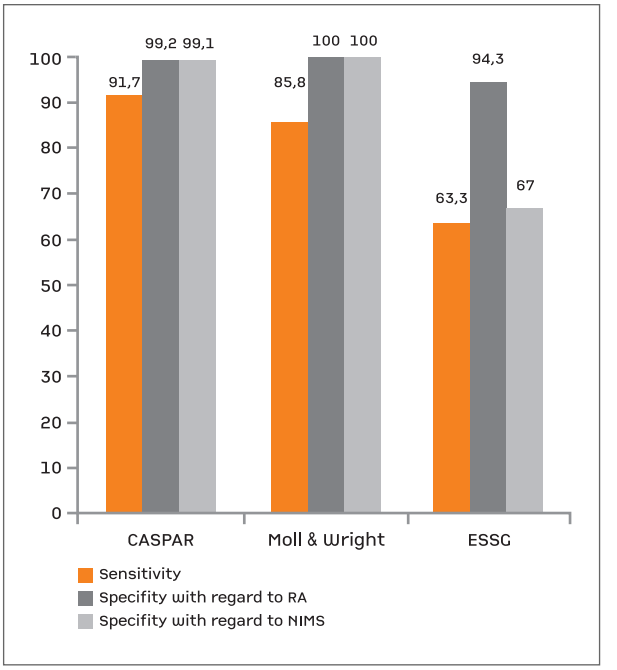

FIGURE 1. Sensitivity and specitifity of the investigated criteria sets

Considering control groups, one patient in RA group with current psoriasis (plus psoriatic nail dystrophy) met the CASPAR criteria. One patient in NIMS group with negative RF, positive family history of psoriasis and juxtaarticular new bone formation met the CASPAR criteria, as well.

The sensitivity of Moll and Wright criteria was 85.8% (Figure 1). Inflammatory arthritis was found in 103 PsA patients (and/or spondylitis in 10 patients). For all of the criteria-not satisfying patients, psoriasis was not accompanied with negative RF, and also one patient with spondylitis, psoriasis and positive RF did not satisfy. Specificity of the Moll and Wright criteria was 100% in regard to RA and 100% in regard to NIMS group (Figure 1).

The lowest sensitivity in this study was found for the ESSG criteria (Figure 1). The main, mandatory ESSG criteria were met by 63% of PsA patients (52% had asymmetrical or predominantly on lower limbs located arthritis, and the rest satisfied the inflammatory spinal pain criteria). All PsA patients who met major ESSG criteria met the minor criteria as well (15,8% met one, 39,5% met two and 44,8% three or more criteria) (Table III).

Some of the main variables from the major ESSG criteria: olygoarthritis, asymmetrical synovitis, synovitis located predominantly on lower limbs and inflammatory spinal pain were also frequently found in NIMS group (Table III). Therefore, major ESSG criteria were met by nearly half of the NISM group patients, of whom 71,2% met minor criteria (34,6% met one, 17,3% two and 19,2% three or more of them). Therefore, ESSG criteria showed the lowest specificity in this study, with regard to NIMS group (Figure 1).

Finally, concordance between ESSG/Moll and Wright and SSG/CASPAR criteria was not found to be significant (k=0.032 p=0.677 and k=0.014 p=0.819, respectively). The only significant concordance was between Moll and Wright/CASPAR criteria, showing fair level of agreement (k=0.379 p<0.001).

DISCUSSION

CASPAR criteria have been recently introduced and are considered to be the most accurate criteria for PsA by now[12]. The sensitivity of the CASPAR criteria, as reported from other studies, rates from 86%[18] and 91,4%[14] to 98.2%[19], 99,1%[14] and 100%[13]. Specificity of

TABLE III. PATIENTS WHO MET THE INDIVIDUAL ITEMS OF THE EUROPEAN SPONDYLOARTHROPATHY

Item	PsA (n=120)	RA (n=123)	NIMS (n=113)
ESSG criteria, number (N°), percent (%)	76 (63.3)	7 (5.7)	37 (32.7)
Major ESSG criteria N° (%)*	76 (63.3)	17 (13.8)	52 (46.0)
Synovitis (either asymmetrical or predominantly lower limb)**	62 (51.7)	15 (12.2)	37 (32.7)
Inflammatory spinal pain ***	32 (26.7)	2 (1.6)	23 (20.4)
Minor ESSG criteria N°(%) ****	76 (100.0)	7 (5.7)	37 (71.2)
Psoriasis	72 (94.7)	/	2 (5.4)
Positive family history of SpA	9 (11.8)	2 (28.6)	13 (35.1)
Enthesopathy	58 (76.3)	3 (42.9)	9 (24.3)
Alternating buttock pain	30 (39.5)	2 (28.6)	15 (40.5)
Inflammatory bowel disease	1 (1.3)	/	/
Urethritis or cervicitis or acute diarrhea one month before arthritis	3 (3.9)	/	/
Radiographic sacroiliitis	23 (30.3)	/	/

ESSG, European Spondyloarthropathy Study Group; SpA, spondyloartropathy
*Inflammatory spinal pain or Asymmetrical synovitis or Synovitis predominantly lower limb
** Past or present asymmetric arthritis or arthritis predominantly in the lower limb
***History or present symptoms of spinal pain in back, dorsal, or cervical region, with at least four of the following features, as reported by patient: a) onset before age 45, b) insidious onset, c) improved by exercise, d) associated with morning stiffness of more than 30 minutes, e) at least 3 months duration
**** Positive minor criteria in patients with positive major criteria. Every supportive criterion was calculated as a percent of supportive criteria positive patients

the CASPAR criteria is around 99%[11,13,19]. The highest specificity was found in a Chinese study – 99.5%[19].

Up to date estimation of the CASPAR criteria specificity was done in relation to control groups with different diagnoses: various inflammatory articular diseases[11,19], combination of inflammatory and non-inflammatory musculoskeletal symptoms[13], or with inflammatory musculoskeletal symptoms only[13].

This is the first study reporting the PsA criteria specificity with regard to control groups which are diagnostically consistent: with rheumatoid arthritis only and with non-inflammatory musculoskeletal symptoms only. It is useful to test the ability of the criteria to distinguish between patients with and without an inflammatory arthritis[11], which is the situation closest to the general population.

Difficulty in distinguishing PsA and RA was emphasized from the time this disease was discovered. For the first time in 1960s, Verna Wright notified that the association between psoriasis and arthritis was one of significance rather than coincidence and strengthened the concept that a seronegative 'variant of rheumatoid arthritis', e.g. psoriatic arthritis, was a distinct entity[20,21].

In the last decade, features like presence of polyarthritis/olygoarthritis, or asymmetry/symmetry of joints have been frequently studied in order to ameliorate the distinction between RA and PsA[22,23,24,25]. In this study, PsA patients had symmetrical arthritis rather than asymmetrical, whereas olygoarthritis was seen in nearly half of PsA patients (Table I).

CASPAR criteria showed the sensitivity of 91.7%. Five patients without psoriasis (either at the time of examination or in personal anamnesis) did not satisfy the CASPAR criteria. Also, four patients with arthritis, negative RF and psoriasis (documented in their personal anamnesis, but not presented at the time of examination) did not satisfy CASPAR criteria, due to different scoring system for the current and previous psoriasis[26,27]. Two patients with PsA sine psoriasis (neither at the time of examination nor documented in personal anamnesis) met the CASPAR criteria (both with negative RF, current dactylitis and juxta-articular new bone formation).

Specificity of the CASPAR criteria did not differ much between RA and NIMS groups (99.2% and 99.1%, respectively).

The lowest specificity in this study had the ESSG criteria, with regard to NIMS group. This could be explained by their disease diagnoses, as the majority of our NIMS patients had degenerative knee or hip di-

sease, as well as pains in lumbar or cervical spine. Therefore, some of those patients reported features of the inflammatory spinal pain and, according to clinical examination, clinical synovitis was found for some of them. Recent studies revealed that almost 50% of subjects with symptomatic, chronic knee OA have synovitis and/or joint effusion as detected by US (28). The explanation could be the mechanical injury, e.g. the secondary inflammatory process on the basis of osteoarthritis.

One third of our NIMS patients had asymmetrical synovitis or synovitis located predominantly on lower limbs according to clinical examination, fulfilling one of the two major ESSG criteria. A fifth of NIMS patients fulfilled the second ESSG major criterion: inflammatory spinal pain, according to the self-reported inflammatory characteristics of the back pain in the interview. So, the major ESSG criteria were met by nearly half of all NIMS patients, of whom 71,2% met the minor criteria, as well (Table III).

Although ESSG criteria satisfied well when applied to SpA, its sensitivity was downgraded when applied to PsA group separately, according to our study. This was documented in other studies, as well[18,19,25,29].

Due to low sensitivity of the ESSG criteria, concordance between ESSG/Moll and Wright and SSG/CASPAR criteria was not significant. The only significant concordance, although fair, was found between Moll and Wright/CASPAR criteria.

STRENGTHS AND WEAKNESSES

There are several advantages of our study: first, we have enrolled patients as they appeared at the hospital registry, so the cases and controls were unselected consecutive clinic attendees with a clinical diagnosis of PsA, RA, or NIMS. Therefore, selection of patients could be considered as random. Second, approximately 3% of RA and 3% of NIMS patients had psoriasis, which is within the range of the expected population psoriasis prevalence[17] and suggests that there was little bias in selection.

The long disease duration for both PsA and RA patients is considered as study limitation, as it limits the results of the present study to patients with a long-standing disease. Another study limitation may arise from the information bias, e.g. bias in diagnosis, which was minimized by observation of each patient by two independent rheumatologists-clinicians who reviewed all of the current and previous data and consequently made diagnosis by consensus.

CONCLUSIONS

The highest sensitivity was found for CASPAR criteria, followed by Moll and Wright and ESSG. The highest specificity was proved for Moll and Wright criteria, followed by CASPAR and ESSG. ESSG criteria showed the lowest sensitivity in this study. ESSG criteria also had the lowest specificity, with regard to NIMS group.

ESSG criteria are not valid enough to be used for classification of patients with psoriatic arthritis. No concordance was shown between ESSG/Moll and Wright and SSG/CASPAR criteria.

CASPAR criteria showed satisfactory validation results, with relation to both patients with inflammatory and non-inflammatory rheumatic diseases.

Further studies aimed at CASPAR criteria evaluation are needed for patients with early PsA, as well as for patients with erosive osteoarthritis and healthy persons.

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