Obesity, metabolic syndrome and other comorbidities in rheumatoid arthritis and psoriatic arthritis: influence on disease activity and quality of life

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Dear Editor,

Patients with rheumatic conditions have an increased risk of premature cardiovascular death[1]. This can be explained by the unfavourable interaction between inflammatory process, drugs and traditional cardiovascular risk factors[2-4]. The influence of body mass index (BMI) on the progression, activity and quality of life in rheumatoid arthritis (RA) and psoriatic arthritis (PsA) has been proven[5-9]. However, studies evaluating the influence of the abdominal circumference (AC) and metabolic syndrome (MS) are scarce.

We aimed to assess the influence of BMI, AC and MS on disease activity and quality of life in RA and PsA patients and to compare the results between these two diseases.

We performed a cross-sectional study, including 150 patients with RA (according ACR/EULAR criteria) and 75 patients with PsA (according CASPAR criteria), consecutively observed in a rheumatology department. BMI, AC and MS were measured. Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Disease Activity Score 28 (DAS28) and Visual Analogue Pain Scale (VAS) were collected for the disease activity evaluation. Quality of life was assessed using the Health Assessment Questionnaire (HAQ). Statistical analysis was performed using the *SPSS* version 24 and statistical significance was defined as 2-sided p <0.050. The descriptive analysis included absolute and relative frequencies of the categorical variables, and mean and standard deviation (SD) or median and interquartile range (IQR) for the continuous variables. In the comparison of means between groups, for the variables with normal distribution, the Student t test (t) was applied and in the ones without a normal distribution the Mann-Whitney U test (U) was used. We performed Chi-square (χ^2) test to evaluate the association between categorical variables and Pearson's coefficient for the correlation between two quantitative variables.

Table I summarizes the patient's and disease characteristics. In our study, age, duration of illness and education level were similar in RA and PsA. PsA patients had significantly higher BMI and AC than RA patients (p<0.001). The total of comorbidities, dyslipidaemia and hyperuricemia were higher in PsA patients (p<0.001, p=0.031 and p=0.018, respectively). Independently of the underlying pathology (RA or PsA), the number of comorbidities was correlated positively with DAS28 (p=0.030), HAQ (p<0.001), CRP (p=0.019) and ESR (p=0.022).

In RA group, overweight/obesity (BMI≥25kg/m^2) were associated with at least one tender joint (p=0.046) and the risk of having at least one swollen joint was 3.4 times higher in patients with increased AC (95% CI: 1.08-10.39). There was an association between the BMI and AC and the CRP value (p=0.049, p=0.045, respectively). Patients with BMI≥25 kg/m^2 and increased AC had significantly higher DAS28 scores (p=0.025, p=0.001). MS was associated with significantly higher ESR (p=0.014). There was a positive correlation of both BMI and AC with HAQ (p=0.041 and p=0.001, respectively) and MS was associated with highest HAQ values (p=0.019).

In PsA group, patients with BMI≥25kg/m^2 had equally more tender joints (p=0.022) and higher CRP values (p=0.043). Patients with MS had higher CRP values (p=0.048), more tender joints (p=0.024) and higher disease activity according to DAS28 (p=0.005). None of the patients with normal BMI had swollen joints, however 20.4% of overweight patients had at least one swollen joint.

In this study the prevalence of obesity and MS was found to be similar to other reported series[7-10]. Howe-

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TABLE I. CLINICAL AND LABORATORY CHARACTERISTICS OF PATIENTS WITH RHEUMATOID ARTHRITIS AND PSORIATIC ARTHRITIS

	Rheumatoid Arthritis	Psoriatic Arthritis	Comparison*
Age, years (mean±SD)	60.9 ± 12.9	60.7 ± 11.2	t(223)=0.092, p= 0.927
Gender %(n/N)	Male: 21.3% (32/150)	Male: 53.3% (40/75)	**X^2 (1)=23.5, p< 0.001**
	Female: 78.7% (118/150)	Female: 46.7% (35/75)	
Age at diagnosis, years (mean±SD)	48.9 ± 14.8	49.5 ± 11.8	t(223)=-0.298, p= 0.766
Years from diagnosis (median±IQR)	11.0±12 (min:0.5, max: 64)	10.0 ± 12.0 (min:1, max:42)	U=5605, p= 0.966
Education level %	Illiterate / <4 years: 13.8%	Illiterate / <4 years: 2.9%	X^2 (6)=8.14, p= 0.229
	≤ 9 years: 60.2%	≤ 9 years: 82.8%	
	9 to 12 years: 14.1%	9 to 12 years: 11.4%	
	Higher education: 11.5%	Higher education: 2.9%	
Patient global VAS (mean±SD)	29.3 ± 21.0	31.0 ± 24.8	t(211)=-0.045, p= 0.585
Tender joints (median±IQR)	0 ± 1	0 ± 0	U=4577, p= 0.132
Swollen joints (median±IQR)	0 ± 1	0 ± 0	**U=4342, p= 0.022**
C reactive protein, mg/dL (median±IQR)	0.43 ± 0.74	0.45 ± 0.73	U=5359, p= 0.565
Erythrocyte sedimentation rate, mm/hr (mean±SD)	22.9 ± 17.5	21.7 ± 17.0	t(222)=0.486, p= 0.627
Health Assessment Questionnaire (mean±SD)	0.923 ± 0.849	0.899 ± 0.757	t(210)=0.201, p= 0.841
Activity Score, DAS28 (mean±SD)	2.660 ± 1.037	2.645 ± 0.926	t(216)=0.105, p= 0.916
BMI, kg/m2 (median±IQR)	26.4 ± 6.1	28.1 ± 5.9	**U=3950, p< 0.001**
BMI classification %(n/N)	Normal: 37.3% (56/150)	Normal: 21.3% (16/75)	**U=2402, p< 0.001**
	Overweight: 42.7% (64/150)	Overweight: 42.7% (32/75)	
	Obesity class I: 18.0% (27/150)	Obesity class I: 29.3% (22/75)	
	Obesity class II: 2.0% (3/150)	Obesity class II: 4.0% (3/75)	
		Obesity class III: 2.7% (2/75)	
Abdominal circumference, cm (median±IQR)	92 ± 15.0	100 ± 11.8	
Abdominal circunference Classification %(n/N)	Normal: 20.9% (31/150) High: 23.1% (35/150 Very High: 56.0% (84/150)	Normal: 13.8%; High: 17.2%; Very High: 69.0%	
Metabolic syndrome %(n/N)	32.0% (48/150)	56.0% (42/75)	X^2 (1)=3.570, p= 0.059
Comorbidities (median±IQR)	3 ± 3	5 ± 3	**U=3576, p < 0.001**
Diabetes Mellitus %(n/N)	24.6% (37/150)	36.0% (27/75)	X^2 (1)=3.16, p= 0.086
Arterial hypertension %(n/N)	46.7% (70/150)	60.0% (45/75)	X^2 (1)=3.56, p= 0.067
Dyslipidaemia %(n/N)	35.3% (53/150)	50.7% (38/75)	**X^2 (1)=4.88, p= 0.027**
Hyperuricemia %(n/N)	1.3% (2/150)	8.0% (6/75)	**X^2 (1)=6.48, p= 0.018**
Pulmonary disease %(n/N)	14.7% (22/150)	12.0% (9/75)	X^2 (1)=0.299, p= 0.584
Cardiac pathology %(n/N)	12.0% (18/150)	14.7% (11/75)	X^2 (1)=0.317, p= 0.574
Psychiatric pathology %(n/N)	28.0% (42/150)	29.4% (22/75)	X^2 (1)=0.044, p= 0.876
Thyroid pathology %(n/N)	7.3% (11/150)	6.7% (5/75)	X^2 (1)=0.034, p= 1.000
Others Comorbidities %(n/N)	50.7% (76/150)	48.0% (36/75)	X^2 (1)=0.142, p= 0.778

*Statistically significant differences are in bold
AC: abdominal circumference; BMI: body mass index; DAS 28: disease activity score 28; IQR: interquartile range; VAS: visual analogue scale; SD: standard deviation; t: Student t test; U: Mann-Whitney U test; X2: Chi-square test;

ver, there was a higher prevalence of classic cardiovascular risk factors in patients with PsA than with RA.[2] The number of comorbidities showed to influence inflammatory parameters, disease activity and quality of life.

In our study, like in literature, in RA patients, a higher BMI was significantly associated with HAQ, painful joints, CRP and DAS 28 values [7-10].

Santos MJ et al. showed that the percentage of fat mass in patients with RA correlates with disease activity[11], we demonstrated the association between AC and obesity with the quality of life and disease activity in patients with RA and PsA. Despite this, it is well known that visceral obesity is responsible for increased pro-inflammatory cytokines[3].

In PsA, the MS was associated with higher inflammatory markers and disease activity[5,10]. There was no association between AC or BMI and HAQ or ESR, which may be justified by the reduced number of patients with normal AC or BMI.

We found that BMI, AC and MS are associated with disease activity, which may be improved by weight reduction and comorbidities control.

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