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ORIGINAL ARTICLE

The epidemiology and influence of osteoarthritis on clinical, laboratory and ultrasound parameters of patients with early rheumatoid arthritis

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Abstract

Background: Osteoarthritis (OA) and rheumatoid arthritis (RA) can overlap and the presence of OA can interfere with the evaluation of patients with RA.

Objectives: The aim of this study was to evaluate the possible impact of OA on the clinical, laboratory and ultrasound parameters currently evaluated in patients with early RA (ERA).

Methods: We have evaluated the data obtained from patients with ERA referred to our Early Arthritis Research Center (EARC). Only data from patients who fulfilled EULAR/ ACR 2010 criteria for RA and had symptom duration of less than 12 months were analyzed. All patients underwent clinical examination, laboratory tests and ultrasound (US) examination.

Results: There was a clear predominance of women (62.8%). The mean age was 55.47±13.71 years. At baseline, 21 patients (48.8%) were diagnosed with OA. Hand OA did not influence the values of any of the parameters assessed ($p>0.05$). For patients with knee OA, significantly higher values were observed only for DAS28 at baseline ($p=0.018$) as well as after 12 months of observation ($p=0.031$).

Conclusions: Significantly higher values of DAS28 were observed in patients with ERA who associated knee OA, while the values of SDAI were not influenced, suggesting that SDAI may be superior to DAS28 in evaluating patients with ERA and knee OA. The values of patient's VAS were not influenced by the presence of hand or knee OA suggesting that these types of OA do not influence the patients' perception of the disease activity. Moreover, the values of ultrasound scores were not influenced by the presence of OA.

Keywords: Rheumatoid Arthritis (RA), Osteoarthritis (OA), disease activity, ultrasound

Introduction

Rheumatoid arthritis (RA) and osteoarthritis (OA) are two commonly seen pathologies in the general population. While RA is a chronic inflammatory disease characterized by joint swelling, joint tenderness, and destruction of synovial joints, leading to severe disability and premature mortality [1], OA is another leading cause of pain, morbidity and disability worldwide, whose prevalence and impact are continuously increasing, thus leading to high socioeconomic costs to individuals and society [2–4]. The two pathologic entities can overlap and the presence of OA can interfere with the evaluation of patients with RA. This study aimed to evaluate the possible impact of OA on the clinical, laboratory and ultrasound parameters currently evaluated in patients with early RA (ERA).

Patients and methods

Patients

Forty-three patients diagnosed with ERA in the Early Arthritis Research Center (EARC) of "Dr. I. Cantacuzino" Clinical Hospital underwent baseline assessment and 12-month follow-up. Only data from patients who fulfilled EULAR/ ACR 2010 criteria for RA [5] and had a symptom duration of less than 12 months were analyzed. Patients were classified as having hand OA based on the EULAR evidence-based recommendations for the diagnosis of hand osteoarthritis [6] and on The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hand [7]. Patients were classified as having knee OA based on the criteria proposed by Migliore et al. [8]. Ethical permission was obtained and all the patients gave written informed consent. Patients were classified as having ERA with OA or ERA without OA.

Clinical and laboratory assessment

Patients underwent baseline 28 swollen and tender clinical joint counts (shoulders, elbows, wrists, I-V MCPs, I-V PIPs and knees bilaterally). Age, sex, symptom duration, early morning stiffness duration, medication, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), patient's visual analogue scale (VAS) for general health, pain and disease activity, physician's visual analogue scale (VAS) for disease activity, rheumatoid factor (RF) and anti-cyclic citrullinated peptide antibody (ACPA) status were recorded. DAS28 and SDAI were calculated both at baseline and at the follow-up visit.

Ultrasound assessment

All the patients underwent ultrasound assessment. A systematic multiplanar grayscale and power Doppler ultrasound examination of 28 joints (shoulders, elbows, wrists, I-V MCPs, I-V PIPs and knees bilaterally) was performed based upon standard EULAR reference scans [9] using a Esaote MyLab 25 Gold ultrasound machine and multifrequency (5–18 MHz) linear array transducers. For power Doppler examinations, the pulse repetition frequency was adjusted to provide maximal sensitivity at the lowest possible value for each joint. Ultrasound findings of synovitis, power Doppler positivity, and erosion were defined according to consensus definitions [10–13]. Based on the results obtained, we have calculated the simplified US score proposed by Naredo et al. (bilateral wrist, second and third MCP, second and third PIP of hands and knee joints) [14] considering that this simplified US score includes the evaluation of the hand and knee.

Statistical analysis

Descriptive analyses were performed and the results are presented as mean ± standard deviation (SD) or median (interquartile range, IQR) for continuous variables and as number and percentages for categorical variables.

Differences between groups of patients were evaluated using the ANOVA or the independent t-test for continuous variables or by Pearson's $\chi 2$ test for dichotomous variables. Probability (p) values < 0,05 were considered statistically significant. All analyses were performed using SPSS software 22.0 (Chicago, SPSS, Inc.).

Results

In terms of patients enrolled in the present study, there was a clear predominance of women (27 women, 62.8%). At baseline, 21 patients (48.8%) were diagnosed with OA. 15 patients (34.9%) presented hand OA and 9 patients (20.9%) presented knee OA. The mean age was 55.47±13.71 years, patients having concomitant OA being significantly older than those without OA (p<0,001).

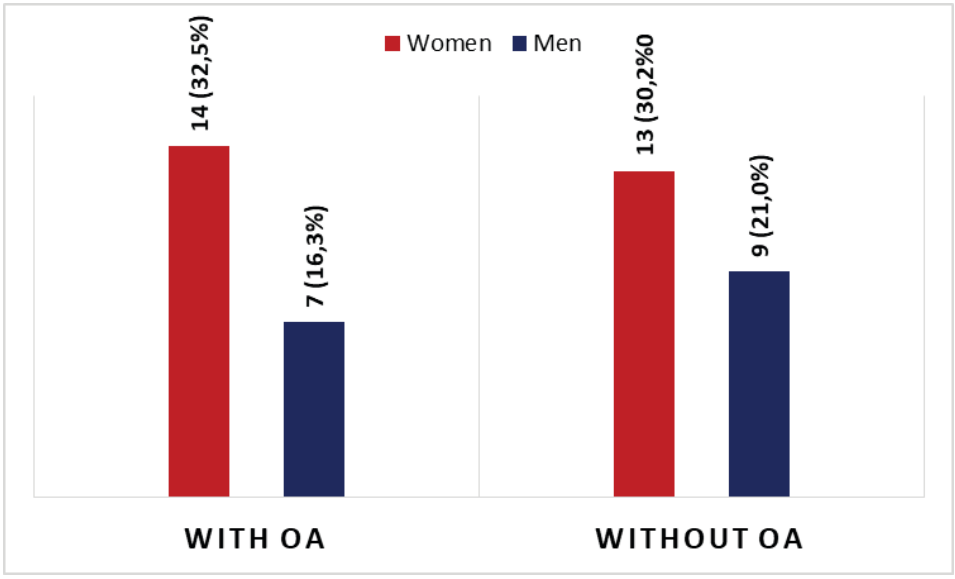


Fig. 1 Gender distribution of OA in ERA patients

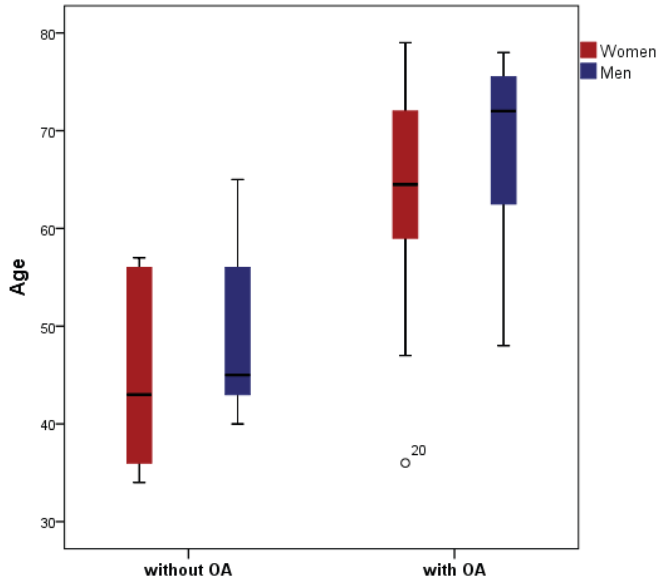


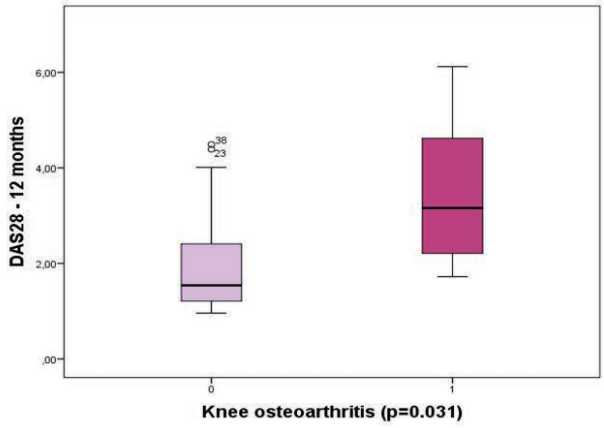
Fig. 2 Age difference between ERA patient with OA and those without OA

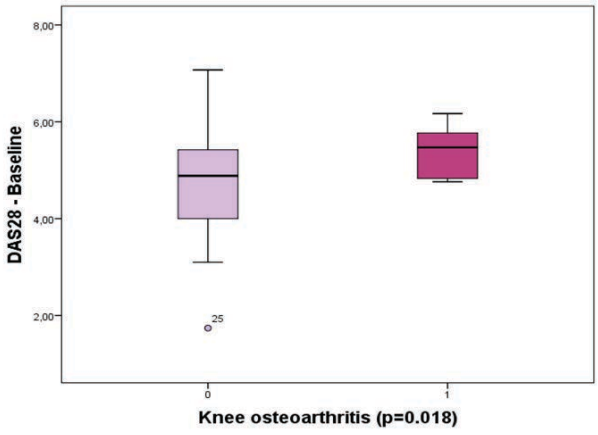
Baseline characteristics of the patients included in the study are presented in Table 1.

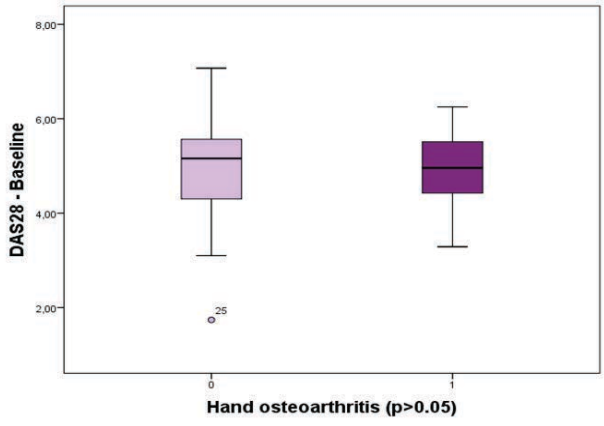
Table 1. Baseline patient demographics and clinical and ultrasound data – n (%), mean ± SD, median (IQR); RF – rheumatoid factor, ACPA – anti-cyclic citrullinated peptide antibody; OA – osteoarthritis; NTJ – number of tender joints; NSJ – number of swollen joints; DAS – Disease Activity Score; SDAI – Simplified Disease Activity Index; US - ultrasound

Women, n (%)	27 (62,8%)
Age, years (mean ± SD)	55.47±13.71
RF, n (%)	39 (90,7%)
ACPA, n (%)	39 (90,7%)
OA, n (%)	21 (51,2%)
Hand OA	*15 (34,9%)*
Knee OA	*9 (20,9%)*
NTJ (median (IQR))	10 (5-13)
NSJ (median (IQR))	4 (2-7)
Morning stiffness, min (median (IQR))	60 (45-90)
DAS28 (median (IQR))	5,07 (4,31-5,50)
SDAI (median (IQR))	38,73 (27,7-50,7)
US score – GS (median (IQR))	9 (5-12)
US score – PD (median (IQR))	3 (0-5)

Hand OA did not influence the values of DAS28, SDAI, patient's and physician's visual analogue scale (VAS) or ultrasound scores (p>0.05). For patients with knee OA, significantly higher values for DAS28 were observed at baseline (p=0.018) and were maintained significantly higher after 12 months of observation (p=0.031). All the other parameters were not influenced by the presence of knee OA (p>0.05). Patients' clinical and ultrasound characteristics at 12 months of follow-up are presented in Table 2.







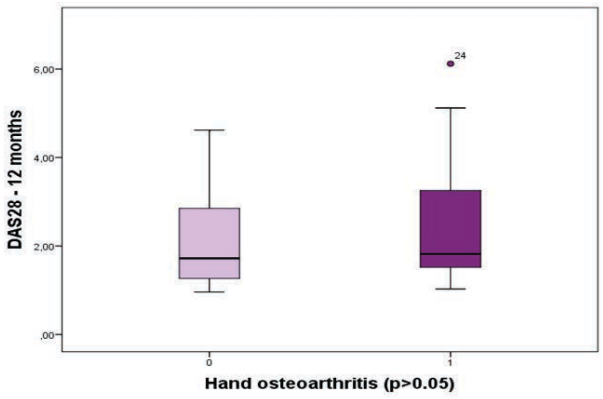


Fig. 3 Variation of DAS28 in ERA patients with and without knee/ hand OA

Table 2. Clinical and ultrasound parameters at 12 months of follow-up – mean ± SD, median (IQR); NTJ – number of tender joints; NSJ – number of swollen joints; DAS – Disease Activity Score; SDAI – Simplified Disease Activity Index; US - ultrasound

NTJ (median (IQR))	0 (0-4)
NSJ (median (IQR))	0 (0-0)
Morning stiffness, min (median (IQR))	15 (5-30)
DAS28 (median (IQR))	1,77 (1,43-3,16)
SDAI (median (IQR))	6,85 (3,44-6,85)
US score – GS (median (IQR))	0 (0-2)
US score – PD (median (IQR))	0 (0-0)

Discussions

Assessing disease activity is essential in order to reach optimal outcomes in RA. Multiple domains must be evaluated, due to the heterogeneous aspects of the disease, and single instruments or composite scores can be employed in order to assess disease activity. The DAS, DAS28 and the EULAR response criteria have been extensively validated and are findings increasing use both in RA clinical trials and for monitoring individual RA patients [15,16]. SDAI and CDAI are easy to apply, sensitive to change, correlate with the two main outcomes of RA: disability and damage, and can be used to define disease activity states [17].

Ultrasound and MRI are superior to clinical examination in the detection of joint inflammation and these techniques should be considered for a more accurate assessment of inflammation, as stated in the EULAR recommendations for the use of imaging of the joints in the clinical management of RA [18]. US unquestionably improves many aspects of disease diagnosis and management, but no consensus has been reached regarding the optimal US methodology that should be used, and high levels of standardization have not yet been attained. For now, the major application of sonography in arthritis should have a focus on diagnostic and especially differential diagnostic aspects [19–21]. It is presently difficult to determine a minimal number of joints to be included in a global ultrasound score. Hammer et al. [24] showed that the reduced joint combinations (7, 12, 28, 44 joints) were highly associated with the 78-joint score. The 12-joint US evaluation proposed by Naredo et al. [14] may be a useful tool for US assessment of overall joint inflammatory activity in RA. Further studies are required in order to achieve and validate optimal US scoring systems for monitoring patients with RA in clinical trials and in clinical practice [22–24].

In a real-life context, clinicians face the

difficulty of differentiating between the most frequent two types of inflammatory arthritis that affects hands: RA and OA [25]; in particular when the clinical examination is equivocal. There are differences regarding the incidence and characteristics of subclinical inflammation in patients with RA and OA, which can be helpful in patients with equivocal clinical examination or history of both diseases. Hussain et al. [26] reported the fact that almost one in ten patients with hand OA had active synovitis, while almost one in two patients with RA had uncontrolled inflammation in at least one joint.

Conclusions

Significantly higher values of DAS28 were observed in patients with ERA who associated knee OA, while the values of SDAI were not influenced, suggesting that SDAI may be superior to DAS28 in evaluating patients with ERA and knee OA. Not the same tendency was observed in patients with ERA and hand OA. The values of patient's VAS were not influenced by the presence of hand or knee OA suggesting that these types of OA do not influence the patients' perception of the disease activity. Moreover, the values of ultrasound scores were not influenced by the presence of OA.

Conflict of Interest statements

Authors state no conflict of interest.

Informed Consent and Human and Animal Rights statements

Informed consent has been obtained from all individuals included in this study.

Authorization for the use of human subjects

Ethical approval: The research related to human use complies with all the relevant national regulations, institutional policies, is in accordance with the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent commitee.

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