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Research article

Correlation of the score for subjective pain with physical disability, clinical and radiographic scores in recent onset rheumatoid arthritis

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Abstract

Background: To analyse the relationship between subjective pain score and other measures of clinical, radiographic and functional status; in particular Larsen radiographic scores and Health Assessment Questionnaire (HAQ); in patients with severe rheumatoid arthritis (RA) with a disease duration of less than 3 years.

Methods: In this cross sectional study of 105 patients with RA (76 women, 29 men: mean age 50.93; mean disease duration 15.86 months; 71% rheumatoid factor positive) subjective pain was assessed according to the Visual Analog Scale (VAS). Correlation coefficients between pain score and disease activity measures (patients' global assessment of disease by VAS, number of tender and swollen joints, morning stiffness, erythrocyte sedimentation rate [ESR], C-reactive protein [CRP] and titre of rheumatoid factor, radiographic evaluations (Larsen-Dale scores for radiographic damage of the small joints of the hands, wrist and feet), disability measures (health assessment questionnaire [HAQ]), and demographic variables were calculated; hierarchical regression analysis was done with subjective pain score as the dependent variable.

Results: The Spearman's correlation coefficient comparing subjective pain and HAQ was 0.421 (p < 0.001), between subjective pain and global assessment of disease and morning stiffness was 0.573 (p < 0.001) and 0.427 (p < 0.001) respectively, and between pain and number of tender and swollen joints 0.037 and 0.050 respectively (p > 0.05). In regression analysis, global assessment of disease by patients explained 32.8% of the variation in pain intensity score, morning stiffness 10.7%, CRP 4.0%, HAQ 3.8% and Larsen-Dale scores explained 2.1%; other variables were not significant in the model.

Conclusions: Pain scores of patients with early severe rheumatoid arthritis are correlated at higher levels with patients' global assessment of disease and with morning stiffness rather than with radiographic or other clinical variables such as number of tender and swollen joints.

Introduction

Pain is one of the major complaints of patients suffering from rheumatoid arthritis [1]. It is almost always present and it is the main reason for medical consultation [2]. Moreover, in the early stages of the disease, pain reflects the nociceptive effects of local inflammation and is often a prominent and persistent feature. However, pain is a personal subjective experience that varies quite dramatically among individuals in response to an apparently similar stimulus.

In patients with chronic rheumatic diseases, such as RA, several methods for a quantitative assessment of pain can be used [3–7]; the most simple and reliable is the evaluation of subjective pain by visual analog scale (0–100 mm) [3]. This parameter is also included in the set of parameters to evaluate the American College of Rheumatology (ACR) improvement criteria of the disease [8].

Analyses of correlation between subjective pain score and the radiographic scores, clinical, psychological and functional parameters may differ according to the severity and the disease duration. Moreover, most of the studies are referred to RA patients with a disease duration of at least several years [9–16].

The aim of this cross sectional study was to evaluate the correlation between subjective pain score and the other clinical, radiographic and functional parameters or scores commonly used in early severe RA patients; in particular, to examine whether other variables might provide greater explanation of the variation in subjective pain score in these patients.

Patients and Methods

A total of 105 patients with a diagnosis of Rheumatoid Arthritis (RA) (according to the American College of Rheumatology criteria of 1987) [17] who were to be enrolled in a prospective trial comparing the effectiveness of several treatment strategies, were included in this study.

All patients has a disease duration of less than 3 years, were older than 16 years, and were free from any other serious disease process. Demographic and clinical characteristic and treatment of the study patients are reported in table 1.

None of these patients had been previously treated with disease modifying antirheumatic drugs (DMARDs). A total of 50.5% patients were already treated with prednisone (median dosage 5 mg/day).

Pain was assessed according to a 100-mm horizontal visual analog scale (VAS) (0 = no pain and 100 = most severe pain). The patients' functional disability index was as-

Table 1: Demographic and clinical characteristics and treatment of the study patients

N° of patients	105
Age, years	50.93 ± 10.72
Female / Males	76 / 29
Disease duration, months	15.86 ± 8.14
RA test + / -	71 / 34
Severity of pain (VAS mm)	61.65 ± 19.10
Duration of morning stiffness (min)	82.14 ± 49.45
Swollen joints (no.)	11.00 ± 5.83
Tender joints (no.)	14.24 ± 6.75
HAQ (0–3)	1.39 ± 0.59
Assessment of patients' disease activity (VAS mm)	50.84 ± 21.03
ESR (mm/1h)	48.78 ± 20.00
CRP (mg/dl)	3.06 ± 1.97
Larsen-Dale score (0–200)	15.90 ± 13.97
Concomitant use of:	
• NSAIDS, % of patients	70.9%
• Systemic corticosteroids, % of patients	50.5 %

VAS: Visual Analogue Scale; ESR: Erythrocyte Sedimentation Rate; CRP: C Reactive Protein. HAQ: Health Assessment Questionnaire

sessed according to Stanford Health Assessment Questionnaire (HAQ); the overall index reported here varies from 0 to 3, 0 being the best (no problem) and 3 being the worst score [18]. Other clinical variables included: number of tender and swollen joints (66/68 joints), duration of morning stiffness, patients' general health assessed according to a 100-mm VAS; laboratory evaluation included erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and the titre of rheumatoid factor.

Radiographic damage of the small joints was assessed according to Larsen-Dale score, ranging from 0–200 points [19].

Bivariate relations between pain score and disease activity, functional status and demographic variables were analyzed by calculating Spearman's correlation coefficient. Regression analysis was performed with pain score (VAS) as the dependent variable; independent variables included age, sex, serologic status (positive/negative), duration of disease, patients global assessment of disease, number of tender and swollen joints, morning stiffness, Larsen-Dale radiographic score, ESR and CRP. All statistical analyses were done with the SPSS/PC+ statistical package. P values less than 0.05 were considered statistically significant.

Results

Patients' characteristics

The 105 patients had a mean duration of disease of 15.8 months (SD 8.14); the mean age of patients was 50.9 (SD 10.7). Table 1 further shows that 76 (67%) were female, and 71 (60 %) of the study population was positive for rheumatoid factor.

Disease activity measure show this patient group to have rather active disease. Disability score (HAQ) indicate that functional capacity was significantly affected in this group of patients.

Bivariate correlations

Subjective pain score was correlated statistically significantly with ESR (r = 0.375, p < 0.001). CRP (r = 0.296, p < 0.001), HAQ (r = 0.421, p < 0.001), global assessment of disease activity by patients (r = 0.573, p < 0.001), morning stiffness (r = 0.427, p < 0.001).

No significant statistical correlation was observed between subjective pain scores and rheumatoid factor values (r = 0.068, p = 0.255), neither between pain scores and number of swollen (r = 0.050, p = 0.314) and tender joints (r = 0.037, p = 0.359), Larsen radiographic score (r = 0.055, p = 0.284), age (r = 0.040, p = 0.320), and disease duration (r = 0.074, p = 0.210).

Multiple linear regression analysis

In the multiple regression analysis (forward selection), the global assessment of disease by patients was the primary explanatory variable for the pain subjective score, accounting for 32.8% of the variation. Morning stiffness contributed only 10.7% to explaining the variation of the subjective pain score, CRP, HAQ and Larsen-Dale score contributed 4.0%, 3.8% and 2.1% respectively (Table 2).

Table 2: Explanatory variables for findings on subjective pain score, by multiple linear regression analysis (n = 105)

Variable	Explanation			
	B	**SE**	**Rate (%)**	*P*
Global assessment of disease by patients	0.330	0.074	32.8	0.000
Morning stiffness	0.119	0.29	10.7	0.000
CRP	2.225	0.71	4.0	0.009
HAQ	6.472	2.506	3.8	0.010
Larsen-Dale score	0.203	0.101	2.1	0.048
Total			53.3	

B: coefficient; SE: standard error.

Discussion

In this present study, the primary observation is that subjective pain intensity (VAS) in early severe RA patients is significantly correlated with patients' global health assessment, HAQ and laboratory parameters (ESR, CRP). Moreover, we observed a very strong correlation between pain and the duration of morning stiffness but no significant correlation with other common clinical variables used for RA patients evaluation such as number of swollen and tender joints, rheumatoid factor, or demographic variables such as age, sex or disease duration.

The HAQ has been shown to be valid and reliable for the assessment of functional status in patients with RA, and it is the best variable for predicting work disability and mortality [20,21]. Health global assessment by physician and patients are important clinical variables included in the ACR set criteria for evaluating disease improvement [9].

In the regression model, 53.3% of the variation of the subjective pain scores was explained by Health global assessment by patients, HAQ score, morning stiffness, CRP and Larsen-Dale radiographic score, while sex, age, and duration of disease, ESR and rheumatoid factor did not contribute statistically significantly to the model.

It is likely that the lack of significance of certain variables in this model may be correlated with the duration and severity of the disease; on the other hand, patients global assessment of the disease and HAQ score are definitely influenced by motivational and psychological factors [22,23]. In this study, however, psychological factors have not been assessed but they may explain part of the variance in subjective pain [24–26].

It has been suggested that anatomical damage of joints leads to functional declines in long-standing RA; this could be the reason why Larsen-Dale score poorly correlates with pain in early RA [27–30].

It is possible that dissociation between pain and clinical scores may reflect a relative preservation of joints and correlation may be higher with more extensive and permanent anatomical damage [31–33].

In conclusion our results confirm that subjective pain score is strongly associated with disability and health assessment indexes. These findings suggest that pain, at least in the early stage of the disease, reflects more the functional disability of the patients than the clinical extent or the early radiographic damage of the disease.

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