Assessment of Temperament and Character of Rheumatoid Arthritis Patients

Bewertung von Temperament und Charakter Eigenschaften von Patienten mit rheumatoide Arthritis

Abstract

Objective: It is widely known that perception of disease affects clinical course and treatment response in patients with rheumatoid arthritis (RA). In this study we aim to define temperament and character properties of RA patients and to discuss the relation between these specific temperament and character properties and clinical variables.

Methods: Study involved 93 RA patients. Temperament and character properties of patients were evaluated using Temperament and Character Inventory. Associations of clinical variables and specific temperament characteristics were evaluated using correlation and association analyses. Approval was obtained from institutional ethical committee.

Results: 74 (79.6%) of study subjects were females and 19 (20.4%) were males. Mean age of the patients was 53.3 ± 11.5 years. There wasn't any difference between sociodemographic and clinical variables and temperament scores of patients according to gender (p > 0.05). Comparison of temperament features and clinical variables showed that there was a weak correlation between harm avoidance and Anticitrullinated Peptide Antibodies (p = 0.04, r = 0.22) and between reward dependence and Disease Activity Score (DAS 28). Regression analysis showed an association between reward dependence and DAS-28.

Conclusion: Our findings indicated that there is an association between harm avoidance and reward dependance temperament properties of RA patients and disease activation, and disease course is more severe in patients who have high scores in these temperament dimensions. Therefore, adding assessment of temperament and character properties will help clinicians while evaluating treatment compliance and motivation of patients at initial and later stages of disease.

Zusammenfassung


Ergebnisse: Von den Studienteilnehmern waren 74 (79.6%) Frauen und 19 (20.4%) Männer. Das mittlere Alter lag bei 53.3 ± 11.5 Jahren. Es bestand kein Unterschied zwischen soziodemografischen und klinischen Variablen und Temperament Punktwerten der Geschlechtergruppen (p > 0.05). Der Vergleich von Temperamentmerkmalen und klinischen Variablen ergab eine schwache Korrelation zwischen „Schadensvermeidung“ und Anticitrullinierten Peptid Antikörpern (p = 0.04, r = 0.22) und zwischen „Belohnungsabhängigkeit“ und dem Krankheitsaktivitätscore (DAS 28). Die Regressionsanalyse zeigte eine Assoziation zwischen „Belohnungsabhängigkeit“ und DAS-28.

**Introduction**

Rheumatoid arthritis (RA) is a chronic, inflammatory, multisystem disease which is seen more commonly in women, has a prevalence of 0.5–1%, has an etiology which is not clearly defined, involves joints, and disfigurements may be seen during its course [1]. The most important effects of rheumatoid arthritis on patients are pain and functional disability due to synovitis and joint destruction [2]. In addition to pain and functional disability chronic drug usage, drug side effects, decreased work capacity, fatigue, and mood disorders adversely affect activities of daily living and quality of life of these patients [3]. In addition, it can’t be clearly defined whether loss of function due to disease is caused by pain and whether this condition is due to chronic pain or a demonstration of predisposing psychological condition.

Psychiatric disorders are known to be an important factor that adversely affect life quality in RA patients [4,5]. Association between disability and mental status is unique in RA patients [6]. Perception of disease which involves personal opinion of the patient about disease plays a key role in RA [7]. Dimensional psychobiological model for evaluating the personality was developed by Cloninger and 2 main component of personality temperament and character were examined [8]. Therefore, it is important to assess temperament which can be defined as an inborn tendency to give an autonomic response in RA patients. There are many national and international studies which report association between temperament properties and serotoninergic dysfunction and also between temperament properties and course and treatment response in nonpsychiatric disorders [9–12]. Character was defined as the person’s relatively stabil, observed objective behaviours and internal individual experiences. It also includes conscious and unconscious responses that are developed by the person to sustain interactions with the environment [13]. Thus, definition of character and temperament features in RA patients is very important considering its influence on perceptions and emotions.

In the light of these findings we aimed to assess temperament and character features of RA patients and to evaluate the association between specific temperament and character properties and clinical variables of RA.

**Subjects and Methods**

This study included totally 93 RA patients between the ages of 21–76 years who met criteria of Diagnostic Criteria of American Society of Rheumatology and who voluntarily accepted to involve in the study.

**Selection**

Before the study, patients were informed and their written consents were obtained. Age and sex of patients, disease duration, smoking and alcohol use, accompanying chronic diseases, presence and duration of morning stiffness at the joints, history of rheumatic diseases in relatives, and drugs that are currently used were questioned. Erythrocyte sedimentation rate, C-reactive protein, rheumatoid factor ve Anti-CCP as laboratory parameters and Visual Analog Scale, Disease Activity Score and Health Evaluation Questionnaire as clinical parameters were used to evaluate disease activity. Temperament and Character Inventory by Cloninger was used to detect temperament and character features. Patients who are being treated for psychiatric disorder and who have chronic psychiatric disorders were excluded to avoid effects of psychiatric illness on clinic variables. Additionally, patients who have brain or central nervous system disease were excluded from the study. Approval was obtained from local ethical committee of our hospital and informed consents were signed by all patients.

**Tools Used for Evaluation**

**Visual analog scale (VAS):** 2 extremes of a parameter to be measured are written are measured are written to edges of a 100 mm line, and patients are asked to report their condition by drawing, or pointing on this line. For pain, ‘extreme pain’ is written to one edge and ‘no pain’ is written to the other edge. Distance from ‘no pain’ to the place pointed by the patient defines patient’s pain. Mean value is calculated from measurements of all patients. This test has proved its validity for a long time and has been accepted in literature. It is a reliable and easy to apply test [14].

**Disease Activity Score (DAS28):** This scale is used in RA patients to assess disease activity. 28 joints are evaluated by this scale. Total score is calculated by this formula: DAS28 = (0.56 × number of tender joints X ½) + (0.28 × number of swollen joints X ½) + (0.7 × ESH) + (0.014 × global assessment by patient [VAS-mm]) [15].

**Health Evaluation Questionnaire (HAQ):** It includes 20 questions assessing 8 activities: dressing, arising, eating, walking, hygiene, grasping, and activities of daily life. Each answer is rated from 0 (good function) to 3 (bad function). HAQ is a questionnaire which reflects functional status and its score has shown to correlate with indicators of disease activity [16].

**Temperament and Character Inventory; TCI:** Temperament and character properties of patients were evaluated using TCI which is based on personality theory of Cloninger [8]. This is a self-rated scale including 240 yes-no questions. Temperament dimensions are novelty seeking, harm avoidance, reward dependance and persistence. Character dimensions are self directedness, cooperativeness and self transcendence [8]. Validity and reliability study in Turkey was performed by Kose et al. and it was approved by Cloninger [17]. During interview, questionnaires of patients who gave inadequate responses to questions or who didn’t understand were filled with help from their relatives.

**Statistical method**

Descriptive statistics were done for each variable. The Mann Whitney U-test was used to compare the non-parametric variables while t-test was used for parametric variables for detecting difference between genders. Pearson and the multiple linear regression analysis (method: stepwise) was used to identify predictors of the disease activity in relation to temperament scores, demographic and clinical variables. Validity of the final regression model was determined by analysis of variance. Statistical evaluations were done by using SPSS package program. P<0.05 was accepted as statistically significant.
Results

Study included 93 RA patients: 74 (79.6%) females and 19 males (20.4%). Mean age of the patients was 53.3 ± 11.5 years, mean duration of disease was 6.3 ± 6.1 years, mean body mass index was 29.1 and 68.8% of the patients had primary education. 91.4% of patients were taking disease modifying drugs and 86.5% were taking Anti-TNF. Mean (± standard deviation) erythrocyte sedimentation rate (ESR) of patients was 39.6 ± 19.9 mm/h, while DAS 28 score was 3.9 ± 1.3, and HAQ score was 0.7 ± 0.6. Median (minimum-maximum) values for C-reactive protein (CRP), rheumatoid factor (RF) and Anti-CCP were 0.81 (0.1–13.5) mg/dl, 38.5 (15–1650) IU/ml, 45.9 (0.3–245), respectively. No significant difference except height was detected in comparison of sociodemographic and clinical features of patients according to gender (Table 1).

No difference could be detected in comparison of scores from 7 TCI scales according to gender (p > 0.05) (Table 2). Comparison between TCI scales and disease characteristics showed weak correlations between harm avoidance and anti-CCP (p = 0.04, r = 0.22) and reward dependance and DAS-28 (p = 0.03, r = 0.23). Regression analysis showed that only association between reward dependance and DAS 28 was statistically significant (Table 3).

Discussion

Cloninger developed a dimensional, psychobiological personality model which explains 2 main components of personality: temperament and character [8]. In this study Turkish version of TCI which was translated by Kose and Sayar [17] was used and association between temperament and character scores and disease characteristics were evaluated. According to the results of our study we detected positive associations between reward dependance and DAS 28 scores and harm avoidance and Anti CCP scores but we couldn’t find association between HAQ score and temperament.

Temperament dimensions (harm avoidance, reward dependance, novelty seeking, persistence) reflect individual differences in perception related responses, and abilities [18]. These dimensions are thought to be homogenous and inherited independently from each other [18]. It was also reported that specific temperament features may appear during infancy period and they may show similarities in different cultures [19]. This temperament features are important to define individual responses to stress and coping mechanism. For example, temperament dimension harm avoidance is related with serotonergic activity and people with high harm avoidance scores show high levels of depressive symptoms when exposed to stressful life events [20]. People with high harm avoidance levels anticipate danger even in the absence of a dangerous situation [8,13]. This anticipation causes maladaptation, behavioral inhibition and anxiety. Such individuals tend to anticipate pain frequently. Altnoren and colleagues found high harm avoidance levels in patients with fibromyalgia than controls and they found a strong positive correlation between Hamilton Depression Rating Scale (HDRS) and harm avoidance scores [21]. Other studies in patients with psychosomatic diseases showed that harm avoidance levels were high in chronic tension type headache [22,23], non-cardiac chest pain [24] and chronic fatigue syndrome [25]. Kilic and friends found high harm avoidance and reward dependance scores in psoriasis [26], while Guler et al. found low harm avoidance but high impulsiveness (subscale of novelty seeking) in psoriasis patients [27]. Besides, Ak et al. found high harm avoidance, reward dependance and novelty seeking scores in male psoriasis patients [28]. From this point of view, significant relation between DAS 28 and reward dependance scores and between Anti CCP and harm avoidance scores may point to a positive relation between harm avoidance scores and pain expression and disease severity. Furthermore, it supports the idea that people with high harm avoidance tend to feel pain more intensely [8,13]. Therefore, these temperament features should be taken into account in RA patients when evaluating prognosis and disease activation. Assessing temperament features in addition to musculoskeletal examination and laboratory findings in RA will guide in predicting prognosis and treatment plan.

Character is shaped mostly by the environment and it is sensitive to learning and maturation. Character can be defined as executive rule which includes execution and judgement [8]. Studies evaluating character have found that patients with fibromyalgia [21], chronic tension type headache [22,23], non-cardiac chest pain [24] and chronic fatigue syndrome had low self directedness scores [25]. Ak et al. found higher self transcendence points in psoriasis patients than controls [28]. We detected normal self directedness and self transcendence scores in RA patients and we couldn’t detect a correlation between disease

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### Table 1

Sociodemographic and clinical features of patients according to gender.

<table>
<thead>
<tr>
<th></th>
<th>Female (n = 74)</th>
<th>Male (n = 19)</th>
<th>p</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>age (year)</td>
<td>53.0 ± 11.5</td>
<td>54.5 ± 11.4</td>
<td>0.612</td>
<td>0.5</td>
</tr>
<tr>
<td>height (cm)</td>
<td>158.5 ± 5.9</td>
<td>168.5 ± 7.0</td>
<td>&lt;0.01</td>
<td>5.6</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>74.3 ± 14.2</td>
<td>76.6 ± 11.6</td>
<td>0.540</td>
<td>0.6</td>
</tr>
<tr>
<td>ESR (mm/h)</td>
<td>38.7 ± 19.9</td>
<td>43.2 ± 20.3</td>
<td>0.384</td>
<td>0.8</td>
</tr>
<tr>
<td>CRP (mg/dl)*</td>
<td>0.78 (0.1–12)</td>
<td>1.35 (0.26–13.5)</td>
<td>0.204</td>
<td>1.2</td>
</tr>
<tr>
<td>RF (U/ml)*</td>
<td>40.1 (15–1650)</td>
<td>34.7 (15–560)</td>
<td>0.552</td>
<td>5.9</td>
</tr>
<tr>
<td>anti-CCP*</td>
<td>40.6 (0.30–245)</td>
<td>11.3 (0.30–207)</td>
<td>0.470</td>
<td>7.3</td>
</tr>
<tr>
<td>DAS 28</td>
<td>3.9 ± 1.3</td>
<td>3.9 ± 1.5</td>
<td>0.867</td>
<td>0.1</td>
</tr>
<tr>
<td>VAS (mm)</td>
<td>37.3 ± 24.3</td>
<td>33.1 ± 23.1</td>
<td>0.496</td>
<td>0.6</td>
</tr>
<tr>
<td>HAQ</td>
<td>0.74 ± 0.63</td>
<td>0.55 ± 0.54</td>
<td>0.238</td>
<td>1.1</td>
</tr>
</tbody>
</table>

SD: Standard Deviation, ESR: Erythrocyte Sedimentation Rate, CRP: C-Reactive Protein, RF: Rheumatoid Factor, Anti-CCP: Anti-citrullinated Peptide Antibodies, DAS 28: Disease Activity Score, VAS: Visual Analog Scale, HAQ: Health Assessment Questionnaire. *Median (minimum-maximum) values were given because of nonrandom distribution

### Table 2

Mean TCI sub-scores of patients.

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD/</th>
<th>Med (min-max)</th>
</tr>
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<tbody>
<tr>
<td>self-transcendence</td>
<td>21.6 ± 5.6</td>
<td></td>
</tr>
<tr>
<td>cooperativeness</td>
<td>25.8 ± 5.4</td>
<td></td>
</tr>
<tr>
<td>self-directedness</td>
<td>25.7 ± 7.5</td>
<td></td>
</tr>
<tr>
<td>persistence *</td>
<td>5 (0–8)</td>
<td></td>
</tr>
<tr>
<td>reward dependance</td>
<td>17.1 ± 3.3</td>
<td></td>
</tr>
<tr>
<td>harm avoidance</td>
<td>20.9 ± 5.7</td>
<td></td>
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<tr>
<td>novelty seeking</td>
<td>26.3 ± 5.2</td>
<td></td>
</tr>
</tbody>
</table>

TCI: Temperament and Character Inventory, SD: Standard Deviation, *Median (minimum-maximum) values were given because of nonrandom distribution

### Table 3

Regression modeling according to DAS28 scores.

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Sd</th>
<th>β</th>
<th>t</th>
<th>p</th>
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<tbody>
<tr>
<td>reward dependance</td>
<td>0.094</td>
<td>0.043</td>
<td>0.233</td>
<td>2.175</td>
<td>0.03</td>
</tr>
</tbody>
</table>

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activity and character features. Previous studies in patients with medical diseases found low self-directedness scores among character dimensions [21–25,28]. This may be associated with severity, and duration of disease and comorbid depression. Self-directedness scores were reported to be low in patients vulnerable to mood and pain disorders [29]. Conrad et al. found low self-directedness scores in patients with chronic pain [30]. Although our study evaluated RA patients without a psychiatric illness, lack of a psychiatric interview is a limitation. On the other hand this finding can be interpreted as though a specific feature of RA patients. Because this is the first study that evaluates temperament characteristics of RA patients with TCI, comparison of its findings with previous studies is not possible. Examination of previous studies on inflammatory rheumatic diseases reveals that a common temperament and character profile has not been established yet. But the most important results common in previous studies are high harm avoidance and reward dependence scores and association of these findings with disease severity [26,28].

In conclusion, this is the first study that evaluates temperament and character properties in RA patients. This study suggests that harm avoidance and reward dependence scores in RA patients are related with disease activation and disease course is more severe in patients with high harm avoidance and reward dependence scores. Therefore we believe that temperament and character profiles can help clinicians to predict patients’ treatment compliance and motivation. Given that psychosocial support is important for prognosis in RA patients, considering temperament and character properties will be useful for treatment planning [28].

Limitations of this study are relatively small sample size, lack of a control group, absence of psychiatric interviews, and utilization of self-rated questionnaires. It is not easy to determine whether temperament and character properties are state or trait in RA patients. Definitive results can be obtained with comparative studies which examine the association between temperament and character properties and long term treatment targets of RA in larger samples.

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Conflict of interest: There are no conflicts of interest.

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