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THE ASSESSMENT OF EFFICACY AND OF SAFETY USING SELF-MONITORING OF DISEASE ACTIVITY VIA INTERNET PORTAL IN THE MANAGEMENT OF PATIENTS WITH RHEUMATOID ARTHRITIS

Abstract
The objective was to identify the exacerbation of the disease as quickly as possible and timely enhance the treatment to achieve remission or low disease activity more rapidly. Methods: The authors created an interactive web portal for self-monitoring of RA activity. The patient management model using this method is that a patient conducts a monthly self-assessment of the disease activity and transfers this information to his/her attending physician in a remote manner via the web portal. In case of state worsening and in the absence of any change, according to the patient, he/she is invited to the center, where this information is verified by the doctor. If case of state improvement, according to the patient, he/she does not come to the clinic and continues the treatment. Currently, 30 women with RA, mean age is 57 years old (38; 71), who completed the 6-month treatment, are enrolled in the study. Twenty women are enrolled in the control group, mean age is 60.5 (40; 77).

Results: During 6 months, there was a positive dynamic of the course of the disease, the activity of RA, according to DAS 28 score, decreased. Initially, 5 patients (16.7%) showed high DAS activity, 24 moderate DAS activity (80%), and 1 low DAS activity (3.3%). After 6 months of treatment, 8 patients (26.7%) showed low activity and 22 (73.3%) achieved remission. The mean value of the DAS 28 score at the time of inclusion was 3.99 (2.46; 5.78), and after 6 months of management it was 2.175 (0.79; 4.31), which is a statistically significant decrease (Wilcoxon T-test = 5). The DAS 28 score in the control group was 4.1 (2.46; 5.78), and after 6 months of management it was 3.9 (0.79; 4.31), which is a statistically significant decrease (Wilcoxon T-test = 5). Analysis of clinical and laboratory parameters did not reveal statistically significant deviations. Conclusions: The 6-month period of patient management via the web portal for self-monitoring of rheumatoid arthritis activity proved the possibility of achieving remission and low disease activity in all patients.

Key words: web portal, rheumatoid arthritis, self-monitoring of disease activity


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RA — rheumatoid arthritis

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Introduction

Rheumatoid arthritis (RA) is an autoimmune rheumatic disease of unknown etiology characterized by chronic erosive arthritis (synovitis) and systemic damage to internal organs [1]. RA incidence occupies a leading position among the inflammatory diseases of the musculoskeletal system. More than 20 million people worldwide suffer from RA [2]. In 2013, the number of RA patients in the Russian Federation was 286,005 people [3]. RA often leads to both temporary and persistent disability of patients. The Russian epidemiological study RAISER conducted in 2010 showed that among 1,500 RA patients, 68% of patients had disabilities, and 2/3 of them were completely disabled. In 83.4% of cases, the causes of disability were the relapsing course of RA and the ineffectiveness of treatment. The mean age of RA patients with disability was (47.5 ± 12.3) years, permanent total disability was observed at the age of (54.6 ± 12.0) years. Moreover, 22.7% of RA patients applied for social benefits due to financial problems [4]. At some later time, I. Yu. Zinchuk and V. N. Amirdjanova in their work showed slightly smaller but nevertheless quite significant indicators of permanent disability detected in 17.9% of RA patients in the Russian Federation. The total number of patients with grade 3 disability, working patients with grade 2 disability, and patients who had to change their jobs due to RA, was 18.1% [5]. At the present time, the achievement of the main goal of RA treatment is theoretically possible, since there is a sufficient range of disease-modifying anti-rheumatic drugs, which are expected to be prescribed in the early stages of the disease [24]. The concept of monitoring has also changed, it is now stricter. The disease activity indicators should be determined by a rheumatologist every month in the case of a high/moderate degree of RA activity, and every 3–6 months in the case of a stable activity. Monitoring of the disease activity in routine practice is performed using standardized international disease activity indices [6, 8, 23]. However, only 5–6% of RA patients can achieve remission in actual practice [7]. There are a number of reasons, both on the part of the patient (difficulty of visiting the hospital due to restricted mobility, low compliance, low efficacy of drugs due to the pathogenetic features of the disease, intolerance of drugs), and on the part of doctors (insufficient number of rheumatologists) [9, 10]. Self-assessment of health status is actively used worldwide in such diseases as chronic heart failure, essential hypertension, and diabetes mellitus. There are various methods of self-assessment of RA activity [12–22]. In 2014, we created a structured training program for training of RA patients in self-monitoring of disease activity, which allows patients to self-assess painful and swollen joints. The study evaluating the effectiveness of this program showed that 68% of patients can properly assess swollen joints, and 60% of patients can properly assess painful joints [11]. In 2015, we created a web portal for the self-monitoring of rheumatoid arthritis activity. The structure of the web portal includes three sections: 1) photo- and video materials with information about RA; 2) teaching photo- and video materials on the method of self-assessment of RA activity; 3) personal account for the patient and the doctor. This electronic resource uses a personalized approach to the patient. A patient’s electronic medical record is provided in the doctor’s personal account (Fig. 1a), which contains clinical, demographic, laboratory and instrumental data; treatment information; data from questionnaires that are filled in by both the patient and the doctor (Fig. 1b). Many parameters are also presented graphically, their time course is shown. Patients are pre-trained according to the methodology “Structured Training Program for Patients with Rheumatoid Arthritis to Self-Monitor Disease Activity”. The patient performs the self-assessment of disease activity on a monthly basis. The patient enters the results of the self-assessment of painful and swollen joints into the chart in their account, assesses various parameters according to the VAS, and fills out HAQ and EQ-5 D questionnaires. The data received from the patient are remotely transferred via the web portal to the attending physician. The doctor receives information about the state of health of the patient in a processed form by email in as short a time as possible. If the course of the disease worsens or in the absence of
any changes, according to the patient, the patient is asked to come to the Center, where the obtained information is verified by the doctor and, if necessary, the treatment is corrected. If an improvement is observed, according to the patient, then the patient does not come to the doctor for a visit, but continues the treatment (Fig. 2).

The web portal, similar to that proposed by us, was developed by the French Society of Rheumatology (SFR) in 2013. This web portal is anonymous and involves an active patient-doctor dialogue through electronic technologies, but without using a personalized approach and long-term dynamic observation. However, there is no scientific evidence of the effectiveness of the portal in the available literature (Sanoia. www.sanoia.com/e-sante/Polyarthrite-Rhumatoide.php).

Therefore, **the objective of our study** was to assess the effectiveness of management of patients with rheumatoid arthritis using the web portal of self-monitoring of rheumatoid arthritis activity.

**Study design:** during the study, the patient was assumed to perform a monthly self-assessment of RA activity and an unscheduled self-assessment in case of deterioration of the RA course. Mandatory in-person meeting with the doctor at the clinic and laboratory monitoring were carried out once in 3 months, as well as during deterioration of health, according to the patient. All patients underwent radiography of the hands and feet twice a year (Fig. 3).
**Materials and Methods**

The study enrolled 30 women diagnosed with RA, the mean age was 57 years (52; 78). The control group consisted of 20 RA patients comparable in age, gender, and the degree of disease activity with the study group, treated in actual clinical practice settings.

**Results**

Within 6 months, all 30 patients of the study group were examined and received treatment recommendations. In the study group, there was a statistically significant decrease in the mean value of the DAS 28 score after 6 months of observation (Table 1). By the 6th month of observation, all patients achieved remission and the degree of disease activity was low (Table 2). There was no positive change of the disease course in the control group (Table 3).

On average, patients in the control group visited the doctor 3.89 times (1; 11) per year, while patients from the study group – at least 12 times per year. Remote monitoring enabled to identify the deterioration of the patient’s health / exacerbation of the disease in 36.7% (11 of 50) of patients in the study group.

Initially, patients in the study group received the following treatment: methotrexate: 16 (53.3%) patients, methotrexate + glucocorticosteroids: 11 (36.7%) patients, sulfasalazine: 1 (3.3%) patient, sulfasalazine + methotrexate: 1 (3.3%) patient, sulfasalazine + methotrexate + glucocorticosteroids: 1 (3, 3%) patient. By the 6th month, the average dose of methotrexate was increased by 2.5 mg in 2 (18.2%) patients, by 5 mg in 7 (63.6%) patients, and by 10 mg in 2 (18.2%) patients.

The majority of patients in the control group received methotrexate as a basic treatment; the treatment was adjusted only in 47% of cases, but the adjustment was not effective enough; none of the patients achieved remission. 10.5% (2 of 20) patients did not receive disease-modifying anti-rheumatic drugs; they received non-steroidal anti-inflammatory drugs (Table 4).

**Table 1. Mean DAS 28 score in study and control groups**

<table>
<thead>
<tr>
<th></th>
<th>DAS 28 at the time of inclusion</th>
<th>DAS 28 after 6 months</th>
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<tbody>
<tr>
<td>Study group</td>
<td>3.99 (2.46; 5.78)</td>
<td>2.175 (0.79; 4.31)</td>
</tr>
<tr>
<td>Control group</td>
<td>4.1 (5.3; 4.9)</td>
<td>3.9 (2.39; 4.8)</td>
</tr>
</tbody>
</table>

*Note.* * Reliable Wilcoxon T-test was 5 (p < 0.05) when comparing DAS 28 score in the study group; ** Wilcoxon T-test was 8 when comparing DAS 28 score in the control group; *** Reliable Mann-Whitney T-test was 57 (p < 0.05) when comparing DAS 28 score in the control and study groups

**Table 2. The degrees of RA activity in the study group**

<table>
<thead>
<tr>
<th></th>
<th>Number of patients at the time of inclusion</th>
<th>Number of patients after 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remission</td>
<td>73.3% (22 of 30)</td>
<td></td>
</tr>
<tr>
<td>First degree of activity</td>
<td>3.3% (1 of 50)</td>
<td>26.7% (8 of 50)</td>
</tr>
<tr>
<td>Second degree of activity</td>
<td>80% (24 of 30)</td>
<td>90% (18 of 50)</td>
</tr>
<tr>
<td>Third degree of activity</td>
<td>16.7% (5 of 50)</td>
<td>0</td>
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**Table 3. The degrees of RA activity in the control group**

<table>
<thead>
<tr>
<th></th>
<th>Number of patients at the time of inclusion</th>
<th>Number of patients after 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remission</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>First degree of activity</td>
<td>5% (1 of 20)</td>
<td>40% (2 of 20)</td>
</tr>
<tr>
<td>Second degree of activity</td>
<td>90% (18 of 20)</td>
<td>90% (18 of 20)</td>
</tr>
<tr>
<td>Third degree of activity</td>
<td>5% (1 of 20)</td>
<td>0</td>
</tr>
</tbody>
</table>
Discussion
The patients in the study group achieved remission/reduction in the level of RA activity faster than the patients in the control group, as they were under close medical supervision via the web portal and more often contacted the doctor in accordance with the method of the study.

The emission in the study group was achieved by the 3rd month of the study in 33.3% of cases; 10% of patients achieved remission by 4–5th months, and another 16.7% – by the 6th month of the study. In 13.3% of patients in the study group, decrease in the degree of disease activity was achieved only by the 6th month of observation. At visit 1, the dose of methotrexate in the study group was increased in 14.2% of cases (2 of 14), at visit 3 — in 42.9% of cases (6 of 14), and at visit 6 – in 42.9% of cases (6 of 14). Unfortunately, 6% of patients (2 of 30) had adverse reactions to methotrexate (increased liver enzymes levels) and therefore it was necessary to reduce the dose. In the control group, no patient achieved remission in 6 months of observation and treatment in actual clinical practice settings. There was a slight decrease in the DAS 28 score: 4.1 and 3.9 at the time of enrollment and after 6 months, respectively.

Conclusions
1. Management of patients using the web portal of self-monitoring of rheumatoid arthritis activity allows achieving the main goal of treatment: remission in 73.3% of cases and low RA activity in 26.7% of cases in a short time (from 3 to 6 months) in most patients.

2. Enhanced self-monitoring of the disease activity by the patient and remote monitoring by the physician made it possible to quickly identify the exacerbation of RA in 36.7% of patients and to adjust the treatment.

Conflict of Interests
The authors declare no conflict of interests.

References


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