UDC 616.72-002.77-08-07

G. G. Bagirova* [1], **Ye. V. Lygina**[1], **S. S. Yakushin**[1], **M. I. Kozminskaya**[2]

[1] Ryazan State Medical University named after academician I. P. Pavlov, Ryazan, Russia

[2] Ryazan State Regional Clinical Cardiologic Dispensary, Ryazan, Russia

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*

For citation: Bagirova G. G., Lygina Ye. V., Yakushin S. S., Kozminskaya M. I. THE ASSESSMENT OF EFFICACY AND OF SAFETY USING SELF-MONITORING OF DISEASE ACTIVITY VIA INTERNET PORTAL IN THE MANAGEMENT OF PATIENTS WITH RHEUMATOID ARTHRITIS. The Russian Archives of Internal Medicine. 2018; 8(6): 469-474. [In Russian]. DOI: 10.20514/2226-6704-2018-8-6-469-474

DOI: 10.20514/2226-6704-2018-8-6-469-474

RA — rheumatoid arthritis

* Contacts. E-mail: doctor.bagirova@yandex.ru

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

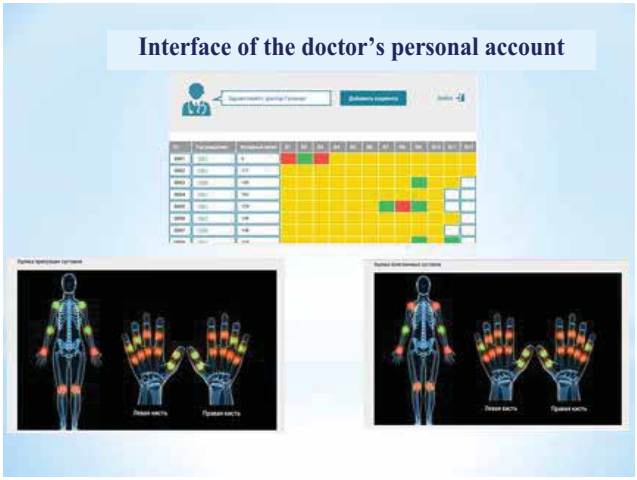

Figure 1a. *The interface of the doctor's personal account. Electronic medical record of the patient*

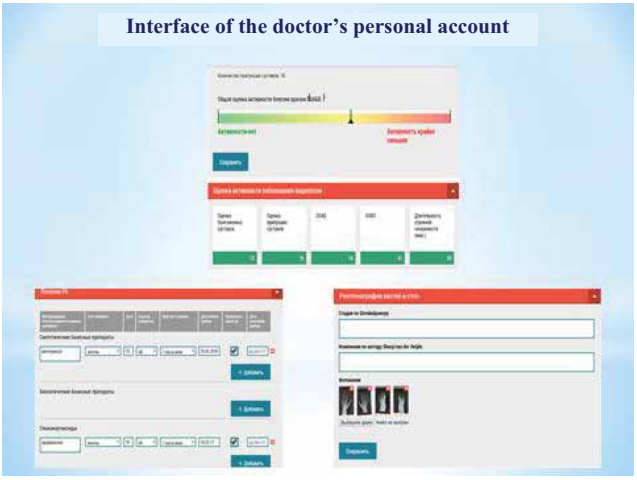

Figure 1b. *The interface of the doctor's personal account. Time course of treatment and disease activity*

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).

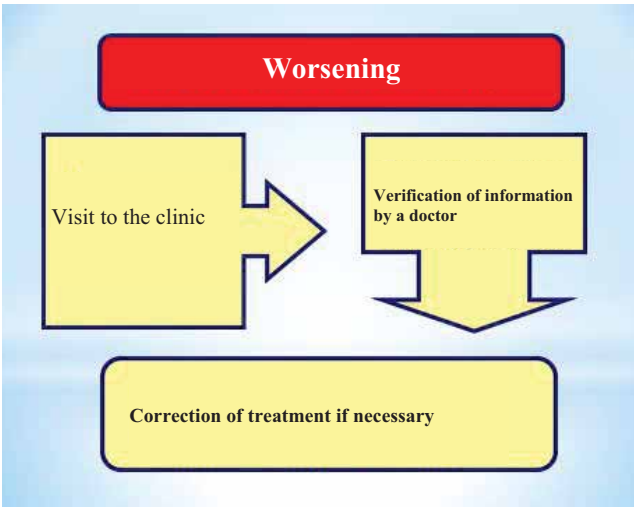

Figure 2. *The procedure in case of worsening*

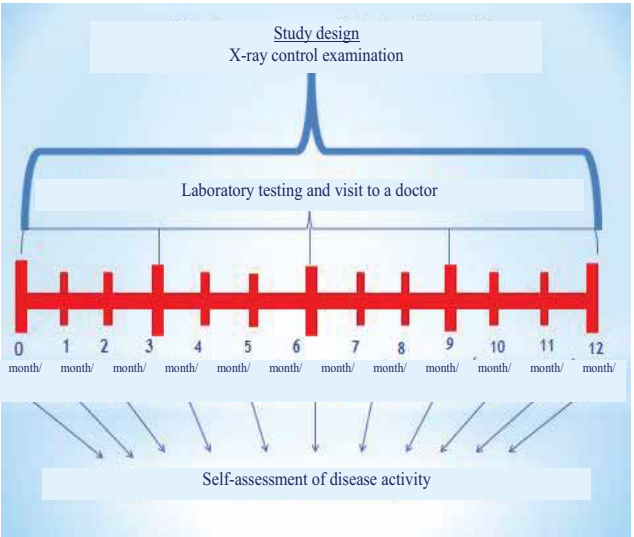

Figure 3. *Study design*

Materials and Methods

The study enrolled 30 women diagnosed with RA, the mean age was 57 years (32; 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 30) 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 antirheumatic drugs; they received non-steroidal anti-inflammatory drugs (Table 4).

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

	DAS 28 at the time of inclusion	**DAS 28 after 6 months**
Study group	3.99 (2.46; 5.78)	2.175 (0.79; 4.31)
Control group	4.1 (3.3; 4.9)	3.9 (2.39; 4.8)

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*

	Number of patients at the time of inclusion	**Number of patients after 6 months**
Remission		73.3% (22 of 30)
First degree of activity	3.3% (1 of 30)	26.7% (8 of 30)
Second degree of activity	80% (24 of 30)	0
Third degree of activity	16.7% (5 of 30)	0

Table 3. *The degrees of RA activity in the control group*

	Number of patients at the time of inclusion	**Number of patients after 6 months**
Remission		0
First degree of activity	5% (1 of 20)	10% (2 of 20)
Second degree of activity	90% (18 of 20)	90% (18 of 20)
Third degree of activity	5% (1 of 20)	0

Table 4. *The average doses of methotrexate in study and control groups*

	At the time of inclusion	After 6 months
The average dose of methotrexate in study group, mg	12.9 (10; 30)	14.6 (10; 25)
The average dose of methotrexate in control group, mg	10.8 (0; 20)	13.5 (0; 20)

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

1. Clinical recommendations for the diagnosis and treatment of rheumatoid arthritis. Moscow. 2013; 18 p. [In Russian].
2. World Health Organization, The Global Burden of Disease, 2004 Update. Accessed 13 March 2012. Available from: http://www.who.int/health, date of the application 06.09.2018.
3. Balabanova R.M., Jerdes Sh.F. The prevalence of rheumatic diseases in Russia in 2012-2013. Rheumatology Science and Practice. 2015; 53(2):120–124. [In Russian].
4. Folomeeva O.M., Nasonov E.L., Andrianova I.A. et al. Rheumatoid arthritis in rheumatological care of Russia: the severity of the disease in a Russian patient population: a cross-sectional epidemiological study (RAISER). Rheumatology Science and Practice. 2010; (1): 50–60. [In Russian] DOI: http://dx.doi.org/10.14412/1995-4484-2010-1406.
5. Zinchuk I.Ju., Amirdzhanova V.N. The social burden of rheumatoid arthritis. Rheumatology Science and Practice. 2014; 52(3): 331–335. [In Russian].
6. Smolen S. Josef, Breedveld C. Ferdinand et al. Treating rheumatoid arthritis to target: 2014 update of the recommendations of an international task force. Ann Rheum Dis doi:10.1136/annrheumdis-2015-207524
7. Verstappen S.M., Bijlsma J.W., Verkleij H. et al. Utrecht Rheumatoid Arthritis Cohort Study Group. Overview of work disability in rheumatoid Arthritis patients as observed in cross-sectional and longitudinal surveys. Arthritis Rheum. 2004;51(3):488–97. DOI: http://dx.doi.org/10.1002/art.20419.

8. Prevoo M.L., van't Hof M.A., Kuper H.H. et al. Modified disease activity scores that include twenty-eight-joint counts. Development and validation in a prospective longitudinal study of patients with rheumatoid arthritis. Arthritis Rheum. 1995;38(1):44–8. DOI: http://dx.doi.org/10.1002/art.1780380107
9. Smolen J.S., Breedveld F.C., Schiff M.H. et al. A simplified disease activity index for rheumatoid arthritis for use in clinical practice. Rheumatology (Oxford). 2003; 42(2):244–57. DOI: http://dx.doi.org/10.1093/ rheumatology/keg072
10. Aletaha D., Smolen J. The Simplified Disease Activity Index (SDAI) and the Clinical Disease Activity Index (CDAI): a review of their usefulness and validity in rheumatoid arthritis. Clin Exp Rheumatol. 2005; 23(5 Suppl 39):S100–8.
11. Lygina E.V., Pron'kina E.V., Jakushin S.S. Structured program of teaching patients with rheumatoid arthritis independent monitoring of disease activity. Rheumatology Science and Practice. 2014; 52(1): 37-43. [In Russian] DOI:10.14412/1995-4484-2014-37-43
12. Mason J.H., Anderson J.J., Meenan R.F. et al. The Rapid Assessment of Disease Activity in Rheumatology (RADAR) questionnaire: validity and sensitivity to change of a patient self-report measure of joint count and clinical status. Arthritis Rheum. 1992; 35: 156-162.
13. Stucki G., Liang M., Stucki S. et al. A self-administered rheumatoid arthritis disease activity index (RADAI) for epidemiologic research. Psychometric properties and correlation with parameters of disease activity. Arthritis Rheum. 1995; 38(6):795-8.
14. Calvo F.A., Calvo A., Berrocal A. et al. Self-administered joint counts in rheumatoid arthritis: comparison with standard joint counts. J Rheumatol. 1999; 26(3):536-9.
15. Choy E.H., Khoshaba B., Cooper D. et al. Development and validation of a patient-based disease activity score in rheumatoid arthritis that can be used in clinical trials and routine practice. Arthritis and Rheumatism. 2008; 59(2):192-9. doi: 10.1002/art.23342.
16. Oljunin Ju.A. Assessment of disease activity in rheumatoid arthritis: recommendations and practice. Modern rheumatology. 2014; (2):4-9. [In Russian]
17. Levy G., Cheetham C., Cheatwood A. et al. Validation of patient-reported joint counts in rheumatoid arthritis and the role of training. J Rheumatol. 2007; 34: 1261–5.
18. Barton J.L., Criswell L.A., Kaiser R. et al. Systematic Review and Metaanalysis of Patient Self-Report versus Trained Assessor Joint Counts in Rheumatoid Arthritis. J Rheumatol. 2009; 36 (12): 2635-41 doi: 10.3899/jrheum.090569.
19. Cheung P.P., Ruyssen-Witrand A., Gossec L. et al. Reliability of patient self-evaluation of swollen and tender joints in rheumatoid arthritis: A comparison study with ultrasonography, physician, and nurse assessments. Arthritis Care Res (Hoboken). 2010; 62(8):1112-9. doi: 10.1002/acr.20178
20. Janta I., Naredo E., Martínez-Estupiñán L. et al. Patient self-assessment and physician's assessment of rheumatoid arthritis activity: which is more realistic in remission status? A comparison with ultrasonography. Rheumatology (Oxford). 2013; 52(12):2243-50. doi: 10.1093/rheumatology/ket297.
21. Dougados M., Soubrier M., Perrodeau E. Impact of a nurse-led programme on comorbidity management and impact of a patient self-assessment of disease activity on the management of rheumatoid arthritis: results of a prospective, multicentre, randomised, controlled trial (COMEDRA). Ann Rheum Dis. 2015; 74 (9):1725-33. doi: 10.1136/annrheumdis-2013-204733
22. Amirdzhanova V.N, Folomeeva O.M, Jerdes Sh. Validation of the index of functional activity of the patient with rheumatoid arthritis (PAS). Rheumatology Science and Practice. 2007; 45(4): 89-96. DOI:10.14412/1995-4484-2007-89-96 [In Russian]
23. Zhukova N.V. Volume and character of laboratory researches at hospitalization concerning reumatical arthritis. I.P. Pavlov Russian Medical Biological Herald. 2011; 19(1): 54-58. [In Russian]. http://dx.doi.org/10.17816/PAVLOVJ2011154-58
24. Zotova L.A., Petrov V.S. Nonsteroidal anti-inflammatory drugs in modern clinical practice: focus on safety. Eruditio juvenium. 2015; 1: 25-30. [In Russian].

Article received on 06.09.2018.
Accepted for publication on 24.10.2018