Assessment of the Significance of Diagnostic Criteria in Rheumatoid Arthritis

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Annotation: Rheumatoid arthritis (RA) is an immuno–inflammatory (autoimmune) rheumatic disease characterized by chronic erosive arthritis and systemic damage to internal organs, leading to early disability. The aim of the study is to identify the most significant diagnostic criteria for RA and undifferentiated arthritis (NDA). The study involved 103 patients who were divided into 2 main groups, 53 patients with RA (group I) and 50 patients with NDA (group II). The results of the study showed that when studying the seropositivity of the Russian Federation, IgM - among RA patients was noted in 41 (77.3%); among NDA patients, IgM seropositivity according to RF was noted in 34 (64.7%) patients, the average concentration of ADC was 20.4 ± 12.04 OEd/ml. Thus, using the research methods conducted by us, it can be considered as promising methods for a more objective assessment of inflammatory changes in joints.

Keywords: rheumatoid arthritis, undifferentiated arthritis, ADC, immunoglobulins, DAS scale.

1. Introduction

Rheumatoid arthritis (RA) is an immuno–inflammatory (autoimmune) rheumatic disease of unknown etiology characterized by chronic erosive arthritis and systemic damage to internal organs, leading to early disability and shortened life expectancy of patients [1]. The social significance of RA for healthcare in general is determined by its high prevalence among people of working age, the complexity of early diagnosis, the rapid development of disability and an unfavorable prognosis of life.

In recent years, it has been convincingly shown that the only real way to stop the steady progression of the disease is to diagnose the disease as early and timely as possible.

In the world, the concept of early arthritis (as a collective concept that includes suspicious cases of chronic inflammatory rheumatic disease, primarily RA) is considered to be the most important period of the disease, largely determining the future fate of the patient. There are several models of the development of RA [2], which in many ways help to understand the patterns of development of this disease, explain the complexity of diagnosis and justify the possibilities of overcoming them.

They suggest that the immunopathological mechanisms of RA may gradually turn on [3] and that a disease developing in a particular person under the influence of genetic (for example, the presence of a common epitope), external (smoking, etc.), immunological factors (for example, the appearance of citrullinated peptides and proteins) undergoes a potentially reversible stage of "non-specific" symptoms, so-called undifferentiated arthritis (NDA) [4, 5], when chronic destructive (rheumatoid?) has not yet formed polyarthritis.

This explains the possibility of the onset of both typical and atypical diseases (in the form of NDA), as well as the formation of clinical heterogeneity. According to A. H. van der Helmvan Mil et al. [6] Most patients go through the NDA stage at the onset of the disease. This is why early diagnosis of RA is considered a difficult task for objective reasons.

The aim of the study was to identify the most significant diagnostic criteria of RA and NDA, to determine the sensitivity and specificity of existing diagnostic criteria in the early stages of the disease.

2. Materials and methods

The study involved 103 patients whose average age was 52.85 ± 14.12 years (from 18 to 79 years), most of them were women (91.2%). The duration of the disease varied from 2-3 months to 25 years. The clinical characteristics of the patients included in the study are shown in Table

parametrs	Patients with RA (n=53)	Undifferentiated arthritis (n=50)
Average age, years	54,85±14,12	51±17,14
Duration of the disease, years	7,45±7,51	2,35±1,51
Your pain level, mm	54,1±4,02	47,8±4,32
Seropositivity according to RF IgM, n (%)	41(77,3%)	33(64,7%)
ADC +, n (%)	53 (100%)	40 (78,4%)
Degree of activity according to DAS28		
remission (DAS28< 2.6)	0	0
low (2.6 <das28<3.2)< th=""><th>1 (2,1%)</th><th>8(15,6%)</th></das28<3.2)<>	1 (2,1%)	8(15,6%)
medium (3.2 <das28<5.1)< th=""><th>16 (30,2%)</th><th>26 (50,9%)</th></das28<5.1)<>	16 (30,2%)	26 (50,9%)
high (DAS28>5.1)	36 (67,7%)	17 (33,3%)
X-ray stage I II III IV	3 (5,6%) 17 (32%) 21(39,4%) 1 (1,8%)	19 (37,2%) 28 (54,9%) 4 (7,8%) -
Functional class		

Table 1. General characteristics of patients with RA and NA (n=103)

I	3 (5,3%)	8 (15,6%)
II	26 (49,9%)	33 (64,7%)
III	20 (37,2%)	10 (19,6%)
IV	4 (7,8%)	0

All clinical studies were conducted in the period 2022-2023 at the Department of Cardiorheumatology on the basis of the Samarkand City Medical Association and at the Department of Rheumatology of the multidisciplinary clinic No. 1 of the Samarkand State Medical University.

According to the set goals and objectives, a prospective study of patients with RA and NA was conducted. Copies were made from the medical history and outpatient records of patients, and the anamnesis of patients was collected.

In accordance with the criteria of the American College of Rheumatology (ACR), together with the European Alliance of Rheumatology Associations (EULAR) ACR/EURLAR, 2010 [7], criteria for the inclusion of patients in the study were compiled.

Exclusion criteria:

-The presence of CVD (AH, CHD, CHF) in the decompensation stage

-Violation of cerebral circulation

- Diabetes mellitus

-Kidney and liver diseases in the acute stage

All patients were divided into 2 main groups. The main group consisted of 53 patients with RA (group I) and 50 patients with NA (group II). The control group consisted of 20 completely healthy individuals.

To carry out this work, an integrated approach was used, including clinical, laboratory, radiological and statistical research methods.

To assess the activity of the disease, we used the combined Diseases active score index for 28 joints (DAS28) [8].

To measure the intensity of pain in patients, we used a visual analog scale (VAS) [9].

The functional class (FC) of patients was determined based on the ACR criterion. The classification is divided into four classes, depending on which of the vital functions the patient can perform [10].

The ESR level was determined by the standard international Westergren method (norm \leq 20 mm/hour). To carry out the serum concentration of IgM rheumatoid factor (RF) and CRP, the solid-phase ELISA method was used on the MR-96A Mindray device (China) with a sensitivity for RF of 1 U/ml, and if the RF level in the blood was higher than 25 U/ml, the results were considered positive. For CRP, the minimum concentration is 0.1 mg/l, and the highest limit is 10 mg/l.

The ELISA method was also used to detect antibodies to cyclic citrullinized peptide (ADC) in blood serum, and was detected using the ELISAPKL PPC 142 apparatus. In healthy people, the average concentration of ADC according to the manufacturer is 1.2 ± 0.8 OEd/ml. This value served as a guideline for interpreting the test results.

Statistical packages IBM SPSS Statistics 22 and Microsoft Excel 2010 were used for statistical analysis of the obtained research results. Numerical characteristics of the variation series were calculated.

The calculations were based on fundamental and modern approaches to medical statistical data processing and analysis.

The assessment of the reliability of differences in values (p) was based on the calculation of parametric criteria (Student's and Fisher's t-criteria) for the normality of the distribution, and

nonparametric criteria for the abnormality of the distribution (Kolmogorov-Smirnov, Wilcoxon, Mann-Whitney).

3. Results and Discussion

When studying the seropositivity of RF IgM - among RA patients was noted in 41 (77.3%); among patients with NA, seropositivity for RF IgM was noted in 34 (64.7%) patients. The average concentration of RF in the blood serum of all patients in both groups was 205.23 ± 201.02 units/ml.

When examining the level of ADC among all RA patients, the average concentration of ADC in serum was 23.1 ± 12.1 OEd/ml and was considered high. Among patients, the level of ADC was high in 40 (78.4%) patients and the average concentration was 20.4 ± 12.04 OEd/ml.

When determining the activity of the inflammatory process according to DAS28 among RA patients: low activity (DAS28<3.2) was observed in only 1 patient (2.1%), moderate activity (3.2 < DAS28 < 5.1) was observed in 16 patients (30.2%), and high activity of rheumatoid inflammation (DAS28>5.1) prevailed in 36 patients (67.7%). The average DAS28 index was 5.6 ± 1.22 points.

Among the patients, 8 patients (15.6%) had low disease activity (DAS28<3.2), 26 patients (50.9%) \square moderate activity (3.2<DAS28<5.1), and in 17 patients (33.3%) \square high activity (DAS28>5.1). The average DAS28 index is 4.3±1.23.

X-ray changes in the majority of RA patients corresponded to stage II-III. One patient with RA had stage IV ankyloses of the joints and was deprived of self-service (FC IV). Among the patients, radiological changes corresponding to stage I-II were more often observed, and no changes corresponding to stage IV radiological changes were observed.

The above indicators indicate that in patients with an increase in disease activity according to the DAS28 index and between the functional class of disability (FC I-IV), the number of painful and swollen joints, and the severity of pain according to VAS, there is a high correlation.

Along with changes in clinical parameters reflecting the activity of the inflammatory process, changes in the main laboratory parameters are also noted in the examined patients.

Among all the patients who underwent the study, the analysis performed to determine the level of acute phase serum parameters such as ESR, fibrinogen and CRP did not significantly differ (p0.01) in both groups. Seropositivity and RF levels were more often high among Group 1 patients and hemoglobin levels were relatively low among patients in this group (Table 2).

Indicator	Patients with RA	Undifferentiated arthritis (n=50)	The control group
Hemoglobin, g/l	105,15±15,17	115,14±15,25	129,8±5,15
ESR, mm/hour	30,75±13,84	28,75±12,91	8,5±0,20
Fibrinogen, g/l	3,83±0,97	3,79±0,12	2,94±0,76
CRP, mg/l	$7,8\pm 2,5$	6,9±2,8	> 1
RF, Units/ml	261,34±212,49	186,49±119,50	> 25

Table 2. Indicators of the main laboratory parameters in patients and healthy individuals

When comparing laboratory data on acute phase parameters of blood serum and the degree of disease activity according to DAS28, FC, X-ray stage and pain intensity according to VAS

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among patients of group 1, a reliable direct relationship between the indicators was revealed, Fig.1.



Figure 1. Comparative indicators of laboratory data between clinical and instrumental data in patients with RA.

Also, among patients with NA, a similar relationship was observed between the levels of acutephase serum parameters and the degree of disease activity according to DAS28, FC, X-ray stage and pain intensity according to VAS (Fig.2). But it should be pointed out that patients of the 1st group, compared with patients of the 2nd group, were characterized by high levels of acute phase parameters, a greater X-ray stage, high pain intensity according to VAS and the degree of disease activity according to DAS28.

Figure 2. Comparative indicators of laboratory data between clinical and instrumental data in patients on.



The level of ADC was high among all patients in group 1, even with the seronegative form of RF. Among the patients of the 2nd group, the level of ADC was high in 40 (78.4%) patients. In this group of patients, when comparing the frequency of detection of ADC and RF among 33 (64.7%) patients, the level of RF was high (Fig.3). I.e., ADC in NA were detected much more often than RF.





Thus, the concept of NA as an early diagnosis of RA includes not only clinical studies, but also the study of instrumental, laboratory and immunological parameters, which must be evaluated in a complex when deciding on the further transition to RA. With the help of the research methods conducted by us, it can be considered as promising methods for a more objective assessment of inflammatory changes in joints, which can provoke early diagnosis, as well as improve the assessment of disease activity in a timely manner.

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