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MODERN LABORATORY DIAGNOSTICS OF RHEUMATOID ARTHRITIS: NEW DIAGNOSTIC METHODS, NEW POSSIBILITIES

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Annotation. Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease that affects the joints and can lead to destruction of joint tissue, disability and reduced quality of life in patients. The human immune system produces antibodies (proteins) that fight viruses and bacteria as well as foreign substances. In rheumatoid arthritis, antibodies are produced against healthy cells and tissues in the body. These are called autoantibodies. An inflammatory process within the joint occurs, in which the synovial membrane thickens and becomes more dense (pannus) and the joint itself swells. As the pannus grows, the articular cartilage becomes deformed, which leads to weakening of ligaments, tendons and muscles, and in the most advanced cases to lysis (dissolution) of bone heads. Against this background, the bones forming the joint begin to deform and deteriorate.Timely diagnosis of RA is crucial for initiating treatment and preventing disease progression. Modern methods of laboratory diagnostics play a key role in detecting RA and assessing its severity.

Keywords: rheumatoid arthritis, antibodies to cyclic citrullinated peptide, patient, joints.

Relevance. One of the most significant advances in modern laboratory diagnosis of RA is the use of biomarkers such as rheumatoid factor (RF) and antibodies to cyclic citrullinated peptide (CCP). Findings show that most patients with RA have positive RF and positive CCP. For example, in the group of patients younger than 40 years of age, 60% have positive RF and 75% have positive CCP, indicating the high sensitivity of these biomarkers in the early diagnosis of the disease. Continuous development and improvement of laboratory methods of analysis allows to increase the efficiency of diagnosis and improve the results of treatment of patients with RA. Rheumatoid arthritis can damage internal human organs (the diagnosis will be indicated under systemic manifestations) - kidneys, liver, spleen, lungs and pleura, skin, peripheral and central nervous system. The most favourable systemic manifestation that does not affect organ function is rheumatoid nodules. They can be localised under the skin on the extensor surfaces of the joints, and sometimes even in the lungs. This pathology affects

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approximately 25% of all rheumatoid arthritis patients, especially those patients who do not achieve low activity or remission of rheumatoid arthritis.

Purpose: To identify early diagnosis of rheumatoid arthritis using modern laboratory diagnostics.

Material and methods: The study was conducted in the multidisciplinary clinic of SamSMU in patients 15-60 years old hospitalised between March 2023 and April 2024. The following laboratory analyses were performed in all patients for examination: general blood analysis, rheumatoid factor (RF), antibodies to cyclic citrullinated peptide (CCP), also analysis for sialic acid content in synovial fluid.

Results: For our study all patients were divided into two groups, Group I was a group with confirmed diagnosis of rheumatoid arthritis, which included 31 patients aged 16-60 years and Group II was 29 patients who had similar symptoms and were at the stage of rheumatoid arthritis diagnosis at the age of 15-58 years.

At the examination of the first group there were the following parameters in the general blood count: leucocyte count: as shown by WBC examination elevated in 7 (22,5%) patients. Erythrocyte contents were within normal limits in all patients. Haemoglobin level was decreased in 4(12.9%) patients. Erythrocyte sedimentation rate (ESR) was elevated in all patients (1-pic).

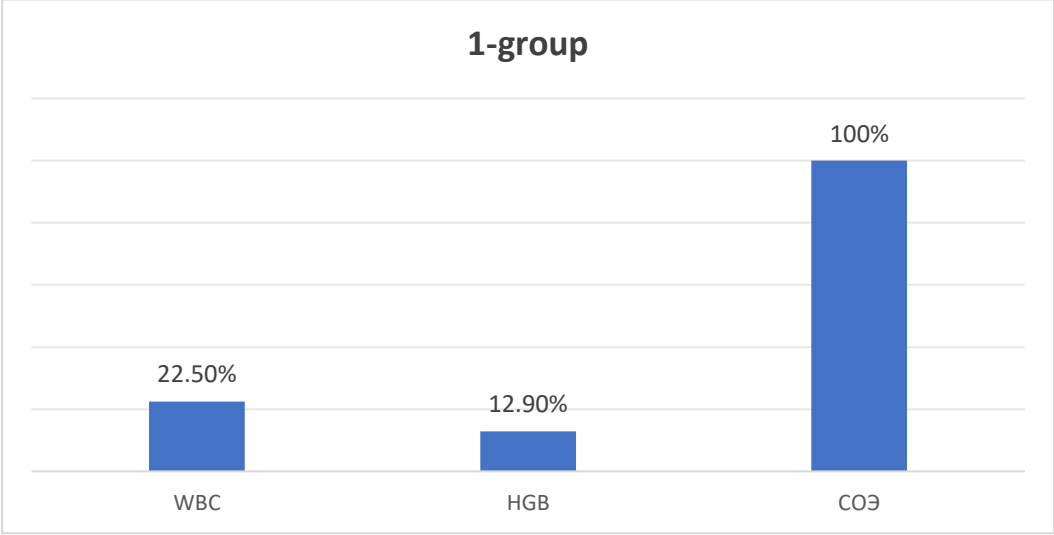

Figure 1. Results of general blood analysis of group 1

Rheumatoid factor (RF) was positive in 70% of patients (n=22). Antibodies to cyclic citrullinated peptide (CCP) was determined in 80% of patients (n=5). Analysis of sialic acid content in synovial fluid: in the first group was elevated in 27(87%) patients. It should be noted, high level of sialic acid indicates active inflammatory process in joints. (2-picture).

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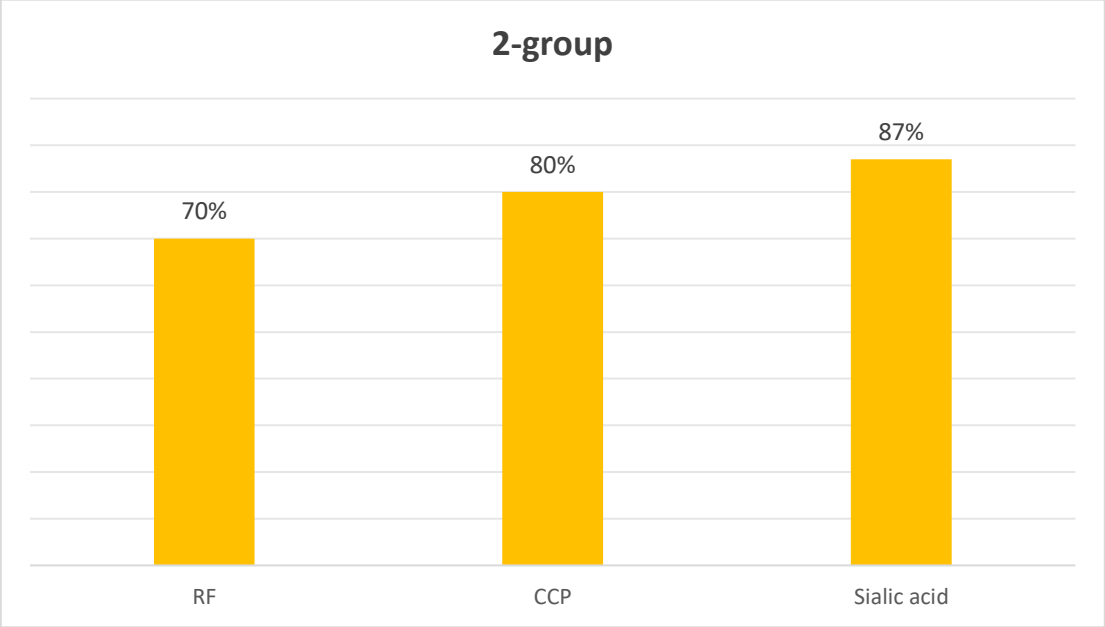

Figure 2. Results of biochemical analyses of group 2

Group 2 consisted of patients with similar symptoms at the stage of confirmed diagnosis of rheumatoid arthritis (29 patients, age 15-58 years). In the general blood analysis: leucocyte level: elevated in 13 (44.82%) patients. Erythrocytes were within normal range. Haemoglobin: was low in 11 (37.93%) patients. Erythrocyte sedimentation rate (ESR) was elevated in 19(65%) patients (Figure-3).

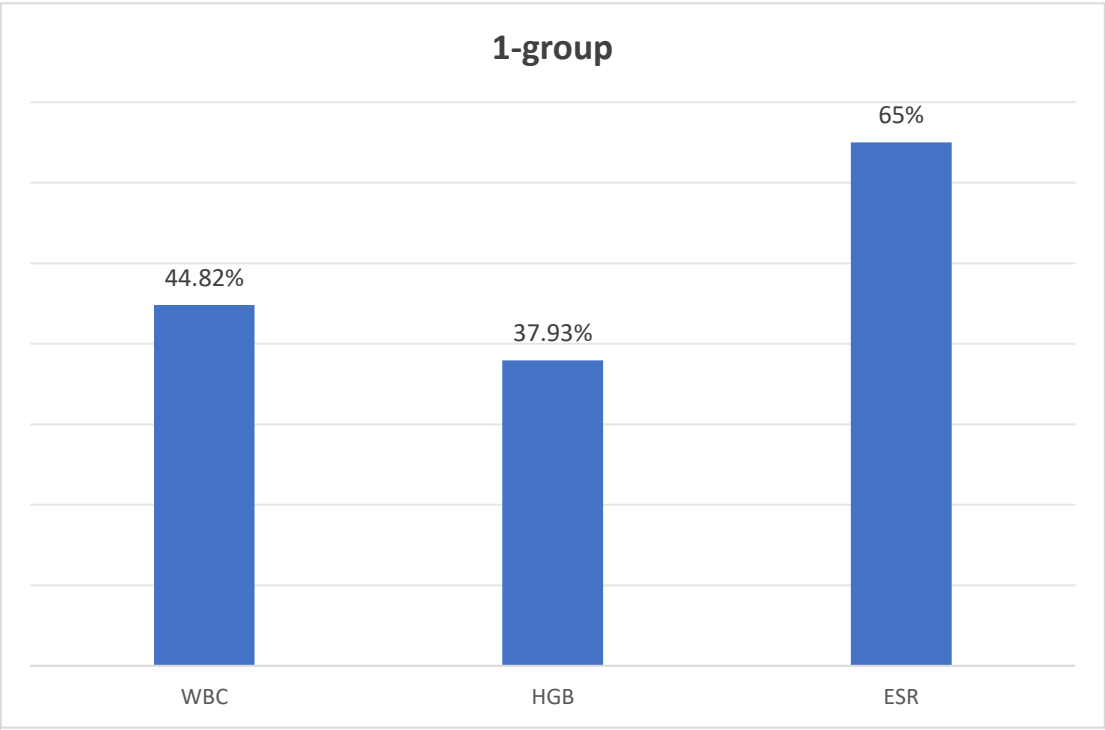

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Figure 3. Results of general blood analysis of group 1

Rheumatoid factor (RF) was positive in 17% (n=5). of patients. Antibodies to cyclic citrullinated peptide (CCP) were positive in 17% (n=5) of patients. Analysis of sialic acid content in synovial fluid: It was also positive in 10% (n=3) of patients.(4-pic).

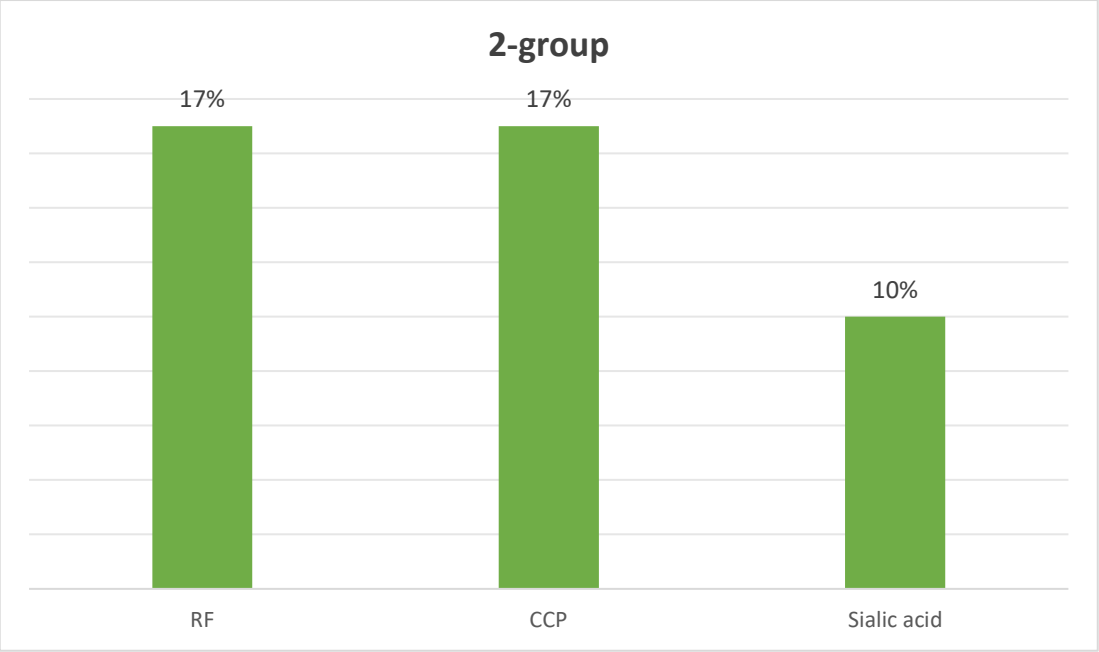

Figure 3. Results of general blood analysis of group 2

As our study showed, in group 1 with a confirmed diagnosis, all indicators were positive, also after our study in group 2 a timely diagnosis of rheumatoid arthritis was made in 17% (5) of patients.

Thus, it is necessary to take into account that modern methods of laboratory diagnostics of rheumatoid arthritis open new opportunities for early detection of the disease.

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