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State of the Peripheral Blood System in Patients with Rheumatoid Arthritis Depending on Haptoglobin Polymorphism

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ABSTRACT

The role of haptoglobin in the body is not limited to the function of hemoglobin transport. Literature data indicate that the exchange of Hb is closely related to processes occurring in connective tissue. According to our data, Hp 2-2 plays a role in the development of chronic inflammatory reaction (92.6%), the Hp 1-1 type is favorable, and 2-1 is characterized by a rapid course in 55.6% of patients. The aim of our further research was to study laboratory data in RA patients with different haptoglobin phenotypes. As is known, in recent years, the degree of anemia is considered a prognostic indicator of RA and is included in the criteria determining the activity of the disease. According to the literature, the greater the degree of anemia, the worse the prognosis of the disease. In our studies, the average hemoglobin content in the peripheral blood of RA patients was 79.1±1.7 g/L, and the erythrocyte count was 2.8±0.06x10¹²/L, reflecting a moderate degree of anemia. Changes in hemoglobin content and erythrocyte count with different haptoglobin phenotypes are shown in Table 3.5.

Changes in Blood Parameters in Patients with RA Depending on Haptoglobin Carriage

№	Hematologic indicators	Hp 1-1	Hp 2-1	Hp 2-2
1.	Hemoglobin , gr/l	81,5±2,6	81,9±2,2	76,7±2,8*
2.	Erythrocytes × 10^{12}/l	2,98±0,11	2,97±0,09	2,73±0,08
3.	Leucocytes × 10^{9}/l	4,97±0,48	5,14±0,29	4,95±0,22
4.	Lymphocytes , %	24,85±2,51	27,36±1,28	23,51±1,15
5.	ESR, mm/hr	29,54±3,24	26,51±1,59	41,81±2,21*
6.	SRP, mg/l	39,19±4,22	44,18±1,59	80,13±6,76*
7.	Haptoglobon, g/l	2,98±0,38	2,80±0,19	3,36±0,22*
8.	Fibrinogen, g/l	4,37±0,20	4,75±0,24	5,24±0,8*
9.				
10.				

Note: The differences between the indicators of the patient group with Hp1-1 and the others are significant, P<0.05.

As shown in Table 3.5, the content of hemoglobin and erythrocytes is most significantly reduced in patients with the Hp 2-2 phenotype (to 76.7±2.8 g/L and 2.73±0.08×10¹²/L), which confirms the aforementioned idea about the severe course of RA in patients with this form of Hp. Among 105 patients with anemia, its severe form was not detected in carriers of Hp 1-1, with the

phenotype Hp 2-1 - in 7% of patients, whereas in patients with the phenotype Hp 2-2 - 24.1%. As can be seen from the data provided, the severity of anemia depended on the type of haptoglobin and was mainly observed in patients with the Hp 2-2 phenotype.

Previously, we established a connection between the activity of the inflammatory process and the carriage of Hp. Indeed, this is confirmed by the highest ESR (Erythrocyte Sedimentation Rate) indicators. Thus, if with Hp 1-1 the ESR increased significantly by 3.02 times, with Hp 2-1 – by 2.7 times, and the highest values (an increase of 4.2 times) were observed in patients with Hp 2-2. Confirmation of this is the increase in acute phase proteins.

The level of fibrinogen also significantly increased, and its severity depended on the haptoglobin phenotype. The greatest increase in fibrinogen level was typical for patients carrying Hp 2-2. Thus, its level increased statistically significantly by 1.97, 2.14, and 2.36 times respectively for the Hp1-1, Hp 2-1, and Hp 2-2 phenotypes.

As is known, CRP (C-Reactive Protein) and ESR are used to determine the concentration of "acute phase" components and allow for the quantitative assessment of the inflammatory process. The value of ESR depends on many factors and, therefore, its specificity is low. However, the concentration of CRP reflects the content of a specific "acute phase" protein, which is more specific. Its concentration increases and decreases faster (decreases by 50% within 24 hours) than ESR, which is characterized by long-lasting high values (decreases by 50% over 1 week) after the subsidence of inflammation.

Indeed, in patients with the haptoglobin type Hp 1-1, the average CRP content (which was elevated in 84.6% of patients) was – 39.19+4.22 mg/L, in patients with the haptoglobin type Hp 2-1 (which was high in 89.5% of patients) – 44.18+1.59 mg/L, in patients with the haptoglobin type Hp 2-2 (which was elevated in 96.3% of patients) – 80.15±6.76 mg/L ($P<0.02$ and $P<0.01$). At the same time, we established a correlation between the activity of the pathological process, high values of CRP, ESR, and the carriage of haptoglobin.

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