THE PREVALENCE OF ANEMIA IN KIDNEY AND LIVER DISEASES

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РАСПРОСТРАНЁННОСТЬ АНЕМИИ ПРИ ЗАБОЛЕВАНИЯХ ПОЧЕК И ПЕЧЕНИ

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Аннотация. Цирроз печени и хронический гломерулонефрит представляют серьёзную проблему медицины в связи с тяжестью заболевания и широкой распространённостью. Параллельно увеличивается и частота осложнений этих заболеваний, в частности анемия. Анемия – это клинико-гематологический синдром, характеризующийся снижением концентрации гемоглобина и эритроцитов в единице объёма крови [1, 4, 6]. Вне зависимости от формы анемии и причины ее развития результатом заболевания является недостаточное обеспечение организма кислородом, следовательно, гипоксия.

Поэтому важным является изучение патогенетического варианта анемии для назначения адекватной терапии конкретному пациенту.

Ключевые слова: цирроз печени, гломерулонефрит, анемии, сахарный диабет, распространённость.

Annotation. Cirrhosis of the liver and chronic glomerulonephritis are a serious medical problem due to the severity of the disease and its widespread occurrence. In parallel, the frequency of complications of these diseases, in particular anemia, is increasing. Anemia is a clinical and hematological syndrome characterized by a decrease in the concentration of hemoglobin and erythrocytes per unit volume of blood [1, 4, 6]. Regardless of the form of anemia and the cause of its development, the result of the disease is insufficient oxygen supply to the body, hence hypoxia. Therefore, it is important to study the pathogenetic variant of anemia in order to prescribe adequate therapy to a particular patient.

Key words: cirrhosis of the liver, glomerulonephritis, anemia, diabetes mellitus, prevalence.

Introduction. The incidence of anemia is extremely high. Statistical calculations by various researchers on the prevalence of anemia vary within fairly significant limits: it is estimated to affect from 10 to 25% of the world's population [2, 12]. Approximately half of patients with chronic liver and kidney diseases suffer from anemia [1, 5].

The causes of anemia are diverse. Certain forms of anemia do not require complex differential diagnosis, and are well corrected by drug therapy. In some cases, the diagnosis can only be established by using time-consuming diagnostic methods, and simplifying and neglecting the details of the patient's examination entails inadequate or ineffective treatment [2, 7, 18].

Hypochromic microcytic IDA accounts for more than 80% of all forms of anemia. The highest incidence of IDA may explain the motivation of the doctor to make an ill-considered conclusion about the possible cause of a decrease in hemoglobin in the patient's blood and the wrong choice of therapy. Diagnostic errors are usually associated with insufficient use of the results of a detailed laboratory assessment and limited interest only in the level of hemoglobin, erythrocytes and serum iron [3, 17, 19].

Performing a complete clinical blood test is a necessary first step determining the diagnostic search for the nosological form of anemia. The determination of the pathogenetic variant of anemia allows us to establish the main mechanism of anemia development in a particular patient [1, 9, 10]. Diagnosis of anemia is one of the simplest tasks, however, practice shows that hemoglobin reduction is often ignored. When assessing the case histories of inpatient patients, only a small percentage of patients

had a decrease in hemoglobin reflected in the diagnosis. Anemia and hypoxia are factors that worsen the patient's condition and the effectiveness of therapy [2, 15, 16].

The aim of the study was to study the prevalence of anemia and identify its leading pathophysiological features in patients with chronic glomerulonephritis, type I diabetes mellitus, and cirrhosis of the liver.

Material and methods. The study included 165 patients. The main group included 96 patients with anemia in the general blood test. The main group of patients was divided into three groups, according to the diagnosis: patients with type I diabetes mellitus - 32 patients (men - 9, women - 23), the average age of patients was 36.5 ± 16.5 years; patients with cirrhosis of the liver - 38 patients (men - 14, women - 24), the average age of patients - 49 ± 18 years old; patients with chronic glomerulonephritis - 26 patients (men - 11, women - 15), average age -42 ± 24 years.

The comparison group consisted of patients with the same diagnoses, but not burdened with anemia. Patients with type I diabetes mellitus - 20 patients (men -10, women - 10), the average age of patients was 41 ± 18 years; patients with cirrhosis of the liver - 20 patients (men - 11, women - 9), the average age of patients - 50.5 ± 18 years; patients with chronic glomerulonephritis - 29 patients (men - 11, women -18), the average age is 43.5 ± 22.5 years. The diagnosis was made by the attending physicians.

Venous blood samples from patients with a confirmed diagnosis were used. In patients, the indicators of the general blood test (UAC), the concentration of serum iron, BCC, ferritin, transferrin, erythropoietin were evaluated.

The results and their discussion. To study the prevalence of anemia in chronic glomerulonephritis, cirrhosis of the liver and type I diabetes mellitus, archival data of patients were analyzed. As a result, it was found that out of 172 patients with cirrhosis of the liver (64 men and 108 women), anemia was detected in 84 patients (48.8%). It should be noted that anemia was more common in women and amounted to 75% (63 patients) than in men - 25% (21 patients). Of the 293 patients with type I diabetes mellitus (136 men and 157 women), anemia was found in 68 patients (23.2%), of which 56 women (82%) and 12 men (18%). Of 453 patients with chronic glomerulonephritis (286 men and 167 women), anemia was observed in 137 patients (30.2%). Anemia in this case was detected in 86 women (62.5%) and 51 men (37.5%).

According to the volume of erythrocytes, anemia in the group of patients with chronic glomerulonephritis was distributed as follows: microcytic anemia was diagnosed in 11 patients (42.3%), normocytic anemia was detected in 13 patients (50.0%) and macrocytic anemia was detected in 2 patients (7.7%). In the examined patients with diabetes mellitus, microcytic anemia was diagnosed in 21 patients (65.6%), normocytic anemia was detected in 11 patients (34.4%). In patients with cirrhosis of the liver, microcytic anemia was diagnosed in 19 patients (50.0%),

normocytic anemia was detected in 16 patients (42.1%), macrocytic anemia in 4 patients (10.5%).

In the process of studying anemia and iron metabolism indicators of iron metabolism indicators (serum iron concentration, OHSS, ferritin, transferrin), it was found that in chronic glomerulonephritis, the leading place belongs to AHZ -46.2%, IDA accounted for 26.9%, AHZ combined with IDA was detected in 23.1%, megaloblastic anemia was detected in 3.8%. It was revealed that anemia in patients with chronic glomerulonephritis can be observed almost equally with both normal and reduced values of serum iron, ferritin and transferrin.

Iron deficiency anemia prevails in cirrhosis of the liver - 31.6%, anemia of chronic diseases was detected in 26.3% of patients, megaloblastic anemia accounted for 13.2% (megaloblastic anemia was diagnosed based on bone marrow puncture). A direct relationship was found between the level of hemoglobin in the blood with the level of iron ($x2 = 6.740$; $p = 0.009$), ferritin ($x2 = 6.920$; $p = 0.008$) and transferrin saturation ($x2 = 4.194$; $p = 0.041$).

In diabetes mellitus, the leading place also belongs to IDA - 37.5% and anemia of chronic diseases - 28.1%. Anemia was detected in 18.8% against the background of iron overload. A direct relationship was found between the level of hemoglobin in the blood and the level of iron ($x2 = 5.85$; $p = 0.05$), ferritin ($x2 = 7.16$; $p = 0.04$), and transferrin saturation ($x2 = 6.921$; $p = 0.009$).

In patients with cirrhosis of the liver with anemia, EPO indicators were significantly higher, i.e., in response to oxygen deficiency in kidney tissues, erythropoietin production increased.

In patients with chronic glomerulonephritis, EPO indicators in the main group and the comparison group practically did not differ and were within the normal range. It should be noted that the concentration of EPO in the main group averaged 14.13 ± 6.99 IU/l, i.e. there is no adequate response of EPO to hypoxia.

In patients with diabetes mellitus in the main group, there was a significant decrease (by 2 times) EPO compared with patients in the comparison group (the range of EPO fluctuations in the main group was 2.2-34.2 IU/l, in the comparison group - 5.8-58.0 IU/l). A direct relationship was found between the level of hemoglobin in the blood and the level of erythropoietin ($x2 = 7,738$; $p = 0.005$). The assumption of the presence of inadequate EPO production is confirmed by the absence of an increase in serum erythropoietin concentration with a decrease in hemoglobin levels, and with the increase in CRF and the severity of anemia, the concentration of EPO in the group of diabetic patients significantly decreased. When comparing the data obtained in patients with HCG and DM, it follows that in diabetic nephropathy, EPO-synthesizing interstitial cells are damaged and destroyed earlier than in nondiabetic nephropathy, which corresponds to the literature data [2, 8, 19].

Latent iron deficiency may be the only sign of iron deficiency. When analyzing iron reserves in patients of the control groups, 33 patients (47.8%) revealed latent iron deficiency of varying severity, which was manifested by a change in the concentration of iron and ferritin in the blood serum compared with the norm. From the data shown in the table, it follows that out of 69 patients in the control group, 16 subjects (23.1%) have a latent iron deficiency, which, in the absence of correction, will turn into iron deficiency anemia. In 4 patients, prelatent iron deficiency was revealed with normal serum iron values of 8.63 ± 0.57 mmol/l and reduced ferritin - 8.9 ± 0.69 ng/ml; in 12 patients, latent iron deficiency was revealed, characterized by low serum iron values - 6.5 ± 0.47 mmol/l and reduced ferritin levels - 8.98 ± 1.4 ng/ml. In 17 subjects (24.6%), a reduced serum iron level of -7.1 ± 1.77 mmol/l (range of fluctuations: from 5.0 to 10.2 mmol/l) was noted against the background of normal or elevated ferretin levels - 79.5 ± 69.3 ng/ml (range of fluctuations: from 25.0 to 228.0 ng/ml). This is due to the fact that ferritin belongs to the "acute phase" proteins, and an increase in serum ferritin (CF) can be regarded as a cytoprotective response designed to extinguish inflammatory and oxidative stress reactions. In our case, this is confirmed by an increase in CRP in this group of patients. The increased ferritin content in these patients correlates with the levels of C-reactive protein. From the data obtained, it follows that with an increase in CRP by 1 g /l, the concentration of serum ferritin increases by 7.78.

Conclusion. The development of anemia in patients with chronic liver and kidney diseases can be considered a natural consequence of structural and functional disorders in the epithelium of the tubules and the stroma of the kidneys. In this category of patients, anemia should be regarded as an unfavorable prognostic factor.

Based on the studies of serum iron, ferritin, transferrin, OHSS, transferrin saturation with iron, it was revealed that iron deficiency anemia and anemia of chronic diseases occupy a leading place in cirrhosis of the liver, chronic glomerulonephritis and diabetes mellitus.

For the diagnosis and further control of anemia in patients with chronic glomerulonephritis, cirrhosis of the liver, type I diabetes mellitus, it is necessary to differentiate anemia based on morphological and kinetic classification of anemia according to the following algorithm:

1. An analytical blood test is required to establish the morphological type of anemia: micro-, normal- or macrocytic.
2. Counting the absolute number of reticulocytes: hyporegenerative or regenerative
3. Examination of serum iron.
4. Study of OHSS, ferritin, transferrin, transferrin saturation with iron, C-reactive protein for the purpose of differential diagnosis of IDA and AHZ.
5. In the absence of changes in iron metabolism, it is necessary to study the metabolites of erythropoiesis (vitamin B12, folic acid).

6. In some cases, the study of erythropoietin levels.
7. Determination of the volume and examination to determine the cause of deficiency of erythropoiesis metabolites.

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