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THE COURSE OF IRON DEFICIENCY ANEMIA IN CHILDREN

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Abstract:
Iron deficiency anemia (WAIT) is an acquired disease from the group of deficiency anemia; accompanied by microcytic, hypochromic, normoregenerative anemia; clinically manifested by a combination of sideropenic and anemic syndromes. IDA includes the following nosological forms having the corresponding codes of the International Statistical Classification of Diseases and Health-Related Problems, 10th revision (ICD-10): IDA (D50), chronic posthemorrhagic anemia (D50.0), anemia complicating pregnancy, childbirth and the postpartum period (O99.0), currents, iron deficiency anemia, children

Keywords: anemia, children, treatment. Diagnostics.

INTRODUCTION

In childhood, accounts for 90% of all anemia. It occurs in all countries of the world, but its prevalence depends on socio-economic conditions, income of the population, the nature of nutrition and other factors. Infants and young children, adolescents, women of childbearing age, pregnant and nursing women are at the greatest risk of developing IDA [1]. Table 1 shows the prevalence of hemoglobin (Hb) in various age groups in developed and developing countries. According to WHO experts, if more than 40% of the population has cancer, the problem ceases to be medical and requires a decision at the state level [1].

Etiology OF Waiting The main cause of iron deficiency in the human body, according to WHO experts, is improper (inadequate) nutrition. Much less often, IDA develops as a result of worm infestations or as a result of chronic posthemorrhagic anemia.

The main causes of IDA in children and adolescents:

• iron deficiency at birth (fetoplacental transfusion);

• alimentary iron deficiency due to unbalanced nutrition;

• iron losses from the body exceeding physiological (bleeding of various etiologies, including copious menstrual blood loss, postpartum anemia).

• Alimentary-dependent factors in the development of iron deficiency in children are [2]: insufficient intake of iron with food (exclusive breastfeeding over the age of 4 months, late introduction of complementary foods, unbalanced nutrition, vegetarianism);

• reduced iron absorption;

• Pathogenesis of IDA

IDA is a group of anemic conditions of various etiologies, the main pathogenetic factor in the development of which is iron deficiency in the body (sideropenia). As a result of iron deficiency in the body, Hb synthesis is disrupted and its content in red blood cells decreases. Can the number of red blood cells will also decrease somewhat. Since the number of red blood cells and the content of Hb decrease unevenly, erythrocyte hypochromia develops, which reflects a

reduced color indicator (CP). Violation of Hb formation leads to a decrease in erythrocyte indices — the average volume of erythrocytes (MCV) and the content of Hb in erythrocytes (MCH). Anisocytosis becomes pronounced (due to the presence of small red blood cells). Erythroid hyperplasia with a predominance of polychromatophilic or oxyphilic normoblasts is detected in the bone marrow. The number of erythroid cells containing hemosiderin sharply decreases. Depletion of iron reserves leads to a disorder of redox reactions in tissues, which causes damage to the skin, mucous membranes, gastrointestinal dysfunction, and a decrease in the activity of many enzymes containing iron.

• Clinical manifestations

• The development of IDA is preceded by latent iron deficiency, which does not have an independent ICD-10 code, but is characterized by the presence of sideropenic syndrome (Table 2). Clinical manifestations of IDA are a combination of two syndromes - sideropenic and anemic [3, 4] (see Table 2). It is believed that the presence of 4 or more of these symptoms is pathognomonic for latent iron deficiency and IDA [5]. Anemic syndrome is associated with a decrease in Hb concentration and accompanies anemia of any genesis. Clinical manifestations depend on the severity of anemia. In patients with mild or moderate anemia, bright symptoms are often absent. With the rapid development of anemia, compensatory mechanisms do not have time to form, which means that clinical manifestations will be more pronounced than with a disease of the same severity, but developing gradually.

with vitamin B12 deficiency). The main distinguishing feature of folic acid and vitamin B12 deficiency is the macrocytic nature of anemia (MCV > 120 fl). In addition, there is a decrease in the concentration of Hb, the number of erythrocytes, hematocrit (Ht), pancytopenia (a decrease in the number of erythrocytes, leukocytes, platelets), hypersegmentation of neutrophil nuclei (5- and 6-lobed nuclei), the presence of megaloblasts in the bone marrow and its hypercellularity [4]. In difficult cases, it is necessary to determine the concentration of folic acid in the blood serum (norm - 7.2—15.4 ng /ml) and red blood cells (norm – 125-600 ng /ml), as well as the concentration of vitamin B12 in the blood serum (norm — 208-964 pg/ml). Differential diagnosis is also carried out between IDA and anemia in chronic diseases (AHB). The main causes of the development of AHB: chronic infections (tuberculosis, sepsis, osteomyelitis, HIV/AIDS); autoimmune diseases (rheumatoid arthritis, systemic lupus erythematosus, inflammatory bowel diseases — ulcerative colitis, Crohn's disease); diabetes mellitus; chronic liver diseases (hepatitis, cirrhosis), kidneys; malignant neoplasms [10]. The key mediator of AHB is hepcidin — humoral regulator of iron metabolism. Inflammation causes macrophages to produce a proinflammatory cytokine, interleukin 6, which stimulates hepatocyte production of hepcidin. This protein, in turn, blocks the absorption of iron in the small intestine and the release of iron from the depot, contributing to its accumulation in macrophages, which leads to a decrease in serum iron concentration and the development of anemia [11, 12].

Consequences of iron deficiency

• Iron deficiency can lead to long-term and irreversible consequences. The most serious of them at an early age is the delay of psychomotor development and cognitive impairment [6, 7]. Such children do poorly in school and have more problems with behavior in middle age. Iron

deficiency can also lead to a delay in sexual development, cause chronic fatigue syndrome, affect the immune status, increase the risk of infectious diseases, disrupt the functioning of the gland of older children and adults as a result of iron deficiency, memory clearly and significantly deteriorates, there are shifts in the psyche, especially in late-formed ones elements (for example, the desire for collective communication, the establishment of friendly relations, the ability to forgive petty insults). As a result, the isolation of the individual arises, unjustified lack of compromise, nervousness and irritability increase

Criteria for laboratory diagnostics of IDA

There are 3 options for laboratory diagnostics of IDA:

• clinical blood test performed by the "manual" method;
• blood analysis performed on an automatic hematological analyzer;
• biochemical blood analysis.

In the clinical blood analysis performed by the "manual" method, they focus on a decrease in the concentration of Hb (< 110 g/l), a slight decrease in the number of red blood cells (< 3.8×1012/l), a decrease in CP (< 0.85), an increase in ESR (> 10-12 mm/h), a normal content of reticulocytes (1-2% or 10-20%). Additionally, the laboratory assistant describes the presence of anisocytosis and poikilocytosis of erythrocytes.

In a clinical blood test performed on an automatic hematological analyzer, changes can be detected not only in the above indicators, but also in a number of erythrocyte indices. The values of MCV (< 80 fl), MCH (< 26 pg) decrease, the average concentration of Hb in the erythrocyte is MCHC (< 320 g/l), the degree of erythrocyte anisocytosis is increased - RDW (> 14%). In addition, modern automatic hematology analyzers allow to determine the availability of functional iron. To do this, the proportion of hypochromic erythrocytes and the Hb content in the reticulate are determined. Under physiological conditions, the proportion of hypochromic erythrocytes is < 5% of the total number of erythrocytes. The Hb content in the reticulocyte > 28 pg indicates sufficient iron reserves for the synthesis of Hb and erythropoiesis.

Severity of the waiting

• Grade I (light) — Hb 110-90 g/l; Grade II (medium) — Hb 90-70 g/l;
• Grade III (severe) — Hb less than 70 g/l.

Treatment of the disease

The aim of the treatment of the disease is to eliminate the underlying cause of the disease (correction of nutrition, identification and elimination of the source of blood loss), and the elimination of iron deficiency in the body.

The basic principles of treatment WAIT.

It is impossible to compensate for iron deficiency without prescribing iron-containing drugs.

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