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IRON DEFICIENCY ANEMIA IN SCHOOL-AGE CHILDREN, OPTIMIZATION OF PREVENTION AND CORRECTION OF TREATMENT

Atajanova Shaira Khalilovna
Head of the Department of Pediatrics and Neonatology,
Docent, ASMI.

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Abstract:

Currently, the relevance of the problem of early diagnosis and adequate treatment of IDA in children is beyond doubt, since iron is involved in many vital processes: in redox and enzymatic reactions, hematopoiesis, supply of organs and tissues with oxygen. Iron deficiency can cause stunted growth and development in children, reduce performance, and contribute to an increase in the incidence of acute respiratory diseases. Early diagnosis, adequate therapy and prevention of IDA are the main components of a modern comprehensive approach to the treatment of anemia to ensure the health of children.

Keywords: iron deficiency anemia, iron-containing drugs, iron bioavailability, method.

INTRODUCTION

Anemia is a clinical and hematological syndrome characterized by a decrease in the level of hemoglobin per unit volume of blood, sometimes with simultaneous decrease in the number of red blood cells. Iron deficiency anemia is a currently common disease in childhood, which is based on iron deficiency in the depot. In practical work, pediatricians can use WHO criteria for diagnosing IDA: a) a decrease in hemoglobin level below 110 g/l under the age of 5 years; below 115 g/l – from 5–11 years; below 120 g/l – from 12–14 years and older; less than 130 g/l – over 15 years of age with a simultaneous decrease in serum iron level of less than 10 μmol/l, b) transferrin saturation index with iron less than 15%, c) decrease in serum ferritin less than 12 ng/ml [1].

MATERIALS AND METHODS

Among the common causes of iron deficiency are the body's increased need for iron and folic acid; insufficient intake of iron into the body from food; impaired absorption of iron in the intestines; chronic blood loss [2]. In newborns, the main cause of IDA is anemia or latent iron deficiency in the mother during pregnancy. In young children, irrational feeding (exclusively with milk) [3]. In adolescent girls, anemia can develop due to iron deficiency in the mother during pregnancy, as well as during periods of intensive growth and with the appearance of menstrual blood loss [4]. Groups at risk for developing IDA include children born prematurely or full-term but low birth weight, as well as adolescents, since an increased need for iron against the background of rapid growth, physical development, and puberty can lead to the development of iron deficiency.

RESULTS AND DISCUSSION

Clinical manifestations of IDA. There are usually two forms of iron deficiency states (IDC):

1. Latent iron deficiency (LDI), in which there is a decrease in the level of stored and transport iron in the blood with normal levels of hemoglobin and red blood cells.

2. IDA – hypochromic microcytic anemia due to iron deficiency in the blood serum, bone marrow and depot with a simultaneous decrease in the level of hemoglobin and (or) red blood cells.

In practice, it is convenient for doctors to use the IDA classification according to the stages of anemia development and severity [3].

IDA classification by stages:

Stage I – loss of iron exceeds its intake; a gradual depletion of its reserves occurs and the absorption of iron in the intestine compensatory increases.

Stage II – depletion of iron reserves. Decreased erythropoiesis.

Stage III – development of mild anemia with a slight decrease in the saturation of erythrocytes with hemoglobin.

Stage IV – severe anemia with a clear decrease in the saturation of red blood cells with hemoglobin.

Stage V – severe anemia with circulatory disorders and tissue hypoxia.

IDA classification by severity: mild (Hb content 120–90 g/l); medium (90–70 g/l); heavy (less than 70 g/l).

Among the clinical syndromes, there are several that are most significant for diagnosis:

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1. Sideropenic syndrome, which includes all metabolic, adaptive and functional disorders in the form of changes in the skin, hair, nails; dysfunction of the gastrointestinal tract; muscle hypotension; addiction to unusual smells; perversion of taste (the desire to eat something inedible); tachycardia, hypotension; changes in the nervous system.

2. Anemic (circulatory-hypoxic) syndrome, manifested by a deficiency of hemoglobin in erythrocytes and a decrease in the number of erythrocytes in the peripheral blood, impaired respiratory function of the blood, oxygen transport with the development of tissue hypoxia.

Diagnosing IDA is usually straightforward. However, from our point of view, it is necessary to carry out a differential diagnosis of IDA with other types of anemia, especially in iron deficiency syndrome [5]. To diagnose IDA, there is a set of laboratory tests that reflect iron metabolism: erythrocyte indices, ferritin, free erythrocyte protoporphyrin, serum iron, serum transferrin receptor, calculated transferrin saturation index. A decrease in stored iron reserves can be judged by the level of serum ferritin. When the ferritin level is less than 20 ng/ml, latent iron deficiency is diagnosed, and a decrease in ferritin less than 12 ng/ml indicates iron deficiency. When the transferrin saturation index decreases below 15%, the supply of iron to the bone marrow becomes insufficient for synthesis. Currently, one of the highly specific indicators of iron metabolism is the level of soluble transferrin receptor (s-TGF) in the blood serum. It is determined on cells with intensive division and reflects the proliferative ability of erythrocytes [2]. To assess iron status, you can use a calculated indicator - p-TGF index (the ratio of p-TGF level to log ferritin), an increase in which reflects the depletion of iron reserves. In peripheral blood tests, quite early, even against the background of normal hemoglobin levels and the number of red blood cells, signs of morphofunctional disorders of red blood cells appear - anisocytosis and hypochromia. The use of serum iron levels in the diagnosis of IDA is very limited, since it is subject to significant fluctuations during the day, depending on gender and age, as well as the presence of inflammation in the body. Other serum parameters of iron metabolism: serum iron-binding capacity, transferrin level are less sensitive, labile and therefore not sufficiently informative for the doctor.

Treatment of iron deficiency anemia. Treatment of IDA

is based, firstly, on eliminating the cause underlying the development of anemia, and secondly, on replenishing iron deficiency in the body. It is impossible to restore iron reserves without prescribing iron supplements (IDs). Basic principles of treatment for IDA:

1. Use predominantly oral iron supplements.
2. Prescription of adequate doses of LPG, which are calculated for each specific patient individually, taking into account his body weight, the severity of anemia and the results of laboratory diagnostics.
3. The duration of treatment with iron supplements should be sufficient: depending on the severity of anemia, it ranges from 3 to 6 months.
4. Therapy for iron deficiency anemia should not be stopped after normalization of hemoglobin levels.
5. If oral drugs are ineffective or it is impossible to use them, drugs for parenteral administration are used.
6. Blood transfusions for iron deficiency anemia should be carried out only for health reasons.

CONCLUSION

Modern diagnostic methods, allowing the use of a differential diagnostic algorithm to assess anemic syndrome, in combination with the rational use of iron supplements, can significantly improve the well-being and quality of life of children with iron deficiency, as well as contribute to the timely prevention of the development of iron deficiency in risk groups to eliminate the negative consequences of iron deficiency on child health.

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