

## CARDIOHEMODYNAMIC DISORDERS IN PREGNANT WOMEN WITH IRON DEFICIENCY ANEMIA

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**Abstract.** *This article outlines scientific research on the study and prevention of cardiohemodynamic views on pregnant women with iron deficiency anemia.*

**Keywords:** *iron deficiency anemia, active myocarditis, heart defects, arterial hypertension, hemodynamic disorders, pregnant women.*

**Introduction.** Not always, however, the body's adaptive and compensatory reserves are sufficient to maintain such blood circulation, and at some stage during pregnancy, especially during labor, severe heart failure develops, often resulting in death. Such outcomes most often develop when pregnant women have active myocarditis, heart defects, or arterial hypertension. Hemodynamic disturbances and the course of pregnancy and childbirth in these diseases have been studied quite well [1]. There are consensus recommendations from experts from the European Society of Cardiology for the management of pregnant women with such diseases.

Less studied are the issues of the course of pregnancy and childbirth with metabolic lesions of the heart associated with extragenital diseases. The most common extragenital disease of pregnant women is iron deficiency anemia (IDA). According to WHO reviews, about 20% of deaths in pregnant women are associated with anemia [2]. One of the latest reviews on this issue noted that anemia as a direct cause of death occurred in an average of 10% of pregnant women (range from 1 to 46%) [3].

In conditions of low prevalence of IDA, its metabolic and hemodynamic consequences are more conservative. Therefore, the problem of IDA in pregnant women has always received sufficient attention [4]. The state of the CVS in patients with IDA, including pregnant women, as well as those who are sufficiently trained [5]. However, there is no unanimity of views. So, V.Kh. Vasilenko[6] note a decrease in myocardial contractility in patients with IDA, and M.M. Shekht presence man [7] denies hemodynamic changes in them characteristic of heart failure.

A number of issues regarding this problem remain unresolved. In particular, there is no answer to the question about the role of the degree of anemia on the development of certain clinical and hemodynamic disorders, although it is a priori assumed that the more severe the anemia, the more serious its consequences for the cardiovascular system should be. Also, the question remains unclear about possible options for changes in hemodynamics during IDA in multiparous, including multiparous women [8]. The views of researchers also remain ambiguous on the possibility of timely, before the onset of labor, correction of hematological and hemodynamic abnormalities in pregnant women with severe IDA.

The effectiveness of the use of vitamin-mineral complexes in the correction of iron deficiency

Reactivation of cytomegalovirus infection increases the risk of complicated pregnancy with the threat of miscarriage in the first (35.71%), in the second (64.28%) and third trimesters

(60.7%), the development of fetoplantar insufficiency (64.28%), and an increase in respiratory diseases (50%).

Active replication of cytomegalovirus during pregnancy leads to the development of iron deficiency anemia in the first (42.8%), second (75%) and third (92.8%) trimesters with depletion of tissue and transport iron stores with the formation of IDA II degree in 32 % women. Viral replication (DNA CMV+) correlates with levels of decreased serum iron ( $r=-0.89$ ) and ferritin ( $r=-0.78$ ).

Differences in the quality of health of children born from pregnant women with indication of DNA CMV in the blood have been established, manifested in the early neonatal period by a low Apgar score (85.6%), decreased body weight (73.8%), deterioration in physical development indicators below average (56.5%), the formation of connective tissue dysplasia syndrome (95.6%), abnormal chordae of the left ventricle (78.2%), mitral valve prolapse (17.3%) and congenital heart defects (8.6 %). General patterns of iron metabolism disorders in the “mother and child” system were identified in the replicative form of cytomegalovirus infection in the form of anemia in 84.8% of mothers and 85.9% of their offspring. In lactating women, a deterioration in the quality of breast milk with a decrease in the level of the essential microelement iron and lactoferrin has been established.

The influence of the social status of the family and the nutritional status of the pregnant woman in the formation of anemia (87.8%) and the depletion of the diet of pregnant women in terms of consumption of meat, fish, lactic acid products, fruits and vegetables in families with low material income has been proven, which increases the frequency of diagnosis replicative form of CMV infection three times.

Prescription of antiviral and immunotropic drugs (acyclovir, viferon) in lactating women and children with indication of DNA CMV in the blood is accompanied by a decrease in the indication of cytomegalovirus to 10.5% in mothers and 8.3% in children, the frequency of iron deficiency anemia by 2.5 times in women and 2.3 times in children, and restoration of iron metabolism, the level of lactoferrin and iron in breast milk.

The advantages of prenatal vitamin and mineral correction in the formation of quality indicators of the health of offspring born from healthy and infected women have been proven. The introduction of preventive technologies made it possible to increase the birth of children of health group II from 5.2% to 42.8% of women with CMV markers, and in healthy women to 81.8% and to restore the parameters of iron metabolism in the “mother and child” system.

#### Practical recommendations

1. The list of diagnostic studies for pregnant women with IDA must be supplemented with a mandatory echocardiographic study for the early detection of cardio dynamic disorders for the purpose of their timely correction.

2. Three-week ferro therapy in pregnant women with IDA improves hematological parameters, but is not sufficient to correct cardio hemodynamic changes, and therefore its prolongation for longer periods is recommended.

3. The data obtained on the state of iron metabolism in lactating mothers who took prenatal vitamin and mineral supplements and their offspring are the basis for the introduction of preventive health-saving technologies during pregnancy to correct iron metabolism disorders in the “mother and child” system and restore the physical health of children.

4. For verification and early diagnosis of latent forms and iron deficiency anemia, in pregnant, lactating women and children, an in-depth examination of the state of iron metabolism is necessary: transport (TG) and reserve funds (SF), hemoglobin, red blood cells, average volume of red blood cells, average hemoglobin content in red blood cells, lactoferrin and iron in breast milk.

5. For children born to mothers with replicative CMV infection, the examination program should be supplemented with ultrasound diagnostics of the cardiovascular system and an electrocardiogram to resolve issues of clinical examination and follow-up with a cardiologist, infectious disease specialist and pediatrician:

6. Prescription of antiviral and immunotropic drugs (acyclovir, viferon) in complex therapy for lactating women and children with indication of DNA CMV in the blood leads to a decrease in the frequency of cytomegalovirus indication to 10.5% in mothers and 8.3% in children, and the incidence of iron deficiency anemia 2.5 times in mothers and 2.3 times in children.

7. In families with a low social level and the absence of ICH preventive technologies, the quality of life of pregnant women and their offspring worsens and the risk of developing iron deficiency conditions in pregnant women increases by 27.3%. The limited possibilities of a family's diet are the basis for the introduction of vitamin and mineral subsidies at the stage of preconception preparation, pregnancy and lactation.

8. In promoting health-saving technologies and the mentality of the foundations of a healthy lifestyle, it is necessary for pediatricians, obstetricians-gynecologists, nutritionists, and therapists to pay attention to preventive and educational work at the family and state levels to eliminate the information deficit of knowledge among the population and create a school for pregnant women.

**Conclusions:** Pregnant women with mild to moderate iron deficiency anemia experience high cardiac output syndrome. In severe cases, there is a decrease in the contractile ability of the myocardium, manifested by a decrease in end-diastolic volume, end-systolic volume, stroke volume and stroke index in relation to moderate anemia [9]. In healthy pregnant women, a phase syndrome of hyperdynamia is observed, and in pregnant women with severe IDA, a phase syndrome of myocardial hypodynamia is observed. In multiparous women, both during and outside of pregnancy, subclinical manifestations of a decrease in the contractile function of the heart are observed in the form of a relative decrease in the ejection fraction and an increase in the end-diastolic volume of the left ventricle, which is confirmed by the phase syndrome of physical inactivity identified in them [8,10].

In non-pregnant women with iron deficiency anemia, successful ferro therapy is accompanied by a statistically significant decrease in the indicators of high cardiac output syndrome observed in them before treatment [11].

In pregnant women, unlike non-pregnant women, three-week effective ferro therapy does not lead to significant changes in hemodynamic parameters. They retain high cardiac output syndrome, which is characteristic and necessary for the normal course of pregnancy.

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