



## Iron Deficiency Anemia in Pregnant Women: Clinic Manifestation and Complication

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**Abstract:** Anemia during pregnancy. Anemia is understood as a decrease in the level of hemoglobin in the blood. During pregnancy, the amount of fluid in a woman's body increases, and therefore the volume of circulating blood. Due to this, the blood "liquefies" and the proportion of hemoglobin in its total volume decreases. This is considered a normal phenomenon, and therefore the lower limit of the amount of hemoglobin during pregnancy is set at 110 g / l (with a norm for a non-pregnant woman of 120-140 g / l). But a further drop in hemoglobin levels is dangerous for the health and even the life of the expectant mother. The threat of termination of pregnancy, gestosis, lowering blood pressure, premature placental abruption, delayed fetal development and premature birth are the most common complications of anemia during pregnancy. During pregnancy, iron is consumed not only for the hematopoiesis of the mother, but also for the needs of the fetus. This consumption increases especially actively at 16-20 weeks, when the process of hematopoiesis in the fetus starts. By the end of pregnancy, iron reserves are depleted in any woman and it takes 2-3 years for their full recovery. So anemia during pregnancy is by no means a harmless condition. It has serious consequences for both the mother and the fetus.

**Keywords:** iron deficiency anemia, treatment, outcomes of pregnancy and childbirth.

**Relevance.** To date, iron deficiency anemia is one of the most important health problems worldwide. This pathology is especially relevant in women during pregnancy due to its high prevalence. According to numerous studies, the frequency of anemia in pregnant women ranges from 20% to 30%, among which about 90% is due to iron deficiency. Iron deficiency anemia is a total organ pathology that leads to functional and morphological changes in all organs and tissues of both mother and fetus. Iron is an essential trace element that provides systemic and cellular aerobic metabolism and oxidative-restorative homeostasis. It also supports immune resistance, contributing to the normal functioning of cellular and local immunity, full-fledged phagocytosis, interleukin production, and synthesis of interferon and lysozyme. Iron deficiency anemia significantly worsens the course of pregnancy and childbirth: 44-48% of pregnant women develop gestosis, 14-40% have premature labor, hypotension and weakness of labor activity are noted in 10-15% of women, and 90-94% have toxicosis in the first half of pregnancy. Iron deficiency during pregnancy can lead to various fetal pathologies, such as prematurity, impaired immunity, delayed mental and physical development, increased risk of neonatal infections.

The aim of the work is to analyze the dynamics of clinical indicators in pregnant women in the first, second and third trimesters, as well as to evaluate the results of treatment with iron-containing drugs.

2 Tasks.

1. To study hematological and ferrokinetic parameters of peripheral blood in pregnant women in the first, second and third trimesters. 2. Compare the dynamics of peripheral blood indicators in pregnant women of the first and second groups.

3. To evaluate the dynamics of therapy in the treatment of iron-containing drugs, as well as to analyze their tolerability and side effects.

**Materials and methods.** The work is based on clinical and laboratory studies of 87 pregnant women registered in the Navoi Maternity Complex from 2021 to 2022.

Pregnant women were divided into two groups: the first group: 48 pregnant women without anemia; the second group: 39 pregnant women with mild anemia. All pregnant women in the first, second and third trimesters, after receiving their informed consent, were analyzed for hematological and ferrokinetic parameters of peripheral blood. All pregnant women included in the study met the following criteria: women aged 18 to 30 years without any concomitant pathologies and/or chronic diseases; the absence of anemia or the presence of mild iron deficiency anemia; without the presence of pregnancy complications and fetal pathologies.

**Results and their discussion.** During the study, it was found that all pregnant women develop signs of iron deficiency, most pronounced in the second trimester and progressing towards the end of pregnancy. Comparative characteristics of hematological and ferrokinetic parameters of pregnant women without iron deficiency anemia in the first, second and third trimester showed the following results. The number of red blood cells in the first trimester was  $3.9 \pm 0.2 \times 10^{12}/l$ ,  $3.8 \pm 0.3 \times 10^{12}/l$  in the second and  $3.7 \pm 0.2 \times 10^{12}/l$  in the third trimester. Hemoglobin indicators are the same decreased during pregnancy:  $124.0 \pm 7.4$  g/l,  $115.7 \pm 8.2$  g/l and  $117.5 \pm 7.6$  g/l in the first, second and third trimesters, respectively. There was also a slight decrease in hematocrit from  $32.7 \pm 1.2\%$  in the first trimester to  $30.9 \pm 1.6\%$  in the third. In the second trimester, the hematocrit level was  $31.9 \pm 1.6\%$ . The average volume of red blood cells was as follows:  $86.2 \pm 3.8$  fl (femtoliters) in the first semester,  $82.1 \pm 3.7$  fl in the second and  $82.0 \pm 3.6$  fl in the third trimester. The average hemoglobin content in the erythrocyte was  $31.1 \pm 1.2$  pg (picogram),  $30.7 \pm 1.1$  pg and  $29.5 \pm 1.0$  pg in the first, second and third trimesters, respectively. Indicators 3 of the average concentration of hemoglobin in the erythrocyte increased in the second trimester  $32.1 \pm 0.9$  g/dl (gram/ deciliter) relative to the first trimester  $31.7 \pm 1.5$  g/dl, but then decreased again and amounted to  $30.1 \pm 0.3$  g/dl. The level of erythrocyte anisocytosis was reduced from  $14.1 \pm 0.8\%$  in the first trimester to  $13.7 \pm 1.1\%$  and  $13.0 \pm 1.5\%$  in the second and third trimesters, respectively. A ferrokinetic indicator was also studied – serum ferritin, the level of which in the first trimester was equal to  $16.5 \pm 8.0$  ng/ml (nanograms/ milliliter), in the second –  $10.8 \pm 3.3$  ng/ml, and in the third –  $11.8 \pm 7.5$  ng/ml. Hematological and ferrokinetic indicators of pregnant women with iron deficiency anemia had a slightly different dynamics relative to the indicators of healthy pregnant women. Erythrocyte counts in the first trimester were  $3.5 \pm 0.1 \times 10^{12}/l$ ,  $3.6 \pm 0.2 \times 10^{12}/L$  and  $3.8 \pm 0.2 \times 10^{12}/l$  in the second and third trimesters, respectively. The hemoglobin level had the following dynamics:  $102.1 \pm 3.8$  g/l (first trimester),  $109.4 \pm 9.4$  g/l (second trimester) and  $115.1 \pm 6.3$  g/l (third trimester). There was a tendency to increase hematocrit during pregnancy from  $28.2 \pm 0.5\%$  in the first trimester to  $29.6 \pm 1.0\%$  in the second, and then to  $30.6 \pm 0.8\%$  in the third. The average volume of red blood cells was as follows:  $78.4 \pm 1.5$  fl in the first semester,  $81.1 \pm 4.6$  fl in the second and  $82.0 \pm 3.6$  fl in the third trimester. The average hemoglobin content in the erythrocyte had the following values:  $25.8 \pm 0.3$  pg in the first,  $28.8 \pm 1.2$  pg in the second and  $29.5 \pm 1.1$  pg in the third trimester. The values of the average hemoglobin concentration in the erythrocyte gradually increased from  $350.6 \pm 7.7$  g/dl in the first trimester to  $366.6 \pm 10.1$  g/dl in the third trimester. In the second trimester, this indicator was  $367.0 \pm 13.6$  g/dl. The level of erythrocyte anisocytosis was reduced from  $15.0 \pm 1.24\%$  in the first trimester to  $14.2 \pm 0.5\%$  and  $13.0 \pm 5.7\%$  in the second and third trimesters. Data were also obtained in the dynamics of ferrokinetic parameters between the first and second groups. The serum iron index in women in the first group was  $13.7 \pm 5.6$  mmol/l, in the second —  $10.0 \pm 3.2$  mmol/l. The total iron binding capacity of serum and transferrin saturation coefficient of pregnant women in the first group were  $73.8 \pm 12.7$  mmol/l and  $19.0 \pm 10.4$  mmol/l; in the second group, these indicators were  $80.7 \pm 12.1$  mmol/l and  $13.8 \pm 5.3$  mmol/l, respectively. Treatment of pregnant women consisted of taking an

iron-containing drug at a dosage of 200 mg per day for two months. In 57% of women, subjective, objective and laboratory-clinical signs of iron deficiency anemia were stopped by the second trimester of pregnancy, in 78% — by the end of pregnancy. In general, the tolerability of the drug was satisfactory, but at the same time women complained of some side effects: diarrhea, nausea, pain in the upper third of the abdomen. Due to side effects, this drug was replaced with a similar mechanism of action.

### Conclusions.

1. All pregnant women develop signs of iron deficiency by the end of the third trimester, requiring preventive measures from the beginning of pregnancy.
2. During the treatment of iron deficiency anemia in pregnant women, compensation occurs by the end of the third trimester in the absence of formation of tissue iron reserves, which requires continued therapy with iron-containing drugs after the end of the lactation period.

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