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Pathophysiological Changes in the Body of Pregnant Women with Anemia

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Annotation: Anemia is a condition in which the number of red blood cells or hemoglobin in the blood is reduced. With anemia, the number of red blood cells and hemoglobin in the blood is reduced and the body does not receive enough oxygen (normal blood on the right, anemia on the left). Erythrocytes, or red blood cells, are the most numerous cells in the blood. Their main function is to transport oxygen from the lungs to the tissues. Red blood cells contain hemoglobin, which helps them transport oxygen. One hemoglobin molecule can bind up to four oxygen molecules.

Keywords: Anemia, pathogenesis, prevention, prognosis and treatment.

Introduction: With anemia, the number of red blood cells and hemoglobin in the blood decreases and the body does not receive enough oxygen (normal blood condition on the right, anemia on the left)

Erythrocytes, or red blood cells, are the most abundant cells in the blood. Their main function is to transport oxygen from the lungs to the tissues.

With anemia, tissues are less supplied with oxygen. Over time, hypoxia develops - oxygen starvation of the body.

During pregnancy, a woman's body undergoes serious restructuring: blood volume increases, the need for certain vitamins and trace elements increases, hormonal balance changes. The work of the hematopoietic system of the expectant mother is also restructured. Therefore, a decrease in the concentration of red blood cells in the blood, that is, anemia, is a very common condition during pregnancy.

However, it is important to distinguish between false or physiological anemia of pregnancy and true, pathological anemia.

Research methods and materials: Physiological anemia is associated with a disproportionate increase in the volume of individual components of the expectant mother's blood. During

pregnancy, the blood volume increases by 30-50% compared to before. Its total volume increases mainly due to plasma (the liquid part of the blood), and the concentration of cells, including red blood cells, does not increase much. Therefore, an imbalance arises: the number of red blood cells in the blood of a pregnant woman seems to have decreased, but in fact this is normal, there is simply more plasma. Physiological anemia of pregnancy is usually not considered a disease. Treatment is carried out only if hemoglobin in the first and third trimesters is below 110 g/l or in the second trimester below 105 g/l.

However, it is true that pathological anemia can also occur during pregnancy. This condition is dangerous for both mother and child, so it requires timely diagnosis and treatment.

Anemia in pregnant women is accompanied by a deterioration in health, which can be easily confused with other diseases: the truth is that this condition does not have specific symptoms.

With anemia, organs and tissues do not receive enough oxygen. Therefore, the pathology manifests itself with symptoms characteristic of hypoxia - oxygen starvation, such as fatigue, shortness of breath, and rapid heartbeat.

Anemia affects the condition of the skin, hair, and nails. Thus, pregnant women with anemia may notice that their skin is dry and often cracked, cracks appear in the corners of the mouth (angular stomatitis), nails become brittle or break, and hair splits.

An unusual symptom of anemia is pica, the name given to a distorted sense of taste and the desire to eat inedible substances (such as chalk).

Some pregnant women with anemia have difficulty swallowing dry and hard foods, feel heaviness and pain in the abdomen after eating. There may be urinary incontinence when coughing or laughing and at night, muscle weakness and low blood pressure.

Anemia occurs due to the restructuring of the body of the expectant mother and the need to meet the needs of the growing fetus:

a. changes in metabolism;

b. changes in immunity: the immunity of the expectant mother must adapt to the growing fetus so that it is not perceived as a threat to the woman's body;

c. hormonal changes: the level of the hormone estradiol increases, which inhibits the formation of red blood cells;

d. deficiency of certain vitamins and microelements (for example, iron, folic acid, vitamin B12);

e. protein deficiency;

f. hematopoiesis disorders;

g. violation of hemoglobin formation;

h. Defect in DNA and RNA synthesis;

i. rapid breakdown of red blood cells.

Pregnant women often experience iron deficiency and folate deficiency anemia.

Iron deficiency anemia is most common (in 90% of cases) in pregnant women. This is because almost 40% of women have impaired iron metabolism even before conception, and the condition worsens during pregnancy.

This pathology is caused by a violation of the synthesis of hemoglobin, an iron-containing protein found in red blood cells. According to WHO, iron deficiency anemia is diagnosed in 51% of cases during pregnancy worldwide.

Results: Iron is needed to form hemoglobin: most of this trace element in the body (75%) is contained in hemoglobin. Outside of pregnancy, part of the iron that comes from food or

supplements is used to form red blood cells and, accordingly, hemoglobin, and the other part is used to form a reserve of this trace element (iron is stored mainly in the liver, spleen, muscles and bone marrow cells in the ferritin protein).

In addition to the processes described, the expectant mother experiences one more thing: during pregnancy, iron is actively used for the development of the fetus. Thus, the need for iron outside of pregnancy is 1.5 mg per day, and during pregnancy it increases significantly.

Pregnant women need a lot of iron: during the entire period of bearing a child, about 1000 mg of this trace element is consumed, that is, about 6.3 mg per day. The iron reserves in the body of the expectant mother are not enough to provide such a significant intake. Therefore, if you do not take additional iron preparations, anemia develops.

It takes 4-5 years to restore the body's iron stores lost during pregnancy and breastfeeding.

Frequent pregnancies and childbirth also serve as a risk factor for iron deficiency anemia: a woman's body does not have time to replenish the deficiency of trace elements that occurred during previous pregnancies.

In addition, iron deficiency anemia in pregnant women can develop due to certain diseases: infections, parasitic infestations (helminthiasis, malaria), liver and stomach pathologies, as well as insufficient or improper nutrition.

Another cause of anemia during pregnancy is a lack of folic acid. Folate deficiency anemia accounts for 1% of all cases of anemia in pregnant women.

Folic acid is involved in the synthesis of DNA molecules (genetic information contained in the nuclei of body cells), so cells need it for normal division. During pregnancy, the fetus grows and the cells of its body actively divide. Therefore, the consumption of folic acid during this period increases significantly. So, the usual daily requirement is 400 mcg, and by the end of pregnancy, it is necessary to consume 800 mcg of folic acid per day.

Approximately one-third of pregnant women do not get enough folic acid.

a. The main causes of folic acid deficiency are:

b. malnutrition (lack of raw materials in the diet);

c. multiple pregnancy;

d. violation of the absorption of this substance in the intestine;

e. concomitant diseases (e.g. infections).

Folic acid is important for hematopoiesis: if the substance is not enough, red blood cells do not mature properly and are replaced by immature megaloblasts. Such defective blood cells cannot effectively deliver oxygen to organs and tissues, and a pregnant woman develops anemia.

a. Most often, folate deficiency anemia occurs in the third trimester of pregnancy, before or after birth.

b. Complications: why anemia is dangerous at different stages of pregnancy

c. Anemia can seriously affect the health of the pregnant mother and the development of the child.

d. Possible complications of iron deficiency anemia, the most common type of anemia in pregnant women, include:

e. threat of termination of pregnancy;

f. an increased incidence of preeclampsia, which can develop after the 20th week of pregnancy and is characterized by metabolic disorders, nervous system disorders, and vascular disorders in the expectant mother;

g. low blood pressure;

h. decreased hormone synthesis;

i. dystrophic changes in the myometrium (muscle layer of the uterus);

j. placental hypoplasia - insufficient mass of this organ;

k. premature detachment of the placenta;

l. fetal growth retardation;

m. premature birth;

n. weak labor activity;

o. bleeding during childbirth;

p. the risk of developing hemorrhagic shock - critical changes in the body due to severe bleeding;

q. inflammation in the postpartum period;

r. hypogalactia - decreased function of the mammary glands, leading to difficulties with breastfeeding;

s. shortening the breastfeeding period.

In addition, a severe form of iron deficiency anemia in women can be accompanied by anemia myocardial dystrophy - a violation of the contractile ability of the heart. Pathology manifests itself as pain in the heart, arrhythmia, and swelling of the legs.

In some forms of anemia, such as severe iron deficiency anemia, pregnancy is generally contraindicated, so the doctor may recommend terminating it before 12 weeks for medical reasons if the condition cannot be normalized.

Anemia in the first trimester can lead to miscarriage or a slowdown in fetal development. Folic acid deficiency anemia is especially dangerous at this stage. The fact is that during this period there is intensive division of fetal cells, including the laying of the neural tube, and with a lack of folic acid, the neural tube does not form properly.

a. The main neural tube defects are:

b. anencephaly - absence of cerebral hemispheres in a child;

c. encephalocele - craniocerebral hernia, protrusion of the brain outside the skull;

d. spina bifida - a split in the spine in a child.

Spina bifida can sometimes be seen with the naked eye: the child has a protruding sac on the back that contains the spinal cord and its membranes.

Discussion: With iron deficiency anemia diagnosed in the first trimester, the risk of miscarriage and fetal growth retardation increases: the more severe the anemia, the higher the risk of these pathologies. If the hemoglobin level in the blood is less than 100 g / l at the time of the first visit to the doctor, as a rule, the risk of stillbirth or death of the child during childbirth increases fivefold.

In the second trimester of pregnancy, especially at 16-20 weeks, there is a strong loss of iron. Low hemoglobin during pregnancy in the second trimester is associated with the fact that the fetus begins to produce its own blood and the total blood volume of the pregnant woman increases. Therefore, there is a high risk of developing iron deficiency anemia and complications such as gestosis, placental abruption, and premature birth.

The fetus receives iron from the mother through active transport across the placenta, mainly in the third trimester of pregnancy. Iron deficiency anemia during this period can lead to premature birth, bleeding during or after childbirth, and also complicates the subsequent recovery process:

inflammation often develops in women with anemia who have recently given birth.

If a woman's hemoglobin concentration in her blood at the 28th week of pregnancy is less than 100 g/l, the risk of stillbirth or death of the child during childbirth increases threefold.

In addition, newborns whose mothers have iron deficiency anemia have significantly reduced ferritin, transferrin levels, and transferrin iron saturation. This can lead to complications: such children are often born prematurely, have low birth weight, may lose weight after birth, have prolonged physiological jaundice, and are at increased risk of infections. And with severe anemia during pregnancy, the newborn may also develop anemia or latent iron deficiency, and he may lag behind his peers in psychomotor development in the first years of life.

Folic acid deficiency anemia in the third trimester of pregnancy is no less dangerous. Studies have shown that the birth weight of the baby is directly related to the concentration of folic acid in the mother's body. Shortly before birth, the fetus actively consumes folic acid from the mother's reserves: thanks to this substance, the weight of the future baby increases; In addition, his body forms its own vitamin reserves. If a pregnant woman has a folic acid deficiency, there is a high risk of giving birth to a low-birth-weight (normal height) baby.

A gynecologist diagnoses anemia in pregnant women. It is impossible to determine anemia based on the patient's complaints: the symptoms of this condition are non-specific and resemble the manifestations of a number of diseases. Sometimes a woman may not notice any unpleasant symptoms. Anemia can be reliably diagnosed only with a blood test.

A complete blood count helps to detect anemia. A decrease in hemoglobin concentration indicates pathology.

A pregnant woman may be diagnosed with anemia if the hemoglobin concentration in the blood is below 110 g/l.

Conclusion: In addition, a number of other indicators are also evaluated: the number of red blood cells and their average size, hematocrit (ratio of red blood cell volume to plasma volume), erythrocyte sedimentation rate (ESR), and the average hemoglobin content in red blood cells.

Complete blood count with leukocyte formula and ESR, smear microscopy for pathological changes in the leukocyte formula (venous blood)

A clinical blood test is a blood test that helps assess overall health, detect inflammation, bacterial, viral, and fungal infections, and help detect anemia, blood-forming disorders, allergic reactions, and autoimmune diseases.

If the doctor suspects that the cause of anemia is iron deficiency, he may additionally order tests to measure the concentration of serum iron, ferritin, transferrin, and determine the total iron-binding capacity of the blood serum.

a. Hemoglobin: the norm in pregnant women
b. Low hemoglobin during pregnancy is a value below 110 g / l. In this case, they talk about anemia.
c. Anemia is indicated by the following indicators:
d. first trimester: less than 110 g / l;
e. second trimester: less than 105 g / l;
f. third trimester: less than 110 g/l.
g. Mild (first degree) anemia during pregnancy is diagnosed when the hemoglobin level is from 100 to 109 g / l, moderate - from 70 to 99 g / l, severe - less than 70 g / l.

Treatment of anemia during pregnancy includes two main areas: nutritional correction and

medication.

In case of iron deficiency anemia, it is recommended to include more meat and offal in the diet: the iron in them is best absorbed - 25-30%. Other animal products, such as eggs and fish, are also useful. However, iron from plant foods is poorly absorbed.

Only 3-5% of iron from plant foods, such as cocoa or pomegranates, is absorbed by the body. Therefore, a vegetarian diet is not recommended for pregnant women.

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