

# Iron deficiency in pregnant women suffering from chronic pyelonephritis

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## Summary

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The aim of the study was the assessment of the peculiarities of iron metabolism in pregnant women suffering from chronic pyelonephritis.

There was shown that pregnant females have signs of iron deficiency anemia which is more severe in women suffering from chronic pyelonephritis. The incidence of chronic pyelonephritis in women with signs of syderopenic syndrome is 35.0 %. There is discussed the pathogenesis of iron deficiency related to the renal dysfunction.

**Key words: iron deficiency, chronic pyelonephritis, pregnancy.**

Iron deficiency is an important problem in obstetrics. The epidemiological data are controversial however there is considered that up to 80% of pregnant women are suffering from iron-deficient health conditions in the former USSR countries. The

occurrence of such diseases in developed countries of Europe and the United States is much less - from 20 to 30 % [1-3]. The association of iron deficiency with renal pathology is not clarified yet but it seems that chronic pyelonephritis as well as other health conditions could provoke iron losses [4].

Iron is a trace mineral that is involved in electron transport, transport and deposition of oxygen, the formation of active centers of redox enzymes. The extreme vulnerability of the mechanisms for the transport and deposition of iron [4, 5], making pregnancy to be an additional risk factor for iron deficiency because the fetus needs iron supplied from reserves of the parent body.

Prior to the development of anemia in pregnant women attracted to such factors as reduced intake of iron from the daily diet, malabsorption of iron in the intestine, bleeding from the gastrointestinal tract (hemorrhoids, peptic ulcers) , vomiting in pregnancy, bleeding during pregnancy (e.g., placenta previa), low parity, twins, too prolonged breast- feeding. Other important factors are the seasonality - iron deficiency anemia is more common in winter and spring, when the diet is poor in fresh vegetables and fruits and the presence of a pregnant some chronic diseases [5 ].

The development of anemia during pregnancy is caused by the imbalance of iron in the body and is associated with high demands of fetoplacental complex (100 mg), strengthening of iron metabolism and redistribution of this trace element in favor of the fetus (400-500 mg). Are also important to increase the size of the uterus (50 mg), their body needs (170 mg), increasing red cell mass (450 mg) [6]. In general, iron deficiency in pregnant women and mothers is associated with inadequate recovery of losses due to nutritional and mobilized iron [4-6].

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#### Material and methods.

The research was conducted at the Regional Maternity Hospital in 2005-2013. There were examined 120 pregnant women with signs of iron deficiency anemia, including 42 women who became pregnant and background remission of chronic pyelonephritis. The average age of the patients was  $26.2 \pm 1.1$  years. The control group consisted of 30 women with physiological pregnancy within the same age group.

All women were examined according to the order of Ministry of Health of 03.11.2008 № 624. Additionally, ferritin content was assessed in plasma by enzyme immunoassay (SC sets "ESMP", Russia)

Statistical analysis was conducted using the software Statistica 6.15 (StatSoft Inc., USA).

#### Results and discussion.

In assessing hematological parameters there was revealed that the patients of the main group of pregnant women had light and subclinical forms of iron deficiency anemia (83 cases or 69.2 %). Most main group patients experienced a decline in hemoglobin and red blood cells (Table 1). Initial iron levels in serum was ranged from 5.3 to 13.3 mmol / l ( $9,67 \pm 1,1$  mmol / l). Hemoglobin level was ranged from 95 to 135 g / l ( $113,3 \pm 3,5$  g / l) whereas the number of red cells averaged as  $3.5 \cdot 10^{12}$  / l.

Table 1

## Clinical indices of iron metabolism

Indices	IDA & chronic pyelonephritis (n=42)	IDA (n=78)	Control group (n=30)
Serum iron, mcmol/l	8,78±1,7*	9,67±1,1*	12,4±1,2
Ferritin, mcg/l	7,2±0,2*	7,8±0,1*	18,2±0,2

\* -  $p < 0,05$ 

The main complaints were represented by the weakness, fatigue, dizziness, shortness of breath on exertion, heart palpitations. In most cases (63.3 %), anemia was detected in the first trimester of pregnancy, 36.7 % - in the second trimester. The most pronounced manifestations of anemia were observed in pregnant women suffering from chronic pyelonephritis. In the control group, physiological deviations from the norm were found.

Upon further analysis of the distribution of values of ferritin content depending on the severity of anemia found that pregnant women with subclinical forms of anemia (hemoglobin above 110 g/l) observed reduction of ferritin (Table 1). In addition, the presence of chronic pyelonephritis led to the deficit of serum iron to  $8,78 \pm 1,7$  mmol/l content ferritin level  $7,2 \pm 0,2$  mg/l, well below the control values ( $p < 0,05$ ).

Anemia associated mainly with increase of inhibitor of erythropoiesis and (or) decreasing production of erythropoietin on the background of a larger generation inhibitor of erythropoiesis. Bone marrow depression by nitrogenous substances,

hematuria, hemorrhagic manifestations of the syndrome , iron deficiency, a great loss of transferrin in the urine with highly proteinuria, cyanocobalamin deficiency could impact on the course of anemia.

#### Conclusions:

1. Pregnant in 69.2 % of cases there are signs of iron deficiency anemia which is more severe in women with chronic pyelonephritis.
2. Incidence of chronic pyelonephritis in women with signs of sideropenic syndrome is 35.0 %.

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