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**ABOUT THE PROBLEMS OF
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TASKS AND WAYS TO
SOLVE THEM**

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FEATURES OF THE COLLAGEN AND TRACE ELEMENTS METABOLISM AND THE CONCENTRATION OF THE MAIN HORMONES IN PREGNANT WOMEN WITH FUNCTIONAL CERVICAL INSUFFICIENCY.

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One of the main factors which determine the health of the nation is miscarriage and prematurity of pregnancy. Preterm delivered newborns form indicators of perinatal morbidity, mortality and disability from childhood. Despite the improvement of an obstetric care quality, the rate of miscarriage, in particular extremely early preterm deliveries, remain consistently high (10-30%) and has no tendency to decrease [1, 2, 5, 6].

Among the etiological miscarriage factors, functional cervical insufficiency (FCI) is out of importance. It is registered in 15-40% of women habitual miscarriage in anamnesis [1, 2, 8].

Nowadays, FCI is considered to be a multifactorial complication of pregnancy. Current research highlights the significant role of undifferentiated connective tissue dysplasia (UCTD) in the FCI genesis which leads to a disparity in the muscle and connective tissue ratio in the cervix [3, 4, 7].

On the other side, the FCI occurs not only due to UCTD, but also due to the lack of trace elements which plays the main role in the local connective tissue metabolism regulation. Taking into account the fact that the connective tissue condition depends on the hormonal, it is reasonable to think about the interdependence of the functional obturatory condition of the cervix and disorders in the estrogens and progesterone biosynthesis [9, 10, 11, 12].

The aim of the research: to determine the features of connective tissue and trace element metabolism, together with main pregnancy hormones concentration in women with functional cervical insufficiency.

Materials and methods of research. 135 pregnant women who formed the main and control groups were examined. The main group included 101 pregnant women with FCI at 22-32 weeks of gestation. The control group was formed by 34 pregnant women

with a physiological condition of the cervix. All pregnant women were examined in accordance with quality standards and current clinical protocols.

In order to study connective tissue condition we provided determination of synthesis (Total P₁NP) and resorption (β -CrossLaps) markers of, also we determined the concentration of Mg²⁺ in the blood serum of pregnant women of the examined groups. The concentration of estradiol and progesterone in blood serum was determined using ELISA. Ultrasound examination of cervix was performed using transvaginal ultrasound examination (TVUSE). In all pregnant women the length of the cervix, the presence and shape of the transformation of the cervical canal were measured.

The results of the research. The average age of pregnant women in the main and control groups ranged from 18 to 40 years and had no significant difference. 77 pregnant women of the main group (76,2%) had diseases that are clinical signs of UCTD, namely: diseases of the cardiovascular system (54 pregnant women - 63,5%; control group – 8 pregnant women – 32,0%; p<0,05), ophthalmological diseases (26 pregnant women – 30,6%; control group – 3 pregnant women – 12,0%; p<0,05), diseases of the gastrointestinal tract and hepatobiliary system (42 pregnant women – 49,4%, control group – 7 pregnant women – 28,0%; p<0,05). Diseases of the urinary tract (9 pregnant women – 36,0%), cardiovascular system (8 pregnant women – 32,0%) and ENT organs (8 pregnant women – 32,0%) prevailed in the control group.

The structure of gynecological morbidity was dominated by combined pathology (53,8%) of mostly inflammatory origin (86,8%), as well as obstetric anamnesis was burdened with premature deliveries (6,9%). Pregnancy in women of the main group occurred against the background of bacterial vaginosis (20,8%) and vaginitis (66,3%), which required adequate antibacterial therapy with mandatory long-term restoration of the vaginal biotope, intestines and urinary tract.

Pregnant women with FCI were characterized by a violation of the connective tissue formation and maturation processes due to increased Total P₁NP (collagen type I synthesis marker) – 68,15±3,55 ng/mL (control group – 50,90±4,27 ng/mL), as well as absolute Mg²⁺ deficiency (0,64±0,01 mmol/L; control group – 0,86±0,03 mmol/l; p<0,05). At the same time, the average value of the connective tissue resorption marker β -CrossLaps, which is a product of collagen degradation, in pregnant women of the main and control groups was within the physiological norm (0,390±0,02 ng/mL and 0,300±0,02 ng/mL, respectively). The results were confirmed by correlation analysis, which revealed the presence of a strong feedback correlation ($r = - 0.7505$) between the concentration of magnesium ions and the connective tissue synthesis marker Total P₁NP in the blood serum of pregnant women of the main group (Fig. 1).

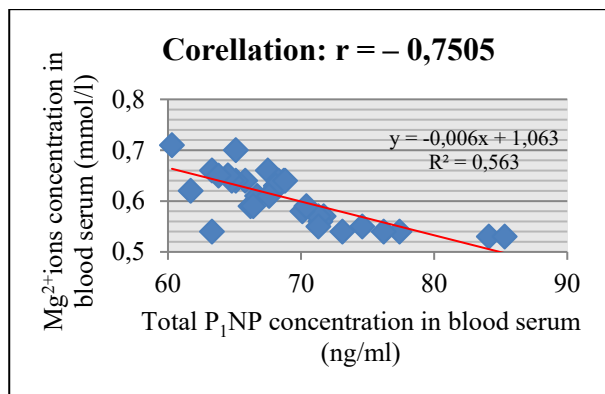


Fig. 1. Strong feedback correlation between the concentration of magnesium ions and Total P₁NP marker in the blood serum

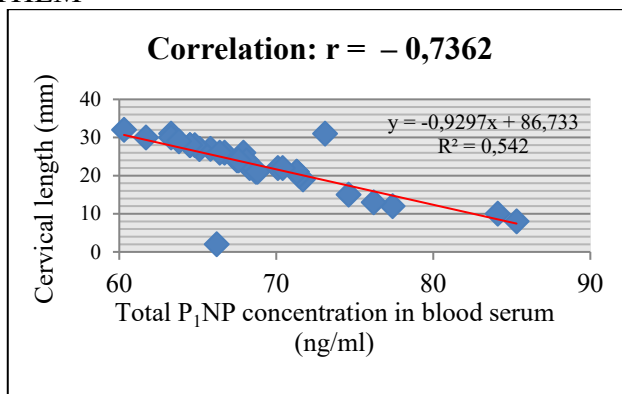


Fig 2. Strong feedback correlation between the concentration of Total P₁NP marker and cervical length

Analyzing the indicators of estradiol in the dynamics of pregnancy, no significant difference in the biosynthesis of this hormone was found. At the same time, the average progesterone concentration, being within the physiological norm in both the second ($180,61 \pm 5,69$ nm/L) and the third trimester of pregnancy ($395,61 \pm 6,20$ nm/l), was almost twice lower in pregnant women of the control group ($358,0 \pm 4,57$ nm/L in the second and $679,43 \pm 6,0$ nm/L in the third trimester) ($p < 0,05$).

According to the TVUSE results, 74 pregnant women of the main group (73,3%) demonstrated asymptomatic shortening of cervix which average length was $22,88 \pm 1,02$ mm. Such results were considered as a pre-cursor of premature deliveries. In every third pregnant woman of the main group (31.7%), a V-/Y-shaped transformation of the cervix with fetal bladder prolapse was detected. The correlation analysis revealed the presence of a strong feedback correlation ($r = -0.7362$) between the cervical length and the concentration of the connective tissue synthesis marker Total P1NP in the blood serum of pregnant women of the main group (Fig.2).

Conclusions. The revealed imbalance in the system of markers of connective tissue synthesis and resorption can be considered as a predictor of threatening functional cervical insufficiency in high-risk pregnant women with miscarriage. Magnesium deficiency contributes to the progression of premature maturation and opening of the cervix.

The shift of the estrogen-progesterone balance in pregnant women with functional cervical insufficiency towards estrogens contributes to a violation of the normal tone of the uterus and is clinically manifested by the development of its premature contractile activity.

A decrease in the processes of biosynthesis or an increase in the processes of progesterone metabolism during pregnancy is usually realized by an increase in diastasis of the internal orifice, which further leads to a wedge-shaped transformation of the cervical canal and the opening of the cervix, which is confirmed by transvaginal ultrasound examinations.

The above mentioned determines the expediency of collagenoprotective and matrixprotective therapy, adequate correction of nutritional status disorders at the stage of pregravidal training of women from the high-risk group for the functional cervical insufficiency development.

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