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**PREDICTION OF PREMATURE OVARIAN INSUFFICIENCY BASED ON  
SOME BIOCHEMICAL PARAMETERS**

Annotation: Premature ovarian insufficiency (POI) is a serious problem for women, medicine and for the state as a whole.

Keywords: premature ovarian insufficiency; infertility; ovarian reserve; amenorrhea; anti-muller hormone.

It has been established that with POI, the ovarian reserve is depleted, ovarian dysfunction develops in young women of reproductive age, which leads to infertility and estrogen deficiency. It is noted that the prevalence of premature ovarian insufficiency is 1-2%, and the frequency of occurrence increases with age. It has been proven that the causes of this condition can be chromosomal abnormalities, autoimmune processes, infections, chemo- and radiation therapy, surgical interventions on the pelvic organs, but in most cases the etiology is unknown. Premature ovarian insufficiency is characterized by amenorrhea, symptoms of estrogen deficiency, a sharp decrease in fertility up to infertility. To assess the state of the ovarian reserve, it is necessary to determine the concentration of anti-muller hormone and inhibin B, ultrasound is also used. It is noted that ovarian biopsy has no advantages over non-invasive diagnostic methods and is not recommended for use in patients with POI. It has been established that the main direction in the treatment of premature ovarian insufficiency is hormone replacement therapy. Timely administration of estrogens can prevent the symptoms and development of complications of hypoestrogenism. To date, there are no drugs with proven effectiveness to solve fertility problems, but spontaneous restoration of ovarian function and the onset of pregnancy are not excluded. An important aspect is to provide a woman with psychological support, an individual approach.

It has been shown that with a combination of drug and non-drug effects, good results can be obtained in preventing the progression and complications of POI.

Premature ovarian insufficiency (POI) is characterized by the cessation of ovarian function in women under the age of 40. Manifestations of this condition are amenorrhea, increased concentration of gonadotropins in the blood, hypoestrogenism and its accompanying symptoms. An important aspect is the presence of infertility, which is formed due to premature depletion of the ovarian reserve. The prevalence of premature ovarian insufficiency (POI) is about 1-2%, but it should be noted that the frequency of occurrence increases with age: in women over 30 years of age, POI is detected 100 times more often than at the age of 20, and 10 times more often than between 20 and 30 years (1% and 0.01%, 0.1%, respectively).

The etiology of POI is still the cause of controversy among scientists. There are a lot of studies conducted all over the world aimed at identifying factors that can lead to premature termination of ovarian function. The most common (65%) is the idiopathic form. An important role is assigned to changes in genetic material. For example, one of the reasons leading to the POI is the presence of defects in the sexual X chromosome. Anomalies in the karyotype are usually detected in a small number of women more often under the age of 30. For example, with the Klinefelter-Turner syndrome, characterized by the presence of only one X chromosome (karyotype 45 XO), germ cells in the first half of intrauterine development are laid in accordance with the norm, but in the future their rapid involution occurs, and by the birth of a girl there is either a sharply reduced number of follicles in the ovary, or their complete absence.

Martin-Bell syndrome (brittle X chromosome syndrome) is characterized by thinning of the ends of the X chromosome, resulting from a significant increase in the number of repetitive sequences of cytosine-guanine nucleotides, which normally should be repeated no more than 45 times.

It can also develop together with a number of diseases caused by monogenic mutations in autosomes, for example, with galactosemia, which has an autosomal

recessive type of inheritance and is characterized by a violation of galactose metabolism and the inability to convert it into glucose. Premature ovarian insufficiency is combined with type 1 BPES syndrome, manifested by blepharophimosis, ptosis and epi-cantus inversus and having X-linked dominant inheritance. The autoimmune nature of premature ovarian failure has long been discussed. Moreover, POI can be either in the form of an isolated disease or as part of autoimmune polyglandular syndromes (APS). A striking example is APS of the second type (Schmidt syndrome), which includes damage to the adrenal glands, thyroid gland, parathyroid glands, gonads, diabetes mellitus of the first type. The development of this syndrome is associated with the presence of antigens of the main histocompatibility complex (HLA-B8, HLA-DW3, HLA-BW35) and a deficiency of T-suppressors, which leads to increased production of antibodies. With the development of autoimmune oophoritis, autoaggression to the own tissues of the ovary develops, which as a result leads to blocking the synthesis of steroids. It is important to remember that autoimmune PSA is very often associated with damage to the adrenal glands (Addison's disease). Chronic adrenal insufficiency (CAI) is a very formidable, life-threatening pathology. In patients with premature ovarian insufficiency, in about 2% of cases, CNN is asymptomatic, and when exposed to certain trigger factors, acute adrenal insufficiency may develop, therefore, timely diagnosis of this condition is extremely necessary. The POI of autoimmune genesis can be established when detecting anti-viral autoantibodies.

The role of infectious agents in the development of premature ovarian insufficiency is not excluded. It has been proved that in viral infections, especially those with frequent relapses, the cellular link of immunity is activated, the production of antigens of the main histocompatibility complex of class II (HLA II) increases not only by cells of the immune system, but also by cells of the ovarian epithelium, which leads to the production of antiviral antibodies.

The consequences of surgical interventions on the pelvic organs are a significant problem today. It is noted that surgical aggression may be one of the

causes of the development of POI. The results of studies to identify the relationship between hysterectomy and PS are quite contradictory. There are opinions that when the uterus is removed, the functioning of the hypothalamic-pituitary-ovarian system is disrupted, involution processes in the gonads are accelerated, the intensity of ovarian blood supply decreases due to the shutdown of the uterine artery branch. Another point of view suggests that all the effects of hysterectomy on ovarian function are short-term, and after a certain period of time, its relative recovery occurs. However, it was found that removal of the uterus together with salpingectomy has a more significant negative effect on the functioning of the gonads in the future than isolated hysterectomy.

Due to the tendency to the growth of malignant neoplasms in people of reproductive age, the use of chemo- and radiation therapy occupies a significant place in the development of PS and infertility. Ionizing radiation has a detrimental effect on the gonads, the most vulnerable is the follicular apparatus. The use of alkylating drugs, often used in the treatment of lymphomas, lymphomas-goats, observed just mainly in the generation of young people and children, often leads to the development of premature ovarian insufficiency in the future.

To date, the role of mitochondrial dysfunction in the genesis of POI is being discussed. Mitochondria are much more connected to the reproductive system than it may seem at first glance. Firstly, the presence of a translocator protein (TBRO), localized mainly on the outer membrane of mitochondria, plays a role in the synthesis of steroid hormones. This protein acts as a transport protein involved in the transfer of cholesterol. Secondly, mitochondria synthesize a universal source of energy adenosine triphosphate, which is necessary in the process of egg maturation. It has been shown that a decrease in antioxidant protection can have a significant significance in the violation of gonad function. With a deficiency of antioxidants, there is an increase in the amount of damage in mitochondrial deoxyribonucleic acid and an increase in the concentration of reactive oxygen species, which, in turn, leads to a violation of mitochondrial functions, as a result, the activity of apoptotic processes increases and the risk of developing premature

ovarian insufficiency increases. In case of mitochondrial dysfunction, the development of oxidative stress is characteristic, in which many cells of the body are damaged, and at present it is the increase in the level of free radicals that is considered the main cause of aging.

Women who have been diagnosed with PSA are in a state of despair, they do not understand how to proceed, information about infertility is especially difficult for them. Therefore, it is very important to find an individual approach to the patient, explain the essence of her disease, focus on the positive effect of therapy for POI, explain that this is not a verdict for them and there are ways to solve the problem. In special cases, a psychologist's consultation is necessary.

Premature ovarian insufficiency is currently not a fully studied pathology. It is necessary to continue the search for therapies that will allow a woman to realize her reproductive potential and avoid the formidable complications of estrogen deficiency.

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