

околозубных тканей в досліджуваній групі спортсменів, що мають практично здоровий пародонт, погіршилися після закінчення інтенсивного тренувального процесу майже у 1,5 рази. Препарат «Бальзам гранатовий» володіє дуже важливими, особливо з профілактичної точки зору, протизапальними, органолептичними властивостями, які на підставі природної стимуляції сприяють поліпшенню гігієнічного стану і мікрофлори порожнини рота, стану тканин пародонта, а також вираженій стимуляції слиновиділення і підвищенню швидкості слиновиділення.

**Ключові слова:** пародонт, слина, гігієна, фізичні навантаження, профілактика.

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околозубных тканей в исследуемой группе спортсменов, имеющих практически здоровый пародонт, ухудшились по окончании интенсивного тренировочного процесса почти в 1,5 раза. Препарат «Бальзам гранатовый» обладает очень важными, особенно с профилактической точки зрения, противовоспалительными, органолептическими свойствами, так как на основании естественной стимуляции способствуют улучшению гигиенического состояния и микрофлоры полости рта, состояния тканей пародонта, а также выраженной стимуляции слюноотделения и повышению скорости слюноотделения.

**Ключевые слова:** пародонт, слюна, гигиена, физические нагрузки, профилактика.

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## DETERMINATION OF THE RISKS OF INFERTILITY IN WOMEN WITH THYROID PATHOLOGY AND HYPOANDROGENIC OVARIAN DYSFUNCTION

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The purpose of the study was to determine the effect of thyroperoxidase antibody levels on the fertility of women with sexual dysfunction and reduced ovarian androgen levels. A study of the risks of infertility in women with pathology of the thyroid gland based on the analysis of the results of hormonal tests and the development of recommendations for planning a pregnancy in conditions of hypoandrogenic ovarian dysfunction. The presence of clinically significant levels of antibodies to thyroperoxidase in young and middle-aged women with sexual dysfunction has been shown to adversely affect the early stages of folliculogenesis. This factor indicates a risk of decreased steroid-producing ovaries and the development of susceptibility to infertility. It is desirable for women with clinically significant levels of antibodies to thyroperoxidase to plan their pregnancy at an earlier reproductive age (18-25 years), because at this time the optimal conditions for fertility are maintained. For women with clinically low levels of antibodies to thyroperoxidase, pregnancy planning is more appropriate in middle reproductive age.

**Keywords:** infertility, antibodies, androgen deficiency.

*The work is a fragment of the research project "Reproductive Health and Sexual Dysfunction of Women of Reproductive Age with Androgen Deficiency. Development of diagnostic criteria", state registration No. 0119U001422.*

The quality of life of a person depends on the realization of its reproductive and sexual function. There are studies of the negative effects of hyperandrogenism on female fertility [11]. Much attention is paid to the study of the sexual health of women, since a woman's sexual health is part of her reproductive health [10].

The endocrine and nervous systems regulate the main physiological processes that ensure sexual function of a person. The neuroendocrine system is the basis of female sexuality: it provides excitement of the relevant nervous structures responsible for sexual reactions, supports the energy component of sexual desire, sexual motivation (sexual centers of the hypothalamus, which affect the sexual centers of the spinal cord, which are subject to the regulatory effects of the limbic system and the cerebral cortex) [2, 11].

Reduced women sexuality is noted against the backdrop of various endocrine diseases as they alter the levels of estrogen and progesterone in the female body. One of the most common diseases of reproductive age women is autoimmune thyroiditis (AIT), an organ-specific autoimmune disease of the thyroid gland, which is the main cause of hypothyroidism. The value of the hypothyroid condition for fertility is due to the high frequency of this pathology - up to 78.4% in women with infertility [1, 9]. It is difficult to estimate the prevalence of AIT, since in the state of euthyroidism it has almost no exact diagnostic criteria. Many authors point out that the number of carriers of both antibodies to thyroid peroxidase and hypothyroidism due to autoimmune thyroiditis is about 10 times higher among women in comparison with men [5]. Quite often, the hypothyroid state is accompanied by hyperprolactinemia. According to the article for women with hyperprolactinemia there is an increase in the frequency of depressive disorders and disorders of the menstrual cycle in combination with a decrease in sexual desire,

lubrication, difficulty in arousal, orgasmic dysfunctions [8]. Therefore, sexual disorders were diagnosed according to the DSM-5 classification [12].

**The purpose** of the work was to determine the most favorable time for fertility in women with autoimmune thyroid disease and low ovarian androgens.

**Materials and methods.** The total number of surveyed women of different reproductive ages (18 to 35 years) is 80 people. They all had complaints of a decrease in sexual desire and discomfort during sexual intercourse. All women applied to the Reproductive Medicine and Surgery department of the Ukrainian scientific and practical center of endocrine surgery, transplantation of endocrine organs and tissues of the Ministry of Health of Ukraine. All women had no pregnancy history and planned a gestational debut. The clinical manifestation of sexual dysfunction was more than 6 months.

The study did not include patients after thyroid surgery; after radioiodine therapy; patients receiving amiodarone or glucocorticoids, as these drugs may affect thyroid functional activity.

Patients underwent clinical and laboratory examination at the center's biochemical laboratory. According to the results, women were divided into two age groups: 18-25 years – early reproductive age (I-a, I-b), and 25-35 years – average reproductive age (II-a, II-b). The I-a and II-a groups included women with clinically insignificant indicators of antibodies to thyroperoxidase, and to I-b, and II-b – with clinically significant indicators of antibodies to thyroperoxidase. Thyroperoxidase antibodies were considered to be clinically insignificant up to 35 IU/ml. All patients were in a state of euthyroidism (TSH did not exceed  $4.0\mu\text{ME/ml}$ ). Determination of hormonal homeostasis of the examined women was performed in the first phase of the menstrual cycle (5-7 days), which is the main indicator of the onset of ovarian steroidogenesis. It is associated with follicle growth.

Statistical data processing was performed using the STATISTICA for WINDOWS software package (version 5.5). For the results obtained, methods were used to evaluate the law of distribution of the obtained data both for a separate group and for the population as a whole. For values with a normal distribution, average values were used together with the standard deviation as the main characteristics of the studied values. To analyze the dependencies, the parameters of the regression equation for the sample were estimated. When analyzing the existence of significant differences for the two groups, the Student criterion was used.

**Results of the study and their discussion.** Analysis of the sexual function of women revealed the following: the frequency of sexual intercourse per week for women of I-a and II-a groups practically did not change with age  $3.9\pm 1.04$  and  $4.10\pm 1.12$ , while for women I-b and II-b, there was a decrease in sexual activity from  $3.25\pm 1.03$  to  $2.5\pm 0.70$  times a week.

According to the main indices of hormonal support the reference norms for follicle-stimulating hormone (FSH) indicator are set at 2.8-1.3 IU/l. For the women of I-a and II-a groups the follicle-stimulating hormone (FSH) index was 4.2 (3.65-4.79) IU/l and 5.35 (4.89-5.81) IU/l (growth by 1.3 times). For women in groups I-b – 4.70 (3.94-5.46) IU/l and II-b – 7.60 (6.39-8.81) IU/l (increase in 1.6 times).

The LH level for women in group I-a was 4.27 (4.00-4.54) IU/l, and for women in group II-a was 5.12 (4.88-5.36) IU/l that is, a slight increase with age (reference rates 1.9-12.5 IU/l). LH index for women in b-group (I-b – 3.69 (3.19-4.20) IU/l and II-b – 4.14 (3.43-4.84) IU/l) has the same a tendency to a slight increase with age.

In this case, the FSH/LH index for group I-a is 0.99, and for group I-b – 1.04, that is, it has practically not changed and complies with the norm for the beginning of follicles maturation. For women of groups II-a (1.27) and II-b (1.9) this ratio tends to increase.

In reproductology, an LH/FSH ratio of less than 0.5 consider as negative for follicle maturation. The LH/FSH index for women of group I-a it was 1.04, for women of group II-a it was 0.96; for women of group I-b it was 0.8, for women of group II-b it was 0.56 .

This indicates that peptide hormone synthesis rates for women with clinically relevant levels are insufficient to adequately synthesize ovarian steroids already at the onset of follicular growth.

For women of group I-a, the level of estradiol was 47.38 (37.74-57.02) pg/l, in group II-a it was 73.14 (82.68- 63.61) pg/l, which shows an increase by 1.5 times (reference norms 19.5-144.2 pg/l). For women of group I-b this index made 67.45 (78.20-56.70) pg/l, and for women of group II-b it made 54.70 (46.44-62.96) pg/l, which characterizes a decrease of the index value with age by 1.23 times. This indicates an opposite tendency in comparison to women of I-a and II-a groups . Analysis of progesterone for women in group I-a determined the level of 0.45 (0.34-0.56), for women in group II-a it was 0.75 (0.64-0.87) ng/ml (increase by 1.66 times). A similar index for women of group I-b was 0.71 (0.46-0.97) ng/ml, and for women of group II-b it was 0.26 (0.22-0.30) ng/ml (decrease by 2.7 times) (reference norms 0.2-1.4 ng/ml).

This means that, with age, progesterone levels for women with clinically significant AT-TPO levels tended to have a significant trend (the probability, that the mean progesterone values for these age groups were obtained from general groups having the same meaning, is less than 0.005) reduction, although it remained within the reference rate for first phase of the cycle.

Androgens are precursors of estrogens in their biosynthesis process. They are extremely important for the reproductive function and maintenance of hormonal women homeostasis at different ages. Androgen biosynthesis is carried out in the cells of preantral and antral follicles under the influence of LH and is provided by six enzyme systems that are necessary for the conversion of cholesterol into testosterone. We analyzed the main androgens of women: total testosterone (Ttot) and DHEA-S.

For women of group I-a Ttot was 0.92 (0.78-1.05) nmol/l, for women of group II-a Ttot was 0.67 (0.52-0.83) nmol/l. These show a decrease by 1.3 times with age (reference rate 0.38-1.97 nmol/l). For women of group I-b the level of Ttot was 0.65 (0.50- 0.79) nmol/l, for women of II-b it was 0.41 (0.38-0.44) nmol/l. The decrease with age ranks up to 1.58 times. It means common testosterone for women with sexual dysfunction and decreased lubrication was a decrease in levels with age. The rate of decline is greater for women with clinically significant levels of antibodies to thyroperoxidase.

The reference norms for DHEA-S depend on age. For 15-20 years old women it is 88-483 mcg/dl, for 20-30 years old women it is 280-640 mcg/dl, for 30-40 years old women it is 120-520 mcg/dl. DHEA-S for women of group I-a it was 154.95 (146.56-163.34) mcg/dl, for women of group II-a it was 134.78 (112.13-157.42) mcg/dl (decrease by 1.14 times). For women of group I-b this index was equal to 102.79 (80.15-125.44) mcg/dl, and for women of group II-b group this index value was equal to 59.83 (52.67-66.94) mcg/dl (decrease by 1.7 times).

This suggests that a decrease in testosterone and dehydroepiandrosterone sulfate levels with age was common for women with sexual dysfunction and decreased lubrication. This decrease is more significant for women with clinically significant levels of antibodies to thyroperoxidase .

For women of group I-a, the cortisol index was 22.35 (20.27-24.42) mg/dl, for women of group II-a, the cortisol level was 15.57 (13.93-17.21) mg/dl, showing a 1.4 – fold decrease (benchmark being 4.30-22.40 mg/dl). For women of group I-b this index value was at the level of 20.19 (17.30-23.07) mg/dl, and for women of group II-b it reached 22.22 (20.64-23.79) mg/dl. This suggests that with age there is a tendency to approach the level of cortisol to the upper limit of normal.

The analysis of prolactin level showed the following: for women of group I-a the prolactin ratio reached 16.06 (13.95-18.16) ng/ml, for women of group II the index value was 15.71 (13.58-17.85) ng/ml, (reference values of 2.8-29.2 ng/ml). For women in group I-b prolactin was 14.82 (13.48-16.16) ng/ml, and for women in group II-b it was 13.17 (9.48-16.85) ng/ml.

This indicates that no hyperprolactinemia was observed in both groups of women surveyed.

This means that, with age, progesterone levels for women with clinically significant levels of antibodies to thyroperoxidase. Levels of antibodies to thyroperoxidase tended to have a significant trend (the probability, that the mean progesterone values for these age groups were obtained from general groups having the same meaning, is less than 0.005) to reduction, although it remained within the reference rate for first phase of the cycle.

Analysis of cortisol levels for women with ovarian dysfunction and androgen deficiency indicates high levels of stress in women of early reproductive age, regardless of the level of antibodies to thyroperoxidase. With age, cortisol levels remain high for women with clinically significant levels of antibodies to thyroperoxidase. For women without high rates of antibodies to thyroperoxidase, cortisol levels come to mean reference rates.

Our observations are consistent with the findings of other researchers [4, 7], who note the initial increase in the concentration of LH and FSH in stress states. Such growth is likely due to the stimulating effect of the corticotropin-releasing hormone. Sexual steroid hormones play a very important role in the system's normal functioning of the body as a whole. For women with clinically relevant levels of antibodies to thyroperoxidase and sexual dysfunction during their lifetime, we have found an increase in FSH/LH imbalance at the dominant follicle sampling stage. This condition is accompanied by significantly lower ( $p < 0.05$ ) estradiol values and progesterone insufficiency in the first phase of the menstrual cycle.

Testosterone helps maintain an adequate response of the body to stress. Duration of stressor is a determining factor for testosterone synthesis [6]. For women with sexual dysfunction, our findings also indicate a decrease in testosterone levels. This decrease is more pronounced for women with clinically relevant rates of antibodies to thyroperoxidase. We found a significant decrease in the level of dehydroepiandrosterone sulfate (DHEA-S) for women with thyroid pathology and sexual dysfunction, indicating an intracrine negative effect of this hormone deficiency on estradiol secretion and steroid

deficiency. The authors, who studied the value of DHEA-S for successful generative function of women, noted that it is the normalization of the DHEA-S level and leads to an increase in the concentration of insulin-like growth factor-1 (ILGF-1) of follicular origin, which indirectly stimulates the influence of gonadotropin and suppresses the process of their premature atresia [3].

### Conclusion

1. The presence of clinically relevant levels of antibodies to thyroperoxidase for women of early and middle age with sexual dysfunction adversely affects the early stages of folliculogenesis. This factor indicates the risk of decreased steroid-producing ovarian function and the formation of a tendency for their androgen deficiency.

2. It is advisable for women with clinically relevant levels of antibodies to thyroperoxidase to plan their pregnancy at an earlier reproductive age (18-25 years), since optimal conditions for fertility are maintained at this time. With age, such women have the conditions for inadequate synthesis of ovarian steroids at the beginning of follicular growth, which increases the risk of primary infertility.

3. It is more appropriate for women with sexual dysfunction and clinically insignificant levels of antibodies to thyroperoxidase to plan for pregnancy in the middle reproductive age. This reduces the risk of primary infertility too.

### References

1. Klimov VS, Abaturova LO, Lyubimaya DR Narusheniye reproduktivnoy funktsii pri patologii shchitovidnoy zhelezy. Molodoy ucheny. 2017; 14 (2): 22-25. [in Russian]
2. Koubassov RV. Gormonalnyye izmeneniya v otvet na vozdeystviye ekstremal'nogo faktora okruzhayushchey sredy. Vísnik RAMN. 2014; 9:102-108. [in Russian]
3. Nuralieva NF, Yukina M.Yu., Troshina EA, Platonova NM Defitsit androgenov u zhenshchin s nadpochechnikovoy nedostatocnost'yu. Degidroeipiandrosteron. Literaturnyy obzor. Ginekologiya. 2018; 20 (4): 35-38. [in Russian]
4. Eiden LE. Neuropeptide-Catecholamine Interactions in Stress. A New Era of Catecholamines in the Laboratory and Clinic. USA, Elsevier Inc. 2013; 68:399-404. doi: 10.4103/0019-5545.117131.
5. Essina MM, VF Snegireva. Reproduction system for hypothyroidism. Archive of obstetrics and gynecology. 2017; 4 (2): 77-83.
6. Kalil B, Leite C, Carvalho-Lima M, Anselmo-Franci JA. Role of sex steroids in progesterone and corticosterone response to acute restraint stress in rats: sex differences. Int. J. Biol. Stress. 2013;16(4): 452-460.
7. Kino T, Charmandari E, Chrousos GP. Disorders of the Hypothalamic-Pituitary-Adrenocortical System. Handbook of Neuroendocrinology. USA, NY: Academic Press. 2012; 639-657.
8. Mokhort TV, Safina MR Hyperprolactinemia syndrome: modern approaches to diagnosis and treatment. Reproductive health. Eastern Europe. 2012; 4 (22): 130-141.
9. Perminova SH, Ibragimova MK, Nazarenko TA, Kashirova TV, Fadeev VV. Infertility and hypothyroidism. Women's Health Issues. 2008; 3 (2): 65-75.
10. Romashchenko OV, Melnikov SM, Belogolovskaya VV, Yashchenko LB, Evaluation of female sexual dysfunction in the system of family planning. Medical aspects of woman's health. 2012; 8 (61): 59-62.
11. Semeniuk LM, Likhachov VK, Yuzvenko TY, Dobrovolska LM, Makarov OG. Risk markers of reproductive loss in women with hyperandrogenism. Wiadomosci Lekarskie. 2018; LXXI(8): 1550-1553.
12. Vihang N. Diagnostic and statistical manual of mental disorders 5: A quick glance. Indian J Psychiatry. 2013; Jul-Sep; 55(3): 220-223.

### Реферати

#### **ВИЗНАЧЕННЯ РИЗИКІВ ФОРМУВАННЯ БЕЗПЛІДДЯ У ЖІНОК З ПАТОЛОГІЄЮ ЩИТОВИДНОЇ ЗАЛОЗИ І ГІПОАНДРОГЕНОВОЮ ДИСФУНКЦІЄЮ ЯЄЧНИКІВ**

**Семенюк Л.М., Юзвенко Т.Ю., Бородкін Г.О., Крижановська О.І.**

Метою роботи було визначення впливу рівня антитіл до тиреопероксидази на фертильність жінок із сексуальною дисфункцією, та зниженням рівнем яєчникових андрогенів. Проведено дослідження ризиків формування безпліддя у жінок з патологією щитовидної залози на основі аналізу результатів гормональних тестів та розробки рекомендацій щодо планування вагітності в умовах гіпоандрогенної дисфункції яєчників. Встановлено, що наявність клінічно значущих рівнів антитіл до тиреопероксидази у жінок раннього та середнього віку із статевою дисфункцією негативно впливає на ранні стадії фолікулогенезу. Цей фактор вказує на ризик зниження функціонування яєчників, що продукують стероїди, та формування сприйнятливості до безпліддя. Бажано жінкам з клінічно значущим

#### **ИССЛЕДОВАНИЕ ФОРМИРОВАНИЯ БЕСПЛОДИЯ У ЖЕНЩИН С ПАТОЛОГИЕЙ ЩИТОВИДНОЙ ЖЕЛЕЗЫ И ГИПОАНДРОГЕНОВОЙ ДИСФУНКЦИЕЙ ЯИЧНИКОВ**

**Семенюк Л.Н., Юзвенко Т.Ю., Бородкин Г.А., Крыжановская О.И.**

Целью работы было определение влияния уровня антител к тиреопероксидазе на фертильность женщин с сексуальной дисфункцией и сниженным уровнем яичниковых андрогенов. Проведено исследование рисков формирования бесплодия у женщин с патологией щитовидной железы на основе анализа результатов гормональных тестов и разработки рекомендаций по планированию беременности в условиях гипоандрогенной дисфункции яичников. Установлено, что наличие клинически значимых уровней антител к тиреопероксидазе у женщин раннего и среднего возраста с половой дисфункцией негативно влияет на ранние стадии фолликулогенеза. Этот фактор указывает на риск снижения функционирования яичников, продуцирующих стероиды и формирование восприимчивости к бесплодию. Желательно женщинам с клинически значимым уровнем

рівнем антитіл до тиреопероксидази планувати свою вагітність у більш ранньому репродуктивному віці (18-25 років), оскільки в цей час підтримуються оптимальні умови для народжуваності. Для жінок з клінічно незначним рівнем антитіл до тиреопероксидази планування вагітності є більш доцільним у середньому репродуктивному віці.

**Ключові слова:** безпліддя, антитіла, андрогенна недостатність.

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антител к тиреопероксидазе планировать свою беременность в более раннем репродуктивном возрасте (18-25 лет), поскольку в это время поддерживаются оптимальные условия для рождаемости. Для женщин с клинически незначительным уровнем антител к тиреопероксидазе планирования беременности является более целесообразным в среднем репродуктивном возрасте.

**Ключевые слова:** бесплодие, антитела, андрогенная недостаточность.

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## **RATIONALE FOR THE USE OF METHODS OF MICROSCOPIC CRYSTALLOGRAPHY IN FRACTALS OF PROTEINS AND IRRIGATION FOR THE EARLY DIAGNOSIS, TREATMENT AND PREVENTION OF INFLAMMATORY PROCESSES IN THE ORAL CAVITY**

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In dentistry, new methods of prevention and treatment of diseases caused by aggressive biofilm are constantly offered. If timely oral hygiene and preventive measures are ignored or underestimated, the impact of aggressive biofilm can be irreversible and cause changes in periodontal tissues. One of the key factors that worsen the general state of oral health is the presence of removable and fixed dentures in patients. This is because soft dental plaque forms much faster on the surface of implant. Today, one of the most effective and optimal methods used for the prevention and treatment of inflammatory processes in the oral cavity is irrigation. We examined a total of 90 people. The age of the patients ranged from 40–60 years. Of these, there were 40 men and 50 women. Analyzing the value of the protein fractals, namely the area, we assessed and confirmed the hygienic condition of the oral cavity in people with dental prostheses. An application of the periodontal tissue irrigation method for fixed dental prostheses leads to a decrease in the percentage of protein fractals area in the digital crystallography samples. The results are confirmed by statistical and clinical data.

**Key words:** microscopic crystallography, irrigation, oral cavity, periodontium, metal-ceramic fixed dental prostheses.

*The work is a fragment of the research project "Restoration of dental health in patients with major diseases and their rehabilitation", state registration No. 0116U004191.*

Hygienic condition of the oral cavity directly affects the development of periodontal disease. One of the leading negative factors is dental plaque. At the initial stage, it contains aerobic microorganisms that demineralize the enamel. The mature dental plaque is dominated by anaerobic bacteria associated with the etiology of gingivitis and periodontitis. Such bacteria penetrate into the gingival pockets, secrete toxins and enzymes that lead to the destruction of periodontal tissues [1].

In dentistry, new methods of prevention and treatment of diseases caused by aggressive biofilm are constantly offered. If timely oral hygiene and preventive measures are ignored or underestimated, the impact of aggressive biofilm can be irreversible and cause changes in periodontal tissues. One of the key factors that worsen the general state of oral health is the presence of removable and fixed dentures in patients. This is because soft dental plaque forms much faster on the surface of implant [5, 6].

Poor oral hygiene significantly reduces the life of dentures, and subsequently leads to periodontal disease.

The study of biofilms formed in the natural habitat revealed significant differences between planktonic and biofilm forms of microbiota, including differences in bacterial behavior, biochemical processes, biosynthesis of various products, information exchange, including genetic one. Obviously, biofilms can promote the transfer of resistance genes to antibiotics and to various chemical biocides. As a result of inflammation initiated by biofilm microbes, the pH in the gingival sulcus increases and can accelerate the growth and proteinase activity of some periodontal pathogens by activating the processes of gene expression [2, 3, 5].

This helps to understand why systemic antimicrobials that are applied topically are not always effective, even in cases where the antibacterial drug is selected by the spectrum of its action and activity on a particular type of periodontal pathogens. The latter allows us to explain why mechanical dental plaque removal and hygienic measures (personal and professional hygiene) are the most important component of comprehensive treatment of patients with periodontal disease in practical dentistry.