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Relationship of the Functional States of the Thyroid and the Reproductive System in Women under Iodine Deficiency

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Abstract: Thyroid gland (thyroid) pathology is more common in women of reproductive age. The article presents a review of modern literature on the effect of autoimmune thyroiditis, thyroid hypo- and hyperfunction, as well as its structural changes on the reproductive system of women. Autoimmune aggression against thyroid cells is often associated with diseases of the reproductive system and is the most common cause of primary hypothyroidism. Key words: reproductive age, thyroid gland, thyroiditis, woman.

Relevance. Hypothyroidism is an easily detectable factor risk of infertility and pregnancy complications, which is easily drug therapy. The impact of elevated levels of maternal thyroid hormones on the fetus and antibodies to TTG receptors can stimulate the thyroid gland in the fetus, as well as lead to the development of a number of diseases in a later period.

During pregnancy, the thyroid gland undergoes structural and functional changes. Management tactics depend on the availability dysfunction and benign/malignant diseases. The reproductive system and the thyroid gland are closely interconnected with each other, which is explained by the common mechanisms of their central regulation. In women of reproductive age, pathology of the thyroid gland occurs more often than in any other populations, therefore it is extremely.

It is important to study the effect of thyroid dysfunction on all stages of development and functioning of the reproductive system: regulation of the menstrual cycle, possibility of conception, pregnancy pregnancy, the course of the postpartum period. It is also important to consider that pregnancy itself has significant effect on the thyroid gland and its function. During pregnancy, the thyroid gland increases up to 10% in women, living in areas without iodine deficiency, and by 20–40% in areas with iodine deficiency.

During normal pregnancy there is an increase renal excretion of iodine, increased levels of proteins that bind thyroxine, increased production of thyroid hormones and stimulating effect of human chorionic gonadotropin on the thyroid gland.

Therefore, during pregnancy, women have lower concentration of thyroid-stimulating hormone (TSH) in the blood serum than before pregnancy. A healthy thyroid gland adapts to these changes. It is believed that to maintain euthyroidism during pregnancy, thyroxine production should increase by 40–50%

All types of thyroid pathology can be divided into into two groups: thyroid dysfunction (hypothyroidism and thyrotoxicosis); structural disorders of the thyroid gland (increased volume, nodular formations).

Purpose of the study. The purpose of our research is to study the influence dysfunction of the thyroid gland on the state of the reproductive system in women of fertile age.

Material and research methods. 168 women were examined in aged from 18 to 45 years (average age 28.4±0.4 years) with impaired reproductive function. 152 (90.5%) of them had certain

morphofunctional changes, the remaining 16 (9.5%) had a euthyroid state against the background of various structural changes thyroid gland. The control group consisted of 20 practically healthy women. A clinical examination, ultrasound examination of the thyroid gland and appendages were carried out uterus and ovaries, examination by a gynecologist, determination of hormonal status thyroid gland (TSH, T4, T3), sex hormones (estradiol, progesterone, testosterone), pituitary hormones (FSH, LH, prolactin).

Hormones were determined by enzyme immunoassay using test systems from Human, Germany. Statistical processing carried out by the method of variation statistics using the F-test Fisher and Student's t-test using standard package statistical programs Statistica-6. The differences were considered significant at $p<0.05$.

Results and discussion. Women examined depending on from the structure and degree of enlargement of the thyroid gland were divided into the following groups: goiter 1st degree - 92 (54.7%) women, 2nd degrees - 41 (24.4%), mixed goiter - 7 (4.2%), nodular goiter - 2 (1.2%), hypoplasia of the thyroid gland - 6 (3.6%), autoimmune thyroiditis - 4 (2.4%).

Depending on the functional state of the thyroid gland women were distributed as follows: euthyroidism - 64 (38.1%), manifest hypothyroidism - in 21 (12.5%), subclinical hypothyroidism – in 65 (38.7%), thyrotoxicosis - in 2 (1.2%). Degree of thyroid enlargement glands were determined according to the WHO classification (1994), functional condition - according to I.I. Dedovu et al. (2000). Among the examined women with reproductive disorders hypofunction of the thyroid gland was observed in 51.1%. Together with the women surveyed were grouped depending on the type NMC and the presence of infertility: NMC was observed in 41 (24.4%) women, primary infertility - in 81 (48.2%), secondary infertility - in 46 (27.4%). In the group with NMC, primary amenorrhea was detected in 1 (2.4%) women, secondary amenorrhea - in 7 (17.1%), oligomenorrhea - in 19 (46.3%), opsomenorrhea - in 13 (31.8%), polymenorrhea - in 1 (2.4%). When studying the hormonal profile as a whole in all subjects women with impaired reproductive system were identified hypofunction of the thyroid gland. In comparison with the control group, they showed significant decrease in T3 level ($p<0.05$), increase in TTG level ($p<0.05$). At the same time, the T4 indicator did not differ significantly from the control values groups. Along with this, there was a significant ($p<0.05$) increase indicators of prolactin, LH, cortisol and decreased levels estradiol. Among the examined women with impaired reproductive system, hypofunction of the thyroid gland was noted in 51.1%.

Comparative analysis of hormonal results between groups of euthyroidism, subclinical hypothyroidism and manifest hypothyroidism with impaired reproductive system showed that according to as the functional activity of the thyroid gland decreases there is a more pronounced decrease in T3 and T4 levels and an increase TTG level. In terms of estradiol and cortisol, statistically no significant deviations were observed. In all studied groups, a significant increase was revealed PRL and testosterone levels. In a group of women with subclinical and manifest hypothyroidism There was a significant decrease in the level of T3, T4 ($p<0.001$) in relation to control group and a significant increase in TTG levels in the group manifest hypothyroidism ($p<0.05$) compared with control. Moreover the most pronounced decrease in thyroid hormone levels observed in the group with manifest hypothyroidism.

These groups also revealed a significant decrease in the level estradiol ($p<0.001$), increase in cortisol levels ($p<0.05$) by relative to the control group. In all studied groups there was PRL level was significantly increased.

Relatively low content of estradiol and T3 in our research can be explained by data from scientific sources, i.e. V conditions of hypoestrogenemia, hypofunction of the thyroid gland occurs or vice versa. Despite the contradictory nature of information about the influence sex hormones on the thyroid gland, most researchers. It is believed that estrogens have an effect on the thyroid gland stimulating effect. Regarding the effect of progesterone on function thyroid gland, then all researchers recognize it depressive effect.

A significant increase in the content of prolactin and TTG in our studies may be explained by the presence of common central regulatory mechanisms, i.e. due to prolactoliberin activity

Thyroliberin. In addition, prolactin is able to compete with gonadotropic hormones for binding to gonadotropin receptors on ovarian cells. As a result, conditions are created for estrogen deficiency, ovulation disorders, development of hypomenstrual syndrome and infertility, which was observed in our studies. Consequently, 65.8% of women with NMC and 62% with infertility. The main cause of reproductive system disorders is hypofunction of the thyroid gland, most of which were persons with subclinical hypothyroidism.

Conclusion. Thus, there is a high correlative dependence reproductive health from the thyroid gland, which is especially can be traced in conditions of iodine deficiency and is confirmed the results we obtained.

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