

# CHARACTERISTICS OF CHANGES IN LIPID PEROXIDATION AND THE ANTIOXIDANT SYSTEM OF THE BLOOD DURING SURGICAL INTERVENTIONS FOR DIFFUSE TOXIC GOITER

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**Abstract:** *relevance according to most researchers, autoimmune thyropathies are multifactorial diseases caused by a complex interaction of genetic, hormonal and environmental factors that provoke the development of inadequate immune responses against the thyroid gland at different levels and initiate a long-term autoimmune reaction. Some of the authors believe that oxidative stress plays an important role in the pathogenesis of autoimmune thyroid diseases. Objective: to study the dynamics of changes in lipid peroxidation and the antioxidant potential of blood in patients with diffusely toxic goiter in the dynamics of surgical intervention. Material and methods of research. For an objective analysis of this problem, we examined 154 patients diagnosed with diffuse toxic goiter (Graves-Bazedov disease) who were on inpatient treatment in the Department of I-surgery of the Bukhara Regional Multidisciplinary Medical Center. The examined patients were conditionally divided into 2 groups. Conclusions. The study of such markers of oxidative stress can be used to confirm the diagnosis and prescribe adequate treatment to patients with autoimmune thyroid diseases. Antioxidants (quercetin) can play a positive role in the correction of metabolic disorders in diffusely toxic goiter. Keywords: diffuse toxic goiter, Thyrostatic therapy, Thyroidectomy, Disease recurrence, Postoperative complications, Diagnostic and treatment algorithm.*

# ХАРАКТЕРИСТИКА ИЗМЕНЕНИЙ ПЕРЕКИСНОГО ОКИСЛЕНИЯ ЛИПИДОВ И АНТИОКСИДАНТНОЙ СИСТЕМЫ КРОВИ ПРИ ХИРУРГИЧЕСКИХ ВМЕШАТЕЛЬСТВАХ ПО ДИФФУЗНОМУ ТОКСИЧЕСКОМУ ЗОБУ

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**Аннотация:** *актуальность по мнению большинства исследователей, аутоиммунные тиреопатии представляют собой многофакторные заболевания, обусловленные сложным взаимодействием генетических, гормональных и средовых факторов, провоцирующих развитие неадекватных иммунных ответов в отношении щитовидной железы на разных уровнях и инициирующих длительную аутоиммунную реакцию. Некоторые авторы считают, что окислительный стресс играет важную роль в патогенезе аутоиммунных заболеваний щитовидной железы. Цель: изучить динамику изменения показателей перекисного окисления липидов и антиоксидантного потенциала крови у больных диффузно-токсическим зобом в динамике оперативного вмешательства. Материал и методы исследования. Для объективного анализа данной проблемы нами обследовано 154 пациента с диагнозом диффузный токсический зоб (болезнь Грейвса-Базедова), находившихся на стационарном лечении в отделении И-хирургии Бухарского областного многопрофильного медицинского центра. Обследованные больные были условно разделены на 2 группы. Выводы. Изучение таких маркеров оксидативного стресса может быть использовано для подтверждения диагноза и назначения адекватного лечения пациентам с аутоиммунными заболеваниями щитовидной железы. Антиоксиданты (кверцетин) могут играть положительную роль в коррекции метаболических нарушений при диффузно-токсическом зобе. Ключевые слова: диффузный токсический зоб, тиреостатическая терапия, тиреоидэктомия, рецидив заболевания, послеоперационные осложнения, лечебно-диагностический алгоритм.*

**Relevance.** According to most researchers, autoimmune thyropathies are multifactorial diseases caused by a complex interaction of genetic, hormonal and environmental factors that provoke the development of inadequate immune responses against the thyroid gland at different levels and initiate a long-term autoimmune reaction. Some of the authors believe that oxidative stress plays an important role in the pathogenesis of autoimmune thyroid diseases [2, 5, 12]. Some of the authors believe that oxidative stress plays an important role in the pathogenesis of autoimmune thyroid diseases. Patients with large diffuse toxic goiters often present with local

compression symptoms, including dysphagia, neck tightness, and airway obstruction, that require surgical management [4, 8, 11]. Reducing the incidence of diffuse toxic goiter is one of the urgent problems of endocrine surgery. According to some authors, it reaches 48% of all thyroid diseases [1, 5, 9]. When choosing a method for treating diffuse toxic goiter, many specialists consider a complex consisting of the patient's age, the degree of thyrotoxicosis, and the results of an emergency (intraoperative) histological examination [3, 6, 7, 10, 12]. However, these methods do not allow to achieve the desired result, due to their routine and unified approach in different forms of the course of the disease.

**The aim:** to study the dynamics of changes in lipid peroxidation and the antioxidant potential of blood in patients with diffusely toxic goiter in the dynamics of surgical intervention.

**Material and methods of research.** For an objective analysis of this problem, we examined 154 patients diagnosed with diffuse toxic goiter (Graves-Bazedov disease) who were on inpatient treatment in the Department of Microsurgery of the Bukhara Regional Multidisciplinary Medical Center. The examined patients were conditionally divided into 2 groups. The first group consisted of 63 (40.9%) patients who took thyrostatic therapy for 1 year, the second group consisted of 91. Surgical interventions were performed in the age groups from 26 to 71 years: 25-40 years -  $30.0 \pm 5.5$  %; 41-56 years -  $36.8 \pm 5.7$ %; from 60 and older -  $33.2 \pm 5.6$ %. All patients were admitted after a comprehensive examination by an endocrinologist. In most cases, patients were hospitalized in the surgical department in the absence of clinical manifestations of thyrotoxicosis. Therapy in the early stages of diffuse toxic goiter consisted in taking antithyroid drugs - thiamazole and propylthiouracil. Indications for surgical treatment were severe thyrotoxicosis, ineffectiveness of thyrostatic therapy "in the form of recurrent thyrotoxicosis", compression of the neck organs with an enlarged gland, the presence of a large goiter, oncological alertness in the presence of nodular neoplasms, severe ophthalmopathy, the inability or unwillingness of the patient to receive long-term medication.

**The results of the study.** During the operation, the following complications were often observed: the opening of bleeding, air embolism in case of damage to large veins, damage to the recurrent nerve. In our opinion, one of the causes of bleeding in the surgical treatment of thyrotoxic goiter, unrelated to the anatomical features of the thyroid gland, is changes in the functional state of the hemostasis system. It should be noted that clear ideas about the nature and mechanism of hemostatic shifts are still debatable, and despite the recognition by many researchers of hypocoagulemia as a cause of bleeding in hyperthyroid states, a secondary origin of hypocoagulemia is not excluded. In connection with the study of the role of lipid peroxidation in the pathogenesis of thyrotoxicosis, additional tasks have appeared to solve postoperative complications in the form of bleeding. Many experimental studies have proved that lipid peroxidation is closely related to hemostasis. In addition, researchers have noted that in small doses, thyrogormones reduce the level of lipid peroxides in tissues, and in large doses they inhibit antioxidant protection. Consequently, the thyroid gland and its hormones are one of the important regulators of the intensity of lipid peroxidation, and its functioning, in turn, is determined, in particular, by the state of free radical processes. Based on the above, we decided to study the dynamics of the state of the lipid peroxidation system and the antioxidant system in patients with diffusely toxic goiter. In the process of preoperative preparation for surgery, antioxidant therapy with the drug Quercetin (500 mg 2 times a day for 30 days) was performed, as a capillary stabilizing, antioxidant, membrane stabilizing, reduces capillary permeability and reparative effect, as well as Essential forte H (1 drop 2 times a day) to strengthen the walls of blood vessels. The complex therapy conducted by us before and after surgery showed a peculiar dynamics of the studied parameters in patients who received mercazolil for 1 year, the level of diene conjugates in the preparatory period tends to decrease by an average of 16% from the baseline on day 14. After surgery, on the 7th day of the study, the level of diene conjugates in blood plasma decreased by 37%. The analysis of the obtained research results indicated a decrease in the level of antioxidants on the 14th day before surgery by 39% and 32.4%, respectively, against the initial values. It should be noted that the obtained results of studies after surgery on the 7th day of the study, where all the studied indicators approached the indicators of the comparison groups (in 78% of the examined persons), which indicates the effectiveness of the preoperative preparation.

**Conclusions.** Oxidative stress plays an important role in the progression of autoimmune inflammation of the thyroid gland. At the same time, mercazolil can increase oxidative stress. The study of such markers of oxidative stress can be used to confirm the diagnosis and prescribe adequate treatment to patients with autoimmune thyroid diseases. Antioxidants (quercetin) can play a positive role in the correction of metabolic disorders in diffusely toxic goiter.

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