ASSESSMENT OF EXTERNAL RESPIRATORY FUNCTIONS ACCORDING TO THYROID FUNCTION IN PATIENTS WITH BRONCHIAL ASTHMA AND TOXIC BULK

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Abstract. *In this article, the effect of thyroid gland diseases on the course of bronchial asthma was studied based on clinical and laboratory methods of examination, thyroid status and asthma attacks. Conclusions are given based on the results of changes in free fraction indicators of thyrotropin hormone, triiodothyronine, tetraiodothyronine among patients receiving replacement therapy.*

Keywords: *bronchial asthma, thyroiditis, toxic goiter, thyroid gland, thyrotoxicosis.*

The urgency of the problem. Bronchial asthma (BA) is one of the most common non-communicable diseases, and for many, this disease has a significant impact on their quality of life. Bronchial asthma is the 16th leading cause of disability in the world. About 300 million people worldwide are affected by asthma, and this may be observed in another 100 million people by 2025 [14]. Despite the progress in the treatment of bronchial asthma, the treatment in recent decades has not yet been completely successful. The incidence and prevalence of bronchial asthma differ between children and adults. It is known that asthma often begins in childhood, but can appear at any time during life, and some develop asthma for the first time in adulthood. Interestingly, the incidence and prevalence of asthma differ by gender. Asthma is more common in prepubescent boys [11]. Despite the advances in pharmacotherapy, the increase in morbidity, the increase in severe uncontrolled forms resistant to treatment, and the high mortality rate explain why bronchial asthma remains a serious social and medical problem [4,5,8,10].

As patients move from one age group to another, symptoms of other chronic diseases are added to the clinical presentation of bronchial asthma. The combination of several diseases, on the one hand, changes and aggravates the BA clinic, and on the other hand, makes the diagnosis and treatment of BA and comorbid pathology difficult. In particular, this applies to the pathology of the thyroid gland. Previously, this was associated with a rare occurrence of bronchial asthma and thyroid pathology in the same patient [9]. According to the authors, cases of thyrotoxicosis were recorded in 300 of the patients listed with BA. However, the combination of these pathologies is more common in clinical practice. In addition, at present, endocrinologists note an increase in the prevalence of autoimmune diseases of the thyroid gland [2,3].

Diffuse toxic goiter is a disease characterized by diffuse enlargement of the thyroid gland and overproduction of thyroid hormones. This is a common autoimmune disease. The prevalence of diffuse toxic goiter is 0.5% or 23:10000 in the population. Women are affected 8 times more often than men, the incidence of the disease is high in the age group of 20-40 years. Diffuse toxic tuberculosis develops after various chronic infectious diseases and stress, and is observed in individuals with a genetic predisposition to TB (HLA-S*07, B8, DR3 antigens) and re-formation of the immune system in the body [6,12].

According to scientists, thyroid pathology (both hypothyroidism and thyrotoxicosis) worsens the course of bronchial asthma: increases the frequency of asthma attacks and shortens the duration of BA remission. The combination of bronchial asthma and thyrotoxicosis is characterized by a high concentration of immunoglobulin E, which has a statistically significant effect on expiratory volume indicators [7,9]. A possible mechanism of worsening of BA disease with thyrotoxicosis is a sharp increase in the activity of T-lymphocytes in inflammation. Toxic goiter is a common thyroid disease. It is one of the diseases that have not lost their relevance due to the serious complications they cause to the cardiovascular system and nervous system. In the development of toxic goiter, the immune system produces autoantibodies against TTG receptors in the thyroid gland tissue, which leads to the production of large amounts of thyroid hormones (thyroxine and triiodothyronine), and causes swelling in the retrobulbar tissue of the eyeball. If the increase in thyroid hormones is called hyperthyroidism, the development of specific symptoms as a result of it is called thyrotoxicosis [2,8,3].

The purpose of the study. Evaluation of external respiratory functions according to thyroid gland enlargement and thyroid function in patients with bronchial asthma and toxic goiter

Research materials and methods. 37 patients with toxic goiter were included in the study, and among these patients, complications such as thyrotoxic heart, severe cachexia, exophthalmos of the 2nd degree were observed, and pathological processes were excluded from the study due to the influence on the number and severity of bronchial asthma attacks. In addition, patients with an excessively large goiter of the Nikolaev level 4-5 of the thyroid gland, patients with an atypically located thyroid gland behind the breast were not included in the observation. In patients with toxic goiter, according to the structure of the thyroid gland, 14 patients had 1 degree enlargement of the thyroid gland, 23 patients had 2 degree enlargement. Among these patients, 7 patients had mixed goiter, all of whom had grade 2 thyroid enlargement and nodules ranging in size from 10 to 17 mm. These nodules were biopsied and the results showed no atypia.

Research results. Patients were divided into 2 groups according to the degree of thyrotoxicosis:

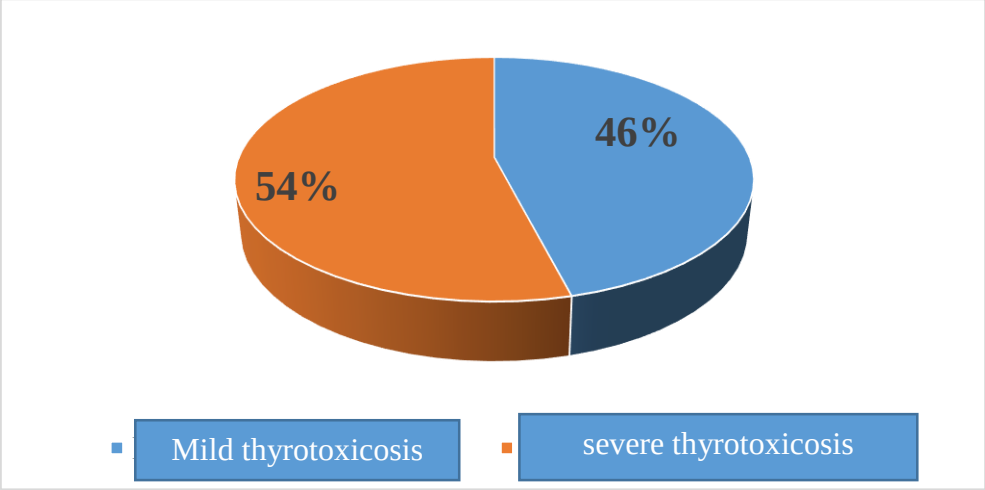

Figure 1. Distribution of patients to levels of thyrotoxicosis.

The average age of patients with mild thyrotoxicosis is 46.3±2.01 years, 10 women, 7 men, and 49.2±2.01 years in patients with moderate thyrotoxicosis, 9 women and 11 men.

In patients with mild thyrotoxicosis, external respiratory functions were evaluated according to thyroid levels (Table 1).

1-table

Assessment of external respiratory functions according to thyroid level in patients with mild thyrotoxicosis

Indicators	1-level n=10	2-level n=7
Age	53,8±1,03	51,9±1,03
Gender, A/E	6/4	4/3
OFV1	1,85±0,2	1,63±0,2
HTS	2,64±0,3	2,33±0,2
Tiffno indexi	0,7±0,02	0,7±0,02

According to this table, external respiratory functions were studied, in which a decrease in OTS and OFV1 indicators was observed in patients with 2nd degree of enlargement of the prostate gland, but the index of Tiffno was equal to the standard indicator of 0.7. The degree of thyroid enlargement did not show a significant difference between the groups.

When studying patients with moderately severe thyrotoxicosis, indicators of external respiratory functions were evaluated according to the enlargement of the thyroid gland (Table 2).

Table 2

Evaluation of external respiratory functions according to thyroid level in patients with moderate thyrotoxicosis

Indicators	1-level n=4	2-level n=16
Age	48,5±1,03	50,2±1,03
Gender, A/Э	A 4	9/7
OFV1	1,12±0,2	0,96±0,2
HTS	1,87±0,3	1,61±0,2
Tiffno index	0,6±0,02	0,6±0,02

According to Table 2, it is possible to see a sharp decrease in external respiratory function indicators in patients with moderately severe thyrotoxicosis. In this group of patients, the indicators of respiratory functions according to the enlargement of the thyroid gland did not give a reliable difference between the groups.

When the patients in the study were studied according to the degree of bronchial asthma, they were divided into the following groups and external respiratory functions were evaluated (Table 4.11). There were 17 patients with 1st degree bronchial asthma, 12 women and 5 men, their average age was 48.1±1.03; There were 13 patients with 2nd degree bronchial asthma, 8 of them women and 5 men (average age 47.4±1.03); There were 4 grade 3 patients, 4 of whom were women (average age 52.7±1.03) and 3 grade 4 patients, 2 women and 1 male (average age 53.3±1.03) organized.

According to Table 3, there was no difference in external respiratory function indicators according to thyrotoxicosis levels among patients with bronchial asthma. The results in these patients were equal to the normative indicators.

Table 3

Indicators of external respiratory function according to the degree of thyrotoxicosis in patients of the 1st degree of BA

Indicators	Mild thyrotoxicosis	Moderately severe thyrotoxicosis
Age	49,8±1,03	47,4±1,03
Gender, A/Э	5/3	7/2
OFV1	2,48±0,01	2,39±0,01
UTS	3,4±0,2	3,37±0,2
Tiffno index	0,73±0,02	0,71±0,02

After that, the group of patients with 2nd degree of bronchial asthma was studied according to the levels of thyrotoxicosis (Table 4).

Table 4

Indicators of external respiratory function according to the degree of thyrotoxicosis in patients of the 2nd degree of BA

Indicators	Mild thyrotoxicosis	Moderately severe thyrotoxicosis
Age	45,3±1,03	50,1±1,03
Gender, A/Э	4/4	4/1
OFV1	2,17±0,01	2,04±0,01
UTS	3,11±0,2	3,0±0,2
Tiffno index	0,70±0,02	0,68±0,02

According to Table 4, the vital capacity of the lungs from the indicators of external respiratory functions was equal to the standard indicators. Only the index of Tiffno was observed to decrease from the norm in patients with moderately severe thyrotoxicosis. The indicators between the groups did not equate to a reliable result.

When external respiratory functions were evaluated in patients with 3rd degree of bronchial asthma, the results were reflected as follows (Table 5):

5-table

Indicators of external respiratory function according to the degree of thyrotoxicosis in patients of the 3rd degree of BA

Indicators	Mild thyrotoxicosis	Moderately severe thyrotoxicosis
Age	50,4±1,03	54,2±1,03
Gender, A	1	3
OFV1	1,42±0,01	1,25±0,01*
UTS	2,45±0,2	2,28±0,2
Tiffno index	0,58±0,02	0,55±0,02

Note: *- the difference compared to the indicators of the mild thyrotoxicosis group is reliable (*-P<0.05)

According to Table 5, all patients with bronchial asthma of the 3rd degree were women. The parameters of the external respiratory function were observed to decrease sharply from the standard parameters to this level. When the groups were compared according to the degree of thyrotoxicosis, the results for the OFV1 index were equal to the reliability value. The remaining measures did not show reliability, although there was a difference between the groups.

Respiratory functions were evaluated according to the 4th degree of bronchial asthma (Table 6).

6-table

Indicators of external respiratory function according to the degree of thyrotoxicosis in patients of the 4th degree of BA

Indicators	Mild thyrotoxicosis	Moderately severe thyrotoxicosis
Age	51,8±1,03	54,9±1,03
Gender, A	2	1
OFV1	0,79±0,01	0,63±0,01*
UTS	1,52±0,2	1,33±0,2*
Tiffno index	0,52±0,02	0,48±0,02

Note: *- the difference compared to the indicators of the mild thyrotoxicosis group is reliable (*-P<0.05)

According to Table 6, it is possible to observe a sharp decrease in external respiratory functions. According to the levels of thyrotoxicosis, it is possible to observe a sharp and reliable decrease of OFV1 and OTS indicators in the group of patients with moderately severe thyrotoxicosis. Although the Tiffno index score was also significantly different from the norm, the results between the groups were not equal to the reliable value.

Summary. Based on the above data, it can be concluded that the disorders of external respiratory functions in patients with bronchial asthma and thyrotoxicosis did not significantly deviate from the standard indicators in patients with bronchial asthma of the 1st and 2nd degree. Patients with mild thyrotoxicosis showed a better outcome compared to those with moderate severity. It can be estimated that this is caused by increased sensitivity to catecholamines caused by thyrotoxicosis to bronchospasm, which is the main pathogenetic link of bronchial asthma, which in turn causes bronchodilation.

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