BRONCHIAL ASTHMA and HYPOTHYROIDISM

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ABSTRACT

A prospective study was conducted, the purpose of which was to compare the features of the clinical course of bronchial asthma (BA) and the functions of external respiration in patients with BA in combination with primary compensated hypothyroidism. A case-control study was conducted in 40 patients who were divided into two groups: group 1 consisted of patients with hypothyroidism, group 2 - patients with isolated asthma. As a result of the study, the features of the course of BA in combined pathology were noted: an increase in the frequency of daytime and nighttime seizures suffocation, scarcity of sputum, frequent detection of atrophic endobronchitis, less pronounced bronchial patency disorders. Analyzing the treatment carried out in patients of the studied groups, it was revealed that in patients with hypothyroidism, control over the course of AD was achieved against the background of high doses of inhaled glucocorticosteroids and short courses of systemic glucocorticosteroids, which did not lead to the formation of hormone dependence. All of the above features indicate the effect of hypothyroidism on the clinical course of asthma.

Keywords: primary hypothyroidism, bronchial asthma, respiratory function, atrophic endobronchitis, glucocorticosteroids

INTRODUCTION

Bronchial asthma (BA), being an autoimmune disease, can lead to diseases of the thyroid gland (thyroid gland). In some patients with endo- and exogenous AD, with a disease duration of more than one and a half years, with a hereditary predisposition to allergies and the development of autoimmune changes, the thyroid gland is involved in the pathological process . With increasing severity and duration of the course of asthma, the level of hypoxia, treatment with inhaled drugs and glucocorticosteroids, the frequency of changes in the thyroid system also increases. In autoimmune thyropathies account for a significant proportion of the structure of thyroid diseases: diffuse toxic goiter and autoimmune thyroiditis, which is the main cause of the development of primary hypothyroidism. BA is a chronic respiratory tract disease, the main pathogenetic mechanism of which is bronchial hyperreactivity due to inflammation, and the main clinical manifestation is an attack of suffocation due to bronchospasm, hypersecretion and edema of the bronchial mucosa. BA has been studied quite comprehensively, but to this day the question of the combination of BA with diseases of the thyroid gland. In some literature sources, an atypical, more severe

course of asthma is noted against the background of diffuse toxic goiter, nodular goiter, hypothyroidism. Thus, compression of the airways of an enlarged thyroid gland, especially with chest localization, causes irritation of the branches of the vagus, followed by bronchospasm, leading to a mechanical reflex respiratory disorder. Patients with large goiter and asthma have severe attacks of suffocation. In decompensated hypothyroidism, a decrease in the vital capacity of the lungs was revealed, a violation of central regulation of respiration due to a decrease in the body's oxygen demand and changes in the level of neurotransmitters such as serotonin , histamine in areas of the brain involved in respiratory control. The effect of hypothyroidism with severe clinical manifestations on the function of external respiration (FVD) is determined by a combination of impaired patency of the upper respiratory tract with a decrease in the permeability of the alveolar capillary membrane. With hypofunction of the thyroid gland, deposits of mucin and glycosaminoglycans in the connective tissue of the bronchi were found, which have hydrophilic properties, muscle discoordination, central regulatory respiratory disorders, alveolar hypoventilation, hypoxia and hypercapnia were noted. Thus, the available data allow us to note the effect of hypothyroidism on the course of AD. However, the clinical features of AD and changes remain unexplored FVD, features of the treatment of AD in patients with hypothyroidism.

The aim of our study was to compare the features of the clinical course of AD and FVD in patients with AD in combination with primary hypothyroidism in the compensation stage compared with patients with AD without thyroid diseases.

MATERIALS AND METHODS OF RESEARCH

A prospective case control study was conducted in 40 patients with asthma, who were divided into two groups: group 1consisted of patients with hypothyroidism, group 2 - patients with isolated asthma. The 1st group included 20 women with asthma aged 39 to 71 years, the average age was 57 ± 16 years old. Patients in this group were diagnosed with primary hypothyroidism in the compensation stage, the level of thyroid–stimulating hormone was in the range of 0.4-4.0 mED/ml; the volume of thyroid gland did not exceed 2-6 cm3 at a norm of up to 18 cm3. All patients of the 1st group were diagnosed with the diagnosis of endogenous uncontrolled AD, of which 10 patients had a mixed (exo- and endogenous) variant of AD. 10 patients had moderate asthma, and the remaining 10 patients had a severe course. The 2nd group (comparison group) included 20 patients with isolated BA aged 41 to 75 years, average age 54 ± 8 years old, of which 3 are men and 17 are women. All patients in this group were also diagnosed with endogenous uncontrolled AD, of which 5 patients had a mixed variant of AD. The study did not include patients with other concomitant diseases, as well as patients who had smoking experience at the time of the study or in the previous period of life ≥ 10 packs / years. All patients received basic BA therapy, which included

inhaled glucocorticosteroids (IGCS), prolonged and short-acting bronchodilators, mucolytic drugs; if necessary, therapy with systemic glucocorticosteroids (SGCS) was included. In group 1, patients took thyroid -stimulating drugs (L-thyroxine) according to indications and in the dosage required by the patient, The average daily dose was 81.25 mg. The clinical picture was assessed by changing the total value of subjective criteria, for which a point scale for evaluating clinical indicators was developed. The severity of shortness of breath, the presence of daytime and nighttime attacks of suffocation; the presence of cough, sputum and its nature, as well as hoarseness of voice were evaluated. A functional study of external respiration was performed at the Erich Jaeger Masterlab installation (Germany). The study assessed the vital capacity of the elderly (IVC), the volume of forced exhalation in 1 second (FEV1) and the Tiffno test (FEV1/IVC). To assess the reversibility of bronchial obstruction, all patients underwent a test with a broncholytic drug (berotec). To determine the intensity of inflammatory changes in the bronchi, bronchological examination with an Olympus fibrobronchoscope was performed in all patients.Statistical processing of the results was carried out using the Microsoft Excel, BIOSTAT software package. To determine the reliability of the differences, the Student's t – test was calculated, the difference method was used for paired measurements and the chi-square criterion ($\chi 2$). The work show M – the sample average, m – the error of the average, n – the sample volume. The critical significance level (p) in testing statistical hypotheses in this study was assumed to be equal to or less than 0.05.

THE RESULTS AND THEIR DISCUSSION

The compared groups of patients did not differ statistically significantly in age and duration of the disease. When collecting anamnesis, it was found that in the 2nd group with isolated asthma, 10 people (in 50% of cases) had frequent exacerbations of asthma (2-3 times a year), whereas in the 1st group with combined pathology, frequent exacerbations of asthma were only in 4 patients (in 20% of cases, $\chi 2 = 1.15$, $p = 0.282$). In patients without hypothyroidism, more frequent respiratory infections were noted (in 14 patients, which accounted for 70% of cases) compared with patients with hypothyroidism and AD were only in 3 patients, in 15 % of cases, $\chi 2 = 3.931$, $p = 0.047$. At the time of examination, the frequency and severity of daytime and nighttime attacks of suffocation, as well as the amount of use of short-acting β2 -agonists, were significantly higher in group 1. Patients in this group had a persistent unproductive cough with mucopurulent sputum (the number of sputum up to 50 ml / day). On the contrary, patients with AD without hypothyroidism had a productive cough with sputum of a predominantly mucous nature (the amount of sputum is more than 100 ml/day). In group 1, 15 patients (in 75% of cases) had weakness ($\chi 2 = 0.011$, $p = 0.917$), 14 patients (in 70 % of cases) had tremor of the hands and body ($\chi 2 = 9$, $p = 0.003$) and 10 patients (in 50 % of cases) had pronounced sweating ($\chi 2 = 6.38$, $p = 0.012$). In

patients of the 2nd group, there was no tremor of the hands and body, pronounced sweating, and weakness was observed in 16 patients (in 80% of cases). In group 1, most patients had constant hoarseness of voice, while in the group of patients with isolated ASTHMA, hoarseness of voice appeared during intensive treatment of IGCS through a nebulizer. Thus, the presence of more frequent hoarseness of the voice in patients with AD with combined pathology can be explained not only by the use of IGCS, but also by changes in the vocal cords caused by hypothyroidism. The study of FVD showed that in patients of group 1, violations of the functional ability of the lungs were less pronounced than in patients The 2nd group. Thus, in 9 patients (in 45% of cases) of the 1st group, an obstructive type of FVD violation was noted, in other cases there were no violations of FVD. In a group without in the combined pathology, obstructive disorders were observed much more often (in 16 patients, which was 80% of cases), ($\chi2 = 0.719$, $p = 0.396$). At the same time, the average values of FEV1, IVC and the Tiffno test were higher in patients of group 1, compared with group 2. A positive test with a bronchodilator drug with an increase in FVD values of more than 15% was noted in 4 patients (45% of cases) in the 1st in the group and in 10 patients (80 % of cases) in the 2nd group ($\chi2 = 1.15$, $p = 0.282$). Consequently, according to the results of the study of FVD in patients of both groups, more pronounced obstructive disorders in BA patients without combined thyroid pathology. Analysis of the results of fibrobronchoscopy showed that 15 patients (in 75% of cases) with hypothyroidism and AD had diffuse deforming atrophic endobronchitis, the remaining 5 patients of this group (25% of cases) were diagnosed 2-sided diffuse catarrhal moderately pronounced endobronchitis. Whereas in the presence of only BA in the 2nd group, atrophic endobronchitis was only in 3 patients in 15 % of cases ($\chi2 = 4.45$, $p = 0.035$), and in the remaining 17 patients, 85 % of cases had catarrhal endobronchitis was detected ($\chi2 = 3.32$, $p = 0.068$). In the treatment of the studied patients during periods of exacerbation and remission of AD, the features and differences in the use of SGCS were noted. So, in the 1st group of SGCS they were used in 12 patients (in 60% of cases), and in group 2 in 7 patients (in 35% of cases, $\chi2 = 0.447$, $p = 0.504$). However, in the group of patients with hypothyroidism, 10 patients had short courses (10-14 days) of treatment (in 50% of cases), and 2 patients (in 10% of cases) had constant hormone therapy with a daily dose of prednisone 15-20 mg. In 2- in the 1st group, short courses of SGCS treatment were observed only in 1 person (in 5% of cases, $\chi2 = 4.392$, $p = 0.03$), and constant intake of SGCS was in 6 patients (in 20% of cases, $\chi2 = 0.822$, $p = 0.364$) with a daily dose of prednisone 15-20 mg in 5-10 patients and 30 mg in the 1st patient. Consequently, in case of combined pathology, constant intake of SGCS was less often prescribed. When analyzing the treatment of IGCS, it was revealed that during the period of exacerbation in all patients of groups 1 and 2, control over the

course of AD was achieved with high doses of beclomethasone (more than 1000 mcg/day), and during remission - with medium doses (500-1000 mcg / day).

CONCLUSIONS

The clinical manifestations of asthma against the background of hypothyroidism are more pronounced, as evidenced by a significant increase in the frequency and severity of suffocation attacks during the day, and especially at night in such patients. Patients with combined pathology are often diagnosed with atrophic endobronchitis; therefore, patients with hypothyroidism have a dry cough or cough with sparsely separated sputum. At the same time, we note minor changes in the FVD. When analyzing the treatment performed in patients of the studied groups, it was found that in patients with AD in combination with hypothyroidism control over the course of AD was achieved against the background of high doses of IGCS and short courses of SGCS, which did not lead to the formation of hormone dependence. All of the above features indicate the effect of hypothyroidism on the clinical course of asthma.

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