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## The Effectiveness of the Physical Factors Complexes Administration in Patients with Bronchial Asthma with Concomitant Hypertensive Disease.

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### ABSTRACT

The aim of the investigation was to assess the effectiveness physical factors complexes administration (intravenous laser blood irradiation with intermittent normobaric hypoxitherapy and magnetotherapy with intermittent normobaric hypoxitherapy) in patients with bronchial asthma with concomitant hypertensive disease. There have been examined 134 patients with bronchial asthma medium severity, mixed form, partially controlled with concomitant hypertensive disease of the 2<sup>nd</sup> phase, 2<sup>nd</sup> degree, average risk were examined. The patients were divided into two main groups and a group of comparison. The group of comparison consisted of 44 people, taking medical treatment. The patients of 1<sup>st</sup> main (44 people) took medical treatment, intravenous laser blood irradiation and intermittent normobaric hypoxitherapy. The patients of the second main group took medical treatment, magnetotherapy and intermittent normobaric hypoxitherapy. To assess the effectiveness visual analogue scale, 24-hour blood pressure monitoring, spirometry and the investigation of blood lipids were used. The improvements of the course of disease were found at a time when the therapy was conducted. The reduction of bronchial asthma symptoms was more significant in patients of the 1<sup>st</sup> main group. The reduction of hypertensive disease was more significant in patients of the second main group. The results of the spirometry were better in patient of the 1<sup>st</sup> main group. The results of the 24-hour blood pressure monitoring were better in patients of the second main group. The results of the investigation of blood lipids were better in patient of the 1<sup>st</sup> main group. The received data of the investigation of patients with bronchial asthma with concomitant hypertensive disease make it possible to recommend these methods to be used in the complex therapy of such patients to increase the effectiveness and the control of the diseases.

**Keywords:** bronchial asthma with concomitant hypertensive disease, intravenous laser blood irradiation, intermittent normobaric hypoxitherapy, magnetotherapy.

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## INTRODUCTION

Bronchial asthma is a chronic inflammatory disease of the airways involving various cell elements, with the occurrence of bronchial hyperresponsiveness, manifested clinically by wheezing, shortness of breath, feeling of stuffiness in the chest and/or cough caused by reversible, different severity of airway obstruction. Morphological basis of asthma is inflammation of the airways, which with lack of effective control goes through several stages: acute obstruction, edema of the bronchial walls, formation of a viscous secret and may lead to remodeling of the bronchi.

In BA treatment used basic medications: inhaled corticosteroids (IGCs), systemic glucocorticosteroids (SGCs), antagonists of leukotriene receptors, cromons, antibodies to immunoglobulin E. In addition to standard treatment are used: long-acting beta-2 agonists, theophylline long-acting, long-acting anticholinergics. [1,2] For relief of symptoms: beta-2 agonists short-acting, anticholinergics short-acting, theophylline short-acting, systemic glucocorticosteroids (SGCs), a combination of drugs. Drug therapy is prescribed individually depending on the degree of control of asthma symptoms. There are 5 steps of asthma therapy. [3-6] Hypertensive disease is a chronic disease, manifested by increased blood pressure (BP) not associated with known causes (pathology of other organs and systems). In the treatment are used the following groups of drugs: beta-blockers, angiotensin converting enzyme inhibitors, angiotensin II receptor blockers, diuretics, calcium antagonists. Additionally it is recommended to use the agonists of imidazoline receptors and alpha-adrenergic blockers. [7-9]

Currently, often there is a combination of two or more chronic diseases, which are not complications of each other. In this case we talk about comorbidity, which may be associated with a common mechanisms of pathogenesis, the similarity of clinical manifestations, common risk factors. In the case of a combination of BA and HD there is a loss of basic support systems of the body: respiratory and cardiovascular, which activity in norm and in pathology are very interrelated. And the result of the defeat of one of them increases the likelihood of dysfunction of the other. In addition, some groups of drugs, effective for one disease is contraindicated in the presence of the other. [10-12] The main treatment of diseases is a complex drug therapy. But, unfortunately, in most cases it does not solve all problems of patients with BA and concomitant HD. And always there remains the search for methods and techniques that could be used in combination with drug therapy and increase its effectiveness. This tool can be a physical factors [13-16]. In accordance with the literature data and the conducted research it appears that in asthma with concomitant HD such methods are: intermittent normobaric hypoxithery and magnetotherapy with intermittent normobaric hypoxithery.

## MATERIALS AND METHODS

In the pulmonology department of the Ryazan regional clinical hospital were examined 134 patients with bronchial asthma medium severity, mixed form, partially controlled with concomitant hypertensive disease of the 2<sup>nd</sup> phase, 2<sup>nd</sup> degree, average risk. The diagnosis of asthma was established on the basis of "Global strategy of treatment and prevention of bronchial asthma" (2014), hypertensive disease based on the criteria of RSC (2010). The duration of the diseases were: bronchial asthma from 3 to 10 years (average  $5 \pm 0.3$  years), hypertensive disease of 3-7 years ( $4 \pm 0.1$ ). The age of the patients was 35-62 years (mean age  $51 \pm 2,25$ ). Allocation into study groups was performed by the independent sequential randomization of patients coming in for short periods of time in hospital, as a result, we formed three groups of treatment. The survey took place: the collection of complaints; history taking; examination; physical examination, the study of respiratory function dynamics (on the day of admission and before discharge on day 13 of hospitalization), 24-hour blood pressure monitoring, blood lipids.

There were two main groups and the comparison group. They can be considered homogeneous in terms of: visual analogue scale of clinical symptoms; lung function according to spirometry; daily monitoring of BP and lipid metabolism. Patients of comparison group received traditional drug therapy: a combination of drugs with the content of IGCs (500-1000 mcg of beclometasone), leukotriene receptor blocker (montelukast at a dose 10 mg daily) for a long time. When asthma attacks – inhalation of salbutamol. Antihypertensive therapy: angiotensin converting enzyme inhibitors (enalapril 20 mg/day or perindopril) or angiotensin II receptor blockers (losartan 50 mg/day or valsartan 80 mg/day).

Statins (atorvastatin or simvastatin 20 mg/day in the evening) for a long time under the control of biochemical parameters (AST, ALT). Patients of the 1st main group received along with drug therapy ILBI with INH. Patients of the 2nd main group – MT with INH courses of 10 treatments. For statistical analysis used "STATISTIC of 8.0" and a spreadsheet in MS Excel 2003.

## RESULTS AND DISCUSSION

When analyzing the data obtained revealed the reduction of symptoms of asthma in the dynamics of treatment in comparison with patients in the control group. The severity of dyspnea in patients first and second groups decreased from 3.8 [3,6:4,0] and 3.7 [3,6:4,0] to 0.5 [0,4:0,6] and 0,5 [0,4:0,6], respectively,  $p < 0.0001$ . In the comparison group, these changes are present, but in less pronounced form from 3.7 [3,6:3,8] to 1.9 [1,8:2,0],  $p < 0.0001$ . In accordance with the results of the univariate analysis of variance and calculation of this square ( $\eta^2$ ) differences in the treatment cause of 55.9% ( $\eta^2 = 0,559$ ). Cough intensity was reduced in the major groups from 4.0 [3,8:4,2] to 0.5 [0,4:0,6],  $p < 0.0001$ , in comparison group from 3.8 [3,7:3,9] to 2.3 [2,2:2,4],  $p < 0.0001$ , according to the results of the statistical analysis due to 71,9% ( $\eta^2 = 0,719$ ). The severity of sputum discharge in patients of the first group increased from 2.1 [2,0:2,2] to 2.9 [2,8:3,0],  $p < 0.0001$ , patients of the second group from 1.5 [1,4:1,6] to 2.8 [2,6:3,0],  $p < 0.0001$ . In the comparison group changes in the clinical symptom statistically significant, but less pronounced in quantitative terms. The share of changes in the intensity of sputum discharge of 26.2% ( $\eta^2 = 0,262$ ).

The symptoms of hypertension when treatment is changed as follows: complaints of headache patients of the first and second group decreased from 4.2 [4,1:4,3] to 0,8 [0,6:1,0],  $p < 0.0001$ , and 4.5 [4,4:4,6] to 1.1 [0,9:1,3],  $p < 0.0001$ , respectively. The symptom of dizziness in the first group decreased from 3.5 [3,4:3,6] to 0.6 [0,5:0,7],  $p < 0.0001$ , and in the second group, from 3.3 [3,2:3,4] to 0.5 [0,4:0,6],  $p < 0.0001$ . Drug therapy in the control group resulted in the reduction of headaches and dizziness from 4.4 [4,3:4,5] to 2.6 [2,5 to 2,7],  $p < 0.0001$  and from 3.4 [3,3:3,5] to 3.0 [2,9:3,1],  $p < 0.0001$ . Patients first and second groups have much less to complain of the weakness from 4.8 [4,6:5,0] to 0,9 [0,8:1,0],  $p < 0.0001$ , and 4.5 [4,3:4,7] to 0,8 [0,7:0,9],  $p < 0.0001$ . Discomfort in the heart after treatment in groups 1 and 2 is practically absent, while in the control it decreased from 2.2 [2,0:2,4] to 1.5 [1,4:1,6],  $p < 0.0001$ . The percentage contribution of therapy in changing symptoms of "weakness and "discomfort in the heart area" is 67,9% ( $\eta^2 = 0,679$ ) and 83,5% ( $\eta^2 = 0,835$ ). In patients who were subjected to combined therapy according to the results of spirometry, the index FEV1/VC has increased by an average of 16.7%. In the first group the increase amounted from 69,9 [67,2:72,5]% to 86.4 [82,9:89,9]%,  $p < 0.0001$ , in the second group from 70,0 [67,0:73,0]% to 87,0 [83,7:90,3]%,  $p < 0.0001$ . In the control group, the index increased by 10.1% from 72,3 [69,8:74,8]% to 82,4 [79,7:85,1]%,  $p = 0.0006$ . Statistical evaluation of the forced expiratory volume in first second (FEV1) represents the results indicate on significant differences in the indicators of respiratory function, with a share contribution of the treatment to 38.9% ( $\eta^2 = 0,389$ ). In the first group we got FEV1 by 30.8 % from 54.3 [51,0:57,6]% to 85.1 [82,6:87,5]%,  $p < 0.0001$ . In the second group, the increase amounted to 26.3% from 59,7 [56,0:63,4]% to 85.1 [82,6:87,5]%,  $p < 0.0001$ . In the control group at the end of treatment no statistically significant increase in FEV1,  $p = 0,94$ .

We assessed indicators of 24- hour blood pressure monitoring. SBP(d) in the first group decreased from 154 [153:155] mmHg to 133 [132:134] mmHg,  $p < 0.0001$ ; in the second group we received the reduction from 152 [151:153] mmHg to 131 [130:132] mmHg,  $p < 0.0001$ . In the control group, the reduction of the SBP(24) was 8 mmHg,  $p < 0.0001$ , from 153 [152:154] mmHg to 145 [144:146] mmHg,  $p < 0.0001$ , which is 2.5 times less than in the first and second groups. The percentage contribution of the therapy 80% ( $\eta^2 = 0,8$ ). Changes in SBP(n) in dynamics of treatment has a less pronounced decrease in comparison with the SBP(d) in the first group analysed had decreased from 136 [135:137] mmHg to 131 [130:132] mmHg,  $p < 0.0001$ ; in the second group from 137 [136:138] mmHg to 130 [129:131] mmHg,  $p < 0.0001$ . In the control group of patients the reduction in SBP(n) after treatment was 3 mmHg that statistically,  $p = 0,00046$ , but has little clinical significance. The percentage contribution of the therapy was 24.2% ( $\eta^2 = 0,242$ ). The average SBP(24) in the first group decreased from 149 [148:150] mmHg to 132 [131:133] mmHg,  $p < 0.0001$ ; in the second group we received the reduction from 147 [146:148] mmHg to 131 [130:132] mmHg,  $p < 0.0001$ . In the control group, the reduction of the SBP(24) was 6 mmHg,  $p < 0.0001$ , 2.7 times less than in the first and second groups. These changes to 66,2% ( $\eta^2 = 0,662$ ) attributable to the treatment. The therapy resulted in a reduction in DBP(d) in the first and second groups from 95 [94:96] mmHg to 86 [85:87] mmHg,  $p < 0.0001$  and from 95 [94:96] mmHg to 86 [85:87] mmHg,  $p < 0.0001$ , respectively. In the control group monotherapy resulted in a reduction of DBP(d) 4 mmHg,  $p < 0.0001$ . Contribution of medical measures according to the statistical analysis is 37.8%

( $\eta^2=0,378$ ). DBP(n) in the experimental groups by the end of the treatment decreased by an average of 4.5 mmHg,  $p<0.0001$ , and in the control group of 2 mmHg,  $p<0.0001$ . With a share contribution of therapy in the result of 16.4% ( $\eta^2=0,164$ ).

The treatment led to lower cholesterol in the first group from 6.6 [6,5:6,7] mmol/l to 4.8 [4,7:4,9] mmol/l,  $p<0.0001$ , that is, the reduction was 1.8 mmol/L. In the second group, the numbers of blood cholesterol decreased from a statistically significant effect, but only by 0.3 mmol/l, which can be interpreted as a slight clinical effect. In the control group also recorded lower blood cholesterol from 6.4 [6,3:6,5] mmol/l to 5.8 [5,7:5,9] mmol/l,  $p<0.0001$ , which is two times more than in the second group and corresponds to the border level is the best indicator of lipid metabolism. Evaluation of the contribution of treatment in the above-mentioned changes were 85.7% ( $\eta^2=0,857$ ). The above-described changes in lipid spectrum of blood indicate that of the analyzed types of therapy best dynamics of changes recorded in the first group of patients who received combined therapy, including intravenous therapy and the intermittent normobaric hypoxotherapy.

On the background of therapy the severity of asthma symptoms (shortness of breath, expectoration, cough, dyspnea, sleep disturbance) decreased in all patients, more in patients 1 and 2 major groups compared with the control group. Positive dynamics is observed in the complaints of headache, dizziness, weakness, discomfort in the heart area more pronounced in patients 1 and 2 major groups compared with the control. Selected methods of therapy had a positive effect on respiratory function according to spirometry. Based on the data of complex therapy with the use of physiotherapy, regardless of its type has a more significant clinical effect in the stabilization of BP. The best the dynamics of changes in lipid spectrum was recorded on the first group of patients who received combined therapy, including ILBI and INH. The feature of this therapeutic approach, in our opinion, had a positive impact on the mechanisms that regulate the concentration of total cholesterol.

The obtained results are a consequence of the following effects of physical treatments desensitizing, anti-inflammatory from ILBI, decongestant, anti-inflammatory, antispasmodic from MT, antihypoxic from INH .

## CONCLUSION

The use of physical factors in traditional therapy of patients with bronchial asthma with concomitant hypertensive disease has a positive effect on the dynamics of disease and can be recommended for use in clinical practice.

## REFERENCES

- [1] Uryasev OM, Panfilov YuA. Vliyanie ozhireniya na kliniko-funkcionalnye pokazateli i ehffektivnost protivooastmaticheskoy terapii u bolnyh bronhialnoj astmoj. Nauka molodyh 2014; 4: 81-90.
- [2] Rogachikov AI, Uryasev OM. Tekhnika ingyalyacii lekarstvennyh sredstv I control nad bronhialnoj astmoj. Rossijskij mediko-biologicheskij vestnik imeni akademika IP Pavlova 2016; 24(3): 86-91.
- [3] Globalnaya strategiya lecheniya i profilaktik bronhialnoj astmy. Peresmotr 2014. Pervod s angl. M: Rossijskoe respiratornoe obshestvo. 147p.
- [4] Olysheva IA, Burlachuk VT, Budnevskij AV, Tribunceva IV, Dobrovnina IS. Spravochnik vracha obshchej praktiki 2014. 45p.
- [5] Skokov MV, Budnevskij AV, Malyshev EYu, Drobysheva ES, Ovsyannikov ES. Vliyanie urovnya komplaensa na kliniko-funkcionalnye pokazateli bronhialnoj astmy. Molodoj uchenyj 2014; 14: 93-97.
- [6] Nilova OV, Kolbasnikov SV. Ocenka summarnogo serdechno-sosudistogo riska u bolnyh arterialnoj gipertenziej sootvetstvenno urovnyu obshchego holesterina plasmy krovi. Kardiovaskulyarnaya terapiya I profilaktik 2014; 13(2): 82-83.
- [7] Fedoseev GB, Trofimov VI, Shaporova NL, Aleksandrin VA, Fillipova NA, Kryakunov KN. V poiskah istiny: chto takoe bronhialnaya astma? Pulmonologiya 2015; 1: 5-18.
- [8] Diagnostika I lechenie arterialnoj gipertenzii. Rossijskie rekomendacii 4 j peresmotr. Sistemn. Gipertenz. (4 peresmotr) 2010. P. 3-25.
- [9] Marchenko VN, Trofimov VI, Aleksandrin VA, Fedoseev GB. Nejrovegetativnaya regulyaciya kardiorespiratornoj funkcionalnoj sistemy u bolnyh bronhialnoj astmoj. Vestnik sovremennoj klinicheskoy mediciny 2010; 3(3): 26-29.

- [10] Abramovich SG, Kulikov AG, Dolbilkin AYu. Obshchaya magnitoterapiya pri arterialnoj gipertonii. Fizioterapiya balneologiya I rehabilitaciya 2014; 5: 50-02.
- [11] Budnevskij AV, Burlachuk VT, Chernov AV, Olysheva IA, Tribunceva LV, Kozhevnikova SA. Rol neteplovogo mikrovolnovogo ehlektromagnitnogo izlucheniya v dostizhenii kontrolya nad bronhialnoj astmoj. Pulmonologiya 2014; 3: 78-82.
- [12] Drobotya NV. Terapiya statinami: realnaya polza I mificheskaya ugroza. Rmzh 2012; 28: 14-33.
- [13] Drobotya NV, Kastanyan AA, Pirozhenko AA. Sravnitel'naya gipotenzivnaya I vazoprotektivnaya ehffektivnost razlichnyh rezhimov terapii u bolnyh arterialnoj gipertenziej. Kardiologiya neotlozhnaya pomoshch 2014; 3(8): 21-24.
- [14] Moskvina SV. Osnovy lazernoj terapii. Moscow; 2016, 895 p.
- [15] Ponomarenko GN, Ulashchik VS. Nizkochastotnaya magnitoterapiya. SPb.: Chelovek; 2017. 171p.
- [16] Sokolov AV, Rondaleva NA. Normobaricheskaya gipoksiterapiya kak metod vosstanovitel'noj mediciny. Ryazan; 2000. 13p.