

## CLINICAL AND FUNCTIONAL PARAMETERS OF BRONCHIAL ASTHMA IN HOT CLIMATE CONDITIONS

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**Abstract:** *The results of a study of 114 patients suffering from bronchial asthma living in a hot arid and favorable zone were issued. The highest degree of manifestation of clinical symptoms and the severe course of the disease were revealed in patients living in a hot arid zone. In the diagnosis and prevention of this disease, it is necessary to take into account the above data.*

**Key words:** *bronchial asthma, hot arid zone, clinic, spirometry.*

Bronchial asthma (BA) is a heterogeneous disease characterized by chronic airway inflammation, respiratory symptoms such as wheezing, shortness of breath, chest congestion, and cough that vary in time and intensity and present with variable airway obstruction (5,11,18,19,20). The heterogeneity of AD is manifested by various disease phenotypes, many of which can be identified in routine clinical practice.

The results of data obtained in France, Chile, England and Italy on the impact of diet on the course of the disease indicated that people who consume plant products, as juices rich in vitamins, fiber and antioxidants, tend to have a more favorable course of the disease, while most of the products of animal origin, rich in fats, proteins and refined easily digestible carbohydrates, are prone to severe disease and frequent exacerbations (3,4,22,23,25,28).

In the last decade, there has been an increase in the role of factors influencing the development and manifestations of AD. Intrinsic factors include genetic predisposition to atopy and bronchial hyperreactivity, gender (asthma is more common in boys in childhood and in women in adolescence and adulthood), and obesity. In BA, the cause of the inflammatory process of the mucous membranes of the bronchial tree is gastroesophageal reflux in up to 50% of cases. Factors of the reflux genesis of the development of bronchospasm include citrus fruits, tomatoes, fatty foods, mint, carbonated drinks, smoked foods and dietary disturbances, taking a horizontal position after eating, taking xanthines, antispasmodics, non-steroidal, steroid hormones, reducing the tone of smooth muscles, physical inactivity, etc. .d. (9,10,11,26,27,29,30). In parallel, there is an increase in external factors, such as the role of the environment, allergens: house dust mites, pet allergens, cockroach allergens, fungal allergens, plant pollen, infectious agents (mainly viral), occupational air pollutants: ozone, sulfur and nitrogen dioxide, products of combustion of diesel fuel, tobacco smoke (active and passive smoking), increased consumption of highly processed foods, increased intake of omega-6 polyunsaturated fatty acids and reduced intake of antioxidants (in the form of fruits and vegetables) and omega-3 polyunsaturated fatty acids (as part of fatty fish). Worldwide, more than 300 million patients suffer from asthma (5,24,31,33). In the Russian Federation, according to epidemiological data, the prevalence of asthma among the adult population is 6.9% (2,35,36), and among children and adolescents - about 10% (5,32,34). The effect of

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traditional therapy gives good results to a significant number of patients, achieving disease control. However, there are BA phenotypes that are difficult to treat (20–30%) of patients (severe atopic BA, BA with obesity, smoker's BA, BA with a late onset, BA with fixed bronchial obstruction), and some difficulties arise in their therapy. This category of patients has the highest frequency of exacerbations and emergency medical visits (2,37,38). In industrialized countries, 12% of patients suffering from asthma with an exacerbation of the disease are treated in emergency departments and emergency departments of hospitals, of which 20-30% need inpatient treatment in specialized departments, about 4-7% - in intensive care units (ICU) (14,16,41,42). 5% of patients with severe asthma exacerbation require tracheal intubation and mechanical ventilation (ALV), mortality reaches up to 7% (17,39,40). The main goals of asthma therapy according to the GINA 2015 concept are symptom control, reduction of airway damage and drug side effects (6,9,15,16,43).

For the diagnosis and monitoring of asthma symptoms in adult patients, peak flowmetry (monitoring of PEF) is recommended (6,13). According to the level of persuasiveness of recommendations C (level of evidence, morning and evening PSV values are measured, diurnal variability of PSV is observed). The study of respiratory function is recommended in patients with suspected asthma at the age of more than 5-6 years (12,17,44,45).

During the identification of anamnestic data with asthma, it is recommended to identify the main factors of the onset of the disease, the presence and duration of clinical symptoms and the resolution of their signs, the presence of allergic reactions in the patient and his blood relatives, the causal features of the occurrence of signs of the disease and its exacerbations (1,6,46 .47). The main signs of the presence of asthma include the presence of more than one of the following symptoms - wheezing, choking, chest tightness and coughing, especially in cases of: worsening of symptoms at night and early in the morning, onset of symptoms during exercise, exposure to allergens and cold air, onset of symptoms after taking aspirin or beta-blockers, history of atopic disease, presence of asthma and/or atopic disease, normal chest examination results if symptomatic, voice change, symptom onset solely on the background of colds, long history of smoking (more than 20 packs / years), widespread dry wheezing when listening (auscultation) of the chest, low PSV or FEV1 (retrospectively or in a series of studies), unexplained by other reasons, peripheral blood eosinophilia, unexplained by other reasons. According to the ECRHS, a 10-year study in 10 EU countries found that chemical floor cleaners and cleaning sprays contain substances that trigger asthma symptoms in adults, with the use of such products associated about 18% of new cases (1,3, 6.48).

One of the urgent tasks of modern medical science is to study the influence of extreme climatic and weather factors on the development of various diseases, in particular inflammatory diseases of the lungs (2,3,7,49).

It is widely believed that not individual meteorological factors and not a specific type of weather, but the change of different weather, cause an increased load on the adaptive and regulatory capabilities of a person. Contrasting climatic and weather factors, having a strong impact, not only lead to a deterioration in well-being and a decrease in the working capacity of healthy individuals, but also significantly aggravate the clinical course of many diseases, including bronchial asthma (2,4,8).

The arid zone differs from other regions of the republic in extreme climatic conditions, dry and hot summers, low air humidity, minimal rainfall, which undoubtedly affect the health of the living population. In the last five years, due to global warming, the air temperature has exceeded previous values, in the Central Asian region, especially from the beginning of June to the first half of August. According to the Uzhydrometeorological center, during the last year of the summer season, the air temperature exceeds by 4-5 degrees compared to previous decades. In connection with the drying of the Aral Sea and the reduction of its area, dozens of times the process is still aggravated. As a result,



emerging environmental factors such as dry, dusty hot air saturated with particles of various toxic substances entering the mucous membranes of the respiratory tract of the population living in the Aral Sea zone have an adverse effect (7.8). Based on what there is a need to study the role of the above factors on the clinical indicators of the respiratory system

**Purpose** - to study the features of the clinical course of bronchial asthma in the hot climate of the Bukhara region.

**Materials and research methods.** We studied 104 patients with different levels of asthma severity, aged 20 to 60 years. Of the examined 54 (I - main group) patients lived in hot climatic conditions in the arid zone (residents of Alat, Zhandar and Peshkun regions). 50 (II-control group) - in a favorable zone (Vabkent, Shafirkan and Romitan districts) of the region. The compared groups were representative in terms of gender, age and duration of the disease. Patients underwent general clinical, radiological and functional research methods. The intensity of clinical symptoms was assessed on a three-point scale: 1 point - weak manifestations, 2 points - average, 3 points - severe manifestations of symptoms. The study of the function of external respiration was carried out on the apparatus of the company "MEDICOR" (Hungary), peak flowmetry - on an individual peak flowmeter "Vitalograf" (Germany). Statistical processing of the results was analyzed by Student's t-test.

**Research results and their analysis.** According to the results of the study, differences in the clinical course of BA in patients living in different areas were established.

Clinical indicators in patients with asthma living in arid and favorable zones (points)

Clinical symptoms	Main group n= 54	Control group n=40
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Cough	3,1±0.2	2.8±0,1
Sputum discharge	1,5±0,1	2.9±0,2*
Expiratory dyspnea	3,2±0.1	1.9±0,1*
Weakness	2,9±0.1	2.1 ±0,2
Sweating	3.1±0.3	2.3±0,4*
Dry wheezing	2,8±0.2	2,9±0,1

Note: \* -  $p < 0.01$  when comparing clinical parameters between the main and control groups.

Thus, the analysis of the intensity of clinical symptoms (Table 1) showed that in patients of group I, the intensity of sputum discharge was 1.5 points lower, and the severity of expiratory dyspnea and symptoms of intoxication was 1.3 and 0.8 points higher than in patients control group ( $p < 0.001$ ). A decrease in the intensity of sputum discharge along with a pronounced intensity of dyspnea and intoxication syndrome in patients of group I indicate a violation of mucociliary clearance as a result of exposure to factors in the arid zone. A significant difference between the compared groups was also revealed in the need for  $\beta$ -agonists in a daily dose, which turned out to be 1.5-2 times higher in patients living in the arid zone, which also indicates the severity of the disease.

Along with an increase in the intensity of clinical indicators, a significant decrease in peak flow measurements was revealed in all patients. The decrease in the peak expiratory flow rate averaged 16% in patients of group I, by 8.5% in group II ( $p < 0.005$ ), which indicates a decrease in bronchial patency under the influence of various aggressive factors of the arid zone.

Indicators of spirometry in patients with asthma living in a hot climate in an arid and favorable



zone of the Bukhara region.

Parameters	Main group n=54	Control group n=40	p
FZhEL	52.8±3,7	68,9±2,9	<0,01
FEV1	59.2±3.1	70,0±2,8	<0,01
pic	56.4±2.4	70.3±2,7	<0,01
MOS 75	60,3±3.1	67,3±2,4	>0,01
MOS 50	63.1±2.4	65,9±3,2	>0,01
MOS 25	62.8±4.2	68,4±3,4	>0,01

Note: Spirometry scores were compared between main and control groups.

In parallel to the above indicators of peak flowmetry, a significant decrease in spirometry indicators was observed in patients living in hot conditions in the arid zone. Comparison of the nature of ventilation disorders showed that obstructive type of disorders was 1.5 times more common (82.4%) in patients of the main group than in patients of the control group (54.9%),  $p < 0.01$ .

Violations of bronchial patency in the peripheral parts of the bronchi, characterized by a decrease in speed indicators at the level of small and medium bronchi, were moderate and were detected in most patients in both groups (Table 2). Generalized obstructive disorders were observed 1.9 times more often in patients of the main group (38.2%) compared with the control group (20.1%)  $p < 0.01$ .

Thus, as a result of the study, it was found that the course of bronchial asthma in people living in a hot arid climate is characterized by a greater severity of clinical symptoms and impaired functional indicators, which must be taken into account when planning treatment and preventive measures.

### Conclusions:

In the hot climate of the arid zone in patients with bronchial asthma, a more severe clinical course of the disease was revealed.

In hot conditions of the arid zone in patients with bronchial asthma, there is a significant decrease in bronchial patency with the development of severe respiratory failure.

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