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FEATURES OF THE COURSE OF DISEASES OF THE BRONCHOPULMONARY SYSTEM IN A HOT CLIMATE

Resume: The article discusses the transitional characteristics of diseases of the bronchopulmonary system in climatic and seasonal changes.

The development of this scientific direction makes it possible to develop priority tasks of medical, state and national economic importance.

Keywords: bronchopulmonary diseases, climatic factors, clinical and meteorological studies.

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ОСОБЕННОСТИ ТЕЧЕНИЯ ЗАБОЛЕВАНИЙ БРОНХОЛЕГОЧНОЙ СИСТЕМЫ В УСЛОВИЯХ ЖАРКОГО КЛИМАТА

Резюме: В статье рассматриваются переходные характеристики заболеваний бронхо-легочной системы в климатические и сезонные изменения.

Развитие данного научного направления позволяет разработать приоритетные задачи, имеющее медицинское, государственное и народно-хозяйственное значения.

Ключевые слова: бронхолегочная заболевания, климатические факторы, клинико-метеорологические исследования.

Relevance. Various physical environmental factors: air temperature and humidity, atmospheric pressure, ozone content in the air can contribute to the development and exacerbation of bronchopulmonary diseases. Thus, it was shown that an increase in the concentration of ozone in the ambient air in the summer led to an increase in the number of patients seeking medical help due to exacerbation of bronchial asthma and chronic obstructive pulmonary disease[5,13,18].

It has been established that the pathological effect of ozone is primarily due to the activation and/or development of the inflammatory process in the bronchi in patients with bronchial asthma and healthy individuals)[11,4,23]. Studies of sputum and bronchoalveolar lavage in patients with bronchial asthma and healthy individuals after exposure to ozone revealed a statistically significant increase in their content of polymorphonuclear neutrophils, as well as some cytokines (interleukin-6, interleukin-8.

The authors who studied the state of the upper respiratory tract after exposure to ozone also showed an increase in the number of leukocytes, the level of leukotriene B4, platelets of activating factor (FAT), interleukin-8 (IL-8) in nasal lavage fluid, and in patients with bronchial asthma these changes were more significant compared to healthy subjects. A significant correlation was

found between the level of IL-8 and the number of leukocytes in the nasal lavage fluid of BA patients after exposure to ozone [16,19,22].

Interestingly, inflammation in the respiratory tract as a result of exposure to ozone in the examined individuals persisted even after the respiratory function indicators returned to normal. It is known that in some patients with bronchial asthma, physical activity can cause attacks of suffocation [1,5,10,19]. As it turned out, there is not only a spasm of the smooth muscles of the bronchi, but also stimulation of mucus production, stagnation in small vessels and an increase in their permeability, as well as damage to the bronchial epithelium.

At the same time, an early reaction is isolated (5-15 minutes after physical exertion), the development of which is mainly associated with:

a) the direct influence of physical exertion;

b) with increased vagal reflexes, due to irritation of sensitive bronchial receptors;

c) with the release of primary mediators (histamine).

A late reaction to physical activity (after 4-10 hours) may be due to repeated release of histamine, as well as other (secondary) mediators that contribute to the development of inflammation and damage to the epithelium.

It is assumed that microcirculation disorders play an important role in the development of the inflammatory process under the influence of physical activity in patients with bronchial asthma [2,7,14.20]. Thus, it has been shown that in patients with asthma of physical effort, physical exertion causes

vasodilation and increased blood flow in the bronchi, which are accompanied by an increase in osmolarity in the bronchial submucosa [6,12,17,21].

Thus, an increase in blood flow in the bronchi directly or indirectly leads to the release of inflammatory and bronchoconstrictor mediators. Such mediators involved in the pathogenesis of physical effort asthma include prostaglandin D2 (PGD2), which exerts its effect by stimulating thromboxane receptors.

In the development of exacerbations of bronchial asthma, various environmental factors are given importance: pollutants, ozone, chemical agents, as well as meteorological factors such as temperature, humidity, atmospheric pressure, precipitation. However, according to a number of authors, only temperature was clearly correlated with exacerbations of bronchial asthma[9,18,26].

Moreover, as it was shown, prolonged exposure to cold led to morphological changes in the bronchi, such as an increase in the number of goblet cells and mucous glands, hypertrophy of the smooth muscles of the bronchi and terminal arteries and arterioles [3,6]. These changes can play an important role in the development of chronic obstructive pulmonary disease and bronchial asthma, as they contribute to increased pressure in the pulmonary artery and inflammatory edema.

Interestingly, in countries with a hot climate, high ambient temperature (more than 25 ° C) can also be a risk factor for the activation of the inflammatory process in the bronchi and exacerbation of bronchial asthma.

The combination of unfavorable factors: temperature (cold air) and physical exertion can significantly aggravate their negative effect on the bronchi in patients with hypersensitivity to these factors and contribute to the activation of the inflammatory process and increased bronchial obstruction [5,13,19,22].

Currently, assessment of the impact of risk factors for chronic obstructive pulmonary disease (COPD) and bronchial asthma (BA) and disease monitoring are significant components of patient care [3,24]. At the same time, the possible trigger role of meteorological factors is not taken into account, although the causes of 1/3 of exacerbations of diseases remain unknown. Meanwhile, there is evidence of increased weather sensitivity in patients with COPD and BA with features inherent in different climatic regions [10,11,15,18]. However, the issues of meteorological pathology of COPD and BA in mountainous conditions have not found proper coverage in the literature. In this connection, the identification of bioclimatic features of the low mountains of Northern Kyrgyzstan, synoptic and meteorological conditions of the formation and recurrence of meteopathic effects of the atmosphere, their influence on the course of COPD and BA is an important problem of balneology and pulmonology, especially if we take into account that in the Kyrgyz Republic respiratory diseases occupy the first place in the structure of the overall morbidity of children and adults, leading - with temporary and persistent disability [17].

According to modern concepts, unfavorable weather conditions can cause physiological compensatory reactions of the body that preserve homeostasis, or

with a violation of adaptive mechanisms, the development of meteopathic reactions, which, in particular, in patients with COPD and BA can occur with increased symptoms of the disease and ventilation disorders [4,15,26]. However, the causes of such disorders have not been sufficiently studied in relation, for example, to the role of the autonomic nervous, oxidant-antioxidant and pulmonary surfactant systems, which in chronic inflammation of the respiratory tract are important in the formation and progression of bronchoobstructive and bronchohyperreactive syndromes [6,23,28]. The literature does not sufficiently cover the issues of meteotropic reactions in patients with COPD and BA (adults and children) with different degrees of meteosensitivity (meteostable and meteolable) under different types of weather in comparison with healthy people.

Complex medical rehabilitation with the use of medications, natural and preformed factors allows to achieve a high effect [9,14,27]. Meteolability reduces the effectiveness of restorative therapy of pulmonological patients, which is mainly studied by the results of sanatorium treatment [4]. Insufficient attention is paid to the issues of rehabilitation of COPD and BA patients, especially meteorolabile ones, in the conditions of rehabilitation centers, although specialized rehabilitation centers are recognized as the main form of its organization for such patients [20,25]. Therefore, maintaining a register of B A and COPD and monitoring the synoptic and meteorological situation are important problems designed to improve the effectiveness of medical rehabilitation of patients.

The issues of meteorological prophylaxis of pulmonological patients with physiotherapeutic methods that increase nonspecific resistance and adaptive capabilities of the body have not received adequate coverage in the literature to date. For this purpose, the study of low-intensity electromagnetic radiation of the EHF band with anti-stress, antioxidant, regulating properties [8,9,16,23,26] remains unexplored, and the literature information on the possibility of EHF therapy in the rehabilitation of patients with COPD and BA is extremely scarce. In this regard, the development of sanogenetically oriented methods of meteorological prophylaxis and rehabilitation is very important.

Scientists from Uzbekistan in the course of experiments proved that when carrying out preventive measures and planning epidemiological studies in relation to "chronically urgent" diseases, including AML, it is necessary to pay special attention to climatometeorological factors and the results of biometeorological studies.

The development of this scientific direction, especially in pulmonology, allows us to develop priority tasks that have medical, state and national economic significance. It is very important that modern science is moving towards expanding the nonspecific prevention of NCDs. This formulation of the question is, of course, based on data from clinical and climatobiorhythmological studies and is associated with predicted natural disasters, especially the expected global warming of the average temperature of the globe (Kyoto Protocol, 2017).

So, H. I. Yanbayeva (2013), based on long-term observations, concluded that "... the study of climatic factors, their possible impact on the human body, its adaptive mechanisms and the development of standards of practical measures for improving working and living conditions are one of the priority aspects of medicine....." [22]. According to E. Ballester et al. (2017) and L. M. Shedani et al. (2012), "... in conditions of changing meteorological factors, biological rhythms contribute to maintaining homeostasis, cause significant fluctuations in hemodynamic and bronchopulmonary parameters. Under their influence, the course of cardiorespiratory pathologies changes ..." [26]. Major studies by F. Fachini et al. (2011), L. B. Lecha Estela (2018) and N. Tanaka et al. (2010) lay the scientific basis for modern clinical and meteorological research and emphasize that "....the main pathogenic meteorological elements include: radiant energy, atmospheric pressure, air temperature, relative humidity, wind direction and speed. The aggravation of diseases occurs under the simultaneous influence of many weather and climatic causes: solar radiation, atmospheric circulation and a number of local climate features...." [27].

Meteorological factors (MF) are also reflected in the clinical manifestations of cardiorespiratory pathology. In some cases, dysadaptation in patients is detected in the form of undesirable clinical manifestations (thermal cramps, thermal exhaustion, thermal fainting and heat stroke) [28]. With an increase in the duration of the effects or fluctuations of meteorological factors, according to L. J. Folinsby (2010), there is an increase in cutaneous blood flow, cardiac

output, heart rate, systolic volume, venous elasticity, internal temperature and sweating [18]. Researchers from far abroad Z. B. Rowell et al. (1986), S. M. Bernard et al. (2011) and M. Jaatelf (1999) report fundamental scientific results that various complications of cardiorespiratory diseases develop in response to meteostress, up to thermal, ischemic or radiation apoptosis and necrosis [25].

In bronchopulmonary and other diseases, under the influence of meteorological factors, there is a decrease in the blood flow of internal organs, renal blood flow, urine production, volume and total fluid content, there is a weighting of various syndromes – bronchoobstructive hypoxic, tonic, spastic, hypotensive, clinical, etc. In addition, under the influence of the MF of a sharply continental climate, according to B. I. Geltzer (2011) and G. A. Danilenko (2010), cardiorespiratory pathologies often occur with a less distinct clinical picture, but with a heavier degree of pathological processes and impaired functioning of various systems [6].

The presented results to a certain extent, of course, convince that by now there have already been scientific ideas about the climatobiorhythmopathogenetic mechanisms of the development and course of cardiorespiratory diseases, including community-acquired pneumonia (VP). Meteorological and climatic factors themselves, independently of other FRS, are associated with the frequency of therapeutic pathologies. However, the available works mainly studied the climatopathological features of chronic respiratory pathologies. We consider it necessary to express our point of view in this area,

especially in matters of ecological pulmonology, on the problems of INDP and VP in various climatogeographic zones. We are interested in the works devoted to the climatopathogenetic mechanisms of development, course and prevention of the noted diseases among the population.

Literature data indicate that meteorological factors have a pathogenic effect not only on the condition of patients with cardiorespiratory pathologies (CRP), but also on the condition of healthy people.

V.A. Karpin (2013) in the course of prospective medical and environmental monitoring, it was proved that in the Khanty-Mansiysk district there is a direct relationship between the number of hospitalized patients with PKK and adverse changes in weather conditions [11].

Data confirming these facts were also obtained by other researchers in different climatogeographic zones: in Uzbekistan [1], in the Far East [2], in arid zones of Turkmenistan [3], in the medical and climatic conditions of Primorye [4], in conditions with a continental climate of various climatogeographic zones of Tajikistan [5], in the hot climate of Uzbekistan [7], in Ashgabat [9], in the North of Russia [12], in climatogeographic zones of Russia with a sharply continental climate [13], in the republics of Central Asia [19], in the conditions of Antarctica [20] and among the population, living in territories contrasting in the degree of atmospheric pollution [23].

This is facilitated by altered electrical atmospheric processes as a result of the formation of a hypoxic type of weather with a hypoxic effect of the

atmosphere. This is the result of climate change in the form of combinations of low AtD, high air temperature (TV) and relative humidity (OVV) with a decrease in the partial density of oxygen in the air. The "peak" of hospitalization of patients coincides with the days of weather changes with a hypoxic effect, the number of cases of exacerbations of diseases, acute respiratory pathologies and complications from them increases [15].

In general, there are 4 types of weather variations: hypotensive, hypoxic, spastic and tonic. The most pathogenic type of weather is a decrease in AtD (hypobaria) + an increase in TVI OVV (hyperthermic hypoxia) [17].

To solve the clinical and environmental aspects of the VP, special climatobiorhythmological studies have not been carried out until now. But there are such works on other PKK, and it will be possible to assess the current situation as a whole.

So, in his doctoral dissertation, H.H. Tursunov (2002), having analyzed 25,940 cases of cardiac diseases, according to the ambulance of the Andijan branch of the RNCEMP, therapeutic and cardiological departments of the clinics of the Andijan Medical Institute, convincingly proves:

1) that the optimal method for studying the climatic features of the development and course of various pathologies in patients is a clinical and meteorological study using the methodology of G. M. Danishevsky;

2) fluctuation of the levels of the main MF has a pathogenic effect on the development, course and clinical manifestations of acute and chronic diseases in the sharply continental climate of the Fergana Valley;

3) meteotropic reactions in patients with cardiological and cardiorespiratory diseases vary significantly depending on the type of weather, weather conditions of the studied region;

4) early and timely forecast of changes in meteorological processes reduces the negative role of meteotropic reactions and gives a chance to prevent the "continuum" in weather-sensitive people;

5) the program of primary, secondary and tertiary prevention of PKK should provide for the integrated use of meteorological prophylaxis and forecasting data [16].

N.M. Ibragimova (2014), having studied 6077 COPD patients also in Andijan, showed that the most unfavorable seasons for COPD patients are summer, spring and autumn. The greatest number of COPD was observed on days with sharp changes in the duration of SS, ATD, TV, OVV, during the passage of the "air front" with "internal altitude" and adverse weather (III and IV). It was noted that patients with COPD developed during sleep have a more severe clinical course of this pathology compared to patients with COPD developed during wakefulness [8].

In the sharply continental climate of the Ferghana Valley, according to Sh. T. Shokirov (2014), severe bronchial asthma is detected 1.4 times more in

women compared to men. With age, the frequency of asthma detection increases by 8 times and the asthmatic condition due to the pathogenic effects of the main MF increases by 18 times [21].

According to D. M. Kalandarov (2011), where the materials of the Andijan ambulance for 2017-1999 were analyzed and 1872 call cards for patients with asthmatic conditions were selected, the following patterns are traced: the most unfavorable seasons in relation to the development of urgent therapeutic conditions are winter, spring and summer. Autumn is a relatively more favorable time of the year; the presence of meteorological risk factors is associated with the highest frequency of asthma attacks and the highest rate of pulmonological "endpoints"; The incidence of urgent conditions in the climatic conditions of Andijan is most often observed in February and August, less often in the autumn months (November, December) [10]. These developments are certainly important for practical healthcare, and based on the results given in them, it will be possible to carry out scientifically based and effective preventive measures among the population, including with regard to VP.

In addition, it will be possible to assume that the "meteorological explosion" caused by MF undoubtedly leads to meteorological discomfort and, as a consequence, a "cascade" of reactions may be triggered that contribute to the development of acute bronchopulmonary pathologies, including VP.

Conclusion. Consequently, for the final confirmation of these facts and for the improvement of the working treatment and diagnostic programs of the VP, it

will be necessary to conduct special clinical and meteorological studies in various regions of Uzbekistan. World experience confirms the necessity, priority and prospects of such a direction in modern science [14].

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