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Features of cardio-vascular system functional state in patients with bronchial asthma at the background of long-term pathogenic organisms persistence in the upper respiratory tract

Key words: *asthma, cardiorespiratory system, pathogenic microflora.*

Bronchial asthma (BA) is one of the most common illnesses in modern society [11, 13]. Today, scientists around the world are interested in the processes that lead to the complication of the disease. Often infectious agents lead to aggravation of asthma.

All patients with asthma, regardless of the extent of the disease, marked changes in the nasal mucosa protective barriers. Violation of colonization resistance observed in more than 70 % of patients with asthma, manifested sowing of gram-positive and gram-negative microorganisms that do not belong to the normal flora of the mucous membranes of the nose. Evaluation of microbial landscape in the nasal cavity of patients showed that 57 % of sown gram-positive flora, among which predominate staphylococci, namely *St. aureus* – 30 %, *St. epidermidis* – 13 %, *St. schleiferi* – 5 %, *St. intermedius* – 3 %, *St. gallinaram* and *St. coprae* – 1%. Much less is allocated streptococcus, represented *Str. mitis* – 4%. Along with gram-positive and gram-negative flora out bacteria in 18 % of cases, of which *Ps. aeruginosa* – 8% of *E. coli* – 5 %, *Ent. aerogenes* – 3 %, *Kl. pneumoniae* and *Ent. cloacae* in 1 % of cases. Data on throat flora in asthma have been identified [15].

Analysis of the literature about sputum in adults with asthma showed that fungal organisms detected in 69,8 % of cases, almost always in association with pathogenic microorganisms. Fungi of the genus *Candida* are present in the sputum in 63,3 % of cases, fungi of the genus *Aspergillus* and *Penicillium* – 2,3 and 4,1 % of cases, respectively. The detection rate of bacteria in sputum was as follows: Coccal flora – *Streptococci* or *Staphylococci* – 55,9 % and 52,4 %, respectively; other bacteria – *Klebsiela* and *E. coli* – 12,8 % and 2,4 %, respectively. Very rare finds were *Pseudomonas*, including *Pseudomonas aeruginosa* – 0,087 % of cases. Thus, the most commonly found asthma fungal microflora in the sputum of patients. In almost all cases, these microorganisms were found in association with bacteria [8, 10, 14, 16].

To date, clarify the role of microflora that colonizes the upper airways in patients with asthma , the disease, the impact on visceral systems of the body as a whole are important, and will help to develop new methods for prevention of exacerbations of asthma, which will improve the quality of life of patients.

Therefore, the **main aim** of this work was to study the influence of constant persistence of pathogenic organisms in the upper respiratory tract functional cardio-vascular system in patients with asthma.

Materials and methods

The study involved 100 patients with asthma of moderate severity in middle age (51,2 ± 0,03) years at the time of exacerbation, and for a year after suffering an exacerbation of asthma, and 15 healthy volunteers without concomitant severe disease in history, at the age of on average (45 ± 0,02) years. Selection of patients by severity of asthma

was conducted in accordance with the criteria of the Decree № 128 of Ministry of Health of Ukraine of 19.03.2007 «On approval of clinical protocols of care in the specialty Pulmonology» [7]. During the investigation it was found that most of sputum in patients with acute exacerbation of asthma, sown *Staphylococcus aureus* and *Candida albicans*, or a combination of these microorganisms and fungi.

All patients in the study were divided into four groups: group I (low degree of colonization of pathogenic microflora – 10^2–10^3) included 25 patients, (25,0 ± 4,3) %; group II (average degree of colonization – 10^4–10^6) – 20 patients, (20,0 ± 4,0) %; group III (high level – 10^6 and above) – 30 patients, (30 ± 4,6) %. The remaining 25 patients (25 ± 3,6) % of patients were included in IV group – the growth of saprophyte microflora. Work was carried out by public funds.

All patients were treated at the bronchoobstructive lung disease department of National Institute of Phthysiology and Pulmonology named after F. G. Yanovsky NAMS of Ukraine. The presence of comorbidity in remission was taken into account. All patients received standard therapy with a baseline period of exacerbation, which included the use of parenteral and inhaled corticosteroids and β_2-agonist, short acting to reduce asthma symptoms. Heavily comorbidity was not observed in any of the patients. All patients regularly taking inhaled corticosteroids, duration of administration of inhaled corticosteroids was an average (5,31 ± 0,12) years. The average forced expiratory volume in 1 second (FEV_1) was (65,8 ± 0,57) %, forced vital capacity (FVC) was (90,9 ± 2,7) %, evening maximum expiratory flow volume (MEFV) was (77,25 ± 1,2) %. The main methods included:

1. General clinical: collecting medical history, examination of the patient.

2. Cytological: gram staining of smears of sputum.

3. Microbiological: commonly used methods of sowing on sputum culture media (Columbia agar, chocolate agar, McConkie agar, Sabouraud medium, wort agar, et al.). The number of isolates of saprophytic bacteria was taken into account (*Neisseria spp.*, *St. Epidermidis*, *St. Saprophiticus* and *S. sanguis*, *S. oralis*, *S. intermedius*, *S. viridans*, *S. haemoliticus*, *S. hominis*, *S. pyogenes*, etc.), and conditionally bacteria (*St. aureus*, gram-negative bacteria of the «E» group , etc.) in bacterial titer 10^3 CFU / ml and higher, yeast (*Candida spp.*) and micromicetes mold (*Aspergillus spp.*, *Penicillus spp.*, etc.) [3–6].

4. Pikfloumetry was performed in all patients in order to determine morning and evening MEFV. Its daily diaries introspection to be able to control asthma symptoms daily. All patients were offered during the treatment period diary introspection. They noted in points night manifestations of asthma (number of awakenings during the night due to respiratory symptoms), morning stiffness in the chest, daytime symptoms, cough during the day, average score of breathlessness. Thus, all of the above symptoms accounted for the overall (total) Asthma account. Also, patients noted a number of inhaled β_2-agonists, short-acting (salbutamol) per day, which was used as an emergency treatment to relieve an asthma attack [13].

5. Functional state of cardio-vascular system was studied using daily measurement of blood pressure (BP) and conducting Holter ECG monitoring [1, 12]. Daily blood pressure measurement was performed using blood pressure monitor «Monitor blood pressure and electrocardiogram Sardio Tens» on an outpatient basis. In analyzing the results of the daily monitoring of blood pressure (DMAT) evaluated four main factors: the average value of blood pressure, blood pressure load, the circadian rhythm of blood pressure, blood pressure variability. The average pressure was determined by calculating the arithmetic mean value of the average blood pressure and systolic and diastolic blood pressure at night, as well as separately for day and night monitoring periods. Also, the calculated average hemodynamic pressure, pulse pressure (PAO), the percentage of measurements in which blood pressure is higher than the normal value-time index (HLDX). This figure was calculated for systolic and diastolic blood pressure average day and night separately. To quantify the load generated by high blood pressure in the patient's body the code was used «load pressure», which reflects the area under the curve of the daily schedule of blood pressure. The index was calculated separately for both systolic and diastolic blood pressure; as for the whole period of monitoring, and for daytime and nighttime periods. Also analyzed is the most important indicator of daily rhythm of blood pressure – lowering its nightlife, which is defined as a percentage of average daily value (daily index, DI). Analysis of blood pressure variability provided an assessment of deviations from the curve BP circadian rhythm, it was used an indicator such as the standard deviation of the average (SD). It also calculated separately for day and night periods. A similar index calculated in as a product of these values.

6. Holter ECG monitoring was performed 24 hours as using Holter ECG system «Monitor blood pressure and electrocardiogram Sardio Tens». Throughout the time the patient led a normal life, measurements were made both day and night. In the analysis of daily ECG monitoring assessed the following parameters: heart rate (HR), cardiac arrhythmias, and ST analysis interval PQ, heart rate variability (HRV). When rhythm disturbances were investigated and analyzed ventricular beats, atrial fibrillation and sinus overnight. Heart rate was distributed to bradycardia and tachycardia with the timing of the day of registration. In analyzing the ST interval shown its maximum and minimum values and the registration [9].

Statistical analysis of the material was carried out using licensed software, included in the package Microsoft Office Professional 2000 license Russian Academic OPEN NO LEVEL № 17016297 in IBM PC Atlon in Excel. To test the normality of data distribution method used Lapacho SN and others, 2001(feature NORMSAMP-1, which is embedded in the environment of Excel). To assess the reliability of differences of average values of sampling from a normal distribution was used bilateral Student t-test (for dependent and independent samples). With the level of probability was estimated, made the indicator probabilities between groups (p), which equaled or were less than 0,05. In the absence of normality of distribution to calculate the probability of the average difference Uilkokson criterion was used, whose assessment was conducted by comparing with the maximum and minimum values of the criterion by. Correlation ties between samples were calculated using the methods of parametric Pearson correlation or Spearman nonparametric correlation.

The significance of the correlation coefficient was calculated using Student's t-test, and then comparing the value of t criterion value. Check for communication between objects with qualitative parameters estimated by shares and proportions using contingency tables using criteria and comparing it with the criterion value or when calculating the odds ratio (OR) and its confidence interval / computing criterion values and confidence intervals was carried out at a given confidence level would ≤ 0,05 [2].

Results

As a result of this work revealed an exacerbation of asthma, regardless of the degree of colonization of the upper respiratory tract, patients in all groups alike complain of increasing shortness of breath on exertion, frequent attacks of breathlessness – 4 to 6 on the week with an increase in the number of use of inhaled β_2-agonists short-acting to an average of 6 to 8 times a week, discharge of phlegm cough with mucus most character during the day, morning stiffness, chest and night symptoms 3–4 times a week. More detailed information is presented in Table 1.

In analyzing the diaries of introspection that led a group of patients with a low degree of contamination of the upper airway during the year, it was found that in a group in remission, complaints of cough, shortness of breath, need to use short-acting bronchodilators, nocturnal awakening due to asthma symptoms morning stiffness and daily asthma symptoms were significantly lower than in acute (see Table 2).

In group II patients (average degree of pathogenic colonization) in the analysis of diaries introspection, 3 and 6 months after the last exacerbation, is not the case of complaints rise to increased cough, shortness of breath, need to use short-acting

Table 1

Clinical manifestations of asthma in patients with varying degrees of contamination of pathogenic microflora of the upper respiratory tract according introspection diary for the week acute phase (M ± m)

Parameter	The period of exacerbation			
	Group I (n = 25)	Group II (n = 20)	Group III (n = 30)	Group IV (n = 25)
Night waking, points	1,9 ± 0,1	2,0 ± 0,2	1,9 ± 0,1	2,0 ± 0,2
Morning stiffness, points	1,1 ±0,1	1,0 ± 0,1	0,9 ± 0,1	1,1 ± 0,1
Daytime symptoms, points	2,1 ± 0,1	2,2 ± 0,2	2,9 ± 0,1	2,0 ± 0,1
Cough, points	1,2 ± 0,1	3,0 ± 0,2	2,9 ± 0,2	1,7 ± 0,1
Dyspnea, points	2,5 ± 0,2	3,6 ± 0,2	3,9 ± 0,2	2,6 ± 0,2
Common asthma score, points	8,8 ± 0,4	11,8 ± 0,5	12,5 ± 0,6	8,4 ± 0,8
Number of β_2-agonist use of short-acting, times	5,7 ± 0,2	5,6 ± 0,2	6,2 ± 0,3	5,2 ± 0,4

Note: statistically significant differences were not found.

Table 2

Dynamics of clinical manifestations of asthma in patients of group I according to the introspection diary (M ± m)

Parameter	Observation period			
	Exacerbation	After 3 months of observation (remission)	After 6 months of follow up (remission)	After 12 months of follow up (remission)
Night waking, points	1,9 ± 0,1	0,2 ± 0,1*	0,2 ± 0,1*	0,6 ± 0,1*
Morning stiffness, points	1,1 ± 0,1	0,5 ± 0,1	0,5 ± 0,1	0,8 ± 0,1
Daytime symptoms, points	2,5 ± 0,2	0,5 ± 0,1*	0,5 ± 0,1*	0,5 ± 0,1*
Cough, points	2,5 ± 0,4	1,5 ± 0,1	1,0 ± 0,1*	1,0 ± 0,1*
Dyspnea, points	3,5 ± 0,4	1,5 ± 0,1	1,6 ± 0,1*	1,6 ± 0,1*
Common asthma score, points	8,8 ± 0,4	4,2 ± 0,2*	3,8 ± 0,2*	4,5 ± 0,2*
Short-acting β_2-agonists use, times	5,7 ± 0,2	2,7 ± 0,2	2,3 ± 0,1*	2,1 ± 0,2*

Note: * – difference is statistically significant between the rate of exacerbation and remission periods ($p < 0,05$).

bronchodilators, nocturnal awakening due to asthma symptoms, morning stiffness and daytime symptoms of asthma. However, one year later, patients with an average degree of colonization of pathogenic microflora in the upper respiratory tract, there was a trend towards deterioration in the estimated parameters. More detailed information is presented in Table 3.

Patients in group III in which the degree of contamination is high, the difference in the frequency of complaints of patients with cough, shortness of breath, morning stiffness, daytime asthma symptoms, overall asthma account needs to use the short β_2-agonists, nocturnal asthma symptoms were observed during the observation period . More detailed information is presented in Table 4.

Patients of the group IV, which is not pathogenic microflora appear also had a reliable positive changes in the estimated parameters, which were stable in the group during the year of observation. More detailed information is presented in Table 5.

The evaluation parameters independently performed peak flowmetria in groups of patients with different degrees of colonization of pathogenic microflora of the upper respiratory tract were found significant difference between the values of MEFV species (see Table 6). Analysis of daily MEFV variability suggests, that patients in groups II and III MEFV daily variability was higher compared with the group of patients with colonies saprophyte microflora.

In analyzing the results of Holter monitoring revealed that in most patients with massive colonization of pathogenic microflora of the upper respiratory tract, more recorded cases of fluctuations in systolic blood pressure (SBP) and diastolic blood pressure (DBP) above normal for days and lengthening the interval QT ≥ 490 ms, and ventricular ectopic, as well as

Table 3

Dynamics of clinical manifestations of asthma in patients of group II according to the introspection diary (M ± m)

Parameter	Observation period			
	Exacerbation	After 3 months of observation (remission)	After 6 months of follow up (remission)	After 12 months of follow up (remission)
Night waking, points	2,0 ± 0,2	1,5 ± 0,1	1,8 ± 0,1	2,1 ± 0,2
Morning stiffness, points	1,0 ± 0,1	0,5 ± 0,1	0,6 ± 0,1	1,2 ± 0,1
Daytime symptoms, points	2,2 ± 0,2	1,0 ± 0,1*	1,2 ± 0,1*	2,3 ± 0,2
Cough, points	3,0 ± 0,2	1,0 ± 0,1*	1,1 ± 0,1*	2,9 ± 0,1
Dyspnea, points	3,6 ± 0,2	1,5 ± 0,1*	1,5 ± 0,1*	2,6 ± 0,1*
Common asthma score, points	11,8 ± 0,8	5,5 ± 0,5*	6,2 ± 0,5*	11,1 ± 0,8
Short-acting β_2-agonists use, times	5,6 ± 0,5	2,5 ± 0,2*	2,5 ± 0,2*	4,9 ± 0,4

Note: * – difference is statistically significant between the rate of exacerbation and remission period ($p < 0,05$).

Table 4

Dynamics of clinical manifestations of asthma in patients of group III according to the introspection diary (M ± m)

Parameter	Observation period			
	Exacerbation	After 3 months of observation (remission)	After 6 months of follow up (remission)	After 12 months of follow up (remission)
Night waking, points	1,9 ± 0,1	1,8 ± 0,1	1,9 ± 0,1	2,5 ± 0,2
Morning stiffness, points	0,9 ± 0,1	0,9 ± 0,1	1,2 ± 0,1	1,5 ± 0,1
Daytime symptoms, points	2,9 ±0,2	2,5 ± 0,2	2,9 ± 0,2	2,2 ± 0,2
Cough, points	2,9 ± 0,2	2,5 ± 0,1	2,3 ± 0,1	2,8 ± 0,1
Dyspnea, points	3,9 ± 0,2	3,0 ± 0,2	3,0 ± 0,2	2,9 ± 0,2
Common asthma score, points	12,5 ± 0,6	10,7 ± 0,5	11,3 ± 0,5	12,0 ± 0,6
Short-acting β_2-agonists use, times	6,2 ± 0,3	4,1 ± 0,2	4,6 ± 0,2	5,2 ± 0,2

Note: statistically significant differences were not found.

Table 5

Dynamics of clinical manifestations of asthma in patients of group IV according to the introspection diary (M ± m)

Parameter	Observation period			
	Exacerbation	After 3 months of observation (remission)	After 6 months of follow up (remission)	After 12 months of follow up (remission)
Night waking, points	2,0 ± 0,2	0,7 ± 0,1*	0,8 ± 0,1*	0,9 ± 0,1*
Morning stiffness, points	1,1 ± 0,1	1,0 ± 0,1	0,9 ± 0,1	0,9 ± 0,1
Daytime symptoms, points	2,0 ± 0,1	0,8 ± 0,1*	0,9 ± 0,1*	0,9 ± 0,1*
Cough, points	1,7 ± 0,1	1,0 ± 0,1	1,0 ± 0,1	1,0 ± 0,1
Dyspnea, points	2,6 ± 0,2	2,3 ± 0,2*	2,1 ± 0,2*	2,2 ± 0,2*
Common asthma score, points	8,4 ± 0,8	6,0 ± 0,7*	5,7 ± 0,7*	5,9 ± 0,7*
Short-acting β_2-agonists use, times	5,2 ± 0,4	4,5 ± 0,5*	4,3 ± 0,5*	4,4 ± 0,5*

Note: * – statistically significant difference between the performance before and after the treatment ($p < 0,05$).

Table 6

Dynamics of MEFV in patients with asthma, (M ± m)

Index	Group I (n = 25)	Group II (n = 20)	Group III (n = 30)	Group IV (n = 25)
MEFV morning, l/min	304,8 ± 81,5	266,5 ± 78,0	264,9 ± 73,8	292,9 ± 67,6
MEFV daily variability, %	9,1 ± 1,1	19,4 ± 1,9*	25,7 ± 2,4*	5,9 ± 0.8

Note: * – statistically proven difference if compared to the group of saprophytic microflora ($p < 0,05$).

Table 7

Monitoring of daily blood pressure and ECG in patients in groups III and IV (M + m)

Index	Group III (n = 30)	Group IV (n = 25)
Maximum SBP per 24 hours, mm Hg	135,6 ± 4,2	142,6 ± 4,2
Minimum SBP per 24 hours, mm Hg	112,0 ±2,1	121,2 ±2,1
Maximum SBP per day, mm Hg	138,2 ± 4,2	145,2 ± 3,2
Minimum SBP per day, mm Hg	115,3 ± 2,5	121,2 ± 2,1
Maximum SBP per night, mm Hg	114,5 ± 1,9	125,2 ± 2,1
Minimum SBP per night, mm Hg	78,5 ± 2,2	98,5 ± 3,2
Maximum DBP per 24 hours, mm Hg	79,6 ± 2,4	89,6 ± 2,4
Minimum DBP per 24 hours, mm Hg	65,8 ± 2,1	75,8 ± 2,3
Maximum DBP per day, mm Hg	72,5 ± 2,0	82,7 ± 3,2
Minimum DBP per day, mm Hg	61,7 ± 2,2	72,5 ± 2,8
Maximum DBP per night, mm Hg	62,6 ± 2,1	72,6 ± 2,5
Minimum DBP per night, mm Hg	62,5 ± 2,2	68,9 ± 2,4
Maximum BP mean per 24 hours, mm Hg	122,4 ± 3,2	142,3 ± 3,5
Minimum BP mean per 24 hours, mm Hg	75,1 ± 1,6	85,3 ± 1,8

Table 7(Continue)

Monitoring of daily blood pressure and ECG in patients in groups III and IV (M + m)

Index	Group III (n = 30)	Group IV (n = 25)
Maximum BP mean per day, mm Hg	121,4 ± 3,5	153,2 ± 3,8
Minimum BP mean per day, mm Hg	77,6 ± 2,2	79,8 ± 2,4
Maximum BP mean per night, mm Hg	86,9 ± 3,2	92,3 ± 3,4
Minimum BP mean per night, mm Hg	64,5 ± 1,2	74,1 ± 1,9
Maximum pulse BP per 24 hours, mm Hg	82,8 ± 2,8	82,9 ± 2,9
Minimum pulse BP per 24 hours, mm Hg	33,8 ± 2,4	33,5 ± 2,2
Minimum pulse BP per day, mm Hg	26,9 ± 1,8	31,9 ± 2,2
Maximum pulse BP per day, mm Hg	65,5 ± 2,0	75,6 ± 2,2
Maximum pulse BP per night, mm Hg	56,3 ± 1,8	66,5 ± 3,2
Minimum pulse BP per night, mm Hg	46,4 ± 2,8	46,5 ± 2,8
The percentage of fluctuations in SBP above normal in a day in the middle, %	12,7 ± 1,4	12,9 ± 1,6
The percentage of fluctuations in SBP above normal for a day in the middle, %	18,2 ± 2,4	18,9 ± 2,2
The percentage of fluctuations in SBP above normal for the night in the middle, %	11,6 ± 2,4	16,8 ± 2,5
The percentage of fluctuations in DBP above normal in a day sir, %	8,6 ± 1,1	17,7 ± 2,2
The percentage of fluctuations in DBP above normal for a day in the middle, %	8,9 ± 2,8	23,9 ± 2,2♦
The percentage of fluctuations in DBP above normal for the night in the middle, %	12,5 ± 2,5	28,5 ± 2,6
Average BP above normal for days in the middle, %	7,9 ± 1,1	14,9 ± 2,4
Average BP above normal day, %	9,5 ± 1,8	23,6 ± 3,2
Average BP above normal night, %	9,5 ± 1,8	11,8 ± 2,2
Results per 24 hours		
SBP standart deviation (SD), %	9,2 ± 1,2	15,9 ± 1,6
DBP SD, %	7,2 ± 1,4	10,2 ± 1,2
BP mean SD, %	8,2 ± 1,3	12,8 ± 1,3
Pulse BP SD, %	7,5 ± 1,9	11,9 ± 1,2
SBP DI rate, %	2,9 ± 1,4	11,9 ± 2,1♦
DBP DI rate, %	3,1 ± 1,1	13,1 ± 1,2
BP mean DI rate, %	3,8 ± 1,2	15,8 ± 2,4
Results per day		
SBP SD, %	8,2 ± 1,1	10,2 ± 1,2
DBP SD, %	4,9 ± 1,6	10,9 ± 2,2♦
BP mean SD, %	7,2 ± 1,1	10,1 ± 1,1
Pulse BP SD, %	4,5 ± 1,1	14,5 ± 2,1♦
SBP DI rate, %	3,9 ± 1,2	14,8 ± 2,2♦
DBP DI rate, %	2,1 ± 0,8	16,5 ± 2,4♦
BP mean DI rate, %	3,9 ± 1,7	14,9 ± 2,2♦
Results per night		
SBP SD, %	7,2 ± 1,2	11,2 ± 1,4
DBP SD, %	7,8 ± 1,7	10,2 ± 1,9
BP mean SD, %	5,8 ± 0,2	12,9 ± 2,2♦
Pulse BP SD, %	4,4 ± 1,0	8,4 ± 1,8♦
SBP DI rate, %	6,6 ± 1,2	12,6 ± 2,2
DBP DI rate, %	2,1 ± 1,3	5,1 ± 1,4
BP mean DI rate, %	2,8 ± 0,8	13,2 ± 2,4♦
ECG		
Percentage of normal ST, %	90,3 ± 2,2	90,8 ± 2,2

Table 7 (Continue)

Monitoring of daily blood pressure and ECG in patients in groups III and IV (M + m)

Index	Group III (n = 30)	Group IV (n = 25)
Percentage of ST elevations (0,20 мВ), %	2,8 ± 0,2	4,8 ± 0,4
Percentage of ST depressions (–0,10 мВ), %	2,1 ± 0,2	4,5 ± 0,4
Percentage of QT ≥ 450 ms episodes, %	1,9 ± 0,2	4,2 ± 0,4
Percentage of QT≤ 450 ms episodes, %	92,1 ± 2,2	92,8 ± 2,2
Percentage of QT ≥ 490 ms episodes, %	0,2 ± 0,1	4,2 ± 0,4♦
Average QT, ms	402,9 ± 6,2	402,7 ± 6,9
Average QTc, ms	404,5 ± 8,2	403,9 ± 8,2
Percentage of normal emissions, %	96,1± 2,3	98,4± 2,4
Percentage of ventricular ectopias, %	–	1,9 ± 0,2♦
The percentage of cases supraventricular ectopias, %	0,8 ± 0,2	3,1 ± 0,3♦

Note: ♦ – index difference between the groups demonstrated statistically (p < 0,05).

cases of depression ST (see Table 7). In groups with low and moderate contamination of this trend has not been established.

When conducting a retrospective analysis of the frequency of exacerbations per year, found that in patients with growth saprophyte microflora frequency averaged (0,8 ± 0,1) times a year, in the group with low (0,9 ± 0 1) cases per year, with an average of (1,2 ± 0,1) cases per year, while the massive colonization (3,5 ± 0,2) cases per year.

Conclusion

Persistence of pathogenic organisms in the upper airways in patients with asthma exacerbations is a provocateur, poor controllability of the disease. In addition, due to the many pathogenic mechanisms implemented its negative effect on cardio-vascular system, both due to endogenous chronic intoxication, and due to the constant need for short-term use of bronchodilators and an exacerbation – parenteral glucocorticosteroids and methylxanthines. Given the findings in the future, it is necessary to improve methods of treating patients with asthma in order to improve the quality of life in this group of patients.

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ОСОБЛИВОСТІ ФУНКЦІОНАЛЬНОГО СТАНУ СЕРЦЕВО-СУДИННОЇ СИСТЕМИ У ХВОРИХ НА БРОНХІАЛЬНУ АСТМУ НА ФОНІ ТРИВАЛОЇ ПЕРСИСТЕНЦІЇ ПАТОГЕННОЇ МІКРОФЛОРИ У ВЕРХНІХ ДИХАЛЬНИХ ШЛЯХАХ

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Резюме. *Аналіз літературних даних щодо характеру патогенної мікрофлори мокротиння хворих на бронхіальну астму показав, що грибкові мікроорганізми виявляються в 69,8 % випадків, практично завжди в асоціації з патогенними мікроорганізмами, кокова флора (стрептококи або стафілококи) – у 55,9 % і 52,4 % випадків відповідно, клебсієла і кишкова паличка – у 12,8 і 2,4 % випадків. Дуже рідкісною знахідкою є синьогнійна паличка – в 0,087 % випадків. У хворих з масивною патогенної колонізацією верхніх дихальних шляхів частіше реєструються випадки коливання систолічного і діастолічного АТ вище норми за добу, подовження*

інтервалу QT ≥ 490 мс, суправентрикулярні та шлуночкові ектопії, а також випадки депресії інтервалу ST. Персистування патогенної мікрофлори є провокатором загострень і причиною поганої контрольованості захворювання. Крім того, за рахунок багатьох патогенетичних механізмів реалізується негативний її вплив на серцево-судинну систему, як за рахунок ендогенної хронічної інтоксикації, сенсибілізації, так і за рахунок постійної потреби в користуванні бронхолітиками короткої дії, а при загостренні – парентеральними глюкокортикостероїдами та метилксантинами. Враховуючи отримані дані, надалі необхідно удосконалювати способи лікування хворих на БА з метою поліпшення якості життя даної групи пацієнтів.

Ключові слова: *бронхіальна астма, кардіореспіраторна система, патогенна мікрофлора.*

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ОСОБЕННОСТИ ФУНКЦИОНАЛЬНОГО СОСТОЯНИЯ СЕРДЕЧНО-СОСУДИСТОЙ СИСТЕМЫ БОЛЬНЫХ БРОНХИАЛЬНОЙ АСТМОЙ НА ФОНЕ ДЛИТЕЛЬНОЙ ПЕРСИСТЕНЦИИ ПАТОГЕННОЙ МИКРОФЛОРЫ В ВЕРХНИХ ДЫХАТЕЛЬНЫХ ПУТЯХ

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Анализ литературных данных относительно характера патогенной микрофлоры мокроты больных бронхиальной астмой показал, что грибковые микроорганизмы обнаруживаются в 69,8 % случаев, практически всегда в ассоциации с патогенными микроорганизмами, кокковая флора (стрептококки или стафилококки) – в 55,9 % и 52,4 % случаев соответственно, клебсиелла и кишечная палочка – в 12,8 и 2,4 % случаев. Очень редкой находкой является синегнойная палочка – в 0,087 % случаев. У больных с массивной патогенной колонизацией верхних дыхательных путей чаще регистрируются случаи колебания систолического и диастолического АД выше нормы за сутки, удлинение интервала QT ≥ 490 мс, суправентрикулярные и желудочковые эктопии, а также случаи депрессии интервала ST. Персистирование патогенной микрофлоры является провокатором обострений и причиной плохой контролируемости заболевания. Кроме того, за счет многих патогенетических механизмов реализуется отрицательное ее влияние на сердечно-сосудистую систему как за счет эндогенной хронической интоксикации, сенсибилизации, так и за счет постоянной потребности в пользовании бронхолитиками короткого действия, а при обострении – парентеральными глюкокортикостероидами и метилксантинами. Учитывая полученные данные, в дальнейшем необходимо совершенствовать способы лечения больных БА с целью улучшения качества жизни данной группы пациентов.

Ключевые слова: *бронхиальная астма, кардиореспираторная система, патогенная микрофлора.*

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