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Asthma clinical features of patients with colonization upper respiratory of pathogenic microflora

Keywords: *asthma, conditionally pathogenic microflora, microbiocenosis*

In recent decades, progress has been made in the treatment of patients with bronchial asthma (BA). According to the main international instruments concerning the principles of diagnosis and treatment of asthma, asthma control is a priority for practitioners [7]. Under the control of asthma are: for the absence (or presence of no more than twice a week) daytime symptoms, no limitation of physical activity throughout the day and night asthma symptoms and the need to use inhaled β_2-agonists, short-acting (or need no more than twice per week), normal or close to normal values of lung function, no exacerbations. With full control of the asthma patient, performing all the necessary advice and applying basic therapy may feel a little healthier [7]. Conversely, under- control asthma patients can live a full life: communicating with friends and family to do the work around the house, play sports. Nearly 2/3 of patients with uncontrolled flow wake up at night at least once a week; are more than 2 times more sick from exacerbation of asthma; ask for an ambulance or are hospitalized twice as often [3]. Despite the deepening perceptions of disease development and widespread adoption of modern methods and treatment regimens, the level of achievement of asthma control is still quite low - according to GINA 57 % of patients with asthma who live in Europe, do not control their disease, 77 % of patients continue as still take drugs fast 2–3 or more times weekly [1, 3]. In addition to inadequate therapy due to insufficient control of asthma may include: permanent effect sensitizing factors (such as common allergens, respiratory infections, occupational factors or substances with high levels of irritants such as tobacco smoke); severe asthma, which is often associated with severe inflammation; and unaccounted comorbidities, such as rhinosinusitis, chronic infection [3, 7]. Thus, the concept of «unified airway» implies that the presence of inflammation in the upper and lower airways, such as asthma and rhinitis, has a single root. Inflammation in these diseases is similar, the two diseases affect each other, possibly due to systemic inflammatory effect. Problems associated with rhinitis lead to asthma inflammation and vice versa. The presence of rhinitis can reduce asthma control. As for chronic sinusitis, it was found that 90 % of patients with mild to moderate asthma and almost 100 % of patients with severe asthma are various anomalies in the sinuses. Chronic rhinosinusitis is usually associated with more severe controlled asthma [3, 7, 8].

The role of respiratory infections in exacerbations of asthma has been proven long ago. Effect of virus and rhinovirus primarily associated with an increase in hospitalizations in patients with asthma. Respiratory viruses can act synergistically with other factors such as allergens and cause exacerbation of asthma. We found that these organisms as *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*, also implicated in the exacerbation of asthma , and in the long term – to decrease lung function [7–9].

Usually exacerbation of asthma is associated with increased inflammation in the airways. Learning features microbiota mucosa of the upper respiratory tract (VAR) in patients with asthma expanded knowledge about the factors that may affect inflammation in the bronchi, and exacerbate the loss of asthma control. As you know, the normal microflora provides a «colonization immunity» and prevents the consolidation of pathogens to the mucosa of the bronchi [5]. But a significant

number of patients with asthma in terms of weakening the protective bar `EMU respiratory system under the influence of continuous use of ICS and periodic use of systemic corticosteroids in acute disease may be disturbed balance of microorganisms airway mucus toward the excessive multiplication of pathogenic microorganisms, including yeast fungi of the genus *Candida* [4–6]. There is a link between the immune system and activation of pathogenic microorganisms. Violations by microbiota VAR against decrease the immune systems resistance creates conditions for frequent respiratory viral infections [5, 6].

We remember that the structural and functional upper and lower respiratory systems represent a single entity. So definitely inflammation in the upper respiratory tract supports a similar process in the lower and vice versa, stimulating the progression of inflammation in both parts of the bronchopulmonary system [5, 7]. It is interesting that the presence of gram-positive bacteria culture in the nasal cavity correlated with the severity of neutrophil inflammation in the lower respiratory tract in sterile bronchoalveolar lavage [4].

The concept of "universal presence" pathogenic microflora in mucosa VAR though scholars debate an issue, but cannot be considered in patients with chronic diseases, including asthma. Keep in mind that opportunistic infectious agents under certain conditions can be transformed into pathogenic, and therefore able to influence the course of asthma. Numerous studies suggest that patients with asthma present a constant minimum level of inflammation, even in the absence of symptoms [4]. Intensive breeding and colonization by opportunistic pathogens of the respiratory tract mucosa together with disturbances in the local (lower viability and absorptive capacity of alveolar macrophages) and immune defense system may contribute to the maintenance and periodic activation of existing minimal inflammation in the bronchi. Pathological changes in the VAR supporting inflammation in the bronchi, leading to a decrease in asthma control, and later eventually provoke exacerbation. A considerable amount of research has shown that prolonged exposure to inducing factors causing more severe asthma [4, 5].

Hence, while it is possible violation of VAR in patients with concomitant asthma as a condition certainly should be considered when assessing the level of asthma control. In particular, it is proved that more than one associated disease can affect the course of asthma in varying degrees. Therefore, to ascertain the impact of colonization of the upper respiratory tract by opportunistic pathogens in patients with asthma on the course of disease is essential to take corrective recommendations in the treatment of asthma, allowing patients to live a full life.

The aim of the study was to investigate the clinical course of asthma in patients with colonization of the upper respiratory tract pathogenic microflora.

Materials and methods

Work carried out by public funds.

The study involved 120 patients with moderate severity of asthma (residents of Kyiv and Kyiv region) in the acute phase and during remission period, from 25 to 71 years (mean age (53,2 ± 1,9) years), of whom 41 men and 79 women. Average FEV_1 equal to (65,8 ± 0,57) %, FVC – (90,9 ± 2,7) %, PEF – (77,25 ± 1,2) %.

All patients were diagnosed with asthma, confirmed clinically and functionally (using spirometry and bronchial obstruction reversibility test with bronchodilators). Distribution of patients according to severity & treatment was carried out in accordance with the Order of the Ministry of Health of Ukraine № 128 of 19.03.2007 «On approval of clinical protocols of care in the specialty «Pulmonology». All patients were treated at the department of broncho-obstructive lung disease tuberculosis and the National Institute of Pulmonology named after F. G. Yanovsky of NAMS of Ukraine. It takes into account the presence of comorbidity. All patients received standard therapy with a baseline period of exacerbation and remission, which included the use of parenteral and inhaled drugs kortykosteroyinyh and β_2-agonists short steps to reduce asthma symptoms.

At baseline, patients were selected in the acute phase, the severity of asthma according to the degree consistent with grade 2–3 (presence of daytime symptoms, aggravation on average every 3–4 months. Frequent nocturnal symptoms, partial limitation of physical activity caused by asthma, FEV_1 between 60 % and 80 % of appropriate, daily fluctuation PEF > 15 % increase in the frequency of use β_2-agonists, short-acting to 8 inhalations a day, receiving oral corticosteroids during exacerbations 1–2 times a year. Patients with second degree BA were 50 persons (41,6 %), with the degree of BA III – 70 people (58,3 %). Disease duration was (10,2 ± 0,8) years, the frequency of asthma exacerbations - (2,3 ± 0,1) times / year. None of the patients at the time of the survey did not smoke, had no history of smoking in the past. Heavily comorbidity was not observed in any of the subjects. The last time the patients received antibiotic therapy on average (6,1 ± 0,47) months ago, all surveyed received only 1 type of antibiotic. In 43 patients (35,8 %) the course of asthma was uncontrolled, the remaining 77 patients the disease was partially controlled (64,2 %). Inhaled corticosteroids received all 120 patients (100 %). The duration of intake ICS was on average (5,31 ± 0,12) years. Last received oral / parenteral corticosteroids on average (6,8 ± 0,04) months ago. Prescription recent exacerbation of asthma (4,3 ± 0,5) months. Therefore, triggered by SARS or hypothermia.

All patients carried a general clinical examination (history collection, examination, assessment of patient complaints). All patients were given pikfloumetry (to determine morning and evening PEF its daily variability) and introspection diary (to record daily asthma symptoms). All patients during the study period were self-observation diary, 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 and shortness of breath during the day. Evaluation of these symptoms over the previous 7 days was overall (total) asthma account. Also, patients noted the need for the use of inhaled β_2-agonists, short-acting (salbutamol) per day.

The study of respiratory function (ERF) based on computer processing spirography, flow- volume curve of the forced expiratory using devices «Pneumoscreen» (Germany);

Flora of the upper respiratory tract (nasal cavity, pharynx, and sputum) in patients with asthma was assessed twice in acute asthma and after 3 months basic therapy.

Microbiological study of the species composition of microflora of the upper respiratory tract were conducted in the laboratory of microbiology NIFP using standard methods (according to the Ministry of Health Decree № 535 from 22.04.1985y.). From sowing to sputum culture media (Columbia agar, chocolate agar agar McConkie, zhovtochno – salt agar, Sabouraud medium, wort – agar, etc.). Sputum samples were collected in the morning after rehabilitation oral cavity in sterile containers and transported to microbiology laboratory within 2 hours. Performed smear microscopy to assess the quality of the material. Sputum samples were considered representative if the neutrophil count was more than 25 and the number of epithelial cells less than 10 in a single view. After microscopy was performed bacteriological examination of sputum. Take into account the number of isolates of saprophytic bacteria (*St. epidermidis, St. Saprophiticus, S. sanguis, S. oralis, S. intermedius, S. viridans, S. haemoliticus, S. pyogenes*, etc.); and opportunistic bacteria (*St. aureus*, gram -negative bacteria «E» group, and others) in bacterial titer 103 U / ml and higher, opportunistic yeast (*Candida spp.*).

With licensed software, included in the package Microsoft Office Professional 2000 (license Russian Academic OPEN NO LEVEL № 17016297 in Atlon IBM PC program Excel) conducted a statistical analysis of the data [2]. To test the normality of data distribution in some sampling function used NORMSAMP-1 built environment in Excel. To assess the reliability of used two-way performance differences Student criterion). With the level of probability taking values of probability (P) that equaled or were less than 0,05.

Results and discussion

To determine the effect of colonization of the upper respiratory tract pathogenic microflora on the course of asthma were analyzed anamnestic, clinical features of asthma according to the colonization of the respiratory tract of patients saprophytic (normal) and pathogenic microflora (*Candida spp., S. aureus*, Gram-negative flora and their associations).

For analysis the patients were divided into two groups: I group (18 people) – patients who have not found the growth of pathogenic microorganisms in the respiratory tract, the second group (102 people) – patients who have had growth of pathogenic microorganisms (*Staphylococcus aureus, Candida albicans*, gram negative bacteria, microorganisms association).

Prior to treatment in the acute phase, all patients complained of shortness of breath, asthma attacks 2-4 times daily, increased use of inhaled.

β_2-agonists, short-acting to an average of 5–6 times a day, cough with sputum discharge of mucus or muco-purulent character for a day, morning stiffness, chest and night symptoms 2-3 times a week. In all the patients at baseline sputum allocated on average (16,0 ± 0,9) ml per day. Mucous sputum was determined in 53,8 % of patients, muco-purulent – in 46,1 %, purulent sputum was observed. Indicators of clinical manifestations of asthma in both groups significantly differed in the groups (Table 1).

Table 1

Clinical manifestations of asthma patients in groups according to self-observation diary for a week, during the exacerbation (M ± m)

Indicator	Normal microflora (n = 18)	Pathogenic microflora (n = 102)
Night waking	1,8 ± 0,1	2,1 ± 0,1
Morning stiffness, scores	1,2 ± 0,1	1,1 ± 0,1
Daytime symptoms, scores	2,3 ± 0,1	2,2 ± 0,1
Cough, scores	1,8 ± 0,2	2,1 ± 0,2
Shortness of breath, scores	3,2 ± 0,3	3,4 ± 0,3
Common asthma-account scores	10,3 ± 0,8	10,9 ± 0,8
Number of application short acting β_2-agonists	5,6 ± 0,6	5,8 ± 0,7

Note: statistically significant differences were not found.

Basic course of adjuvant therapy period of exacerbation was performed in all patients using the testimony of systemic antimicrobials (with a muco-purulent sputum), systemic corticosteroids if needed, nebulizer therapy with bronchodilators and anti-inflammatory drugs.

In analyzing the diaries of introspection in patients of group (which is not revealed growth of pathogenic microorganisms in the airways) before treatment were as follows: daytime symptoms – (2,0 ± 0,1) points; morning stiffness – (0,9 ± 0,1), night awakenings due to asthma symptoms accounted for (1,8 ± 0,1) points; cough - (1,8 ± 0,1) points; shortness of breath – (3,2 ± 0,2) points; number of inhaled β_2-agonists (5,6 ± 0,6) inhalation; average asthma – account group was (9,7 ± 0,8) points for the week.

After 3 months of therapy showed significant improvement following indicators: reduction in nocturnal awakenings due to asthma symptoms of (1,8 ± 0,1) to (0,6 ± 0,1) points ($p < 0,05$), with daytime symptoms (2 3 ± 0,1) to (0,7 ± 0,1) points, with cough (1,8 ± 0,1) to (0,4 ± 0,1) scores, morning stiffness of (1,2 ± 0,1) to (0,5 ± 0,1) points, with dyspnea (3,2 ± 0,2) to (1,7 ± 0,2), the number of application β_2- agonists, short-acting with (5, 6 ± 0,6) on the day before (2,1 ± 0,5) inhalations per week and overall asthma account of (10,3 ± 0,8) to (3,9 ± 0,6) points (Table 2).

In this way, according to the diaries of introspection majority 17 (94,4 %) patients of group who had no violations by the microbiota of the upper respiratory tract, under the state -controlled asthma. Only one patient after 3 months. treatment was inadequate control of asthma, which was associated with the violation mode of basic therapy. None of the patients at 3 months. observation was not acute asthma.Patients II- nd group (in violation of microbiota VMD) before treatment nocturnal awakening due to asthma symptoms in the group

Table 2

Dynamics of clinical manifestations of asthma in patients of group (normal microflora) according to self-observation diary for a week (M ± m)

Indicator	Period of observation	
	Before treatment	After 3 months
Night waking	1,8 ± 0,1	0,6 ± 0,1#
Morning stiffness, scores	1,2 ± 0,1	0,5 ± 0,1#
Daytime symptoms, scores	2,3 ± 0,1	0,7 ± 0,1#
Cough, scores	1,8 ± 0,2	0,4 ± 0,2#
Shortness of breath, scores	3,2 ± 0,3	1,7 ± 0,3#
Common asthma-account scores	10,3 ± 0,8	3,9± 0,6#
Number of application short acting β_2-agonists	5,6 ± 0,6	0,1 ± 0,1#

Note: # – statistically significant difference in the rate compared with that before treatment ($p < 0,05$).

Table 3

Dynamics of clinical manifestations of asthma in patients Group II (breach of microbiota VAR) according to self-observation diary for a week, (M ± m)

Indicator	Period of observation	
	Before treatment	After 3 months
Night waking	2,1 ± 0,1	1,3 ± 0,1#
Morning stiffness, scores	1,1 ± 0,1	1,0 ± 0,1
Daytime symptoms, scores	2,2 ± 0,1	1,6 ± 0,1#
Cough, scores	2,1 ± 0,2	1,8 ± 0,2
Shortness of breath, scores	3,4 ± 0,3	2,9 ± 0,3
Common asthma-account scores	10,9 ± 0,8	8,6 ± 0,7#
Number of application β^2-agonists, short acting	5,8 ± 0,7	1,1 ± 0,1#

Note: # – statistically significant difference in the rate compared with that before treatment ($p < 0,05$).

amounted to – (2,1 ± 0,1) scores, morning stiffness – (1,1 ± 0,1), daytime symptoms – (2,2 ± 0,1) points, coughing – (2,1 ± 0,2) points, shortness of breath – (3,4 ± 0,3) points, the use of β_2- agonists, short-acting to (5,8 ± 0.7) inhalations per day, the average asthma – account (10,9 ± 0,8) points for the week.

Dynamics of clinical manifestations in patients with asthma group II (patients who had growth of pathogenic microorganisms in the VAR (*Staphylococcus aureus, Candida albicans*, gram negative bacteria, microorganisms association) before treatment and after 3 months of treatment is presented in Table. 3.

Table 3 shows that in the second group of patients with impaired upper airway microbiota in 3 months. basic therapy observed a significant reduction in nighttime awakenings due to asthma symptoms and daily symptom to (1,3 ± 0,1) and points to (1,6 ± 0,1) points, respectively, but morning stiffness remained at the same level – (1, 0 ± 0,1), shortness of breath and cough unreliable decreased to (2,9 ± 0,3) and (1,8 ± 0,2) , respectively. Common asthma account and use of β_2- agonists, short-acting also significantly decreased to (8,6 ± 0,7) and (4,3 ± 0,6), respectively. Thus, in patients with impaired microbiota VMD (Group II) asthma control after 3 months. partially achieved . Of the 102 patients obtained complete control in 27 individuals (26,5 %), incomplete control was achieved in 66 patients (64,7 %), uncontrolled course – in 9 patients (8,8 %). Within 3 months observation in 5 (4,9 %) patients of the first group II were exacerbation of asthma.

According to the diary of introspection and clinical examination of patients during treatment after 3 months observation of 120 patients with asthma under complete control of 44 persons (36,7 %) (no daytime and nocturnal symptoms, activity limitations, the need for urgent preparations 1–2 times

Table 4

Distribution of UPM localization in the upper airways of patients with persistent asthma in remission stage (M ± m)

Localization of UPM	Patients with partially controlled asthma (n = 76)		Patients with controlled asthma (n = 44)	
	Abs	%	Abs	%
Nasal cavity	43	56,6 ± 1,2	4	9,09 ± 0,4
Pharynx	39	51,3 ± 1,4	3	13,63 ± 0,5
Sputum	32	42,1 ± 1,2	–	–

Table 5

The nature of the flora of the nasal cavity in patients with partly controlled asthma in remission (M ± m)

Cultured organisms	Number of patients with asthma (n = 76)		Healthy donors (n = 25)
	Abs	%	%
Candida spp.	1	1,3 ± 0,1	4,2 ± 0,4
Staphylococcus aureus	33	43,4 ± 2,1#	20,2 ± 1,1
Staphylococcus aureus and Candida spp.	5	6,6 ± 0,5#	0 ± 0,0
Gram-negative microflora	2	2,6 ± 0,2#	0 ± 0,0
G(-) microflora, *S. aureus and Candida spp.*	2	2,6 ± 0,2#	0 ± 0,0
Staphylococcus epidermidis	33	43,4 ± 2,4#	76,1 ± 3,1

Note: # – statistically significant difference compared with the group of healthy ($p < 0,05$).

per week) in 76 patients (63,3 %) control asthma – partial or inadequate (daytime symptoms 3–5 times a week and more than 1 time per week nocturnal symptoms, activity limitations sometimes, the need for emergency treatment 3-4 times a week). During the survey it was found as follows: in patients with complete control of asthma normal microflora in the upper airways vysivalasya in 38 (86,4 %) patients (in the nasal cavity and throat, phlegm in none of them stood out), the other 6 patients (13,6 %) received conditionally pathogenic flora of the nasal cavity and throat. In general, patients in this group of specimens was not provided . In the second group of partly controlled asthma in the number of 76 persons (63,3 %) in the survey found colonizing pathogenic microflora (UPM) upper respiratory tract, including the nasal cavity in UPM occurred in 43 patients (56,6 %) in the throat – 39 (51,3 %) patients and sputum – in 32 (42.1 %) patients. More detailed information is presented in Table 4.

Of the 76 patients with 2nd group, 33 (43,4 %) patients had nasal cavity in normal microflora – *Staphylococcus epidermidis*, other 43 (56,6 %) – opportunistic, which in most cases was found colonies *Staphylococcus aureus* – 76,7 %, the percentage of *Candida spp.* associations and 16,2 %, Gram-negative bacteria: *Haemophilus influenzae, Klebsielleae spp., Citrobacter spp.* – 9,3 % (Table 5).

Thus, violation of nasal colonization resistance observed in a significant number of patients (56,6 %) with partially controlled asthma, manifested sowing pathogenic microflora. In 76,7 % of patients are present in the nasal cavity *Staphylococcus aureus*, isolates of *Candida spp.* associated with *Staphylococcus aureus* and gram-negative flora. Other 33 examined a group of partly controlled asthma had a nose normal flora (*Staphylococcus epidermidis*).

Patients 2nd group of partly controlled asthma , which was found opportunistic microorganisms localization sowing UPM as follows : only in the nasal cavity vysivalasya UPM in 17 (22,36 %) patients in the throat – 13 patients (17,10 %) in the sputum of 14 persons (18,42 %) in the nasal cavity and throat at the same time – 14 patients (18,42 %), pharynx and sputum 5 patients (6,57 %), nose and sputum examined 6 (7,8 %) and 8 patients (10,5 %), which was found in both UPM sputum, throat and nasal cavity. More detailed information is presented in Table 6.

An examination of patients with partial control of asthma (group II) in the throat in 39 individuals (51,3 %) of 76 was obtained growth of pathogenic microorganisms, other 37 (48,7 %) - normal flora. Among the UPM in the throat vysivalasya *Staphylococcus aureus* in 16 patients (21,1 %) isolates of *Candida spp.* examined in 6 (7,9 %), *Staphylococcus aureus*

Table 6

Distribution of pathogenic microflora localization detection in patients with bronchial asthma in remission stage (M ± m)

Localization of UPM	Patients with partially controlled asthma (n = 76)		Patients with controlled asthma (n = 44)	
	Abs	%	Abs	%
Nasal cavity	17	22,36 ± 1,1	3	6,8 ± 0,5
Pharynx	13	17,10 ± 1,0	2	4,5 ± 0,4
Sputum	14	18,42 ± 1,1	–	–
Nasal cavity and Pharynx	14	18,42 ± 1,1	1	2,3 ± 0,4
Pharynx and Sputum	5	6,57 ± 0,5	–	–
Nasal cavity and Sputum	5	6,57 ± 0,5	–	–
Nasal cavity, Pharynx and Sputum	8	10,5 ± 0,6	–	–

Table 7

The nature of the throat flora of patients with partly controlled asthma in remission (M ± m)

Cultured organisms	Number of patients with asthma (n = 76)		Healthy donors (n = 25)
	Abs	%	%
Candida spp.	6	7,9 ± 0,5#	4,3 ± 0,2
Staphylococcus aureus	16	21,1 ± 1,2#	16,2 ± 0,8
Staphylococcus aureus and Candida spp.	4	5,3 ± 0,2#	0 ± 0,0
Gram-negative microflora	9	11,8 ± 0,8#	2,1 ± 0,1
G(-) microflora, *S. aureus, Candida spp.*	1	1,3 ± 0,1#	0 ± 0,0
G(-) microflora and *S. aureus*	3	3,9 ± 0,2#	0 ± 0,0
Normal microflora	37	48,7 ± 2,5#	77,1 ± 3,2

Note: # – statistically significant difference compared with the group of healthy ($p < 0,05$).

association with *Candida spp.* and gram-negative flora in the other 17 (22,3 %). Overall, *Staphylococcus aureus* was found in 23 persons (30,3 %), *Candida spp.* – 11 patients, or 14,5 %, gram-negative flora – 13 patients (17,1 %). More detailed information is presented in Table 7.

Thus half of the patients with partial control of asthma in remission occurs quite intense colonization throat opportunistic flora that can maintain inflammation in the bronchi as foci of chronic infection in the body, and subsequently affect the amount of aggravation of asthma.

An examination of the patients of group II specimens were obtained in 32 (42,1 %) patients 76, the other 44 (57,9 %) specimens are not isolated. All 32 patients had an increase in sputum pathogenic microorganisms such as *Staphylococcus aureus* vysyvavsya in 14 (43,8 %) of these, *Candida spp.* – 19 (59,4 %) and Gram-negative – in 17 (53,1 %). Almost half of (46,9 % or 15) of patients in the sputum was found associations microbial growth (*Staphylococcus aureus, Candida spp.*, Gram negative flora). More detailed information is presented in Table 8.

Analyzing the data obtained during the examination of patients with asthma in the acute phase and remission should be noted. From 120 patients with asthma with sputum UPM presence there during exacerbation of asthma was found in 78 (65 %) patients in the phase of remission in 32 (26,7 %) patients.

Interesting was the microbiological composition of sputum during exacerbation and remission phase, the number of patients with *Candida spp.* in the phase of remission significantly decreased compared to the aggravation, due to the conduct of basic comprehensive treatment of asthma exacerbation (Table 8). The percentage of patients with the association of *Candida spp.* and *Staphylococcus aureus* also fell under the influence of anti-inflammatory therapy aggravation. As for *Staphylococcus aureus*, gram-negative flora and their associations, it should be noted a slight increase in the percentage of patients with the presence of these organisms in asthma remission. This fact can be explained by disorders of the immune system and local, which is caused by the depletion of specific mechanisms and immunosuppressive action of inhaled corticosteroids and antimicrobials, which is subsequently lost the effectiveness of infection control in the mucous membranes of the respiratory tract.

Table 8

Microbiological landscape sputum in patients with bronchial asthma with pathogenic microflora (M ± m)

Cultured organisms	Number of patients with asthma in remission stage (n = 32)		Number of patients with asthma in the acute phase (n = 78)	
	Abs	%	Abs	%
Candida spp.	6	18,8 ± 1,1#	31	39,7 ± 2,2
Staphylococcus aureus	5	15,6 ± 1,1#	9	11,5 ± 0,8
Staphylococcus aureus and Candida spp.	4	12,5 ± 0,8#	20	25,6 ± 1,2
Gram-negative microflora	6	18,8 ± 1,1#	7	8,9± 0,6
G(-) microflora, *S. aureus and Candida spp.*	3	9,3 ± 0,6#	2	2,5± 0,2
G(-) microflora and *S. aureus*	3	9,3 ± 0,6#	1	1,3± 0,1

Note: # – statistically significant difference compared with the group of healthy (p < 0,05).

Conclusions

As a result of this work found that even with basic patient care is not always possible to achieve total control of asthma. In 63,3 % of patients with asthma lack of control associated with persistence in the upper respiratory tract of potentially pathogenic microorganisms (*Staphylococcus aureus, Candida spp.*, Gram-negative flora and microbial associations), which supports continuous inflammation in the bronchi, creates conditions for frequent respiratory viral infections provoke an aggravation of the disease, and thus reduces the effect of basic treatment and control of asthma. Therefore, we should consider the possibility of a violation of the upper respiratory tract microbiota in patients with bronchial asthma in assessing the level of asthma control and to search for effective methods of correcting the balance microorganisms.

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ОСОБЕННОСТИ КЛИНИЧЕСКОГО ТЕЧЕНИЯ БРОНХИАЛЬНОЙ АСТМЫ У БОЛЬНЫХ С КОЛОНИЗАЦИЕЙ ВЕРХНИХ ДЫХАТЕЛЬНЫХ ПУТЕЙ УСЛОВНО-ПАТОГЕННОЙ МИКРОФЛОРОЙ

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Резюме

Цель исследования. *Изучить особенности клинического течения бронхиальной астмы (БА) у больных с колонизацией верхних дыхательных путей условно-патогенной микрофлорой.*

Материалы и методы. *В исследовании приняли участие 120 пациентов с БА средней степени тяжести, которых обследовали в период обострения и ремиссии. Всем пациентам проводилось клиническое обследование (анамнез, осмотр, оценка жалоб), оценка симптомов астмы по дневникам самонаблюдения за неделю, исследование функции внешнего дыхания (ФВД), микробиологическое исследование видового состава микробиоценоза верхних дыхательных путей. Статистическую обработку полученных данных проводили с помощью пакета Microsoft Office Professional 2000.*

Результаты. *У больных БА с колонизацией верхних дыхательных путей условно-патогенной микрофлорой контроль астмы (по дневникам самонаблюдения, данным пикфлоуметрии и ФВД) через 3 месяца базисной терапии получен только у 26,5 % пациентов, неполный контроль – у 64,7 %, неконтролируемое течение астмы наблюдалось у 8,8 % человек. В группе больных БА без нарушений микробиоценоза верхних дыхательных путей статистически достоверно достигнут полный контроль БА у 94,4 % пациентов. В течение 3 месяцев базисной терапии у пациентов I группы (с нормальной микрофлорой) не было ни одного обострения заболевания, во II группе больных БА (с наличием условно-патогенной микрофлоры) напротив – обострение астмы произошло у 5 (4,9 %) человек и у 2 пациентов обострение БА привело к госпитализации.*

Выводы. *В результате исследования особенностей клинического течения БА у больных с колонизацией дыхательных путей условно-патогенной микрофлорой доказано, что недостаточный контроль астмы у 63,3 % пациентов связан с персистенцией потенциально патогенных микроорганизмов (Staphylococcus aureus, Candida spp.,*

грам-отрицательная флора и микробные ассоциации) на слизистой оболочке верхних дыхательных путей. Нарушенный баланс микрофлоры дыхательных путей поддерживает в бронхах воспалительный процесс, что проявляется наличием симптомов астмы, повышенной потребностью в использовании короткодействующих ингаляторов, склонностью к респираторным вирусным инфекциям и частыми обострениями заболевания. Учитывая полученные результаты, у пациентов с БА необходимо проводить коррекцию нарушений микробиоценоза верхних дыхательных путей.

Ключевые слова: *бронхиальная астма, условно-патогенная микрофлора, микробиоценоз.*

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CLINICAL FEATURES OF ASTHMA IN PATIENTS WITH PATHOGENIC MICROFLORA COLONIZATION OF THE UPPER RESPIRATORY TRACT

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Summary

The aim. *Explore the clinical features of asthma in patients with colonization of the upper respiratory tract with pathogenic microflora.*

Materials and methods. *The study involved 120 patients with bronchial asthma (BA) of moderate severity, which were examined in the period of exacerbation and remission. All patients underwent clinical examination (history, physical examination, evaluation of complaints), assessment of asthma symptoms according to weekly diary of self-observation, a study of respiratory function, microbiological study of the species composition of the upper respiratory tract microbiocenosis. Statistical analysis of data was held using the package Microsoft Office Professional 2000.*

Results. *After 3 months of basic therapy only 26,5 % of BA patients with pathogenic microflora upper respiratory tract colonization received asthma control (according to weekly diary of self-observation, peak flow data and ERF), partial control – in 64,7 %, uncontrolled asthma was observed in 8,8 % of them. In the group of patients with asthma without violations microbiocenosis of upper airways 94,4 % of patients achieved full control of asthma symptoms. Within 3 months of basic therapy in patients of the I group (normal microflora), there was no exacerbation, in the II group of patients with asthma (with the presence of pathogenic microflora) on the contrary – exacerbation of asthma occurred in 5 patients (4,9 %) and in 2 cases the exacerbation of asthma has led to hospitalization.*

Conclusions. *The study of the clinical course of asthma in patients with pathogenic microflora respiratory tract colonization proved that inadequate control of asthma in 63,3 % of patients is associated with the persistence of potential pathogens (Staphylococcus aureus, Candida spp., Gram-negative flora and microbial associations) in the mucosa of the upper respiratory tract. Impaired balance of microflora supports bronchial inflammation, which is manifested by the presence of asthma symptoms, increased demand for the use of short-range inhalers, a tendency to respiratory viral infections and frequent exacerbations of the BA. Given these results, it is necessary to carry out the correction of microbiocenosis upper respiratory tractviolations in asthma patients.*

Key words: *asthma, conditionally pathogenic microflora, microbiocenosis.*

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