

Assessment of the Severity of Chronic Obstructive Pulmonary Disease in Combination with Bronchial Asthma

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Annotation: To date, respiratory diseases represent not only a medical but also a socio-economic problem, which is the most widespread according to the World Health Organisation, ‘the number of people suffering from bronchial asthma (BA) is 300 million, and chronic obstructive pulmonary disease (COPD) is the fourth leading cause of death’. In clinical practice, patients with characteristic symptoms of both nosological forms are often encountered, which leads to certain difficulties in diagnosis and treatment. Despite the similarity of symptoms, these diseases differ from the histological point of view, are characterised by different physiological disorders and differ in their clinical manifestations. Nowadays the main task of specialists is to slow down the progression of BA and COPD and their combination, taking into account the peculiarities of pathogenetic pathways of diseases, to improve the quality of life of patients and to prevent the development of complications.

Key words: Bronchial asthma, chronic obstructive pulmonary disease, induced sputum, picflowmetry, pulse oximetry, spirometry.

Relevance. To date, respiratory diseases represent not only a medical but also a socio-economic problem, which is the most widespread according to the World Health Organisation, ‘the number of people suffering from bronchial asthma (BA) is 300 million, and chronic obstructive pulmonary disease (COPD) is the fourth leading cause of death’. In clinical practice, patients with characteristic symptoms of both nosological forms are often encountered, which leads to certain difficulties in diagnosis and treatment. Despite the similarity of symptoms, these diseases differ from the histological point of view, are characterised by different physiological disorders and differ in their clinical manifestations. At present, the main task of specialists is to slow down the progression of AD and COPD and their combination, taking into account the peculiarities of pathogenetic pathways of diseases, to improve the quality of life of patients and prevent the development of complications.

Despite the study of the mechanisms of bronchial asthma and COPD development in the world, a number of scientific studies are conducted to analyse the pathogenetic mechanisms in the principles of prevention and treatment, measures to prevent the disease and create a fundamental basis for early diagnosis. The diseases are progressive in course, with clear systemic manifestations, especially in severe and extremely severe forms, despite differences in etiology, pathophysiology and clinical manifestations, which is explained by the presence of symptoms of COPD and bronchial asthma in 10-20% of cases. In AD and COPD, the assessment of endothelial state, immunological status, functional state of the respiratory system and functional lung reserve is of particular importance.

In our country a number of tasks have been set for the development of the medical industry, adaptation of medicine to the requirements of world standards, development of diagnostics, prevention and treatment of various somatic diseases. ‘Improving the efficiency, quality and accessibility of medical care, as well as the introduction of high-tech methods, support for healthy lifestyles and disease prevention...’. These objectives serve to reduce the level of disability among the population as a result of prognosis by assessing the age and recovery of patients with AD and COPD, assessing the immunological status, functional state of the respiratory system and functional reserves of the lungs.

Purpose of the study. To determine the degree of ventilation impairment in patients with chronic obstructive pulmonary disease combined with bronchial asthma.

Materials and methods of the study. The object of the study was 101 patients diagnosed with bronchial asthma and chronic obstructive pulmonary disease in the department of second therapy of Samarkand city medical association in 2020-2023 and 20 relatively healthy people of the control group.

General clinical examination contained the following parameters: clinical examination of patients, collection of anamnesis, assessment of disease severity, general blood analysis with percentage and absolute values of neutrophils, eosinophils, examination of general condition, analysis of induced sputum (IS), examination of external respiratory function (ERF), assessment of bronchial permeability.

The study was performed in several stages. At the first stage, all patients underwent initial complex anamnestic, clinical, laboratory and instrumental investigation, which included:

1. general clinical examination:
2. patient interview:
 - a) St George's Hospital questionnaire
 - b) SAT test
 - c) AST test
3. Instrumental examination (pneumometry, pulse oximetry, spirometry).

RESULTS: Saturation, forced expiratory volume and peak expiratory flow rate among patients with AD, COPD and their combination.

All patients before and after treatment were prescribed such instrumental studies as pulse oximetry, spirometry, and peak flowmetry. The obtained data were compared between 3 groups of patients, where it was clearly seen that patients with AD and COPD had statistically insignificant differences between them, but it was noted that saturation among AD patients was relatively high in comparison with AD+COPD patients.

When comparing saturation indices among patients with BA and BA+COPD, as well as COPD and BA+COPD, statistically significant difference in indices was revealed ($P<0.05$; $P<0.01$), in particular, among patients with extremely severe COPD and BA+COPD the difference was equal to $3.9\pm 0.2\%$, and the difference in saturation between patients with severe BA and BA+COPD was $4.7\pm 0.3\%$.

During further examination, all patients were subjected to pneumometry, for this purpose the patient after the maximum possible deep inhalation performs at once (without breath hold at the peak of inhalation) a sharp exhalation into the pneumometer. The measurement was repeated 3-5 times, the result was considered to be the highest obtained PSV value in l/min. The difference between the results of the next measurements should not exceed 40 ml/min. Daily variability of PSV was calculated by dividing between the maximum (PSVmax) and minimum (PSVmin) values.

$(PSV_{max} - PSV_{min}) / PSV_{max} \times 100 \%$ or

$(SSV_{max} - SSV_{min}) / (SSV_{max} + SSV_{min}) / 2 \times 100 \%$.

The average value for the period of 1-2 weeks was taken as the final result.

Patients with AD and AD+COPD had high values of PSV, and there was a statistically significant difference in the values ($P<0.01$), which requires timely correction of this condition.

Further, all patients were subjected to spirometry in the morning on an empty stomach, and such indices as LEF%, PEF1%, MOS%, MOS75%, MOS50%, MOS25% were determined (Table 1.).

Table 1. Spirography indices among AD patients

Severity of AD	LEF, %	OFV1, %	MOS25%, %	MOS50%, %	MOS70%, %
Intermittent	68,8±3,1	69,2±3,0	52,8±2,3	42,6±1,8	41,6±1,6
Mild persistent	62,6±2,7	63,8±2,4	44,3±2,0	32,6±1,5	28,5±1,4
Moderate persistent	55,5±2,1	58,0±2,8	31,5±1,4	21,7±1,0	17,2±0,8
Severe	50,2±2,2	53,0±2,3	27,4±1,1	12,7±0,6	9,7±0,5

Table 2. Spirographic parameters among COPD patients

COPD severity	LEF, %	OFV1, %	MOS25%, %	MOS50%, %	MOS70%, %
Mild	61,5±2,8	58,2±2,1	44,1±1,9	28,7±1,3	25,5±1,2
Medium	53,2±2,3	51,2±1,9	29,1±1,3	20,5±1,1	16,2±0,7
Severe	48,5±2,0	42,3±1,7	24,1±1,0	15,1±0,7	10,2±0,6

Table 3. Spirographic parameters among patients with AD+COPD

Severity of AD+COPD	LEF, %	OFV1, %	MOS25%, %	MOS50%, %	MOS70%, %
Intermittent	64,5±2,8	65,3±2,7	48,2±2,3	35,1±1,7	37,5±1,8
Mild persistent	57,3±2,4	59,2±3,1	35,3±1,6	25,2±1,2	21,2±1,0
Moderate persistent	48,1±2,4	50,1±2,4	29,4±1,2	18,7±0,9	12,9±0,6
Severe	38,7±1,8	39,0±1,7	24,1±1,0	13,2±0,6	8,5±0,4

Then all the above studied parameters among patients of 3 groups were compared with each other (P1, P2, P3) (Table 1.2.3.).

Thus, during the study of spirometry among patients with AD it was revealed that among patients with moderately severe course of BA it was reduced to 55.5%, while among patients with intermittent BA this index was equal to 53.2% (Table 4.).), besides, the indices OFV1, MOS25%, MOS50% and MOS75% were also reduced, but when comparing these indices among COPD and BA+COPD patients, the above-mentioned indices were significantly reduced, in particular, among the patients with comorbid course of AD+COPD patients with moderately severe course of AD+COPD, LEF was equal to 48,1 (Table 3), PEF1 45,1, MOS25% 25,1, MOS50% 17,2, MOS75% 14,5% (Table 4).

Table 4. Comparative characteristics of spirometric parameters in patients of the compared groups

BA severity	BA	COPD	COPD + BA	P1	P2	P3
LEF	55,5±2,1	53,2±2,3	48,1±2,4	>0,5	<0,05	>0,5
PEF1	58,0±2,8	51,2±1,9	45,1±2,1	<0,05	<0,01	>0,5
MOS25%	44,3±2,0	31,2±1,4	25,1±1,0	<0,001	<0,001	<0,05
MOS50%	32,6±1,5	20,5±1,1	17,2±0,8	<0,001	<0,001	<0,05
MOS75%	28,5±1,4	16,2±0,7	14,5±0,5	<0,001	<0,001	>0,5

Note: P - reliability of differences between the compared groups, P1 - reliability of differences between BA and COPD, P2 - reliability of differences between BA and BA+COPD, P3 - reliability of differences between COPD and COPD+BA.

Conclusion. Thus, our study revealed that the high-risk group was patients who had co-morbidities, as saturation indices among patients with severe BA+COPD were 70.8±14.16, whereas patients with BA and COPD had 74.8±14.9; 73.8±14.7, respectively. Indices of LEF%, SPF1%, MOS%, MOS75%, MOS50%, MOS 25% also among this category of patients was more disturbed, than among patients with AD and COPD, and also as it was already said the indices of cellular composition of induced sputum was significantly disturbed, that confirms the studied literature sources.

The study of spirographic indices showed that the indices of LEF, PEF1, MOS75% were more in patients with BA in comparison with BA+COPD by 7,4 and 12,9 respectively, the indices of MOS25%, MOS50% were significantly more in patients with isolated course of BA and COPD in comparison with combined course, which requires early diagnosis and treatment of this category of patients.

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