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CLINICAL AND FUNCTIONAL FEATURES OF THE CROSS-OF BRONCHIAL ASTHMA AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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✓ ***Resume***

Asthma and chronic obstructive pulmonary disease (COPD) are serious public health problems and are the leading cause of morbidity and mortality worldwide. Objective: to study the clinical and functional parameters in patients with overlapping bronchial asthma and COPD in comparison with patients with bronchial asthma or chronic obstructive pulmonary disease. Materials and research methods: To carry out this work in the period from 2020-2021, 159 patients with chronic diseases of the lower respiratory tract (BA, COPD, ACO) were examined. Results and conclusions: Our studies allowed us to draw the following conclusions: patients with overlapping BA and COPD were characterized by an earlier onset of the disease and, accordingly, a longer duration of the disease itself; to a greater extent, professional hazards and tobacco smoking were identified; the predominance of an infectious dependent component; in the analysis of sputum for ACO, the eosinophilic nature of inflammation was more characteristic, as well as leukocytosis with neutrophilic inflammation in the blood test; diseases of the gastrointestinal tract were more pronounced among the comorbidities in the ACO group; Complications of the underlying disease for the group with ACO were characterized by the formation of cor pulmonale and respiratory failure.

Key words: bronchial asthma, chronic obstructive pulmonary disease, bronchial asthma chronic obstructive pulmonary disease overlap

КЛИНИКО-ФУНКЦИОНАЛЬНЫЕ ОСОБЕННОСТИ ПЕРЕКРЕСТА БРОНХИАЛЬНОЙ АСТМЫ И ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЕГКИХ

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✓ ***Резюме***

Астма и хроническая обструктивная болезнь легких (ХОБЛ) являются серьезной проблемой общественного здравоохранения и представляют собой ведущую причину заболеваемости и смертности во всем мире. Цель исследования: изучить клинико-функциональные параметры у больных с перекрестом бронхиальной астмы и ХОБЛ по сравнению с пациентами, страдающими бронхиальной астмой или хронической обструктивной болезнью легких. Материалы и методы исследования: Для выполнения настоящей работы в период с 2020-2021 гг были обследованы 159 больных с хроническими заболеваниями нижних дыхательных путей (БА, ХОБЛ, ПБАХ). Результаты и выводы: Проведенные нами исследования позволили сделать следующие выводы: для пациентов с перекрестом БА и ХОБЛ был характерным более ранний дебют заболевания и, соответственно, большая длительность самого заболевания; в большей степени были выявлены профессиональные вредности и табакокурение; преобладание инфекционного зависимого компонента; в анализе мокроты для ПБАХ был более характерен эозинофильный характер воспаления, также как лейкоцитоз с нейтрофильным воспалением в анализе крови; заболевания желудочно-кишечного тракта были более выражены среди сопутствующей патологии в группе ПБАХ; осложнениями основного заболевания для группы с ПБАХ были характерны формирование легочного сердца и дыхательная недостаточность.

Ключевые слова: Бронхиальная астма, хроническая обструктивная болезнь легких, перекрест бронхиальной астмы и хронической обструктивной болезни легких.

BRONXIAL ASTMA VA SURUNKALI OBSTRUKTIV O‘PKA KASALLIGINING KESIShMASIDA KLINIK-FUNKSIONAL XUSUSIYATLAR

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✓ ***Rezyume***

Astma va surunkali obstruktiv o'pka kasalligi (O'SOQ) sog'liqni saqlashning jiddiy muammolari bo'lib, dunyo bo'ylab kasallanish va o'limning asosiy sababchisi hisoblanadi. Maqsad: bronxial astma va surunkali obstruktiv o'pka kasalligi bilan taqqoslaganda bronxial astma va O'SOQ kasalligi bo'lgan bemorlarning clinic va funktsional parametrlarini o'rganish. Materiallar va tadqiqot usullari: Ushbu ishni bajarish uchun 2020-2021 yillarda pastki nafas yo'llarining surunkali kasalliklari (BA, O'SOQ, BAO'Q) bilan kasallangan 159 bemor tekshirildi. Natija va xulosalar: Bizning tadqiqotlarimiz quyidagi xulosalarni chiqarishga imkon berdi: B.A. ko' proq darajada kasbiy zararlar va tamaki chekish aniqlandi; yuqumli qaram tarkibiy qismining ustunligi; BAO'Q uchun balg'amni tahlil qilishda yallig'lanishning eozinofil tabiati, shuningdek qon testida neytrofilik yallig'lanish bilan leykotsitoz ko'proq xarakterli edi; oshqozon-ichak trakti kasalliklari BAO'Q guruhidagi qo'shma kasalliklar orasida ko'proq aniqlandi; BAO'Q bo'lgan guruh uchun asosiy kasallikning asoratlari kor pulmonale shakllanishi va nafas olish etishmovchiligi bilan tavsiflangan. oshqozon-ichak trakti kasalliklari BAO'Q guruhidagi qo'shma kasalliklar orasida ko'proq aniqlandi; BAO'Q bo'lgan guruh uchun asosiy kasallikning asoratlari kor pulmonale shakllanishi va nafas olish etishmovchiligi bilan tavsiflangan. oshqozon-ichak trakti kasalliklari BAO'Q guruhidagi qo'shma kasalliklar orasida ko'proq aniqlandi; BAO'Q bo'lgan guruh uchun asosiy kasallikning asoratlari kor pulmonale shakllanishi va nafas olish etishmovchiligi bilan tavsiflangan.

Kalit so'zlar: bronxial astma, o’pka surunkali obstruktiv kasalligi, bronxial astma, o’pka surunkali obstruktiv kasalligi kesishmasi

Relevance

Due to the significant prevalence of chronic nonspecific lung diseases and the high level of disability, one of the most important tasks of healthcare is the prevention and effective diagnosis, as well as the treatment of patients withchronic diseases of the lower respiratory tract. Asthma and chronic obstructive pulmonary disease (COPD) are a major public health problem and are the leading cause of morbidity and mortality worldwide [1,2.7]. Asthma and COPD are the most common chronic respiratory diseases, each with a specific pathophysiology [1,11,12,20]. Usually, asthma is characterized by chronic inflammation of the airways with reversible symptoms, while COPD is characterized by persistent respiratory changes in the bronchopulmonary system [3,4,15,18]. However, patients can sometimes have clinical features of both diseases, and this condition is called asthma-COPD overlap (ACO), recommended by the joint guidelines of GINA (Global Strategy for the Management and Prevention of Asthma) and GOLD (Global Initiative on Chronic Obstructive Pulmonary Disease). According to this guide, ACO is characterized by "permanent airflow limitation with some features of asthma and COPD."

Due to the significant impact on health and reduced quality of life of the population, data on the incidence of overlap of asthma and chronic obstructive pulmonary disease are of critical importance for the strategic plan and health policy.

The significance of the ACO phenotype and the need for its further study are beyond doubt, since this pathology significantly reduces the quality of life of patients, being a serious medical and social problem. Most previous studies have shown that patients with ACO have more severe respiratory symptoms, frequent exacerbations, poor quality of life, high mortality, increased use of healthcare resources, and a higher prevalence of comorbidities than patients with isolated asthma or COPD [5,13,17,19]. That is why the study of clinical and laboratory parameters is a promising way of development in the field of innovative methods for diagnosing and treating the combination of BA and COPD. It is important to emphasize that only dynamic clinical and functional monitoring of patients makes it possible to make a correct diagnosis.

Purpose of the study:to study clinical and functional parameters in patients with bronchial asthma overlap COPD compared with patients suffering from bronchial asthma or chronic obstructive pulmonary disease.

Material and methods

To carry out this research work, 159 patients were examined in the period from 2020-2021with chronic diseases of the lower respiratory tract. Clinical material was collected in the Bukhara Regional Multidisciplinary Medical Center, in the 3rd city hospital of the Mirabad district of the city of Tashkent and in the private clinic "Poytaxt med diagnostika".

The diagnoses were verified on the basis of a thorough medical history, clinical, laboratory (complete blood count, urine), biochemical blood tests, bacteriological examination of sputum, instrumental (chest x-ray, electrocardiography, spirography, peak fluometry) methods.

The following groups were formed to conduct clinical and laboratory studies:

- Group 1 - 67 patients diagnosed with bronchial asthma
- Group 2 - 67 patients diagnosed with chronic obstructive pulmonary disease
- 3rd group - 30 patients who had an overlap of bronchial asthma and chronic obstructive pulmonary disease (COPD)

Result and discussion

The average age of patients with bronchial asthma was 56.8 ± 9.94, patients with COPD - 60.3 ± 8.19, patients with ACO - 57.4 ± 8.48.

Age at the time of examination in patients with a combination of BA and COPD did not reveal significant differences.

Gender analysis revealed that women predominated in the BA and ACO groups, while there were more men in the COPD group. Perhaps this is due to the greater susceptibility to smoking in men.

First of all, the onset of the disease was observed in bronchial asthma at a young age (22.8 ± 8.86).

Isolated COPD was characterized by a shorter duration (15.2 ± 9.2) of the disease compared to ACO (18.8 ± 4.3) and bronchial asthma (34.1 ± 10.1).

When analyzing the clinical and pathogenetic variants of BA, the infectious type was observed in 12.7% (7) of patients, the allergic type in 73.2% (45). At the intersection of BA with COPD, 61.3% (18) of patients had a non-allergic type and 30 patients had an infection-dependent type of bronchial asthma.

A burdened allergic history was detected in 37.6% of patients with ACO and in all patients with isolated BA, while there were no signs of atopy in patients with COPD.

The main complaints of patients with the studied pathology were cough, of a different nature in 100% (159)

Shortness of breath was detected on average - in 69.9% (111), but was more observed in the group with ACO; signs of intoxication (pallor, cyanosis of the nasolabial triangle, weakness, sweating, loss of appetite) were observed to a greater extent in ACO, as well as pain in the chest.

Recent studies indicate that obesity is a greater cause of disease than smoking and alcoholism. The main sign of obesity is the accumulation of adipose tissue in the body - body mass index (BMI). BMI is not only a diagnostic criterion for obesity, but also an indicator of the relative risk of developing diseases associated with obesity, in particular asthma and COPD. In this connection, we studied anthropometric parameters. When comparing the average indicators of anthropometric data, no static significant differences between the groups were found.

But when studying BMI in each group separately, the following was revealed; in the bronchial asthma group, patients with obesity prevailed 40.3% (25), while patients with normal and overweight were 22.6% (14) and 37.1% (23), respectively. In the COPD group, patients with normal body weight 67.2% (45) prevailed, overweight and obesity were 25.3% (17) and 7.5% (5), respectively. In the ACO group, overweight patients accounted for 43.3% (13), normal weight 20% (6) and obese 36.7% (11).

When analyzing functional research methods, percussion in patients with BA revealed a shortening of the sound in 87.1%, a box sound in 45.2% of patients. In the COPD group, shortening of the sound was observed in 62.7%, and boxed sound in 50.7%. In the ACO group, shortening of the sound and a box sound were in 60.0% and 83.3%, respectively. (Table. 1.)

Table 1.

Functional research methods in examined patients

Examination methods	BA (n=62)		COPD (n=67)		ACO (n=30)	
	n	%	n	%	n	%
Percussion:						
shortening	54	87.1	42	62.7	18	60.0
box shade	28	45.2	34	50.7	25	83.3
Auscultation:						
hard breathing	53	85.5	40	59.7	27	90.0
weakened breathing	33	53.2	28	41.8	19	63.3

On auscultation, rough breathing predominates in the BA/COPD overlap group, as does weak breathing.

When assessing the severity of the disease in patients with overlapping bronchial asthma and COPD, the average severity of the disease prevailed. In the group of patients with ACO, there were more exacerbations and hospitalizations in the last year. (Table 2)

Table 2.

The severity of the underlying disease in patients with asthma, COPD and ACO

Index		Diagnosis		
		BA n=62	COPD n=67	ACO n=30
Asthma severity	Light	30.4% (19)	10.5%	0% (0)
	Medium	37.1% (23)	37.9%	83.3% (25)
	heavy	32.2% (20)	51.6%	16.7% (5)
Exacerbations in the last year		3 (2;4)	1 (1;2)	4 (1;6)
Hospitalization in the last year		2 (1;3)	2 (1;3)	1 (1;2)

The analysis of somatic diseases revealed that in patients with COPD and ACO, hypertension was more common (92.4% and 80.3%, respectively). History of coronary heart disease in the group of patients with COPD was in 65.3%, which is significantly higher than in the group of bronchial asthma and ACO (32.5% and 38.6%). Diseases of the gastrointestinal tract (GERD, chronic gastritis, gastric ulcer and diseases of the hepatobiliary system) were detected in 70.4% of patients with ACO, which is significantly more common than in the group with isolated COPD (64.3%) and BA (20, 6%). The incidence of ENT diseases (allergic rhinitis, chronic tonsillitis and sinusitis) was higher in the isolated BA group (61.8%), which may be due to the presence of an allergic component in this group. Endocrine diseases were detected more in the COPD group, common in the ACO group.

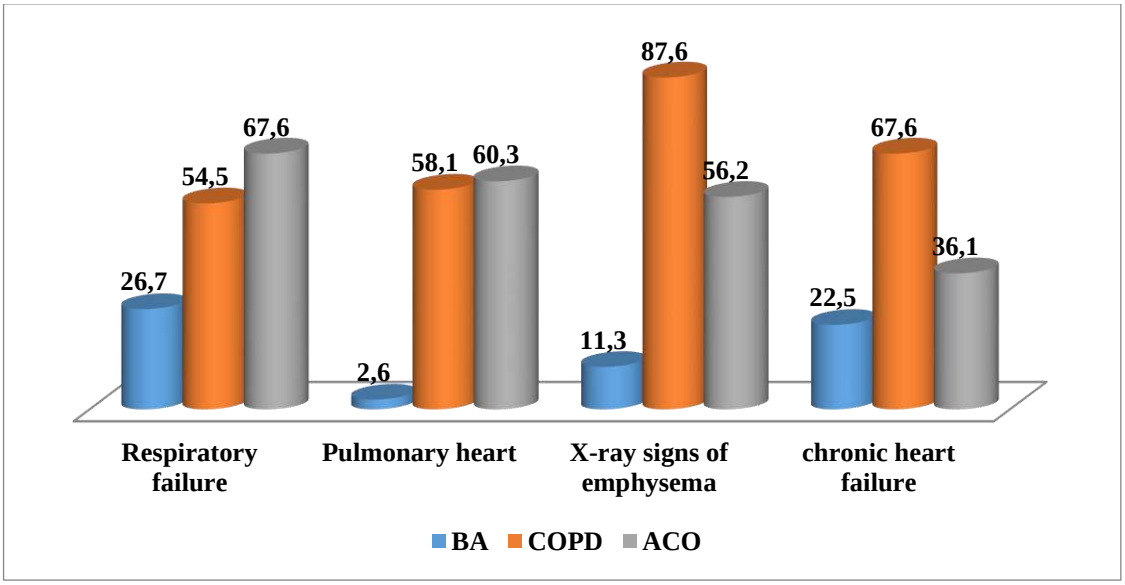
Important among the risk factors for the development of chronic bronchopulmonary pathology is contact with dust, various paints and varnishes and abrasive materials, inhalation of pesticides and fuels and lubricants. Among the patients examined by us, occupational hazards in history prevailed in the group with ACO and COPD. Tobacco smoking is also one of the main risk factors for the development of ACO. Most of the patients examined by us, especially in the group with ACO (79.6%) and COPD (85.9%), had a long history of smoking. Among patients with AD, only three patients had smoking experience, and less than 1 pack/year (Table 3).

Among the complications in the group of those examined with ACO, the percentage of cor pulmonale was higher than in the group with COPD (58.1%) and BA (2.6%), respectively. Respiratory failure of I and II degree was observed in 67.6% of patients with ACO, which was significantly higher than in the compared groups with COPD (54.5%) and BA (26.7%). Signs of chronic heart failure were more typical for patients in the COPD group (67.6%), as well as emphysema (87.6%). (Pic. 1.)

Table 3

Concomitant pathology in patients with asthma, COPD and ACO

Index		Diagnosis		
		BA	COPD	ACO
GD	№	21.2	7.6	19.7
	I.	12.6	10.2	3.8
	II.	20.3	27.6	43.4
	III.	5.9	54.6	33.1
Cardiac ischemia		32.5	65.3	38.6
Diseases of the digestive tract		20.6	64.3	73.4
Diseases of the ENT organs		61.8	35.6	49.4
Anemia		2.1	27.6	6.2
Endocrine diseases		12.6	27.6	6.4
Occupational hazards		8.7	13.1	11.4
Tobacco smoking		8.2	79.6	85.9
Smoker index, pack years		0.3 (0.0;0.3)	56.0 (45.0; 85.0)	37.0 (20.0; 47.0)



Pic. 1. Complications of the underlying disease in the examined patients

Analysis of laboratory data revealed changes in the level of leukocytes (neutrophils, eosinophils, monocytes) in peripheral blood. Severe leukocytosis was observed in patients with COPD 67.6% (45) than in the group with ACO 56.2% (17), and leukocytes were normal in the BA group. There were no statistically significant differences in the level of eosinophils. The erythrocyte sedimentation rate was statistically higher in the group of patients with COPD, which is 2.35 times higher than in patients with ACO and 9 times higher than in isolated BA.

CRP and fibrinogen levels were higher in the COPD group.

To study the role of innate immunity parameters in the development of ACO, we studied acute phase proteins.

The main function of the acute phase protein system is the excretion (elimination) of foreign cells and the regulation of the immune response.

One of them is C-reactive protein (CRP) - an acute phase protein related to non-specific protective factors produced by liver cells.

In the group of patients with BA, the level of CRP reached an average of 12.4 ± 0.7 mg/l, which is 1.63 times higher than the values of the group with COPD, 1.16 times higher than the group with ACO and 3 times higher than the values of the control group ($P<0.001$). In the group of patients with COPD, the level of CRP reached up to 7.6 ± 0.4 mg/l, which is 1.85 times higher than in the control group ($P<0.001$). The level of CRP in patients with ACO was 2.6 times higher than the control values in

(P<0.001).

In addition to CRP, complement components, APP also includes lactoferrin, the level of which is reduced in bronchopulmonary pathology, and a deeper deficiency was observed in patients with BA (365±12.2 ng/ml versus 445±9.8 ng/ml in control). (P<0.01).

. The level of lactoferrin in patients with COPD was significantly reduced compared with the data of the control group (P<0.05). In patients with ACO, the concentration of lactoferin was 1.2 times lower than the control values, averaging 372.4±24.3 ng/ml. The obtained results suggest that the reduced level of serum lactoferrin is due to the fact that it keeps neutrophils in the focus of inflammation, probably in connection with this, its content in the blood is reduced.

Hypovitaminosis D and excess accumulation of adipose tissue has a mutually negative effect, which results in the accumulation of inactive forms of vitamin D and a decrease in its bioavailability. Vitamin D in obesity has direct and indirect mechanisms of influence. BMI is not only a diagnostic criterion for obesity, but also an indicator of the relative risk of developing diseases associated with obesity, in particular asthma and COPD.

Since asthma and COPD overlap syndrome (ACO) is a controversial and multifaceted pathological process, the study of vitamin D concentration as one of the factors leading to the development of a vicious circle is relevant.

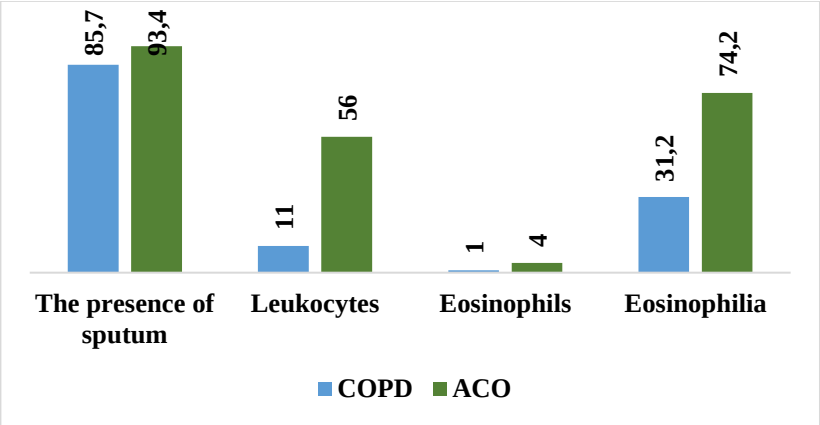
In all studied groups, obesity was observed in 41 patients, which is an additional risk of reducing the level of vitamin D, which in turn leads to aggravation of bronchopulmonary pathology. It was in these patients that the determination of the vitamin content in the blood serum was carried out.

Our data show that all obese and overweight patients are deficient in vitamin D, and its lowest level is observed in patients with overlapping asthma and COPD. Perhaps this is due to the long-term use of antibacterial, anti-inflammatory and glucocorticoid drugs, as well as the number of concomitant diseases, the duration of the process and the age of patients.

During the collection of anamnesis, 63 percent of the examined were found to be taking drugs containing vitamin D. But Unfortunately, most people find it difficult to reach the recommended levels of vitamin D intake, even if they consume a healthy and balanced diet, as rich food sources of vitamin D are rare.

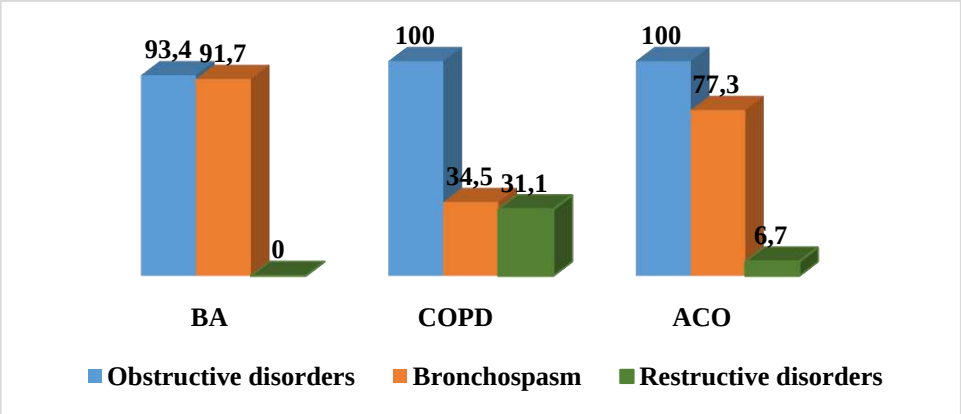
Thus, the above data indicate the need for long-term administration of vitamin D for patients with AD, COPD, and ACO.

Next, we performed sputum analysis in 57 patients with COPD and 28 patients with ACO, which revealed an increase in the number of leukocytes more in patients with ACO than in patients with COPD (56 ± 2.1 and 11 ± 1.4 cells per field of view, respectively). The eosinophilic nature of inflammation was more characteristic of ACO compared to the group of patients with COPD (74.2% and 31.2% of individuals, respectively). (Pic. 2.)



Pic. 2. Indicators of cytological examination of sputum in patients with COPD and ACO

Patients of all groups underwent an analysis of the function of external respiration (RF). Analysis of the conducted studies revealed the phenomenon of obstruction in all examined groups. Bronchospasm was observed in the BA group in 91.7%, in the ACO group - 77.3%, while for COPD it was observed in a smaller percentage (34.5%). There were no restructuring phenomena in the BA group, in 6.7% they were observed in the overlap of BA and COPD, and to a greater extent prevailed in the group of patients with COPD (31.1%). (Pic. 3.)



Pic. 3. Analysis of respiratory function in examined patients

Next, we analyzed the ECG data. In the BA group, signs of ischemia were registered in 19 (30.6%) patients, dystrophic changes in the myocardium in 37 (59.6%), arrhythmias in 10 (16.2%) and signs of left ventricular hypertrophy in 22 (35.5%) patients. (Table 4)

Table 4

ECG changes in patients with BA, COPD and ACO

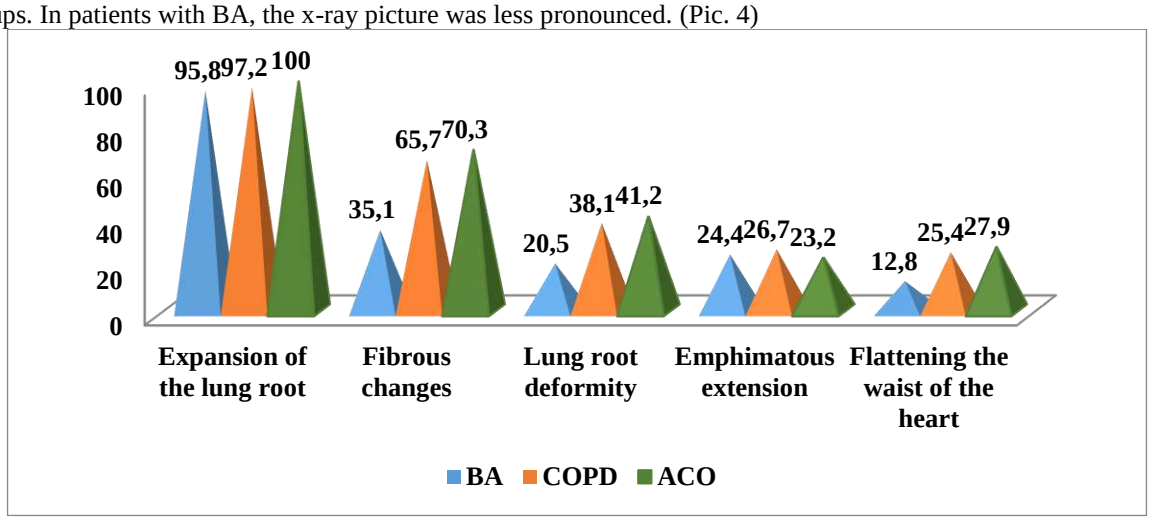
	Ischemia	DIM	Arrhythmias	LVH
BA	30.6% (19)	59.6% (37)	16.2% (10)	35.5% (22)
COPD	63.7% (42)	77.6% (52)	35.8% (24)	73.1% (49)
ACO	80.0% (24)	93.3% (28)	36.7% (11)	53.3 (16)

For patients with COPD, ischemia was characteristic in 42 (63.7%) patients, dystrophic changes in the myocardium in 52 (77.6%), arrhythmias - in 24 (35.8%) and signs of left ventricular hypertrophy in 49 (73.1%) patients.

In groups in addition to the overlap of BA and COPD, signs of ischemia were registered in 24 (80.0%) patients, dystrophic changes in the myocardium in 28 (93.3%), arrhythmias in 11 (36.7%) and signs of left ventricular hypertrophy in 16 (53 .3%) of patients.

The predominance of cardiac pathology among patients with COPD and ACO may be associated with a high percentage of smokers in this sample.

The picture of the lungs during X-ray examination of patients overestimated the severity of pathological changes. Analysis of the data obtained showed that 70.3% (41) had fibrotic changes in the lungs, 41.2% lung root deformity, 27.9% flattening of the heart waist, and 100% of the examined patients had lung root enlargement. Emphysematous lung expansion occurred more in the COPD group than in the other compared groups. In patients with BA, the x-ray picture was less pronounced. (Pic. 4)



Pic. 4. X-ray examinations of the examined

Conclusion

Thus, our studies allowed us to draw the following conclusions: for patients with overlapping BA and COPD, an earlier onset of the disease was characteristic and, accordingly, a longer duration of the disease itself; occupational hazards and tobacco smoking were revealed to a greater extent; the predominance of the infectious dependent component. In the analysis of sputum for ACO, the eosinophilic nature of inflammation was more characteristic, as well as leukocytosis with neutrophilic inflammation in the blood test. Vitamin D deficiency was more pronounced in this group. Diseases of the gastrointestinal tract were more pronounced among comorbidities in the ACO group. Among the complications of the underlying disease for ACO, the formation of cor pulmonale and respiratory failure is more characteristic.

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