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ASSESSMENT OF THE HYPOLIPIDEMIC EFFECT OF ANTIHYPERTENSIVE THERAPY IN PATIENTS WITH A COMBINATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ARTERIAL HYPERTENSION

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The urgency of the problem of chronic obstructive pulmonary disease, in addition to the increase in morbidity and mortality, is also due to comorbidity, in particular with arterial hypertension, which increases the risk of cardiovascular events. The state of lipid metabolism is of particular importance in this context. The aim of the study was to study the dynamics of lipid metabolism according to the results of antihypertensive therapy in patients with a combination of chronic obstructive pulmonary disease and arterial hypertension. 58 patients with chronic obstructive pulmonary disease and arterial hypertension were examined without gender differences. Arterial hypertension was recorded at blood pressure ≥140/90 mmHg. All patients had grade 2 hypertension. A triple combination of perindopril, indapamide and amlodipine, was prescribed as an antihypertensive drug in doses of 10+2.5+10 and 5+1.25+5 mg. Statins were not included in the treatment regimen for both obstructive pulmonary disease and arterial hypertension. Systolic and dystolic blood pressure, total cholesterol, triglycerides, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and very low-density lipoprotein cholesterol were determined. The results of the study showed the high effectiveness of antihypertensive therapy, regardless of the category of patients, as well as its pleiotropic effect in the form of positive dynamics of the atherogenic blood lipid fraction.

Key words: chronic obstructive pulmonary disease, hypertension, antihypertensive therapy, lipid metabolism, patients of category B, patients of category E.

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ОЦІНКА ГІПОЛІПІДЕМІЧНОГО ЕФЕКТУ АНТИГІПЕРТЕНЗИВНОЇ ТЕРАПІЇ У ХВОРИХ ІЗ ПОЄДНАННЯМ ХРОНІЧНОГО ОБСТРУКТИВНОГО ЗАХВОРЮВАННЯ ЛЕГЕНЬ ТА АРТЕРІАЛЬНОЇ ГІПЕРТЕНЗІЇ

Актуальність проблеми хронічного обструктивного захворювання легень, окрім зростання захворюваності та смертності, зумовлена також коморбідністю, зокрема з артеріальною гіпертензією, що підвищує ризик серцево-судинних подій. Особливе значення в цьому контексті має стан ліпідного обміну. Метою дослідження було вивчення динаміки показників ліпідного обміну за результатами антигіпертензивної терапії у хворих із поєднанням хронічного обструктивного захворювання легень та артеріальної гіпертензії. Без гендерної різниці було обстежено 58 хворих на хронічне обструктивне захворювання легень з артеріальною гіпертензією. Артеріальна гіпертензія реєструвалася при артеріальному тиску ≥140/90 мм рт. ст. У всіх пацієнтів було зареєстровано 2 ступінь артеріальної гіпертензії. В якості антигіпертензивного препарату призначали потрійну комбінацію периндоприлу, індапаміду та амлодипіну в дозах 10+2,5+10 та 5+1,25+5 мг. До схеми терапії як обструктивного захворювання легень, так і артеріальної гіпертензії статини не входили. Визначали систолічний та дистолічний артеріальний тиск, загальний холестерин, тригліцериди, холестерин ліпопротеїдів високої щільності, холестерин ліпопротеїдів низької щільності та холестерин ліпопротеїдів дуже низької щільності. Результати дослідження показали високу ефективність антигіпертензивної терапії незалежно від категорії хворих, а також її плейотропну дію у вигляді позитивної динаміки показників атерогенної фракції ліпідів крові.

Ключові слова: хронічне обструктивне захворювання легень, артеріальна гіпертензія, антигіпертензивна терапія, ліпідний обмін, пацієнти категорії В, пацієнти категорії Е.

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At the current stage of medical development, the problem associated with the presence of chronic obstructive pulmonary disease (COPD) and comorbid arterial hypertension (AH) is becoming increasingly relevant due to the increasing frequency of their occurrence [2, 11]. In this regard, mandatory examination of COPD patients for the presence of cardiovascular diseases (CVD) is recommended. The greatest interest is focused on studying the mechanisms contributing to the formation of cardiovascular pathology in patients with COPD in combination with AH, since in this case the highest degree of cardiovascular risk is noted [3]. To form a coherent strategy in this matter, it is necessary to study the process of formation of atherosclerotic lesions of the vascular wall underlying the development of cardiovascular pathology in patients with COPD. In this context, the main role belongs to the study of lipid metabolism in these patients.

In studies devoted to the study of this issue, it has been established that oxidative stress in COPD patients causes an increase in lipid metabolism, in addition, chronic hypoxia and inflammation also play a role in this issue [4, 13]. Currently, there is no consensus among experts on the relationship between lipid metabolism and COPD, as the Arora Sh. at al. study did not establish a link between COPD and blood lipids [6]. Therefore, the issue of studying the relationship of COPD with indicators of lipid metabolism remains relevant to this day, especially

with this comorbidity, which is very important from the point of view of forming proposals for the secondary prevention of cardiovascular pathology in this patient population.

The purpose of the study was to examine the dynamics of lipid metabolism in response to antihypertensive therapy in patients with a combination of chronic obstructive pulmonary disease and arterial hypertension.

Materials and methods.182 patients with a combination of COPD and AH, whose age was in the range of 30–70 years, who were treated at the Elmed Medical Center and the Research Institute of Pulmonary Diseases, Baku, Azerbaijan, were examined. 58 people were selected from the total number of patients. The treatment of this group of patients took place from December 12, 2021 to March 14, 2022. The gender characteristics of the patients were not taken into account. Taking into account the severity of shortness of breath (mMRC scale, points) and the impact of COPD on quality of life (CAT scale, points), all patients were assigned to one of 3 categories/groups – A, B and E. There were no category A patients in our study. According to the GOLD 2023 classification, category B included patients with low risk – mMRs ≥2 and CAT≥10 points (22 patients). In category E, there were patients who had ≥2 exacerbations or ≥1 leading to hospitalization (36 patients) [5].

Blood pressure was measured using the Korotkov method, after a mandatory 5–minute rest, on both hands, based on the highest blood pressure values with the calculation of its arithmetic mean. The presence of AH was recorded at a blood pressure value ≥140/90 mmHg [9]. Blood pressure was measured using a Rossmaxx GD102 device. All 58 patients had grade 2 AH according to ESC classification [9]. Triplixam (Servye, France), which is a triple combination of perindopril, indapamide and amlodipine, was used as an antihypertensive drug. Depending on the degree of blood pressure, 2 dosages of the drug were used: 10+2,5+10 mg and 5+1,25+5 mg. When prescribing the drug, the presence of concomitant pathology, tolerance to the drug and previous treatment (if these molecules were used in monotherapy) were taken into account. The drug was administered in the morning on an empty stomach 30 minutes before meals for 12 weeks.

The blood lipid spectrum was determined using a fully automatic biochemical analyzer Responses-920 manufactured in Germany using an enzymatic colorimetric method. Blood was taken from the vein in the morning on an empty stomach, subject to a mandatory 12–14 hour fast. Then, the blood taken was centrifuged and the average concentration of total cholesterol (TCH), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C) and very low-density lipoprotein cholesterol (VLDL-C) was determined in plasma.

The SCORE2/SCORE2-OP scale (ESC 2021) was used to assess cardiovascular risk. The interpretation of the lipid spectrum parameters and the target (reference) values were determined according to the ESC/EAS recommendations for the treatment of dyslipidemia (2019). The classification of dyslipidemia corresponded to the Fredrickson phenotypic system.

Statistical processing of the obtained data was carried out using the statistical analysis program Microsoft Excel-2010. The following statistical analysis methods were used: the Student's criterion (t) to evaluate the differences in averages for quantitative features with the correct distribution, the Mann-Whitney criterion (U) to evaluate the differences in averages for quantitative features with the incorrect distribution. The criterion for the reliability of the results was based on the value of $p \leq 0.050$.

The research was approved at a meeting of the Ethics Committee of the Azerbaijan State Advanced Training Institute for Doctors named after A. Aliyev (ASATID) on Extract from Protocol No. 4 dated 10.02.2026.

The article is a fragment of the PhD thesis of the second co-author. The individual records of the examined patients contain their written consent to participate in the study, which complies with recognized standards (Helsinki Declaration).

Results of the study and their discussion. It was found that in patients with COPD combined with hypertension, the baseline systolic blood pressure (SBP) before treatment with Triplixam in category B was 165.56+9.83 mmHg, and in category E 165.63±10.93 mmHg, the difference was statistically unreliable ($p \geq 0.050$) (Fig.1). Both indicators corresponded to the II degree of AH. The average DBP in patients of category B was 92.50±8.09 mmHg, and in category E – 88.50±9.14 mmHg (Figs.1 and 2). These indicators did not significantly differ from each other ($p > 0.050$). In category B, the average DBP corresponded to grade I AH, and in category E, increased blood pressure according to the new classification.

As a result of antihypertensive therapy with Triplixam in patients in category B, SBP was reduced to 121.11±5.30 mmHg, in category E, after treatment, SBP was 121.00±4.80 mmHg. These data did not significantly differ from each other ($p > 0.050$). Here, the indicators corresponded to the criterion of normal high blood pressure. Before the start of treatment, the average DBP in the categories of patients B and E was 92.50±8.09 and 88.50±9.14 mmHg, respectively, after treatment 77.89±5.57 mmHg and 77.88±4.22 mmHg, which was significantly less than $p < 0.050$).

As a result of antihypertensive therapy with Triplixam in patients in category B, SBP was reduced to 121.11±5.30 mmHg, in category E, after treatment, SBP was 121.00±4.80 mmHg. These data did not significantly differ from each other ($p > 0.050$). Here, the indicators corresponded to the criterion of normal high blood pressure. Before the start of treatment, the average DBP in the categories of patients B and E was 92.50±8.09 and 88.50±9.14 mmHg, respectively, after treatment 77.89±5.57

mmHg and 77.88±4.22 mmHg, which was significantly less than p<0.050). The achieved blood pressure levels will significantly reduce the risk of developing coronary heart disease, as well as severe complications affecting the growth of disability and mortality rates, and improve the quality of life of these patients.

Further analysis of the results shows that the average concentration of TCH in blood plasma in category B before the start of antihypertensive therapy was 212.12±44.32 mg/dl, and as a result of its implementation, it decreased to 194.61±56.33 mg/dl, which was not statistically significant (p>0.050), which Nevertheless, it can be regarded as a positive result in reducing the risk of developing coronary heart disease and cardiovascular complications in the form of myocardial infarction and stroke in these patients. In patients of category E, the average concentration of TCH in blood plasma before the start of antihypertensive therapy was 251.64±51.66 mg/dl, which was significantly higher than in patients in category B (p<0.050) and also met the criteria for hypercholesterolemia (HCH). As in patients of category E, this indicator decreased to 207.28±40.25 mg/dl (p<0.059) as a result of the therapy (Fig. 2).

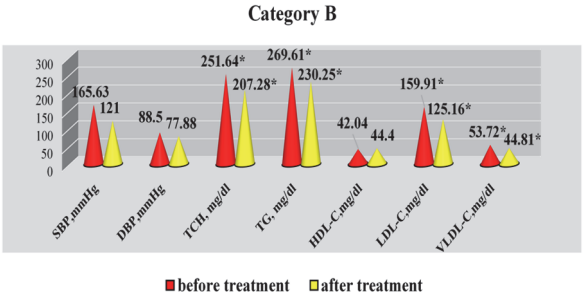

Fig. 1. Indicators of blood pressure and lipid spectrum in patients with COPD (category B) in combination with AH.

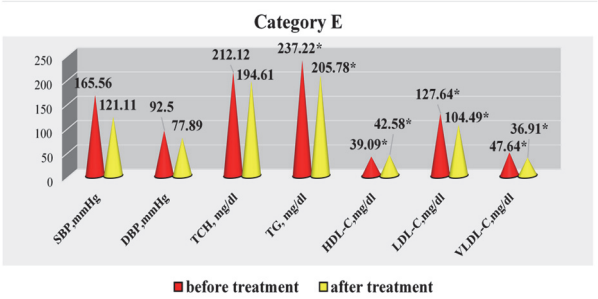

Fig. 2. Indicators of blood pressure and lipid spectrum in patients with COPD (category E) in combination with AH.

But just like in patients in category B, he continued to meet the HCH criterion, which can most likely be explained by an insufficient follow-up period. But it can also be regarded as a positive result in relation to the risk of myocardial infarction and stroke, which is very important in relation to secondary prevention and can be represented as the presence of a pleotropic hypolipidemic effect of the antihypertensive drug Triplixam.

The average concentration of TG in the blood plasma of patients with COPD and AH classified as category B before the start of antihypertensive therapy was 237.22±86.32 mg/dl, and as a result of its implementation it significantly decreased to 205.78±72.96 mg/dl (p<0.050). However, in both cases, the indicator was higher than the normal criterion, which indicated the presence and persistence of hypertriglyceridemia. However, in our opinion, this can also be considered a positive result. As for patients classified in category E, this indicator was statistically significantly higher before starting treatment compared to category B and amounted to 269.61±75.68 mg/dl (p<0.050). As a result of prescribed antihypertensive therapy, this indicator decreased to 230.25±73.55 mg/dl, which was statistically unreliable (p>0.050). Obviously, there were very high rates of hypertriglyceridemia. These are very important indicators for adequately prescribed therapy in patients with a combination of COPD and AH.

The next indicator of lipid metabolism was HDL, assessed as an anti-atherosclerotic factor. In patients in category B, its average plasma concentration before treatment was 39.09±8.17 mg/dl, and as a result of its administration it increased to 42.58±11.46 mg/dl, which, although it was not reliable (p<0.050), could be regarded as a positive result in reducing the risk of heart attack. myocardial infarction and stroke in patients with a combination of COPD and AH. In patients in category E, the average concentration of HDL-C cholesterol in blood plasma was 42.04±7.44 mg/dl. as a result of antihypertensive therapy, this indicator increased to 44.40±9.52 mg/dl, which in both cases met the criterion of normality and was regarded as a very positive result regarding the risk of developing in these patients. cardiovascular complications.

The average LDL plasma concentration in patients in category B was 127.64±24.41 mg/dl, which was significantly higher than normal, and as a result of antihypertensive therapy, it decreased statistically significantly to 104.49±59.35 mg/dl (p<0.050). In the E patient category, this indicator was 159.91±39.94 mg/dl before antihypertensive therapy, and as a result of it, it significantly decreased to 125.16±37.04 mg/dl (p<0.050). These results of the study also indicate a significant pleotropic hypolipidemic effect of the drug we used.

Finally, the average concentration of VLDL in the blood plasma of category B patients before treatment was 47.64±12.61 mg/dl, and as a result, it significantly decreased to 36.91±14.79 mg/dl. Among patients in category E, the average VLDL concentration in blood plasma was 53.72±15.18 mg /dl, and as a result of antihypertensive therapy, the indicator significantly decreased to 44.81±16.20 mg/dl. These data also reliably indicate a significant pleotropic hypolipidemic effect of the drug Triplixam.

Thus, prescribing Triplixam to patients with a combination of COPD and AH allowed us to achieve a significant reduction in SBP and DBP, which will significantly affect their risk of developing cardiovascular complications in the

form of myocardial infarction and stroke, as indicated in a number of studies [9]. In a study conducted in Spain, it was found that smoking, which is the main risk factor for COPD, is the cause of a significant increase in the concentration of atherogenic lipids in blood plasma and a decrease in antiatherogenic lipids [3, 10]. With regard to lipid metabolism, we have recorded high values that meet the criteria of hyperlipidemia in almost all its components, which indicates a high risk of cardiovascular complications in patients with a combination of COPD and AH [8, 12], which requires the search for adequate and effective antihypertensive therapy according to published data from other studies [7]. Our therapy with Triplixam allowed us to achieve significant improvements in the main parameters of lipid metabolism, which indicates a significant pleotropic hypolipidemic effect of the antihypertensive drug we used. Since we compared these data in categories B and E, as a result, it was found that patients in category E, compared with category B, had significantly more pronounced pathological changes in both blood pressure and lipid metabolism. Since patients belonging to category E have more significant pathological indicators reflecting the degree of chronic inflammation and impaired respiratory function, this may be the reason for the differences we found in blood pressure and lipid metabolism, which undoubtedly should be taken into account by clinicians when planning therapeutic measures for the secondary prevention of cardiovascular disasters with this comorbidity. According to experts in the field under discussion, priority attention should be given to COPD prevention measures by correcting risk factors in the population, early diagnosis, and slowing the progression of the disease [5].

Limitations. The limitations faced by the authors were related to "lockdowns" during the COVID-19 pandemic, which made objective patient control difficult.

Conclusions

1. A significant antihypertensive effect of Triplixam has been established with correction of the initial high values of both systolic and diastolic blood pressure in patients with the metabolic phenotype of COPD in combination with AH. This effect of the drug will significantly reduce the risk of developing cardiovascular complications such as myocardial infarction, stroke and other vascular disasters.

2. The presence of initial high levels of atherogenic lipid fractions – TCH, TG, LDL-C and VLDL-C was revealed in patients with a combination of the metabolic phenotype of COPD and AH. The conducted therapy with Triplixam allowed us to achieve a significant improvement in the main parameters of the atherogenic lipid fraction, which indicates the pleotropic hypolipidemic effect of the antihypertensive drug we used.

3. The established pleotropic hypolipidemic effect of Triplixam can be used by practitioners for the treatment and prevention of cardiovascular complications in the complex treatment of patients with the metabolic phenotype of COPD in combination with AH.

4. The absence of statins in the complex therapy of COPD patients in combination with AH and the observed positive dynamics in the lipidogram against the background of therapy with the antihypertensive drug Triplixam allows us to think about a broader prospective study in this area in this patient population, both in terms of prevention of vascular complications and polypragmasia (a large number of drugs for symptomatic and pathogenetic treatment of COPD with this comorbidity).

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ANALYSIS OF CLINICAL MANIFESTATIONS IN PATIENTS WITH INTESTINAL NEMATODE INFECTIONS

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This study evaluated the clinical and epidemiological features of intestinal nematode infections in Azerbaijan during 2022–2024. Preventive educational activities and parasitological examinations were conducted among 2,800 individuals, with dynamic laboratory assessment before and after deworming in 168 infected patients aged 1–65 years. A control group included 65 healthy individuals. Infection rates ranged from 7.7 % to 26.5 %, with ascariasis, enterobiasis, and hymenolepiasis being the most prevalent. The highest infestation rates were observed in children, particularly among girls aged 12–15 and boys aged 8–11. Clinical manifestations were dominated by gastrointestinal dysfunction, general weakness, allergic skin reactions, and anemia. The results demonstrate a high prevalence and significant clinical impact of intestinal helminth infections in Azerbaijan, especially in the pediatric population, underscoring the need for improved prevention, diagnostics, and sanitary-epidemiological control.

Key words: intestinal parasitic diseases, etiology, prevalence, human parasitosis, helminth infections.

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АНАЛІЗ КЛІНІЧНИХ ПРОЯВІВ У ХВОРИХ З КИШКОВИМИ НЕМАТОДОЗАМИ

У цьому дослідженні оцінювалися клінічні та епідеміологічні особливості кишкових нематодних інфекцій в Азербайджані у період з 2022 по 2024 рік. Профілактичні просвітницькі заходи та паразитологічні обстеження були проведені серед 2800 осіб, з динамічною лабораторною оцінкою до та після дегельмінтизації у 168 інфікованих пацієнтів віком від 1 до 65 років. Контрольна група включала 65 здорових осіб. Показники інфікування варіювалися від 7,7 % до 26,5 %, при цьому найпоширенішими були аскаріоз, ентеробіоз та гіменолепіаз. Найвищі показники інфікування спостерігалися у дітей, особливо серед дівчаток віком 12–15 років та хлопчиків віком 8–11 років. Клінічні прояви характеризувалися шлунково-кишковою дисфункцією, загальною слабкістю, алергічними шкірними реакціями та анемією. Результати демонструють високу поширеність та значний клінічний вплив кишкових гельмінтозних інфекцій в Азербайджані, особливо у педіатричній популяції, що підкреслює необхідність покращення профілактики, діагностики та санітарно-епідеміологічного контролю.

Ключові слова: кишкові паразитарні захворювання, етіологія, поширеність, паразитарні інфекції людини, гельмінтози.

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The WHO expert assessment shows that diseases caused by helminths are the third most important infectious and parasitic diseases in the world, and diseases caused by plasmodials are the fourth (1.4 billion and 600 million cases, respectively) [8, 10]. Intestinal parasitosis ranks 4th among the causes of all diseases and traumas due to the damage they cause to the health of the population. Helminthosis is a widespread group of diseases and to some extent determines the health status of the population. Entering the human body, helminths are capable of disrupting the microecological balance in the intestinal cavity and causing an imbalance of microflora [1, 9]. However, there is very little information on intestinal microbiocenosis during helminthosis in domestic and foreign literature [3, 5, 7]. In this aspect, the negative impact of some parasites on the immune status of infected persons