DETERMINATION OF THE BLOOD LIPIDE SPECTRUM IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Mamatkhuzhaev Zohidbek Sadirdin ugli
Independent Applicant, Andijan State Medical Institute (Andijan, Uzbekistan)
mamatxajayevzohidbek@gmail.com.
ORCID:0009-0003-9373-7086

Khujamberdiev Mamazoir Akhmedovich
MD, Professor, Andijan State Medical Institute (Andijan, Uzbekistan)

Uzbekova Nelya Rafikovna
MD, Associate Professor
Andijan State Medical Institute (Andijan, Uzbekistan)

Introduction

Chronic obstructive pulmonary disease (COPD) is one of the leading causes of morbidity and mortality worldwide, occupying a significant place among socially significant diseases. In addition to progressive respiratory system damage, COPD is accompanied by pronounced systemic disorders, among which chronic inflammation, oxidative stress, and metabolic dysregulation play an important role. These processes negatively affect the cardiovascular system, increasing the risk of developing atherosclerosis, coronary heart disease, and other comorbid conditions.

Determining the lipid profile in patients with COPD allows for the timely detection of metabolic disorders, assessment of individual cardiovascular risk, and adjustment of patient management tactics, taking into account the systemic manifestations of the disease.

Purpose of the study

The purpose of the study was to study the lipid spectrum of the blood in patients with chronic obstructive pulmonary disease.

Materials and methods

The object of the study was 53 patients diagnosed with COPD, 20 healthy volunteers were taken as a control group. All participants received written consent to participate in the study. All patients were determined the concentrations of total cholesterol (TC), high-density lipoprotein cholesterol (HDL cholesterol), triglycerides (TG) using a modern biochemical express analyzer "Reflotron Plus" from "Roshe" (Germany). The content of total cholesterol (TLC), low-density lipoprotein cholesterol (LDL cholesterol), and very low-density lipoprotein cholesterol (LDL

cholesterol) was calculated using the formula W. Friedwald:

LDL-C (mmol/l) = triglycerides×0.45

LDL XC (mmol/l) = OXC - HDL XC - LDL XC

Calculation of low-density lipoprotein cholesterol (LDL cholesterol) using the Friedwald formula is justified when the triglyceride concentration is less than 5 mmol/l (450 mg/dl).

Additionally, the integral indicator - atherogenicity index - was determined using the formula proposed by A. Klimov:

IA (units) = (OXC - HDL XC): HDL XC.

Results and discussion

The conducted analysis of the blood lipid spectrum revealed several significant differences between patients with chronic obstructive pulmonary disease (COPD) and practically healthy individuals. It was established that in patients with COPD, the concentration of a number of atherogenic lipid fractions is statistically significantly higher than the indicators of the control group, which indicates the presence of lipid metabolism disorders characteristic of this pathology.

The level of total cholesterol in patients with COPD was significantly higher (5.15±0.22 mmol/l) compared to healthy individuals (4.0±0.2 mmol/l, $p<0.001$). This increase reflects systemic metabolic changes occurring against a background of chronic inflammation, hypoxia, and pronounced oxidative stress characteristic of COPD.

The content of low-density lipoproteins (LDL), which are the main atherogenic fraction, was also significantly increased - 2.86±0.25 mmol/l versus 2.13±0.1 mmol/l in healthy individuals ($p<0.01$). Increased LDL is an important risk factor for the development of concomitant atherosclerosis and cardiovascular complications, the frequency of which is increased in patients with COPD.

Especially pronounced differences were observed in the concentration of very low-density lipoproteins (LDL), the level of which in patients was 0.75±0.05 mmol/l, which is three times higher than the indicator of the control group (0.25±0.02 mmol/l, $p<0.001$). LDL is the main carrier of triglycerides, therefore their increase is consistent with the detected increase in triglyceride levels in patients with COPD - 1.77 ± 0.1 mmol/l versus 1.3 ± 0.1 mmol/l ($p < 0.001$). These data confirm the presence of hypertriglyceridemia, which is often accompanied by chronic inflammation and can intensify with systemic metabolic disorders associated with prolonged hypoxia.

It is interesting to note that the level of high-density lipoproteins (HDL) in patients with COPD was somewhat higher than in the control group (1.64±0.19 mmol/l versus 1.2±0.13 mmol/l), however, the differences did not reach statistical significance ($p>0.05$). Such an increase may

be related to the compensatory mechanisms of the body's antioxidant defense in conditions of chronic inflammation.

The atherogenicity index, which reflects the ratio of atherogenic and anti-atherogenic lipids, was slightly lower (2.42 ± 0.22 units) in patients with COPD compared to healthy individuals (2.6 ± 0.14 units, $p < 0.001$), which is explained by a relative increase in the concentration of HDL while simultaneously increasing other lipid fractions. Nevertheless, the observed changes in the lipid profile indicate the emerging trends in lipid metabolism disorders that contribute to the development of concomitant cardiovascular pathology.

Conclusion

A study of lipid spectrum indicators in patients with COPD revealed characteristic changes reflecting the presence of systemic metabolic disorders. In patients, a significant increase in the levels of total cholesterol, low and very low-density lipoproteins, and triglycerides was established, indicating the formation of atherogenic dyslipidemia. Despite the absence of significant differences in the level of high-density lipoproteins, the identified changes confirm an increase in cardiovascular risk in this category of patients.

The obtained data emphasize the importance of regular monitoring of the lipid profile in patients with COPD for the early detection of dyslipidemia, timely correction of risk factors, and prevention of atherosclerotic complications.