DETERMINATION OF THE BLOOD LIPIDE SPECTRUM IN PATIENTS WITH HEART ISCHEMIC DISEASE

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Introduction

Ischemic heart disease (IHD) remains one of the leading causes of morbidity, disability, and mortality worldwide. Despite the achievements of modern cardiology, coronary artery atherosclerosis continues to determine the prognosis in this category of patients. The atherosclerotic process is based on lipid metabolism disorders, among which an increase in the level of atherogenic lipid fractions and a decrease in the content of high-density lipoproteins play a key role. Therefore, studying the lipid profile of the blood in coronary artery disease has not only diagnostic significance but also serves as a crucial tool for predicting cardiovascular risk.

In the context of the increasing prevalence of coronary heart disease, as well as the increase in the comorbid course of coronary heart disease with other diseases, lipid profile assessment is becoming a mandatory component of modern clinical observation.

Purpose of the study. The purpose of the study was to study the lipid spectrum of the blood in patients with coronary heart disease.

Materials and methods. The object of the study was 40 patients diagnosed with coronary heart disease, 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: Lipid profile analysis demonstrated significant differences between patients with coronary heart disease and practically healthy individuals, reflecting characteristic metabolic disorders underlying atherogenesis. According to the obtained data, the concentration of total cholesterol in patients with coronary artery disease was significantly higher than in the control group (6.1±0.2 mmol/l versus 4.0±0.2 mmol/l, $p<0.001$). An increase in total cholesterol indicates a severe disruption of lipid metabolism and is one of the main factors in the progression of atherosclerotic changes in the vascular wall.
Low-density lipoprotein levels (LDL) are of particular diagnostic and prognostic importance, as they play a leading role in the structure of atherogenic lipids. In patients of the study group, the concentration of LDL-C was almost twice as high as in healthy individuals - 4.16±0.15 mmol/l versus 2.13±0.1 mmol/l ($p<0.001$). This increase is a direct reflection of the increased tendency to cholesterol deposition in the intima of arteries and the formation of atherosclerotic plaques.
Even more noticeable changes were observed in relation to the concentration of very low-density lipoproteins (LDL), the level of which in patients was 0.99±0.05 mmol/l, which was almost four times higher than the indicator of the control group (0.25±0.02 mmol/l, $p<0.001$). LDL is the main transport form of triglycerides, and their increase is usually associated with a disruption of carbohydrate-lipid metabolism and insulin resistance, which is often accompanied by coronary heart disease.
The triglyceride content in patients with coronary heart disease was also significantly higher (2.2±0.1 mmol/l) compared to healthy individuals (1.3±0.1 mmol/l, $p<0.001$). Hypertriglyceridemia exacerbates the atherogenic condition and contributes to the formation of small, dense LDL particles with high penetrating ability through the vascular wall.
The level of high-density lipoproteins (HDL), traditionally considered an antiatherogenic factor, is of interest. Despite the absence of statistically significant differences ($p > 0.05$), patients with coronary heart disease showed a tendency towards a decrease in the level of HDL (0.95 ± 0.07 mmol/l) compared to the control group (1.2 ± 0.13 mmol/l). Since HDLs participate in cholesterol reverse transport, their decrease can potentially contribute to a decrease in the body's ability to remove excess lipids from the vascular wall.
A key integral indicator characterizing the degree of imbalance between atherogenic and anti-atherogenic lipoproteins is the atherogenicity index. In patients with coronary heart disease, it

was significantly elevated - 5.42±0.22 units, which is more than twice as high as in healthy individuals (2.6±0.14 units, $p<0.001$). A high atherogenicity index reflects the predominance of lipid fractions that contribute to the development of atherosclerosis and correlates with the severity of coronary artery damage.

Conclusion. The combination of the obtained data indicates pronounced atherogenic dyslipidemia in patients with coronary heart disease, characterized by a significant increase in LDL, LDL, triglycerides, and total cholesterol, with a relative decrease in the level of HDL and a significant increase in the atherogenicity index. These changes emphasize the importance of lipid metabolism correction in the complex treatment and prevention of the progression of coronary heart disease.