



Application of Modern Methods of Dietotherapy and Nutriceutics in the Treatment of Dyslipidemia (Literature Review)

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Annotation: All patients with dyslipidemia should be advised to reduce their intake of saturated fats due to their adverse effect on the risk of cardiovascular events due to their proatherogenic effect. Regardless of the disease, it is necessary to exclude Tran's fatty acids due to an increased risk of developing premature atherosclerosis.

In the presence of overweight and obesity, it is necessary to limit the total calorie content of the diet (up to 2,000 kkal / day) to normalize body weight and reduce cardiovascular risk. In the group of patients with moderate and low risk of CVD, the use of special nutraceutical agents and functional foods that affect the lipid spectrum may be promising, but requires further rese.

Keywords: dyslipidemia, overweight, obesity, nutraceuticals, vegetarian diet.

Cardiovascular disease remains the leading cause of death in developed countries. Atherogenic dyslipidemia plays an important role in the occurrence and progression of CVD and manifests itself in an increase in the level of total cholesterol, LDL cholesterol and a decrease in the antiatherogenic fraction of HDL cholesterol [1].

A huge evidence base has been accumulated on the positive effect of lipid-lowering therapy, in particular statin therapy, on the prevention of CVD. The benefits of statin use have been demonstrated in secondary and primary prevention studies [2,3].

The evidence base for the use of non-drug methods of influence is systematized to a much lesser extent than for drug therapy. This review aims to analyze the current evidence base for the possibility of dietary effects on dyslipidemia.

The factor of lifestyle changes, including the correction of eating habits, is currently attracting increasing attention. Moreover, according to modern concepts, non-drug methods should accompany the use of lipid-lowering drugs [2,4,5].

The Russian recommendations for the diagnosis and correction of disorders of the National Society for the Study of Atherosclerosis (NOA) [6] leave room for non-drug methods as the only therapeutic intervention (without prescribing lipid-lowering therapy) for the management of patients with low and moderate risk according to the SCORE scale.

Eating habits affect the risk of CVD through the impact on risk factors (BP, body weight, DM), as well as a number of other effects.

Thus, the primary goal of non-pharmacological methods is to reduce LDL-C and non-HDL-C. The secondary goal is to correct other RFs, such as obesity, DM, and AH [7–9].

Limiting saturated fat intake

The key dietary intervention for CVD prevention is limiting the intake of trans fats. The main principles of healthy fat intake are: limiting the intake of saturated fats, drastically limiting (or better, completely eliminating) trans fatty acids, increasing the intake of long-chain polyunsaturated fatty acids (PUFAs), which reduce plasma TG levels [10].

According to the updated dietary guidelines, saturated fat should make up less than 10% of total calories, and trans fatty acids should not exceed 1% of the diet. Salt intake should be limited to 5 g/day, while fiber intake, on the contrary, should be increased to 30–45 g/day. It is recommended to consume at least 200 g of vegetables and 200 g of fruit per day. Eating fish and seafood is recommended 1–2 times a week [11].

With regard to mineral intake, the need to increase potassium intake and reduce sodium intake should be emphasized. Total calorie intake should be calculated based on BMI and age-specific basal metabolic rate. With severe obesity, a decrease in body weight for every 10 kg is accompanied by a decrease in LDL cholesterol by 0.2 mmol/l [5].

The effectiveness of nutraceuticals

Nutraceuticals may alter the plasma lipid spectrum, which may reduce the severity of cardiovascular disease. [9]. these include sterols / stanols, polyphenols, spirulina. The use of sterols/stanols in food is associated with a decrease in the level of total cholesterol in the blood [10]. They predominantly act on LDL and very little on high density lipoproteins (HDL) and triglycerides (TG) [11, 12]. The mechanism of action of sterols/stanols is associated with a decrease in the absorption of cholesterol in the intestine, the regulation of LDL receptors in the liver and a decrease in the production of endogenous cholesterol [13]. Their regular intake as a dietary supplement can reduce LDL levels by 10% [14]. A meta-analysis of 15 RCTs confirmed that the combined use of sterols/stanols and statins led to an additional decrease in the concentration of cholesterol and LDL, without affecting HDL and TG [15,16].

Another meta-analysis of studies in which these nutraceuticals were added to the diet showed no additional reduction in lipid spectrum levels [15]. The last large study confirmed that the use of phytosterols may be associated with a reduction in the risk of myocardial infarction in men, but this does not affect the reduction in the risk of CVD [17]. Such conflicting data require further research. Several studies have shown that polyphenols are able to influence plasma lipid concentrations [18].

Thus, the consumption of 700 mg of grape polyphenol extract per day by healthy people was associated with a decrease in cholesterol and LDL levels [19]. However, a meta-analysis of 9 studies, including 390 people, did not show any effect on the lipid spectrum [20, 21]. There are also conflicting data on the benefits of resveratrol. In the latest meta-analysis, no relationship was found between it and the concentration of cholesterol, LDL, TG and glucose [22].

A meta-analysis of 6 studies of cocoa polyphenols showed a significant reduction in LDL levels, but only in individuals with an increased risk of CVD [23]. The Flaviola Health Study demonstrated a 0.20 mmol/L reduction in cholesterol levels, 0.17 mmol/L in LDL, and a 0.10 mmol/L increase in HDL in low-risk individuals over 1 month. taking flavonoids of cocoa beans [20].

On the other hand, meta-analyses and studies of green and black tea polyphenols have shown a significant reduction in cholesterol and LDL levels with regular use. At the same time, black tea was more effective in lowering LDL levels in individuals with hypercholesterolemia and other markers of increased cardiovascular risk [15–18]. Another nutraceutical that can affect the lipid spectrum is spirulina (*Spirulina Maxima*). Studies and meta-analysis have shown its ability to reduce cholesterol and LDL levels [19]. At the same time, a dose-dependent effect of this additive on the concentration of plasma lipids was revealed [10, 11].

Vegetarian diet

The vegetarian nature of the diet involves the consumption of vegetables, fruits, cereals, whole grains. Depending on the attitude to the possibility of additional consumption of milk, eggs or fish, vegetarians are divided into vegans, which completely exclude animal products from the diet; lacto-ovo vegetarians, who allow the consumption of milk and eggs, and pescovegetarians, who allow themselves seafood and fish.

Randomized and observational studies have demonstrated positive effects of vegetarian diets on LDL-C, SBP and DBP, and body weight. Even a short-term adherence to a vegetarian diet (within 4 weeks) led to a significant beneficial effect on the lipid spectrum, blood pressure, as well as the content of C-reactive protein (CRP), insulin and glycated hemoglobin [15]. In the same study, a decrease in the need for medications, primarily antihypertensives, was demonstrated.

Long-term adherence to vegetarianism, according to a number of studies (up to 280 thousand participants), prevents the development of obesity, as well as coronary artery disease, in comparison with a diet that included meat products. The incidence of stroke did not differ between groups [16].

Some studies, however, have also demonstrated a reduction in anti-atherogenic HDL-C [17].

Vegetarian nutrition may be of interest from the point of view of environmental and economic feasibility, both directly - by avoiding expensive meat products, and indirectly - by reducing the dose of concomitant cardiological drugs.

Omega-3 unsaturated fatty acids

Evidence from observational studies shows that consumption of fish (at least twice a week) and plant foods rich in omega-3 fatty acids (α -linoleic acid found in walnuts, some vegetables, and vegetable oils) reduces the risk of death from CVD and stroke, but has no significant effect on plasma lipoprotein metabolism [25,26]. Long-chain omega-3 fatty acids at pharmacological doses (2-3 g per day) reduce TG levels by approximately 30% and also reduce the postprandial lipemic response, but a higher dose may increase LDL-C. Alpha-linolenic acid is less effective in reducing TG levels [16]. More recently, in patients with elevated TG levels during statin therapy, a significant reduction in the risk of ischemic events, including death from CVD, was noted when taking 2 g of eicosapentaenoic acid ethyl ester 2 r / day (2 times a day) [15].

Conclusion. Thus, all patients with dyslipidemia should be advised to reduce their intake of saturated fats due to their adverse effect on the risk of cardiovascular events due to their proatherogenic effect. Regardless of the disease, it is necessary to exclude trans fatty acids due to an increased risk of developing premature atherosclerosis.

In the presence of overweight and obesity, it is necessary to limit the total calorie content of the diet (up to 2,000 kcal / day) to normalize body weight and reduce cardiovascular risk. In the group of patients with moderate and low risk of CVD, the use of special nutraceutical agents and functional foods that affect the lipid spectrum may be promising, but requires further research.

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