wjpmr, 2019,5(5), 313-316

SJIF Impact Factor: 4.639

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Research Article

ISSN 2455-3301

WJPMR

CHANGE THE CONTENT OF THE APO B WITH THE DEVELOPMENT OF EXPERIMENTAL HYPERCHOLESTEROLEMIA AND WAYS TO CORRECT IT

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Article Received on 20/03/2019 **Article Revised on 10/04/2019** **Article Accepted on 01/05/2019**

ABSTRACT

The study examined the effect of Biomaysa on the content of apoprotein in and total cholesterol, lipoprotein cholesterol in the dynamics of experimental hypercholesterolemia. Apoprotein B. of combined administration Biomaysa and ultroksa installed significant difference in the reduction of total cholesterol levels in ApoB 2.2 and 1.5, indicating good cholesterol reducing the effectiveness of the combination of these drugs by activating LDL receptor capture.

KEYWORDS: experimental hypercholesterolemia, blood, atherosclerosis, lipoproteins, cholesterol, apoprotein B.

INTRODUCTION

Hypercholesterolemia (CHS) plays an important role in the pathogenesis of atherosclerosis and coronary heart disease (CHD),[5] the incidence and mortality from which remain high in Russia and in the CIS countries.[3] Prescription of drugs that reduce cholesterol is a priority in the treatment of coronary artery disease and GHS.[2]

Apo protein B (ApoB) is a major apolipoprotein from the group of atherogenic lipoproteins, including very low-density lipoproteins (VLDL), intermediate density lipoproteins (LDL) and low-density lipoproteins (LDL).[7] The concentration of ApoB significantly reflects the amount of these particles in the plasma. This is especially important in the case of a high concentration of fine, dense LDL particles in the blood. In several prospective studies, the level of ApoB was shown to be a prognostic indicator of a risk equivalent to X - LDL level.[8] Studies of statins has shown that the level of ApoB was not defined as the main goal of treatment exposure, however, during the retrospective analysis it was revealed that the level of ApoB is not only a risk marker, but also the purpose of exposure during treatment, even better than cholesterol level LD.

The purpose of this study is to evaluate the effect of Biomaysa on the content of Apoprotein B and total cholesterol in the dynamics of experimental hypercholesterolemia.

MATERIAL AND METHODS OF RESEARCH. The experiments were carried out on 30 male rabbits of the Shinshelle line weighing 2500–3000 g, divided (depending on the purpose of the study and method of treatment) into 5 groups (6 rabbits each): 1st (control) - intact rabbits; 2nd — animals with simulated experimental hypercholesterolemia; 3rd — correction of experimental hypercholesterolemia and mystatin; 4th - correction of experimental hypercholesterolemia and bibiomix; 5th — Correction of experimental hypercholesterolemia mystatin and Biomaysa.

A model of experimental hypercholesterolemia was reproduced by daily intragastric injection of cholesterol at 0.2g per kg body weight for 2 months.[1] Treatment of experimental animals was carried out after 2 months of cholesterol injection. The Ultrox was used as a statin (Nobel Farm), which was injected at 0.6 mg/kg for 30 days, also as a statin was used Biomaysa - by 142 mg/kg for 30 days. Biomaysa is a wheat sprouts and it was represented by OOO ORION-SKORPION. The studied drugs were injected intragastrically using an atraumatic probe daily in the morning and evening hours, an amount of injection was calculated on the basis of the body weight of the rabbit.

The object of the study was blood serum.

All studies were conducted in compliance with the principles set in the “Convention on the Protection of Vertebrate Animals used for Experimental and Other Scientific Purposes” (Strasbourg, 1986).

To establish a comparative evaluation of plant-derived drugs Biomaysa and Statin Ultrox in the blood serum on an automated biochemical analyzer (RXDaytona /Randox, United Kingdom) of total cholesterol (total

cholesterol), high-density lipoprotein cholesterol (LDL), very low density (VLDL) the atherogenic coefficient (CA) was calculated. ApoB was evaluated by the method of turbidimetry on a biochemical automatic analyzer.

Digital material was processed statistically on a personal computer using a software package for statistical analysis.

RESULTS AND DISCUSSION

To get more accurate characterization of the early stages of lipedema, besides determination the level of blood lipids, the levels of ApoB were determined as well.

Table 1: The effect of Biomaise and Ultrox on lipid metabolism in experimental hypercholesterolemia (n=6).

Indicators	Control group	Animals Experimental Hypercholesterolemia	After treatment		
			Ultrox	Biomaise	Combinations of Ultrox and Biomaise
Total cholesterol mg/dl	71.8 ± 0.78	295 ± 1.45	142 ± 0.66	179 ± 1.77	131 ± 1.2
HS HDL mg/dl	26.7 ± 0.98	17.8 ± 0.8	29.6 ± 0.7	25.3 ± 1.08	34.8 ± 0.75
XS VLD mg/dL	2.92 ± 0.07	6.98 ± 0.15	5.9 ± 0.22	7.46 ± 0.21 *	5.12 ± 0.68
LDL cholesterol mg/dl	40.78 ± 0.86	270.3 ± 2.8	106.7 ± 0.68	146 ± 1.88	91.08 ± 0.14
Apo b mg/dL	81 ± 0.8	179 ± 1.59	130 ± 1.04	158 ± 0,87	118 ± 0.87

Note: * - P ›0.05 in relation to the untreated group

In the group 1, the ApoB blood concentration was 81±0.8 mg/l, which corresponded to the normal values given in the literature.[9] Therefore, all the results of studies conducted by 2-5 groups were compared with the data of group 1.

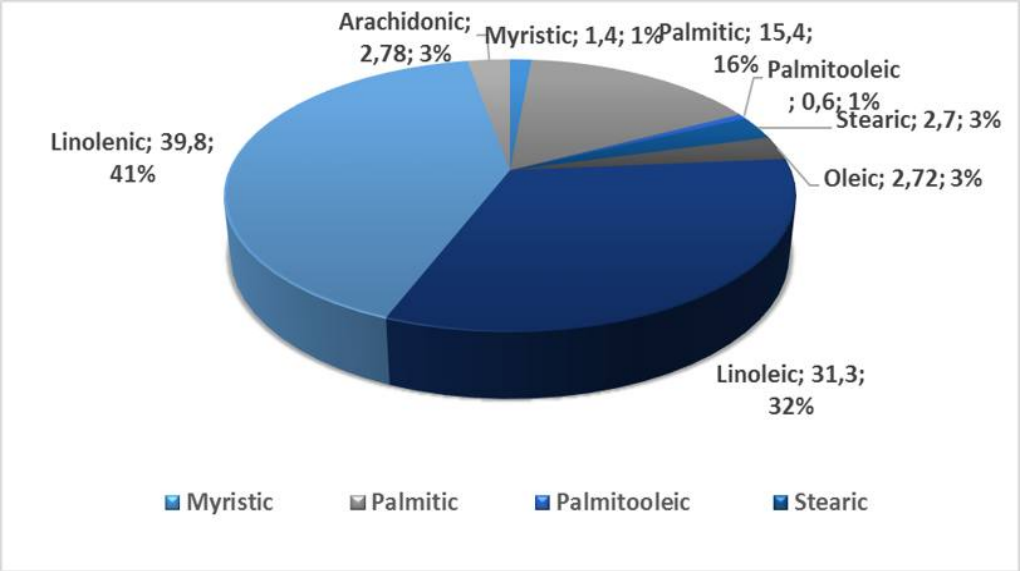

Figure 1: Fatty acid composition of Biomaysa in % per 1 mg of substance.

In the group 2, the development of experimental atherosclerosis is indicated by a tendency for blood cholesterol increase in the blood (295 ± 1.45, P 0.05), a decrease in the HDL cholesterol atomic fraction (17.8±0.8, P<0.05), a significant increase in atherogenicity (15.6±0.43, P<0.05). In the group 2, hypercholesterolemia (GHS) was detected in the blood with a significant excess of cholesterol-LDL compared with group 1 6.6 times (P<0.05). ApoB levels in the second group averaged 179±1.59 mg/dl., I.e. 2.2 times exceeding the normal level. An increase in the ApoB fraction indicates a violation of ApoB-100 receptor endocytosis and uptake of VLDL cells,[10] VLDL, which is not absorbed by the cells, forms hypertriglyceridemia.

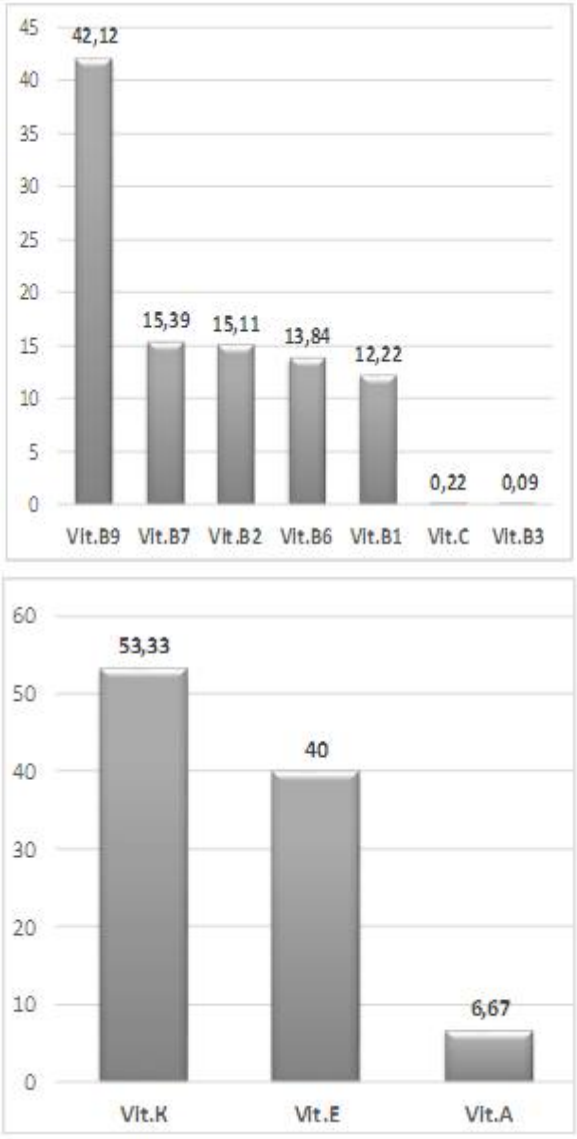

Figure 2: Vitamins content of Biomaysa.

The research results has showed that in groups 3 and 4, the content of total cholesterol and the level of ApoB decreased by 2.1; 1.6 and 1.37; 1.13 times, respectively, compared with 2 group. The degree of reduction in total cholesterol and apo B were similar.

In group 5, in comparison with the control, 30 days after the combined administration of drugs, there was a significant difference in the decrease of total cholesterol level by 2.2 ($p<0.05$) and Apo B by 1.5 times, which indicates effective reduction of cholesterol level due to the combination of drugs Ultrox with Biomaise by activation of receptor uptake of LDL. The Ultrox and Biomaise decreased the level of CA in this group by 4 and 2.5 times, respectively, compared with the untreated group. At the same time, the combined administration of used drugs led to a decrease in this ratio by 5.6 times compared with the untreated group.

Thus, the strength of the effect of the combination of drugs Ultrox and Biomaise exceeds together in comparison of using the drugs separately. It can be predicted that combination of these drugs increases the the capture receptor ApoB containing PL.

It is known that statines normalize hyperlipidemia by: a) activating the uptake of VLDL by insulin-dependent cells and b) activating the uptake of LDL by all cells, increasing the bioavailability of PUFA, activating apoB-100-endocytosis.[4]

Thus, the creation of a multicomponent biologically active substance with lipid-lowering properties, which act on the ApoB and TC, appears to be effective not only for the potential usage in the treatments of light forms of lipid metabolism disorders, but also in combination with statins in order to reduce the dose of the latter, and therefore their side effects.

Based on the research we can conclude the following statements

1. In the simulation of experimental hypercholesterolemia the level of CH increases in the atherogenous cholesterol content of the lipoprotein - LDL and VLDL, the level of antiatherogenic HDL decreases in the blood serum as compared to the intact animals of rabbits. The strong correlational interconnection ($r = 0,8$) was revealed between LDL cholesterol and apo V.
2. Monotherapy with Ultrox at a dose of 0.5 mg / kg and Biomaise - 142 mg / kg statistically significantly reduced the levels of ApoB, total cholesterol level and LDL-C and compared with an untreated group of animals.
3. With the combined usage of the drugs, the significant descrease in the level of cholesterol-LDL, cholesterol-VLDL, Apo B and total cholesterol levels was found compared to untreated and monotherapy treated animals.

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