

Plasma Lipid, Lipoprotein and Apoprotein B Profiles in College Student Athletes and Non-Athletes.

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ABSTRACT

Background: physical activity has been reported to produce beneficial changes in the lipid and lipoprotein profiles. These changes are also influenced by physical activity, diet, body weight and percentage body fat. The purpose of this research was to investigate profile of Plasma lipid (TG), lipoprotein (LDL, HDL) and apolipoprotein B between male athletes' college student and non athletes.

Methods: Subjects were 20 person (19- 26 years) that divided in two groups. The athlete group in average had been 6.8 years regular physical activity and other group hadn't been any regular physical activity in the last five year. The blood samples of subjects takes for determine levels of plasma TC, TG, LDLc, aPOB and HDLc while subjects were at rest and fasting for 12 o'clock. After collecting data, were compared in statistic method (T test & rigration) ($\alpha = 0.05$).

Results: The results showed that levels plasma triglyceride (TG) total cholesterol (TC), low density lipoprotein (LDLc), TC/HDL and apolipoprotein B (aPOB) in athletes group was lesser than non athlete group, also the content of light density lipoprotein (HDLc) was higher in athletes group in compare non athletes, however all of this difference were significant. Moreover the comparison between variables aPOB & LDLc indicated that this relation was significant only in athlete's group.

Conclusion: The finding of this study shows that the regular physical activity is useful way in reduce or stability of risk factors such as TC, TG, LDLc, TC/HDLc and aPOB, also exercise is useful for increase HDLc as an anti risk factor in prevention of cardiovascular disease.

Key word: Triglyceride- cholesterol-lipoproteins LDL, HDL& apolipoprotein B-physical activity.

INTRODUCTION

Today, the study about lipoproteins is very important, because, the mortality and morbidity due to metabolism disorders is increased. Research interest in lipids and lipoprotein metabolism has increased due to the establishment of the roles played by lipids, lipoproteins and apolipoprotein in the development of cardiovascular disease (CVD) (2-6). A cardiovascular disease is rapidly emerging as major cause of morbidity and mortality in some country. Suboptimal levels of lipids and lipoproteins represent a major risk factor for cardiovascular disease (CVD), the number 1 cause of mortality in the United States. Recent estimates indicate that more than 100 million US adults have a suboptimal lipid and lipoprotein profile. An abnormal plasma lipid and lipoprotein profile is an independent and strong predictor of mortality and morbidity from coronary artery disease (21). In one study indicated that public servants, who were mainly university graduates, were found to have abnormally high levels of plasma lipids (8). Plasma lipid and lipoprotein levels have been shown to be influenced by age, sex, socioeconomic status, genetics, race, diet, cigarette smoking coffee and alcohol intake, and medication as well as habitual and leisure time physical activity. Increased physical activity has been reported to produce favorable changes in the lipid and lipoprotein profiles (19, 26). The epidemiologic studies showed that LDLc is a risk factor and aPOB is a essential major (95%) of LDL structure and has a important role in LDL catabolism. aPOB is combined with heparin and glucose amino glican. This chemical equation, lead to atherosclerosis disease (20, 25, 22).

Regular physical activity is considered one of the most effective strategies in preventing the leading causes of morbidity and mortality in western countries. This was motivated by the serious risk to individual and social health due to the lack of physical activity. It has been known, even for early ages, that the level of physical activity seems to be related to specific cardiovascular risk factors (9, 18).

Whereas these cardiovascular risk factors are threaten for the people and with regard to become prevalence in society, also considering that some research indicates the change lifestyle and habitual from inactive to active and doing physical activity is useful, it has been distinguished it can prevention from appearance of cardiovascular disease (1, 7, 12).

Therefore it is very important for doing any research about lipoproteins, lipids and physical activity, also affects of changes them on health and appearance some illnesses such as CVD and atherosclerosis. In the current study, the aim is to study, the difference lipids (TC, TG), lipoproteins (LDL, HDL) and aPOB between male athletes' college student and non athletes.

METHODOLOGY

Subject:

With regard to this fact that our statistical society consisted of college students in two groups, twenty healthy male athletes (mean (s.d.) age 23(1.36); range 19-26 years) at the Institute of Physical Education, Tehran University which had at least a four year participation in sport competitions, and 20 healthy non-athletes (mean age 22.87(1.67); range 20-28 years) at the same university served as other group. All participants gave their consent before the study. The athletes and the control group were matched ($P > 0.05$) for age, weight, height, body mass index (BMI), systolic and diastolic blood pressure. They were all on the same university regular diet.

Collection of blood samples

Fasting blood samples (10-12 h after the last meal) were collected from each subject (about 12 h after physical exercise in the athletes) into sodium-EDTA anticoagulant. The plasma was separated within 2 h of collection in a refrigerated centrifuge (Damon/IEC B-20A) precooled to 4°C at 1500g for 15 min, and stored at -80°C before analysis.

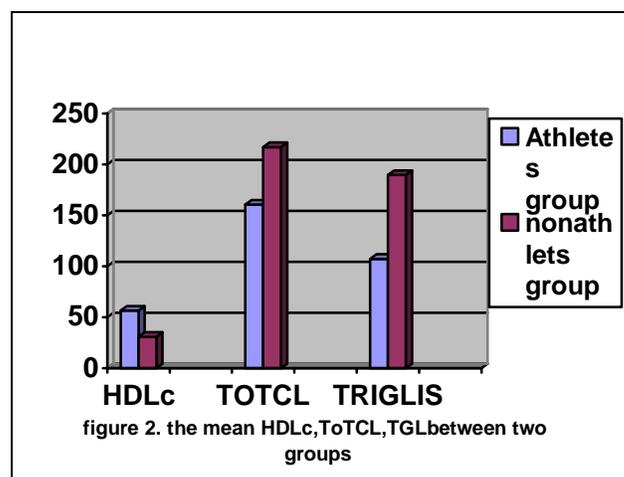
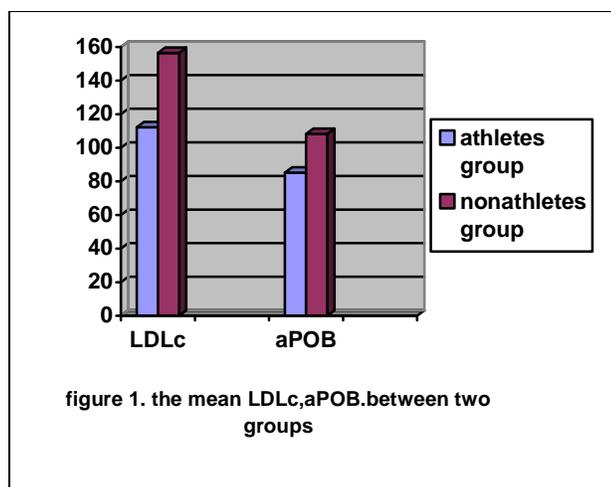
Plasma total cholesterol and HDL-cholesterol and triglycerides were analysed by enzymatic colorimetric assay via a Hitachi 911 analyzer at the Laboratory shariaty hospital. HDL was isolated using the modified heparin-2M MnCl₂ procedure. LDL-cholesterol was calculated by the Friedewald equation. The apolipoproteins (apo) B were analysed using competitive enzyme-linked immunosorbent assay (ELISA) procedures utilizing a monoclonal antibody against apolipoprotein B.

Statistical analysis

All the data are expressed as mean (s.d.). The data of the athletes and nonathletes were compared by employing a two-tailed independent t test and coefficient of regression. Therefore, we examine in detail the plasma lipid, lipoprotein and apolipoprotein profiles, and in some athlete and nonathletes college students.

RESULTS

As shown in figure 1, the mean plasma total cholesterol, plasma triglycerides were significantly lower ($P < 0.05$) in the athletes levels in male athletes than in nonathletes. Furthermore, the means of TC: HDL, LDL-cholesterol, and apo B were also lower than those of the in nonathletes group. The differences were statistically significant ($P < 0.05$). The mean HDL-cholesterol was lower in athletes group, too ($P < 0.05$). Also, there was a significant relation ($P < 0.05$) between LDLc& aPOB in Athletes group. However, this relation wasn't significant ($p>0.05$) in nonathletes group.



DISCUSSION

The finding of this study shows, the values of HDL-cholesterol were different between two groups. The roles played by the various lipid, lipoprotein and apolipoprotein fractions in the development of coronary heart disease have been documented in the literature. However, many reports (28, 11) are available on this subject in athletes. The present study is, therefore, important. It shows that the levels of atherogenic lipids total and LDL-cholesterol, apo B and were favourable in the athletes, an indication that physical activity may be associated with favourable changes in the lipid and apolipoprotein profiles of young and healthy college student athletes. This observation is similar to an earlier finding in male untrained college students 28 and some other reports on Caucasians (27, 16) In people engaged in training programmes, both acute responses and chronic adaptation may contribute to the respective lipoprotein profiles(29). Previous researchs have reported a positive relationship between physical activity and cardiovascular health in adults. Physical training has been shown to produce favourable changes in the lipid and lipoprotein profiles(18,19,27); some reports, however, did not show apparent changes, most especially in women (9,11,14). This has been attributed to changes in endogenous sex (10,16) hormones during the exercise training periods and also probably because premenopausal women start with a higher pretraining HDL cholesterol level than men⁴⁴ The inverse association between physical activity and CVD incidence appears to relate at least in part to the effect on HDL cholesterol^{8 13"16'20 46}. In men, increased physical activity usually results in an increase in HDL level(13,29,17).some researchers, however, found no change in HDL level(27).This may be due to changes in the distribution of HDL sub fractions without alteration of total HDL concentration, or to differences in experimental design. In this study, there was also apparent difference between the mean HDL levels in the male athletes when compared with nonathletes. This observation may be due to the fact that the athletes are mostly involved in kind sports. The LDL- cholesterol fraction was, however; significantly lower ($P < 0.05$) in the athletes. The mean total triglycerides in athletes in this study tended to be higher. Overall, it is expected that the athletes will be more physically fit than nonathletes. Ratios TC: HDL, in the athletes showed a favorable, decreased risk of CVD when compared with other group. It thus appears that exercise decreases TC: HDL ratios in college students by lowering LDL- cholesterol. In Caucasians, exercise tends to lower TC:HDL ratios by raising HDL-cholesterol^{3" (13,17,23)} as well as lowering LDL-cholesterol(14,18,29).our findings likewise revealed that regular exercise may be associated with desirable lipid, lipoprotein and apolipoprotein profiles in college students athlete. The atherogenic total and LDL-cholesterol, apo B, were favorably affected. Based on our findings, we conclude that increased physical activity level may reduce atherosclerosis and CVD risk in healthy college student's athletes.

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