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PREOPERATIVE LIPID PROFILE OF PATIENTS OPERATED FOR CORONARY BYPASS SURGERY

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ABSTRACT

Aims: Dyslipidemia is a major risk factor for atherosclerosis and coronary heart disease. Evidence showed that an atherogenic lipid pattern is characterized by high levels of small, dense low-density lipoprotein, low levels of high-density lipoprotein cholesterol, elevated triglyceride and total cholesterol levels; similar with the lipid profiles of diabetics.

Methods: In this study, 91 patients who underwent coronary artery bypass grafting in Trakya University Hospital Department of Cardiovascular Surgery from April 2017 to September 2017 were analyzed retrospectively. As for statistical analysis, Student's t-test and Mann Whitney U tests were performed.

Results: The lipid profiles of patients were not significantly related to their ages and genders. However, when diabetic patients' lipid profiles were analyzed, their low-density lipoprotein, and total cholesterol values were found to be significantly lower.

Conclusion: It is unexpected to see that patients with diabetes had significantly lower total cholesterol and low-density lipoprotein levels than non-diabetic patients. As for the reason, it is thought that patients with diabetes are more conscious of their health condition.

Keywords: Coronary disease, atherosclerosis, diabetes mellitus

INTRODUCTION

Dyslipidemia is a major risk factor for atherosclerosis and coronary heart disease (1). Evidence showed that an atherogenic lipid pattern is characterized by high levels of small dense low-density lipoprotein (LDL), low levels of high-density lipoprotein cholesterol (HDL-C), elevated triglyceride and total cholesterol levels. High LDL, low HDL-C and high total cholesterol levels have been reported to increase cardiovascular disease (CVD) frequency in diabetic or non-diabetic patients (2, 3).

Coronary artery bypass grafting (CABG) is a very common surgical treatment for patients who have atherosclerosis in one or more coronary arteries (4). As a matter of fact, CABG is the gold standard for patients with diabetes.

The aim of this study is to investigate whether there is a correlation between lipid profile and having coronary bypass surgery in diabetic and non-diabetic patients.

MATERIAL AND METHODS

This study was approved by Scientific Researches Ethics Committee of Trakya University Medical Faculty. In this study, 91 patients who underwent CABG in Trakya University Hospital Department of Cardiovascular Surgery from April 2017 to September 2017 were analyzed retrospectively. Patients who are taking statins, underwent heart valve or an urgent surgery are not included in the study. There was no data concerning the diabetes status of 4 patients, triglyceride, HDL-C and total cholesterol levels of 3 patients and LDL levels of 2 patients.

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With the usage of the protocol numbers, the data about the patients' preoperative states were gathered from hospital's archive. Gathered information contains demographic data (gender, age) and lipid profiles (HDL-C, LDL, triglyceride, total cholesterol levels) also shows whether the patient is diagnosed with diabetes or not. Routine laboratory test of the patients was taken in concern, no further tests were performed. Normal levels are LDL: 0 - 100 (mg/dl), HDL-C: 40 - 60 (mg/dl), triglyceride: 0 - 150 (mg/dl), cholesterol: 0 - 200 (mg/ dl).

Afterwards, all of the data was analyzed by using SPSS version 22.0 (IBM corp., Armonk, NY, USA). Student's t-test and Mann-Whitney U test were performed to see whether there is a difference regarding patients' lipid profiles and demographic charecteristics between diabetic, non-diabetic; also gender groups. As for descriptive statistics; arithmetic mean ± standard deviation, number and percentages, median (minimum-maximum) were used. P value < 0.05 is considered statistically significant.

RESULTS

This retrospective study included 91 patients operated for CABG at Trakya University Faculty of Medicine, Department of Cardiovascular Surgery. The mean age of patients was 63.87 ± 9.33. 60 (65.9%) of the patients were male and 31 (34.1%) of them were female. Mean HDL-C value of the patients was 38.98 ± 8.03, mean LDL value was 113.75 ± 29.77, mean triglyceride value was 161.89 ± 114.71 and mean total cholesterol value was 176.10 ± 39.50.

Table 1: Lipid Profiles of Patients Prior to CABG Surgery

	Number of Patients (Percentage(%))
LDL	
High	62 (68%)
Normal	29 (32%)
HDL-C	
High	1 (1%)
Normal	39 (43%)
Low	51 (56%)
Total cholesterol	
High	21 (23%)
Normal	70 (77%)
Triglyceride	
High	40 (44%)
Normal	51 (56%)

It was detected that in 62 (68%) patients, LDL levels were high; in 21 (23%), total cholesterol levels were high, while triglyceride levels were higher in 40 (44%) patients, only one patient with high HDL-C was found, and in 51 (56%), low HDL-C levels were observed. Lipid profiles of the patients are given in Table 1.

There was no difference between gender groups regarding patients' ages and lipid profiles. However, when patients' lipid profiles were analyzed regarding the diagnosis of diabetes, diabetic patients showed statistically significantly lower levels of LDL and cholesterol(p=0.009, p=0.02 respectively).

DISCUSSION

Low-density lipoprotein is one of the most atherogenic class of cholesterol carrying lipoprotein in human plasma. LDL is modified by oxidation and taken up by macrophages in the intima of the arterials resulting in the formation of foam cells, which is an important step in atherogenesis.

The level of LDL in the plasma is regulated by the LDL receptors, which eliminates LDL from plasma by receptor-mediated endocytosis. The cholesterol content of the hepatocyte regulates the LDL receptors located primarily in the liver. If the gene that is encoding the LDL receptors is defected, LDL level in plasma is elevated and produces premature coronary atherosclerosis, which occurs in patients with familial hypercholesterolemia (5). Other factors like physical injury or stress as a result of direct trauma or hypertension, turbulent blood flow e.g. where arteries branch, hyperlipidemia and chronically elevated blood glucose can be a cause for atherogenesis.

Atherosclerosis is an important cause of vascular diseases worldwide. Its major clinical manifestation is CVD. When the worldwide meta-analysis researches are collected, lipid measures (specifically LDL cholesterol) are accepted as causal risk factors for atherosclerosis. However, high lipid profile may not cause CVD. It is considered that environmental and genetic factors are important in the development of CVD (6).

In our study, patients had low levels of total cholesterol (mean: 176.10 mg/dl), LDL (mean: 113.75 mg/dl), and HDL-C (mean: 38.98), but high triglyceride levels (mean: 161.89). Our patients' lipid profile were consistent with the findings of the review of Onat A, which analyzed the lipid profiles of 3687 Turkish people (7). In our study group, the lipid profiles were not as significant

as in a meta-analysis on Finn and Swedes according to difference of age, sex and diabetes status (8). In a study that has been conducted with over 300.000 people, the decrease of HDL and LDL levels has shown a better result in CVD risk if they are decreased together (9). In our study, low levels of HDL at 56% of the patients have not shown any hindrance to have a CABG surgery because 68% of the patients' LDL values were high.

It was not an expected result to see that patients with diabetes had significantly lower total cholesterol and LDL levels than non-diabetic patients. As for the reason, it is thought that patients with DM are more conscious of their health condition.

In conclusion, although high cholesterol levels have a prectipitating effect on atherosclerosis and CVD, diabetes does not have a significant impact on the lipid profile in this study group.

Ethics Committee Approval: This study was approved by Scientific Researches Committee of Trakya University School of Medicine.
Informed Consent: Written informed consent was obtained from the participants of this study.
Conflict of Interest: The authors declared no conflict of interest.
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