

Research Article

Change of LDL and HDL levels in patients with acute coronary syndrome on admission and 3 months after treatment

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ABSTRACT

Background: The heart ischemic disease has become considerably prevalent worldwide and causes about one-fifth of deaths. Hyperlipidemia is a risk factor for atherosclerosis that includes hypercholesterolemia and hyperlipidemia. The aim of this study was to study the change in the level of LDL and HDL on admission and 3 months after treatment in patients with acute coronary syndrome (ACS).

Methods: This is a case-series study that has been done on 180 patients with acute coronary syndrome. 24 hours after admission, the lipid profile was checked for patients and the amounts of LDL and HDL were registered. After drug prescription and three months later the levels of LDL and HDL were rechecked and compared.

Results: 64.4% were men and the average age was 54.46 years. 34.44% were with diabetes, 32.7% were with high blood pressure, 46.6% with hyperlipidemia background, and 56.7% with smoking background. Compare the amounts of LDL, cholesterol and triglyceride after three months showed that the levels of them were decreased significantly.

Conclusions: The results of this study showed that after 3 months of treatment, the mean of LDL level was more than the target range (70 mg/dl) that this may be due to inadequate dose of drug, irregular use, improper education to patient and irregular follow-up.

Keywords: LDL, HDL, ACS, Hospital, Ardabil

INTRODUCTION

Ischemic heart disease is highly prevalent worldwide, and causes about one-fifth of deaths, and it is very likely to become the most common cause of death worldwide by 2020.¹ Coronary artery disease causes death, disability and economic loss more than any other disease in the developed countries and it is the most common, dangerous and deadly chronic disease in the United States. Over 12 million people in US are affected by ischemic heart disease. Almost every minute that ticks by, coronary artery disease kills an American.² According to statistics, about 15 million people out of Iran's 70-million-population are suffering from cardiovascular diseases.³ As studies undertaken have shown, cardiovascular diseases are the most common cause of mortality in Iran, i.e., about 46% of deaths occur because of it.⁴ So far, a number of

factors including age, family history, blood fat disorders, high blood pressure, diabetes, history of heart disease have been identified effective in the development of the disease.⁵ The international Health Institute of America in 2005 announced that, annually, 23 million of young people are diagnosed with heart disease, of which 85% have at least one risk factor.⁶

Justin et al. in their study reported that 49% of heart patients studied had at least two risk factors.⁷ Estegamati et al study in Tehran showed that 30% of patients suffered from diabetes, 91% had hypertension, 42% were smoking.⁸ Diabetes mellitus is a risk factor for heart disease that accelerates atherosclerosis and is often accompanied by an increased risk of angina pectoris, myocardial infarction and sudden death.¹ Fitchett asserts that diabetes increases the risk of heart disease up to

almost 2 to 3 times, as such 70% of patients with diabetes die due to coronary artery disease.⁹

Studies have detected a strong link between high blood pressure, smoking and the incidence of ischemic heart disease.^{1,10}

Hyperlipidemia is a risk factor for atherosclerosis which involves hypercholesterolemia, and hypertriglyceridemia.¹ Today, cholesterol, triglycerides and lipoproteins are examined mostly because of being tied with the major cause of mortality in different countries. Not only are abnormal concentrations of lipids and lipoproteins the main risk factors for cardiovascular disease, but available evidence suggests that changes in lipid and lipoprotein levels made by having food or drug interactions may also significantly alter the incidence of cardiovascular disease.²

The purpose of this study was to examine dyslipidemia in patients with acute coronary syndrome, and also LDL and HDL levels, three months after treatment, as well as their success rate in the management of patients and decreasing their lipid level in their profile to the targeted level (less than 70).

METHODS

This is a case-series study. In this study, 180 patients with acute coronary syndrome, who were hospitalized in the cardiology ward and CCU in Ardabil Imam Hospital, were selected and information like age, sex, coronary risk factors, type and dosage of prescribed drugs when they were discharged from hospital, were gathered and recorded in the data collection sheets. The patients were informed about the necessity of using medication and were given primary instructions on keeping themselves on diet through educational pamphlets. Patients had visited the cardiology clinic one week and one month after being discharged from hospital and the prescribed medication were rechecked, and advice was given for the patients on regular consumption of the drugs. Eventually, in the third follow-up (three months after discharge) patients repeated examination and tests and their levels of LDL, and HDL were assessed again. The data, after being collected, were analysed in SPSS v16 using descriptive statistics, chi-square and T-test, and were presented in the form of tables and charts. In all tests the level of significance was set at less than 0.05.

RESULTS

Of all patients, 116 cases (64.4%) were male and the rest were female. Their average age was 54.46 ± 8.66 and 65 patients (36.1%) were in the age range between 40 and 50 years. 62 patients (34.44%) had a history of diabetes, 59 patients (32.7%) had hypertension, 102 patients (56.7%) were smokers, and 100 patients (55.6%) had taken medications irregularly. 84 cases (46.6%) had hyperlipidemia.

At the beginning of study, the LDL level of 113 patients (86.7%) was more the targeted level. After 3 months, this number reduced to 38 patients (21.1%). Additionally, it was also observed that average LDL level in patients went down significantly, after three months of treatment ($P = 0.001$) (Table 1).

The assessment of HDL level, three months following treatment, showed no significant increase in HDL level of patients (Table 1).

The number of patients who had high total cholesterol level (i.e., 127 patients, 70.6%) fell to 58 patients (32.2%) by the end of the third month. It was also observed that three months after treatment, total cholesterol levels reduced significantly ($P = 0.001$) (Table 1).

In the beginning of the study, the number of patients with an increased level of triglyceride was 159 (88.33%). This number decreased to 41 patients (22.77%), following 3 months of treatment. The results showed that the decrease in triglyceride level of the patients after three months of treatment was significant ($P = 0.033$) (Table 1).

Table 1: The mean of LDL, HDL, TG and Cholesterol during study.

Variables	Time	Mean±SD	P-Value
LDL	On Admission	220.1±22.6	0.001
	Three month late	87.9±18.4	
HDL	On Admission	39.5±11.9	0.134
	Three month late	37.9±8.4	
TG	On Admission	197.7±40.2	0.001
	Three month late	164.9±25.5	
Cholesterol	On Admission	218.3±158.9	0.033
	Three month late	186.2±124.4	

DISCUSSION

Of the patients, 64.4 percent were male and the average age of the patients was 54.5 years, which was similar to the studies done in other places in terms of age and sex.^{4,11-13} Considering LDL, it was observed that 86.7%, and 21.1% of patient were of abnormal level of LDL at the beginning and at the end of the study, respectively, indicating that treatment significantly reduced LDL levels ($P < 0.001$). Similarly, at the beginning of and at the end of the study, 70.6% and 32.2% of patients, respectively had increased cholesterol level, that treatment could significantly reduce ($P < 0.001$). Additionally, 88.3% of patients at the beginning of the study and 22.8% percent at the end of the study had increased level of triglyceride, that treatment also had a significant effect on its drop ($P = 0.033$). However, no significant change was observed in HDL levels. Asadpour et al in their study found that 62.8% of patients with final diagnosis for acute coronary syndrome, had dyslipidemia.⁴ In a study conducted by Heydari et al two groups of patients with coronary heart disease ($n = 386$), and without coronary heart disease (181 patients) were compared and no significant

difference was detected in total cholesterol and LDL-C between groups, while their difference in triglyceride and HDL-C levels was significant.¹⁰ In a study by Sakuma et al, low HDL-C in men, and high triglyceride and low HDL-C and in women, were the main risk factors for acute coronary syndrome.¹¹ In the study done by Hammoudeh et al, the prevalence rate of hypercholesterolemia and hypertriglyceridemia was 19% and 27% respectively.¹² The prevalence of low HDL-C in men and women with coronary heart disease was more common than in men and women without coronary heart disease, but the prevalence of hypercholesterolemia and hypertriglyceridemia didn't vary across two groups. In their study, Radovanovic et al observed that of all the patients with acute coronary syndrome, 45% had dyslipidemia.¹⁴ Additionally they found that early administration of lipid-lowering medication was associated with lower in-hospital mortality. Rosenson et al. identified atorvastatin and rosuvastatin as the most effective drugs in reducing serum LDL, while atorvastatin and rosuvastatin are also equally effective in reducing triglycerides and are the best medication for lowering it in serum.¹⁵⁻¹⁷ Considering the above study's finding and comparing it with other studies, the lack of appropriate reduction in LDL cholesterol can be attributed to several factors mentioned below:

1. The low doses of drugs like atorvastatin that in this study the majority of patients were taking the dose of 20 mg/dl.
2. Irregular drug use, more than half of patients had taken the drug irregularly in this study.
3. Lack of follow-up and lack of timely visit or referring to other doctors, different drug prescriptions may have led to change in the dosage of drug and have controlled the patients' lipid profiles.
4. Patients not having timely routine tests which can be attributed to their unawareness of the necessity of follow-up tests.

CONCLUSIONS

The results showed that the mean level of LDL after three months was more than the target amount (more than 70 mg/dl), which can be due to inadequate drug dosage, irregular use of medication, inadequate training or irregular follow-up which needs to be reviewed.

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