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Assessment of Lipid Profile of Patients with Acute Myocardial Infarction: A Comparative Study

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Abstract
Background: *Cardiovascular disease is regarded as a multifactorial disease, which affected by the environment and genetic factors. A growing evidences indicates that elevated concentrations of TG, TC, LDL-C and decreased HDL-C accelerate the development of atherosclerotic plaques. Hence; we planned the present study to assess the levels of mean serum lipid profile in AMI patients.*
Materials & Methods: *The present study included assessment of serum lipid profile in AMI patients. A total of 20 AMI patients and 20 aged matched controls were included in the present study. After overnight fasting, venous blood was collected from all the subjects in serum separator Vaccutainer tubes. We evaluated the levels of serum total cholesterol and serum triglycerides by using an Autoanalyzer. All the data were recorded on excel sheet. SPSSs software was used for the assessment of level of significance.*
Results: *A total of 20 AMI patients and 20 normal were included in the present study. Significant results were obtained while comparing the mean TC levels and HDL levels in patients of the AMI group and control group.*
Conclusion: *Risk of AMI is not prevented by reduction in the mean serum cholesterol levels.*
Keywords: *Acute myocardial infarction, Lipid profile.*

Introduction

Cardiovascular disease (CVD) is the leading cause of mortality and morbidity worldwide in both male and female populations that are widely accepted.[1, 2] Cardiovascular disease is regarded as a multifactorial disease, which affected by the environment and genetic factors. Traditional cardiovascular risk factors, such as smoking, drinking, diabetes, dyslipidemia and advanced age, can increase the risk of cardiovascular disease.[3] Among the many cardiovascular disease risk factors, dyslipidemia is considered as the most important factor, which is a strong predictor for cardiovascular outcomes after Acute myocardial infarction (AMI).[4] Lipid profile evaluation including total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL-C) and high-density lipoprotein (HDL-C) allows an assessment of CVD risk. A growing evidences indicates that elevated concentrations of TG, TC, LDL-C and decreased HDL-C accelerate the development of atherosclerotic plaques.[5- 7] Hence; we planned the present study to assess the levels of mean serum lipid profile in AMI patients.

Materials & Methods

The present study was planned in the department of general medicine of Government RBM hospital

and medical college, Bharatpur and included assessment of serum lipid profile in AMI patients. Ethical approval was taken from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 20 AMI patients and 20 aged matched controls were included in the present study. Inclusion criteria for the present study included:

1. Patients with acute myocardial infarction and who gave written consent for participating in the study.
2. Chest pain lasting more than 20 minutes
3. Diagnostic ECG changes with characteristic ECG alterations consisting of (in Absence of LVH and LBBB)
   a. ST elevation:

i. New ST elevation at the J point in two contiguous leads with the cut-points.

ii. ≥0.1mV in all leads other than leads V2–V3 where the following cut points apply. ≥0.2 mV in men ≥40 years; ≥0.25 mV in men <40 years, or≥ 0.15 mV in women.

b. ST depression and T wave changes:

c. New horizontal or down-sloping ST depression ≥ 0.05 mV in two contiguous leads and/or T inversion≥ 0.1 mV in two contiguous leads with prominent R wave or R/S ratio 1.

After overnight fasting, venous blood was collected from all the subjects in serum separator Vaccutainer tubes. We evaluated the levels of serum total cholesterol and serum triglycerides by using an Autoanalyzer. All the data were recorded on excel sheet. SPSSs software was used for the assessment of level of significance. One way ANOVA and chi-square test were used for assessment of results. P- value of less than 0.05 was taken as significant.

Results

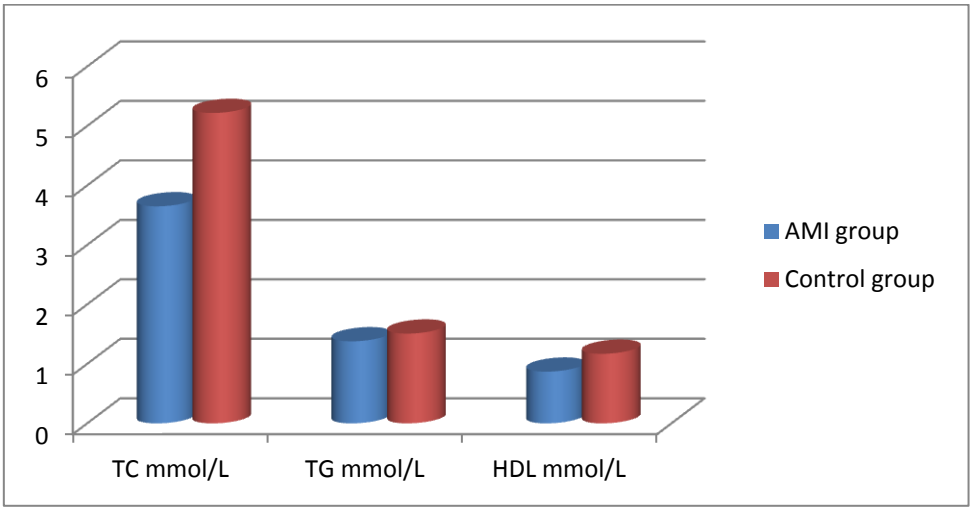
A total of 20 AMI patients and 20 normal were included in the present study. Mean TC levels in AMI patients and normal control were found to be 3.65 and 5.22 mmol/L respectively. mean TG levels in the patients of AMI group and normal control group were found to be 1.38 and 1.51 mmol/L respectively. Significant results were obtained while comparing the mean TC levels and HDL levels in patients of the AMI group and control group.

Table 1: Comparison of TC, TB and HDL levels in patients of AMI group and control group

Parameter	AMI group	Control group	P- value
TC mmol/L	3.65	5.22	0.01*
TGmmol/L	1.38	1.51	0.25
HDLmmol/L	0.87	1.17	0.02*

*: Significant

Figure 1: Mean TC, TB and HDL levels in patients of AMI group and control group



Discussion

In the present study, we observed significant results while comparing then mean TC levels and TG levels in patients of the AMI group and contour group. Zhong et al estimated the prevalence lipid profiles in Hakka patients with AMI in southern China. They analyzed 1382 patients with a first AMI in Hakka patients in southern China between Jan. 2015 and Dec. 2015. Their findings demonstrated that low-density lipoprotein cholesterol (LDL), total cholesterol (TC), and triglyceride (TG) were higher in nonelderly than in elderly for males. There were significant differences in TC, LDL, HDL, and TG among various age groups for both males and female patients ($P < .05$). TC, LDL, HDL, and TG were higher in females than males for the elderly, and the LDL levels of females were higher in 70–79,80–89 year age groups than males. The HDL level of female patients was higher than males in those 50–59, 60–69, and 70–79 year age groups. Compared with males, females had higher level of TG in the 60–69, 70–79, and 80–89 year age groups and had higher level of TC in the 50–59, 70–79, and 80–89 year age groups, respectively. Isolated high TG (normal LDL + normal HDL+ high TG) was most common type of combined dyslipidemia for female elderly (22.2%), female nonelderly (23.2%) and male elderly (24.1%) patients. Their results confirmed that serum lipid levels varied in age and gender in Hakka patients with acute myocardial infarction. Dyslipidemia is more prevalent in the non-elderly than in the elderly for males. Levels of TC, LDL, HDL, and TG were higher in females than males for the elderly Hakka population in southern China.[8] Shrivastava AK et al evaluated the effect of acute myocardial infarction (AMI) on the levels of lipid profile and inflammatory markers. They investigated 400 patients with AMI who were admitted within 24 h of onset of symptoms. Serum levels of total cholesterol (TC), triglyceride (TG), low density lipoprotein (LDL) and high density lipoprotein (HDL) were determined by standard enzymatic methods along with high sensitive C-reactive protein (hs-CRP) (latex enhanced immunoturbidimetric assay) and cytokines, interleukin (IL)-6 and IL-10 (quantitative ‘‘sandwich’’ enzyme-linked immunosorbent assay). The results indicated a trend of reduced TC, LDL, and HDL, and elevated TG levels, along with pro- and antiinflammatory markers ($p < 0.001$), between day 1 and the day 2 serum samples of AMI patients. However, corrections in the serum levels have been observed at day 7. Their results demonstrated significant variations in the mean lipid levels and inflammatory markers between days 1, 2 and 7 after AMI. Therefore, it is recommended that the serum lipids should be assessed within 24 hours after infarction. Early treatment of hyperlipidemia provides potential benefits. Exact knowledge regarding baseline serum lipids and lipoprotein levels as well as their varying characteristics can provide a rational basis for clinical decisions about lipid lowering therapy.[9]

Khan HA et al compared the lipid profiles, including serum total cholesterol (TC), low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL) and triglycerides (TG), in 67 AMI patients. Patients included 28 STEMI (ST-elevated myocardial infarction) patients, 39 NSTEMI (non-ST-elevated myocardial infarction) patients and 25 patients with chest pain. Control group included 54 age- and gender-matched normal subjects. We also studied the correlation between lipid profile and systemic inflammation in these subjects. There were significant decreases in TC, LDL and HDL levels in both STEMI and NSTEMI patients as compared to normal subjects; however, patients with chest pain did not show any significant change in these lipids. Serum TG levels did not differ significantly among the study groups. There were significant increases in serum high-sensitive C-reactive protein (hs-CRP) levels in STEMI and NSTEMI patients, as compared to control group. Serum hs-CRP showed significant inverse correlation with HDL; however, hs-CRP was not correlated with TC, LDL, and TG. In conclusion,

our findings suggest that reduction in serum TC does not prevent the risk of AMI, whereas a decrease in serum HDL and increase in hs-CRP strongly predisposes the risky individuals to an AMI event. They emphasize the importance of HDL and CRP measurements for the assessment of a combined lipid-inflammation risk factor that could be a useful predictor of high risk individuals, as well as a prognostic marker in AMI patients.[10]

Conclusion

From the above results, the authors concluded that risk of AMI is not prevented by reduction in the mean serum cholesterol levels. AMI patients are significantly associated with increase in systemic inflammation as depicted by their correlation with triglyceride levels. However; future studies are recommended.

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