

Original Article

Comparison of Serum Lipid Profiles Immediate on Admission And 24 Hours Later in Patients with Acute Myocardial Infarction

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ABSTRACT

Aims: To compare serum lipid profiles immediately and random immediately on admission & 24 hours later in Acute myocardial infarction (AMI) patients. **Methods:** In this cross-sectional study, 118 AMI patients admitted in the Cardiology Department of a tertiary hospital in Bangladesh were evaluated. Serum total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglyceride (TG) were measured in both random states immediately other admission & then 24 hours later. **Results:** All the measured component of the lipid profile e.g. serum TC, HDL-C, LDL-C and TG, were higher in the random post admission state than the measured components in 24 hours later in AMI patients. **Conclusion:** Random immediately after admission blood sample, which is more convenient, should be used for assessing lipid profile in AMI patients advised for the test.

Keywords: Serum Lipid, Acute Myocardial Infarction, Coronary artery disease (CAD)

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INTRODUCTION

Coronary artery disease (CAD) is a leading cause of death and by 2020, 60% of world's heart disease has occurred in

India subcontinent. Atherosclerosis in the underlying cause of CAD. The major risk factors for atherosclerosis include

hypertension, tobacco smoking, dyslipidaemia, insulin resistance, diabetes mellitus (DM) and obesity. Evaluation of dyslipidaemia is usually done in fasting state in most of the laboratories in and includes estimation of serum total cholesterol, triglycerides (TG), high-density lipoprotein cholesterol (HDL) and low-density lipoprotein cholesterol (LDL). Of these LDL is calculated using the Friedwald's Formula which is cost effective.

Opinion is divided on the changes that occur in serum lipids and lipoproteins following myocardial infarction (MI). Most workers have reported a reduction in total cholesterol¹⁰, HDL-cholesterol and LDL-cholesterol⁷⁻⁹ after acute MI. Others have, however, reported no change in serum total cholesterol and HDL-cholesterol¹¹. Similar variations have also been noted in serum triglycerides levels¹¹⁻¹³. From these reports it is clear that phasic changes do occur in patients following MI and therefore there is a recommendation for detection of hyperlipidaemia in patients with acute MI that the serum lipids should be assessed either within 24 hours after infarction.

Issues regarding how soon after myocardial infarction should plasma lipid values be assessed has undertaken in several studies abroad. Such study in Bangladesh yet to be done.

The present study is, therefore, undertaken to examine the changes in serum lipid profile in our Bangladeshi subjects with acute MI patients randomly after admission in hospital & 24 hours later which could guide treatment in AMI patients, if any.

METHODS AND MATERIALS

This cross-sectional study was conducted in the cardiology inpatient department of Mymensingh Medical College Hospital in Bangladesh from September 2016 to August 2017; the Institutional Review Board approved the study protocol. All

patients aging 25-75 years got admitted to the cardiology inpatient department with chest pain were included in the study population. Patients having a major cardiovascular disorder to whom keeping 8 hours fasting is not justifiable; patients with severe illness for any cause who unable to give 8 hours fasting blood sample; patients of diabetes mellitus who is on insulin therapy, TG \geq 400mg/dL; and patients not willing to enroll in the study were excluded from the study.

The study was carried out is 118 patients (76 male, 62.71% and 44 females, 37.28%) admitted in CCU with acute myocardial infarction. The diagnosis of MI was established by clinical (history and physical examination), 12 lead electrocardiogram and plasma level of troponin I. Data were collected from all respondents by the direct interview; informed written consent was obtained from all. Blood samples collected after admission were sent to the cardiology laboratory of the hospital for the estimation of Lipid profile, serum creatinine, random blood sugar and troponin I level. The lipid profile was measured again on the next day morning after overnight fasting of at least 8 hours. The measurement of TC, TG and HDL cholesterol was carried out by the semi-auto chemistry analyzer MF, 808A (Med future LLC, USA); LDL-C was calculated from TC, HDL-C and TG using the Friedwald equa

STATISTICAL ANALYSIS

The data were analyzed by the Statistical Package for Social Science Version 20 (IBM, Corp, Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) software. The categorical variables were represented as percentages, and measurable variables were represented as mean \pm standard deviation. The student's t-test was performed for comparing the lipid parameters in fasting and non-fasting

states. $P < 0.05$ was considered statistically significant.

RESULT

In the present study, we measured random, non-fasting and fast fasting 1-2 days later lipid profiles in 118 acute Myocardial infarction patients.

Table -1: Demographic and clinical characteristics of the study participants (n=118)

Variable	Sub group	N (%)
Gender	Male	74 (62.71%)
	Female	44 (37.28%)
Age (years) mean \pm SD	<40	19 (16.10%)
	41-50	34 (33.05%)
	51-60	16 (13.55%)
	>60	44 (37.28%)
Smoking status	Non-smoker	40 (33.89%)
	Smoker	78 (66.11%)
BP status	Non-Hypertensive	37 (31.35%)
	Hypertensive	81 (68.65%)
DM	Absent	13 (11.01%)
	Present	105 (89%)
BMI (kg/m ²) mean \pm SD	Normal	58 (49.16%)
	Overweight obese	60 (50.84%)

Table 1 summarize study populations, predominate are male, the majority of the patients are aged >50 years. Among the

affected patients majorities are smokers, diabetics & hypertensives. The majority of them (>50%) are obese or overweight.

Table-2: Mean fasting and non-fasting lipid profile of the study population (n=118)

Patient category	Lipid component (mg/dL)	Mean \pm SD		P
		Rand, Non- fasting value	Fasting 1-2 days later value	
AMI (n=118)	TC	199.99 \pm 44.74	173.42 \pm 36.88	0.001
	HDL-C	39.46 \pm 14.41	36.17 \pm 10.72	0.007
	LDL-C	127.91 \pm 42.15	109.07 \pm 30.72	0.001
	TG	161.92 \pm 80.09	140.90 \pm 53.22	0.001

Unpaired student 't' test, ≤ 0.05 is significant.

Table-2 summarizes the comparison of random immediately on admission and 24 hours later lipid profile of study population. All the components of the lipid profile (TC, LDL-C, HDL-C and TG) were significantly higher in the random immediate state in comparison to fasting 24 hours later state.

DISCUSSION

AMI is associated with profound alternations in the plasma lipoprotein profile. The mechanism of these alternations yet to be clearly known, and both cholesterol biosynthesis up- and down- regulation could be a consequence of AMI. Lipids change after AMI may persist for several weeks. That is why it is better to do a lipid profile in such patients during the first 48 h after AMI, and the test

may be repeated after 3 months.⁴ We measured the lipid profile in myocardial infarction patients after hospital admission and again the next day morning at a fasting state. Higher values of all the components of the lipid profile measured (TC, HDL-C, LDL-C, and TG) were observed in the nonfasting state when compared to fasting values in these patients. Ryder et al. observed no significant difference between random and fasting TG level though TC, LDC-C and HDL-C showed significant falls in the fasting state.⁹ Vether et al.⁵ recorded a progressive fall in triglycerides levels from the second hour after MI. Nigam et al.⁴ shows some significant alterations in serum HDL-cholesterol, triglycerides and ratings of TC/HDL-C and LDL-C/HDL-C after MI, but did not find significant changes in serum total lipids, total cholesterol and LDL-cholesterol. Therefore, the optimum time for estimation of serum lipids in patients with MI appears to be within 24 hours of acute episode. The mechanism of the changes is still not clear. Could it be a metabolic effect of stress, hormone etc? One recent study has shown that acute myocardial infarction causes a profound up regulation of cholesterol synthesis as acute phase response and the observed decrease of plasma cholesterol levels after acute myocardial infarction must, therefore, be explained by Parallel increase of LDL receptor activity and thus increased cholesterol Catabolism⁶. The mechanistic aspect of these changes deserves further investigations with larger number of patients.

CONCLUSION & RECOMMENDATIONS

The current study found the patients with AMI had higher levels of all lipid parameters in the random, immediately on admission including triglyceride concentration. Values of total cholesterol, low density lipoprotein and high-density lipoprotein all fall significantly in fasting state 24 hours later. Lipid profile may be

assessed more accurately at admission random & immediately on admission rather than later. Further, large-scale studies involving more diverse clinical group of patients in multiple center may be done to justify the utility of random, immediate lipid profile estimation in AMI patients.

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