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COMPARISON OF POST PRANDIAL LIPID PROFILE AT AN INTERVAL OF 2 HOURS AND 4 HOURS IN PATIENTS OF CORONARY HEART DISEASE

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ABSTRACT: Coronary heart disease (CHD) is widely prevalent both in the developed and developing countries and continues to be a leading cause of mortality despite recent advances in diagnostic facilities and treatment modalities. Recently it has been proposed that postprandial lipoprotein may be a better indicators of deranged lipoproteins metabolism and hence of atherosclerosis and CHD. The levels of non-fasting triglycerides are better at predicting future cardiovascular events than levels of fasting triglycerides. Furthermore, it is possible that non-fasting levels of lipids, lipoprotein, differ only minimally from levels in the fasting state simply because, most of the people consume for less fat at ordinary meals than during a fat tolerance test. The aim of the current study is to determine the postprandial (at the intervals of 2 hours and 4 hours) lipid parameters TC, TGL, HDL, LDL and VLDL levels in Coronary heart disease patients and to compare it with fasting lipid profile. 200 subjects were selected with 100 controls and 100 CHD cases. Statistical analysis was done. The study was concluded that the lipid parameters TC, TGL, LDL and VLDL levels are decreased in 2 hours and 4 hours postprandial and the HDL levels gradually increased in 2 hours and 4 hours in CHD compared to controls group.

INTRODUCTION: Coronary heart disease (CHD) is widely prevalent both in the developed and developing countries and continues to be a leading cause of mortality despite recent advances in diagnostic facilities and treatment modalities. It is a multifactorial disease where atherosclerosis and dyslipidaemia were the prominent causes involved.¹

Hypercholesterolemia and hypertriglyceridaemia are considered the independent risk factors but most of the earliest studies in the area have considered only the fasting lipids and lipoproteins. Recently it has been proposed that postprandial lipoprotein may be a better indicators of deranged lipoproteins metabolism and hence of atherosclerosis and CHD.²

Despite this fact, plasma lipids, lipoprotein, for cardiovascular risk prediction are usually measured in fasting state.³⁻⁵ A main reason is the increased in triglyceride level scene during a fat tolerance test, in which patient typically consume 1 gram fat per 1 Kg body weight.⁵⁻⁶

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However, levels of non-fasting triglycerides are better at predicting future cardiovascular events than levels of fasting triglycerides. Furthermore, it is possible that non-fasting levels of lipids, lipoprotein, differ only minimally from levels in the fasting state simply because most people consume for less fat at ordinary meals than during a fat tolerance test.⁷ We tested the hypothesis that levels of total cholesterol, triglycerides, HDL, LDL and VLDL. In this TG and HDL will be estimated enzymatically with the use of gold standard diagnostic kits, while VLDL and LDL will be calculated using Friedewald equation.⁸⁻¹¹

MATERIALS AND METHODS: 200 subjects selected in which 100 were CHD cases and 100 normal pregnancy controls. 3ml of venous blood sample was collected aseptically for each subject after a twelve hours overnight fasting and then two hours and four hours after a mixed diet. After centrifugation at 3000 rpm for 10 minutes, the serum samples were analyzed for lipid parameters using standard kits. Total cholesterol (TC), HDL-

cholesterol (HDL-C) and TG were estimated enzymatically while VLDL and LDL were calculated using Friedewald equation.¹¹

Statistical Analysis: ANOVA test was used to compare the groups to continuous variables. All analysis was done using windows based SPSS statistical package.

RESULTS AND DISCUSSION: There were significant differences in the total cholesterol, triglyceride, HDL, LDL and VLDL between Control and coronary heart disease patients groups **Table 1** and **2**. P value (<0.05) significant for fasting, 2 hours and 4 hours lipid profile for CHD **Table 2**. The observation of the study was 2 hours and 4 hours interval of postprandial lipid profiles is the better indicator for Coronary heart disease patients. Coronary bypass grafting surgery and coronary angioplasty [Lipid Lowering Therapy] it help to increase HDL Level in 2 Hours and 4 Hours post prandial lipid profile in coronary heart disease patients.

TABLE 1: SHOWS THE CONTROL GROUP OF MEAN AND STANDARD DEVIATION OF FASTING, 2 HOURS, AND 4 HOURS OF LIPID PARAMETERS

| Parameters (mg/dl) | Fasting | 2 Hours | 4 Hours | P-Value |
|--------------------|--------------|--------------|--------------|---------|
| TC | 120.7 ± 18.3 | 120.3 ± 19.1 | 117.0 ± 18.2 | >0.05 |
| TGL | 92.1 ± 15.4 | 100.7 ± 12.1 | 98.1 ± 8.5 | >0.05 |
| HDL | 34.1 ± 2.6 | 34.5 ± 4.3 | 35.2 ± 3.8 | >0.05 |
| LDL | 101.7 ± 8.6 | 103.9 ± 9.3 | 132.3 ± 12.3 | >0.05 |
| VLDL | 17.4 ± 3.3 | 15.9 ± 3.3 | 16.6 ± 8.6 | >0.05 |

P value >0.05 denotes not significant. Values are given in Mean ± SD

TABLE 2: SHOWS THE STUDY GROUP OF MEAN AND STANDARD DEVIATION OF FASTING, 2 HOURS, AND 4 HOURS OF LIPID PARAMETERS IN CHD PATIENTS

| Parameters (mg/dl) | Fasting | 2 Hours | 4 Hours | P-Value |
|--------------------|--------------|--------------|--------------|---------|
| TC | 186.0 ± 18.0 | 179.0 ± 18.2 | 174.1 ± 19.8 | >0.05 |
| TGL | 121.8 ± 22.7 | 111.3 ± 19.3 | 116.7 ± 19.9 | >0.05 |
| HDL | 37.4 ± 6.0 | 39.0 ± 4.7 | 36.7 ± 3.9 | >0.05 |
| LDL | 117.1 ± 18.9 | 119.7 ± 10.4 | 118.6 ± 9.6 | >0.05 |
| VLDL | 29.0 ± 5.7 | 25.3 ± 6.6 | 23.5 ± 6.8 | >0.05 |

P value >0.05 denotes not significant. Values are given in Mean ± SD

DISCUSSION: Coronary revascularization by percutaneous techniques is widely used in the treatment of patients with stable angina pectoris, inducible myocardial ischemia, or both. Studies comparing medical treatment and percutaneous revascularization suggested that patients who underwent revascularization had an improvement in their quality of life, exercise performance, or both. However, effect of medical treatment, as compared percutaneous revascularization, on the

incidence of ischemic events and the need for subsequent revascularization was less certain. Lipid-lowering treatment has been shown to reduce significantly the incidence of cardiovascular events, overall mortality, and the need for revascularization. Without increasing the risk ischemic events. In a randomized, control study, we compared the outcomes in patients who received atorvastatin with the outcomes in similar patients who underwent percutaneous revascularization,

with or without stenting, and the received usual medical treatment, which could include lipid-lowering medication.¹²

In our study due to after done the coronary artery bypass grafting surgery (or) angiogram, (lipid lowering therapy). HDL level increased gradually in 2 hours and 4 hours lipid profile in CHD patients to compare other lipid parameters (TC, TGL, LDL and VLDL).

It is well documented that Hyperlipidemia is a risk factor for cardiovascular disease and fasting lipoprotein measurements, according to ATP III recommendation guidelines, is currently considered the standard of care when assessing a patient's lipid profile.¹³ In a clinical setting this creates an inconvenience for patients and providers alike. However recent studies have raised doubt as to the need to measure fasting lipids and thus changing clinical practice.

The studies in this review directly compared fasting versus non-fasting lipid concentration as a risk factor for cardiovascular events.¹⁴⁻¹⁶

In 2007, postprandial lipemia was proven to be an independent risk factor for cardiovascular events in a study of 1,793 adults from the Copenhagen general population study. The study showed that increasing levels of non-fasting triglyceride were associated with increased risk of MI, IHD, and consequently death in men and women. Their findings propose that every 1mmol/L increase in non-fasting triglyceride levels corresponds to further increase in the hazard ratio of the cardiovascular outcomes.¹⁷ In our study concludes that HDL levels were increased rapidly in CHD patients, other parameters TC, TGL, LDL were decreased at 2 hours and 4 hours post prandial lipid profile in CHD patients. The significant value or the sustained postprandial increase, of the postprandial TG and VLDL levels shown in this study are also of significant importance. All the postprandial TG values up to the 12th hour of observation were significantly higher than the baseline at a range of 23.86 to 72.02 mg/dl (0.27 to 0.82 mmol/L).

In this study HDL levels were increased after done the bypass grafting surgery or angiogram, the levels of other parameters in lipid profile were decreased.

The postprandial VLDL levels showed a similar pattern to TG as mentioned above. However, there is still a lack of data regarding VLDL values. Although in our analysis, VLDL had a significant postprandial rise and is considered as a component of postprandial lipemia as well. With our results and data of other studies presented, this postprandial phenomenon should be addressed especially in this set of high risk patients in order to avoid recurrence of cardiovascular events. Of note, Boccalandro *et al.*, have shown that patients with coronary artery diseases have a prolonged postprandial lipemia compared to healthy individuals.¹⁸

Fasting levels of triglycerides, VLDL-C and total cholesterol in patients of CHD are significantly higher as compared to those in controls ($p < 0.001$). Fasting HDL-C in CHD patients is lower as compared to that in controls but not significantly. LDL-C is increased significantly in CHD.

Patients as compared to controls in fasting state. AI is significantly higher in patients of CHD than controls ($p < 0.001$). In a prospective cardiovascular Munster study, elevated TG has been found to be significant and independent risk factor for major coronary events even after adjustment for LDL-C and HDL-C levels and other risk factors.¹⁹ Similar results have been reported by some other authors.²⁰⁻²¹ Postprandially, TG levels in CHD patients are found to be raised significantly as compared to controls ($p < 0.05$) and fasting state ($p < 0.001$). Total cholesterol is high postprandially as compared to controls ($p < 0.001$) but decreased as compared to fasting in both controls ($p > 0.05$) and study group ($p < 0.001$).

Similar findings have been reported by Ernst JS *et al.*, but they observed significant decrease in both the groups 4 PP HDL-C is lower in study group as compared to control group ($p < 0.05$). TG rich lipoproteins in PP state act adversely on vascular endothelium through increasing superoxide anion radicals or by direct impairment of vascular endothelium by decreasing coronary bioactivity.²²⁻²³

In our study HDL levels increased in gradually after done the bypass grafting surgery in 2 hours and 4 hours lipid profile.

CONCLUSION: Our study highlights that the postprandial lipid parameters TC, TGL, LDL and VLDL levels were decreased in 2 hours and 4 hours CHD patients to compare to the fasting samples. HDL levels were gradually increased 2 hours and 4 hours CHD patients to compare to the fasting lipid profile. So conclusion of the study was postprandial lipid profile is a better indicator to analyses the CHD patients.

In our study due to after done the coronary artery bypass grafting surgery (or) angiogram, (lipid lowering therapy). HDL level increased gradually in 2 hours and 4 hours lipid profile in CHD patients to compare other lipid parameters (TC, TGL, LDL and VLDL).

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