

Study Of Post-Prandial Hypertriglyceridemia as An Independent Risk Factor for Ischemic Heart Disease

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Abstract:

Introduction: Coronary heart disease is the leading cause of death in Western countries and it is now an increasing problem in developing countries too, due to changes in life style and dietary habits. Heart Disease is responsible for more deaths and disability among Western Population, both male and female, than any other killer disease, and it is quickly establishing itself as the leading cause of death and disability among Indians as well.

Aim of the Study: To study relation between risk factors for atherosclerosis and fasting and postprandial triglyceride levels in patients of Coronary artery disease. To establish that post-prandial triglycerides level is a better indicator as a 'risk factor' for atherosclerosis

Materials and methods: A complete physical and cardiovascular system examination performed. Blood pressure measurements were performed with mercury sphygmomanometer in a standardized fashion. Waist circumference was measured at umbilical level. Hip circumference was measured at maximum girth at hip. Recording of ECG was done with 12 leads recording in standard fashion with B.P.L machine. Fasting samples of blood glucose, Fasting Lipid profile was measured

Results: In our study, out of 56 male 34 (62.5%) were suffering from diabetes mellitus while 30 female out of 44 were (68.18%) diabetic. So out of 100 patients 64 patients were suffering from diabetes. In our study, 57 patients were hypertensive. 32 male patients out of 56 male patients were hypertensive (57.14%) and 25 female patients out of 44 patients (56.81%) were hypertensive. In the present study, postprandial hypertriglyceridemia was found in 16 patients out of 23 patients (69.5%) in the age group 35-45, 31 patients out of 46 patients (67.39%) in the age group 46-55, 9 out of 21 patients (42.8%) in the age group 56-65, and 8 patients out of 10 (80%) in the age > 66 years.

Conclusion: In our study with reference to patient of ischemic heart disease, postprandial Hypertriglyceridemia was found in 64% patients, having normal fasting triglyceride level. There is statistically a significant correlation between postprandial triglyceride and ischemic heart disease, even in patients having normal fasting triglyceride level. It means that patients having high postprandial triglyceride levels have higher risk of Ischemic heart disease. The relative risk is 1.44.

Key words: Coronary heart disease, Fasting Lipid profile, Hip circumference, Postprandial Hypertriglyceridemia.

Introduction

This sudden increase in incidence of Heart disease is seen in our people, as they have adopted a more sedentary westernized life style, together with the intake of high-fat, high-salt diet and processed foods that have come to be associated with technological affluence [1]. The association between atherosclerotic diseases and elevated fasting plasma LDL-C and reduced fasting plasma HDL-C is well established. However, many individuals without fasting lipid abnormalities develop atherosclerotic diseases and several lines of evidence suggest that no fasting lipid measurements may be more relevant to atherogenesis [2]. Typical diets are associated with measurable postprandial lipemia 18 hours per day. A major source of circulating triglycerides is dietary fat, which after hydrolysis into free fatty acids and glycosides, is transported through the intestinal villi and absorbed by enterocytes where these particles are synthesized into chylomicron - associated Triglycerides for entry into the blood compartment and ultimately storage in adipose tissue [3]. Postprandial lipids and their associated partially hydrolyzed chylomicron remnants appear to promote early atherogenesis and adversely affect endothelial function, associate with atherogenic small LDL particles, and correlate with both pro-thrombotic and proinflammatory biomarkers, including factor VII, plasminogen activator inhibitor-1, and C-reactive protein [4]. Thus measurement of postprandial Triglycerides - particularly because they peak 3-4 hr after ingestion of a fat-rich meal - might well provide more relevant information on vascular risk than measurements based on fasting concentrations. Diabetic patients have delayed clearance of Triglyceride from blood. Most type 2 diabetic patients have postprandial triglycerides above optimal concentrations for several hours after meals. Moreover, optimal fasting concentrations are not always a good predictor of postprandial triglycerides. So there should be some association of postprandial lipid Metabolism and atherosclerosis, which remains to be proved [6]

Materials and methods

This study was carried out in reference to 100 patients, diagnosed to have ischemic heart disease who were admitted at Pacific Institute of Medical Science, Udaipur for Coronary artery disease. This study was conducted on patients between May 2022 and December 2022.

Inclusion criteria

- Unstable angina diagnosed on classical angina chest pain or angina chest pain equivalent with ECG showing ST segment depression in two consecutive chest leads or Limb leads and Normal S.CPK-MB levels.
- Fasting S. Triglycerides <150 mg%
- Fasting S. Cholesterol < 180 mg%.

Exclusion criteria

- Patients on treatment with lipid lowering drugs.
- Suspected cases of Prinzmetal's angina Rheumatic heart disease.
- Oral contraceptive pills or other hormone therapy.
- Abnormal liver and Renal function test.

A complete and detailed history of patient with address, occupation, past history of diabetes, hypertension, family history, habits of smoking and alcohol was noted. A complete physical and cardiovascular system examination performed. Blood pressure measurements were performed with mercury sphygmomanometer in a standardized fashion. Height measured in standing position without shoes with a standard tape meter. Body mass index was calculated with formula of B.M.I = wt (kg)/Ht (m²). Waist circumference was measured at umbilical level. Waist hip ratio cut off points > 1.0 for male and > 0.85 for female was considered. Recording of ECG was done with 12 leads recording in standard fashion with B.P.L machine. Fasting samples of blood glucose, Fasting Lipid profile was measured which includes measurements of Cholesterol, S. triglyceride, HDL, and LDL VLDL. Post prandial 2 hour. Glucose 4 hour blood samples for triglycerides levels. Fasting lipid profile defined as at least 12 hour fast overnight in which only water is permitted.

Results

In the present study, there were total 100 patients, out of whom 56 were male and 44 were female. Only 17 female patients are aged less than 46 years. There were 46 patients in age group 46-55, out of which 27 were male, and 19 were female. In the age group 56-65 years, 16 were male and 5 were female, while only 7 male and 3 female were in > 65 years age group. The mean age was 47.10 ± 5.2 years. (Table – 1).

Table – 1: Distribution according to age and sex.

Age (Years)	Male	Female	Total
35-45	6	17	23
46-55	27	19	46
56-65	16	5	21
> 66	7	3	10
Total	56	44	100

In our study, out of 56 male 34 (62.5%) were suffering from diabetes mellitus while 30 female out of 44 were (68.18%) diabetic. So out of 100 patients 64 patients were suffering from diabetes (Table – 2).

Table – 2: Presence of diabetes mellitus.

D.M.	Male	Female	Total
Presence	34	30	64
Absence	22	14	36
Total	56	44	100

In our study, 57 patients were hypertensive. 32 male patients out of 56 male patients were hypertensive (57.14%) and 25 female patients out of 44 patients (56.81%) were hypertensive (Table – 3).

Table – 3: Presence of hypertension.

Hypertension	Male	Female	Total
Presence	32	25	57
Absence	24	19	43
Total	56	44	100

In this study, out of 100 patients, 64 patients showed Triglyceride levels >160 mg% after four hour of meal. 34 out of 56 male patients (60.7%) and 30 out of 44 female (68.18%) showed post prandial hypertriglyceridemia (Table – 4).

Table – 4: Distribution according to PP4TG.

PP4TG	Male	Female	Total
Normal	22	14	36

High	34	30	64
Total	56	44	100

In the present study, out of 100 patients 64 had postprandial hypertriglyceridemia. Out of 64, 44 had low fasting S. HDL and 20 had normal fasting S. HDL. While 36 patients had normal postprandial Triglyceride level, out of 36, 14 had low fasting S.HDL and 22 had normal fasting S.HDL. There was no relation found between HDL level and High PP4TG levels (P value was 0.34) (Table – 5).

Table – 5: Distribution according to age and PP4TG.

Age (Years)	Normal PP4TG	High PP4TG	Total
35-45	7	16	23
46-55	15	31	46
56-65	12	9	21
> 66	2	8	10
Total	36	64	100

Discussion

In the present study, 69% patients were aged less than 55 years. While 75% female and 62% male were aged less than 55 years. These findings show that middle age patients are more likely to be selected for study like the present study (P value <0.05). In Hiroyasu, et al. study, 55% were male and 45% were female, average age was 55.1 ± 6.3 years. In that study also majority of patients were from middle age group. (P value <0.05) [10]. In our study, 40% of patients were overweight, 52% of patients were obese, according to National Institutes of Health Definition. The mean BMI was 30.08. The mean BMI in normal PP4TG group was 28.90 and high PP4TG group was 30.87, so there is strong correlation found between High BMI and High PP4TG. In Hiroyasu, et al. study, the mean BMI was 28.08. The mean WHR in normal PP4TG group was 0.968 and high PP4TG group was 1.028, so there is strong correlation found between High WHR and High PP4TG. In Couillard, et al. study, on postprandial triglyceride response in visceral obesity showed that obesity and waist hip ratio are associated with impaired postprandial TG clearance [11]. In our study, 64% were diabetic of which 62.5% of male were suffering from Diabetes Mellitus, whereas 68.18% females were diabetic. The mean FBS in normal PP4TG group was 80.30 and high PP4TG group was 168.90, so there is strong correlation found between High FBS and High PP4TG. The mean PP2BS in normal PP4TG group was 174.30 and high PP4TG group was 226.46, so there is strong correlation found between High PP2BS and High PP4TG. In this study, out of 100 patients, 64 patients showed serum triglyceride level more than 160 mg% after 4 hours of meal. 34 out of 56 male patients (60.7%) and 30 out of 44 females (68.18%) showed postprandial hypertriglyceridemia. These data tell that patients having ischemic Heart disease, even if they have normal fasting triglyceride levels, they might have impaired postprandial lipid metabolism. The mean PP4TG was 181.47 mg% (P Value <0.05) suggest that there is an association between coronary artery disease and PP4TG levels and the relative risk was 1.75.

Conclusion

In our study with reference to patients of ischemic heart disease, postprandial Hypertriglyceridemia was found in 64% patients, having normal fasting triglyceride level. There is statistically a significant correlation between postprandial triglyceride and ischemic heart disease, even in patients having normal fasting triglyceride level. It means that patients having high postprandial triglyceride levels have higher risk of Ischemic heart disease. The relative risk is 1.44. There is statistically a significant correlation found between postprandial Hypertriglyceridemia and high waist-hip ratio and Diabetes Mellitus. Our study showed patients of ischemic Heart disease have high postprandial triglyceride levels in spite of normal fasting triglyceride level. There is a positive correlation between high waist-hip ratio, diabetes mellitus and postprandial hypertriglyceridemia in ischemic heart disease patients.

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