

FREQUENCY OF HYPERTRIGLYCERIDEMIA IN PATIENTS PRESENTING WITH ACUTE CORONARY SYNDROME

Khurshid Ali^{a*}, Imran Waheed^b, Sajjad Ahmad^a, Zohaib Sadiq^a, Gulshan Ahmad^a, Muhammad Aqeel^a

^aPunjab Institute of Cardiology, Lahore. ^bKhawaja Safdar Medical College, Sialkot.

Date of Submission : 24-02-2021; Date of Acceptance: 23-07-2021; Date of Publication: 30-07-2021

ABSTRACT:

BACKGROUND: *Hypertriglyceridemia is a manifestation of several common metabolic disorders in the world. The association of hypertriglyceridemia and clinically important complications such as cardiovascular events is suggested by several studies. But previous studies are showing a significant variation in frequency of hypertriglyceridemia in patients with acute coronary syndrome (ACS), however, we planned the present study to record the frequency of this morbidity.*

AIMS & OBJECTIVE: *The study was conducted to estimate the frequency of hypertriglyceridemia in acute coronary syndrome patients.*

MATERIAL & METHODS: *This cross-sectional, observational study was performed in Cardiology department of Punjab Institute of Cardiology, Lahore over a period of six months from 1st February 2016 to 31st July 2016. Two hundred cases of ACS were enrolled. An informed consent of the patients was obtained. In early morning, an overnight fasting blood sample was drawn from a vein of every patient and was sent to the Pathology Laboratory of Punjab Institute Cardiology for the lipid profile (serum triglyceride level). Hypertriglyceridemia was labelled as per defined criteria.*

RESULTS: *There were 200 patients. Around, 11.5% (n=23) were between the ages of 30-50 years and 88.5% (n=177) were between the ages 51-70 years. The mean of age was 56.95±5.97 years. Males were 55.5% (n=111) and females were 44.5% (n=89). The mean triglyceride levels were calculated as 198.45±23.11mg/dl. The estimated frequency of hypertriglyceridemia in ACS patients was 58% (n=116).*

CONCLUSION: *We can inference that the frequency of hypertriglyceridemia is quite high in ACS patients.*

KEY WORDS: *Acute coronary syndrome, hypertriglyceridemia, frequency*

Correspondence : Khurshid Ali, Punjab Institute of Cardiology, Lahore. Email: khurshid_52x@yahoo.com

Author's Contribution: KA: Principal investigator of the study, collected the data and wrote the article. IW: Helped in conducting the study, gave frequent advises during the study. SA: Helped in article writing and did proof reading. ZS: Helped in data collection. GA: Helped in article writing and rearranging data. MA: Did proof reading.

INTRODUCTION

ACS is a complex state of different coronary events including ST-segment elevation myocardial infarction (STEMI), non-ST segment elevation myocardial infarction (NSTEMI) and unstable angina. The underlying pathology of ACS is presence of atherosclerotic plaque which ruptures due to stress leading to thrombotic occlusion of artery.¹⁻²

A long-time association exists between elevated triglyceride levels and cardiovascular disease.³ In the era of statins, the main focus is on reducing the levels of low density lipoproteins and the importance of triglycerides is reduced. There were many suggestions about the role of high density lipoproteins in the outcomes of coronary artery disease and role of triglycerides was masked.⁴ In ACS, there are changes in lipid profile of the patients which may include decrease in cholesterol and increase in triglycerides.⁵ Another recent local study⁶ recorded that hypertriglyceridemia was present in 83.33% of the cases while another recent study recorded these findings in 50.1%⁷ of the cases.

In previous studies a significant variation in frequency of hypertriglyceridemia in acute coronary syndrome (ACS) was found which needs another research work to conduct to clarify this issue. Results of the study would be helpful for cardiologists and patients as well. By knowing the actual magnitude of the problem we can effectively treat the patient of ACS with hypertriglyceridemia.

MATERIAL AND METHODS:

This cross-sectional, observational study was performed in Cardiology department of Punjab Institute of Cardiology, Lahore for the period of six months from 1st February 2016 to 31st July 2016. Sample size was estimated as 200 cases with confidence level of 95% while 7% margin of error and taking expected percentage of hypertriglyceridemia i.e. 50.1%⁷ in ACS patients. Non-probability, consecutive convenience sampling was used.

Patients with age ranging from 30 to 70 years of both genders presenting with acute coronary syndrome (Patients who present with chest pain of more than 30 minute duration with electrocardiographic changes. Any one of them can be present. i.e. ST-segment elevation >2mm in at least two contiguous chest leads or >1 mm in two contiguous limb leads, ST segment depression with in at least two contiguous chest leads or in two contiguous limb leads) were included. Patients with other co-morbidities such as history

of hypertriglyceridemia (Hypertriglyceridemia was labeled if the patient had more than 200mg/dL of triglycerides in the overnight fasting early morning sample (on lab investigations) with chronic kidney disease (blood urea nitrogen (BUN) > 20mg/dl, creatinine >1.3mg/dl), already under treatment (all assessed on past medical records) were excluded.

DATA COLLECTION PROCEDURE:

A total of 200 cases were included for study purpose from wards of Punjab Institute of Cardiology. An informed consent of the patients was obtained with the assurance of confidentiality of their medical record. A detailed history of the patients, their medical record, demographic profile e.g. age, gender, monthly income, home address and contact numbers were obtained and recorded. In early morning, an overnight fasting venous blood sample was drawn of every patient and sent to the Pathology Laboratory of Punjab Institute Cardiology for the lipid profile (serum triglyceride level). Hypertriglyceridemia was labelled as per operational definition. Patients with deranged lipid profile were offered treatment as per hospital routine.

DATA ANALYSIS PROCEDURE:

The data analysis was done by using software SPSS-16. Quantitative variables i.e. age and triglycerides were defined in the form of mean \pm S.D while gender, BMI (obese and non-obese) and hypertriglyceridemia were presented in the form of frequency and percentage. Data stratification for age, gender and BMI (obese and non-obese) was done and Chi-square test was applied. p value < 0.05 was taken as significant.

RESULTS:

Two hundred participants were enrolled to estimate the frequency of hypertriglyceridemia in patients presenting with ACS.

Age distribution of the subjects was: 30-50 years 11.5% (n=23) while 51-70 years 88.5% (n=177), mean + SD was 56.95 + 5.97 years. (Table No. 1). Distribution of gender was: males 55.5% (n=111) and females 44.5% (n=89) (Table No.1). Mean triglyceride levels were calculated as 198.45+23.11 mg/dl. Frequency of hypertriglyceridemia in study population was 58% (n=116) of the cases while 42% (n=84) had no findings of the morbidity. (Table No. 1 & 2)

Data stratification for age, sex and BMI (obese and non-obese) was done and Chi-square test was applied. P value < 0.05 was considered as significant. (Table No. 3)

Table - 1: Age & Gender distribution and frequency of hyper-triglyceridemia (n=200)

		No. of patients	%	Mean±SD
Age (years)	30-50	23	11.5	56.95±5.97
	51-70	177	88.5	
Gender	Male	111	55.5	
	Female	89	44.5	
HYPER-TRIGLYCERIDEMIA in ACS patients	Yes	116	58	
	No	84	42	

Table - 2: Mean Triglyceride Levels (n=200)

Triglyceride (mg/dl)	Mean	SD
	198.45	23.11

Table-3: Stratification of hyper-triglyceridemia with regards to age, gender and obesity

		hyper-triglyceridemia		P value
		Yes	No	
Age (in years)	30-50	14	9	0.76
	51-70	102	75	
Gender	Male	66	45	0.64
	Female	50	39	
Obesity	Yes	55	94	0.000
	No	32	19	

DISCUSSION

Hypertriglyceridemia is a manifestation of several common metabolic disorders in the world. The association of hypertriglyceridemia and clinically important complications such as cardiovascular events is suggested by several studies. But previous studies are showing a significant variation in frequency of hypertriglyceridemia in ACS, however, we planned this study to record the frequency of this morbidity.

In this study, out of 200 cases, age range was 30-50 years 11.5% (n=23) while 51-70 years 88.5% (n=177), mean + sd was calculated as 56.95 + 5.97 years, 55.5% (n=111) were male while 44.5% (n=89) were females, mean triglyceride levels were calculated as 198.45+23.11mg/dl, frequency of hypertriglyceridemia in patients presenting with ACS was recorded in 58%(n=116) of the cases.

We compared our results with a recent local study⁶ which recorded that hypertriglyceridemia was present in 83.33% of the cases, it is in contrast with our study, while another recent study recorded these findings in 50.1%⁷ of the cases, these findings are in support of our study.

In the past, many studies have seen the effect of hypertriglyceridemia on cardiovascular system.

There were approximately 4800 patients in Prospective Cardiovascular Münster (PROCAM) study. These patients were followed for eight years to see the frequency of acute cardiac events. it was concluded that hypertriglyceridemia is an independent risk factor for cardiac events. In Copenhagen Study,⁸ there were 2906 patients with no previous cardiac disease. It was noticed that risk of cardiac events was 50 % higher in patients with raised triglycerides. Similarly, different meta-analyses have also demonstrated independent associations between ACS and raised triglycerides levels. Females demonstrated a relative risk of 1.76 (95% CI 1.50-2.07) while there was 1.32 (95%CI 1.26-1.39) risk in males.

Reykjavik cohort and the Epic-Norfolk cohort have also demonstrated odds ratio of 1.76 in and 1.57 respectively while the data was compared for lowest and highest tertiles of triglycerides. In an another study conducted by Tiroshet al.⁹ including approximately 14000 patients , has reported relation of triglycerides with prevalence of acute cardiac events. The patients were followed for 10 years and significant correlation was demonstrated between high triglyceride levels and acute cardiac events.

Recently, there is debate about whether

triglycerides are to be evaluated in fasting or non fasting state. There are two publications showing an important relationship between non-fasting plasma TG and CVD risk and it was also shown in the Copenhagen City Heart Study. High non-fasting TG levels were associated with increased risk of acute cardiac events.

In another study comprised of 26000 patients known as the Women's Health Study, raised non-fasting TG levels were associated with acute cardiac events and it was independent of other conventional risk factors for cardiac disease. Similarly, many studies have shown that high triglyceride levels in non-fasting condition is more important. These observations collectively recommend that non-fasting TG measurements reflect more accurately the risk of cardiovascular events.¹⁰

Type 2 diabetes the metabolic syndrome¹¹ and familial combined hyperlipidemia are conditions

associated with raised levels of triglycerides. A central hallmark is the existence of insulin resistance. Such patients share the presence of the atherogenic lipoprotein phenotype being raised plasma TG, decreased HDL-C and raised prevalence of small dense LDL particles. Raised hepatic VLDL secretion, and impaired LPL-mediated TG clearance in dysfunction of lipid transfer proteins describes the hypertriglyceridemia phenotype.¹² Thus, central insulin resistance is the basic pathophysiological abnormality which contributes to peripheral hypertriglyceridemia.

Finally, results of our study are helpful for cardiologists and patients as well. However, by knowing the actual magnitude of the problem we can effectively treat the patient of ACS with hypertriglyceridemia.

Large scale studies are required to validate the results.

CONCLUSION:

In conclusion, frequency of hypertriglyceridemia is higher in patients with ACS in our population.

References:

1. O'Connor RE, Bossaert L, Arntz HR, Brooks SC, Diercks D, Feitosa-Filho G. Part 9: acute coronary syndromes: 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation*. 2010;122(16 Suppl 2):S422-65.
2. Kosowsky JM, Yiadom MY. The diagnosis and treatment of STEMI in the emergency department. *Emerg Med Pract* 2009;11(6):2
3. Triglycerides and Cardiovascular Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2011;123:2292-33.
4. Varbo A. Triglycerides and cardiovascular disease. *The Lancet* 2014;384:626-35.
5. Pacheco HG, Barron JV, Vallejo M, Reyna YP, Castillo AA, Tapia PS. Prevalence of conventional risk factors and lipid profiles in patients with acute coronary syndrome and significant coronary disease. *Therapeut Clin Risk Manag*. 2014;10:815-23.
6. Malik MM, Malik SN, Rahman M, Afzal M. Association of Dyslipidaemia and Acute Coronary Syndrome in Patients Admitted to CCU, PIMS. *Ann. Pak. Inst Med Sci* 2014;10(3):155-61.
7. González-Pacheco H, Vargas-Barrón J, Vallejo M, Piña-Reyna Y, Altamirano-Castillo A, Sánchez-Tapia P. Prevalence of conventional risk factors and lipid profiles in patients with acute coronary syndrome and significant coronary disease. *Ther Clin Risk Manag*. 2014;10:815-23.
8. Jeppesen J, Hein HO, Suadicani P. Triglyceride concentration and ischemic heart disease: an eight-year follow-up in the Copenhagen Male Study. *Circulation*. 1998;97:1029-36.
9. Tirosh A, Rudich A, Shochat T. Changes in triglyceride levels and risk for coronary heart disease in young men. *Ann Intern Med*. 2007;147:377-85.
10. Bansal S, Buring JE, Rifai N, Mora S, Sacks FM, Ridker PM. Fasting compared with nonfasting triglycerides and risk of cardiovascular events in women. *JAMA*. 2007 Jul 18; 298(3):309-16.
11. Isomaa B, Henricsson M, Almgren P. The metabolic syndrome influences the risk of chronic complications in patients with type II diabetes. *Diabetologia*. 2001;44:1148-54.
12. Adiels M, Olofsson SO, Taskinen MR. Overproduction of very low-density lipoproteins is the hallmark of the dyslipidemia in the metabolic syndrome. *Arterioscler Thromb Vasc Biol*. 2008;28:1225-36.