Hyperlipidemia in Heart attack and Angina patients

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ABSTRACT

Cardiovascular diseases (CVD) have a number of risk factors, one of the most important of them is hyperlipidemia. The present study was aimed to assess blood levels of the lipid compounds in angina and post myocardial infarction patients. Seventy cardiovascular patients and thirty controls were included in the study. The patients were divided into diabetic & non diabetic and also grouped into angina and heart attack patients. The data showed that the level of blood sugar, triglyceride, & LDL cholesterol had increased in patients who were suffering from angina, and the patients who had suffered from heart attack, as compared to control subjects. The HDL- Cholesterol content was lower in patients as compared to control subjects and the HDL-C / LDL-C ratio is also very low in CVD patients as compared to normal control subjects. The lipid profile between angina and heart attack patients had shown no significant difference.

Key words: Cardiovascular patients, Cholesterol, HDL- Cholesterol, LDL – Cholesterol.

INTRODUCTION

Cardiovascular disease occurs due to the blockage or narrowing of coronary arteries carrying blood to heart muscles, due to the deposition of fatty substances [1]. It was noted that hyperlipidemia is linked with subsequent ischemic myocardial damage [2]. Risk of coronary atherosclerosis increases with age but evidences suggest that condition may start to develop in early life. About four out of five die of coronary heart disease at the age of 65 or older. The acute myocardial infarction is prevalent under age of 45 years in Pakistan [3].

An elevated serum cholesterol level is a major risk factor for myocardial infarction. Individuals with hereditary high level of blood cholesterol are more susceptible to develop heart disease [4]. High blood pressure is another risk factor for heart diseases. High blood pressure increases heart's work load, causing heart to enlarge & weaken over the time [5]. Diabetes is also an important predictor of cardiovascular disease [6]. High blood cholesterol especially with higher LDL-Cholesterol and lower HDL-Cholesterol is a significant factor correlated with coronary artery disease & early death. HDL has antioxidant properties that may directly slow the atherogenic process. HDL positively associated with a decrease risk of coronary heart disease [7].

This study is designed to evaluate the variation of blood lipid contents in angina and heart attack patients.

MATERIAL AND METHOD

The angina and heart attack (myocardial infarction) patients were selected from the National institute of cardiovascular disease Karachi, Pakistan having no kidney disease and arthritis & having no other diseases. The control subjects were of the same age group and had no history of any disease, were also included in the study. The patients and controls consent were taken by signing the consent form. The study was approved by ethical committee of Biochemistry department, Karachi University. The fasting blood samples of cardiovascular patients and control normal subjects were taken and the serum was separated. The serum was analyzed for triglyceride, [8].Cholesterol [9]. HDL – Cholesterol [10] and glucose [11].

RESULTS

The results were analyzed by students t test. $p < 0.05$ was taken as significant. The study includes 70 cardiovascular patients (52 Male, 18 Female) and 30 (20 male 10 Female) control subjects. The

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cardiovascular patients were grouped into two groups, namely the group one includes the patients who had suffered from heart attack & the group two consist of patients who were suffering from angina. The diabetic & non diabetic patients were also separated.

Table – (I) shows the age, weight and blood pressure of the control and patients. The cardiovascular diabetic & non diabetic patients had shown high level of cholesterol, Triglyceride & LDL-Cholesterol as compared to control patients (Table – II). Table – III shows the variation of lipid contents on the basis of sex in control & cardiovascular patients. The diabetic patients who were suffering from heart attack had shown an increased level of cholesterol & Triglyceride as compared to non-diabetic heart attack patients. The angina diabetic patients also had shown a significant increased level of glucose, cholesterol, Triglyceride and LDL-Cholesterol as compared to non-diabetic angina patients (Table – IV). But there seems to be no difference in the lipid profile of heart attack and angina patients.

DISCUSSION

Cardiovascular disease is the commonest disease of blood vessel system & a leading cause of death all over the world, the disease enhances with advancing age along with other risk factors. Myocardial ischemia due to coronary artery atherosclerosis occurs without symptoms in patients with diabetes [12]. Elevated serum cholesterol is a risk factor for coronary artery disease [13]. In the present study a high serum cholesterol level was observed in cardiovascular patients as compared to control subjects (Table -II) Kannel et al [14] reported that serum cholesterol level was a significant predictor of coronary heart disease, the atherosclerosis process begin by the deposition of lipids such as cholesterol which leads to the formation of characteristic fatty streak in blood vessel walls.

In the present study a significant decreased level of the HDL-Cholesterol was observed in cardiovascular patients as compared to control subjects. Rywik et al [15] reported an inverse relation of HDL-Cholesterol to cardiovascular mortality. Variation in HDL-Cholesterol may be associated with more substantial alterations in metabolic indices predictive of ischemic heart disease [16]. It was reported that HDL-cholesterol >60 mg/dl was associated with reduced MI risk.

The lowest risk was among patients with LDL between 70 mg/dl and 100 mg/dl [17]. But Voight et al [18] reported that raised plasma HDL-cholesterol do not seem to lower risk of myocardial infarction.

Fasting triglyceride levels were associated with long term and short term risk after acute coronary syndrome. Triglyceride rich lipoprotein may be an important target for therapy [19]. Hypertriglyceridemia is associated with an alteration in HDL and might be consistent with risk of cardiovascular disease in insulin resistant subject [20].

The level of total cholesterol (TC), LDL-C & HDL – C are low in Acute myocardial infarction (AMI) patients as compared to stable angina pectoris and unstable angina pectoris group. Although the levels of lipids are low in Acute myocardial infarction (AMI), but it is related with acute inflammatory reactions [21]. In the present study the level of blood cholesterol, HDL –C, LDL-C had not shown any marked difference between the angina & heart attack patients. Blood triglyceride level in cardiovascular patients was elevated as compared to control subjects. Similar results were observed by Schwartz et al [19]. The nature of link between elevated triglyceride & coronary artery disease is not well understood, but on the other hand VLDL – cholesterol may be atherogenic [22]. The influence of elevated triglycerides may underlie their link to coronary artery disease Oberman [23] supported the relationship of high triglycerides level with the development of atherosclerosis.

In the current study we have found elevated level of LDL – Cholesterol in Cardiovascular (Angina and heart attack) patients. Lemieux et al [24] reported that men with elevated LDL - cholesterol had a 2.2 fold increased risk of coronary heart disease than man without elevated LDL-Cholesterol. A correlation of LDL-C with the severity of coronary artery disease was found [25]. So, it is obvious that hyperlipidemia is a risk factor of heart disease, and can leads to heart attack.

CONCLUSION

It is evident from the study that hyperlipidemia is present in both angina and heart attack patients. The level of blood cholesterol (HDL-C & LDL-C) had shown no significant difference between angina and heart attack patients.

Table – I
Variation of age, weight and blood pressure of cardiovascular disease patients and control subjects.

Age, weight and blood pressure in heart attack angina cardiovascular disease patients were estimated.
The mean and ± S.E.M. are shown in table.

Groups	Age Year	Weight (Kg)	Blood pressure (mm of Hg)	
			Systolic	Diastolic
Control	41.6±2.40 (30)	60.33±1.23 (30)	119.6±1.11 (30)	81.1±1.21 (30)
Heart attack	48.28±2.40 (32)	60.39±1.15 (32)	122.65±2.61 (32)	81.84±1.94 (32)
Angina	46.63±2.30 (38)	60.39±1.15 (38)	119.73±2.34 (38)	79.23±1.96 (38)

Table – II
Variation of serum glucose, cholesterol, triglyceride, HDL – Cholesterol, LDL – Cholesterol and HDL – Cholesterol/LDL- Cholesterol in control and cardiovascular disease patients on the basis of diabetes.

The serum glucose, cholesterol, triglyceride, HDL-Cholesterol, LDL-Cholesterol & the ratio HDL-C/LDL-C of control subjects were compared with diabetic and non-diabetic cardiovascular (CVD) disease patients.
The mean ± S.E.M are shown the table. The number of cases are given in parentheses

Groups	Glucose mg/dl	Cholesterol mg/dl	Triglyceride mg/dl	HDL-Cholesterol mg/dl	LDL-Cholesterol mg/dl	HDL – C / LDL- C
Control (Total) CVD	84.78±1.45 (30)	174.24 ±1.67 (30)	191.26±5.18 (30)	64.0 ±0.94 (30)	71.74 ±2.17 (30)	0.91 ±0.03 (30)
Diabetic (Total) CVD	^* 140.31±1.79 (38)^	^* 254.76 ±1.96 (38)^	^* 358.99 ±9.28 (38)^	^ 35.04 ±1.36 (38)^	^* 147.91 ±2.67 (38)^	*^ 0.23 ±0.01 (38)
Non-Diabetic (Total)	^ 94.60 ±1.33 (32)	^ 237.41 ±1.53 (32)	^ 300.01 ±8.5 (32)	^ 36.42 ±1.35 (32)	^ 140.67 ±2.29 (32)	^ 0.25 ±0.01 (32)

* P<0.05 statistically significant as compared to non-diabetic
^P<0.05 statistically significant as compared to control

Table – III
Variation of srum glucose, cholesterol, triglyceride, HDL – Cholesterol, LDL – Cholesterol and HDL – Cholesterol/LDL- Cholesterol in control and cardiovascular disease patients on the basis of sex.

The mean values and ± S.E.M. are shown in table. The number of cases are given in parentheses.

Groups	Glucose mg/dl	Cholesterol mg/dl	Triglyceride mg/dl	HDL-Cholesterol mg/dl	LDL-Cholesterol mg/dl	HDL – C / LDL- C
Control (Male)	84.04 ±1.43 (20)	175.31 ±2.17 (20)	196.02 ±7.94 (20)	61.145 ±0.78 (20)	74.89 ±2.58 (20)	0.82 ±0.03 (20)
CVD (Male)	* 119.27 ±3.35 (52)	* 246.37 ±1.96 (52)	* 333.50 ±0.66 (52)	* 34.05 ±1.07 (52)	* 147.01 ±2.06 (52)	* 0.23 ±0.009 (52)
Control (Female)	86.24 ±3.16 (10)	172.13 ±2.35 (10)	184.88 ±3.16 (10)	69.72 ±0.61 (10)	65.43 ±2.93 (10)	1.08 ±0.05 (10)
CVD (Female)	$ 186.10 ±65.43 (18)	$ 248.01 ±2.98 (18)	$ 343.5 ±11.56 (18)	$ 41.13 ±1.41 (18)	$ 138.53 ±3.56 (18)	$ 0.29 ±0.01 (18)

* $P < 0.05$ statistically significant as compared to control male
$P < 0.05$ statistically significant as compared to control female

Table – IV

Variation of serum glucose, cholesterol, triglyceride, HDL – Cholesterol, LDL – Cholesterol and HDL – Cholesterol/LDL- Cholesterol in control and cardiovascular disease patients on the basis of heart attack, Angina and diabetes.

The mean values and ± S.E.M. are shown in table. The number of cases are given in parentheses.

Groups	Glucose mg/dl	Cholesterol mg/dl	Triglyceride mg/dl	HDL-Cholesterol mg/dl	LDL-Cholesterol mg/dl	HDL – C / LDL- C
Control	84.77 ±1.43 (30)	174.24 ±1.67 (30)	191.26 ±5.18 (30)	64.0 ±0.94 (30)	71.74 ±2.17 (30)	0.91 ±0.03 (30)
Heart attack Diabetic	* # 139.6 ±2.16 (18)	* # 255.4 ±3.01 (18)	* # 369.19 ±13.50 (18)	# 34.24 ±2.40 (18)	# 147.32 ±4.28 (18)	# 0.24 ±0.02 (18)
Heart attack Non diabetic	# 97.48 ±2.13 (14)	# 238.92 ±2.01 (14)	# 310.45 ±13.47 (14)	# 35.04 ±1.76 (14)	# 141.79 ±3.39 (14)	# 0.24 ±0.01 (14)
Angina Diabetic	$ * # 140.8 ±2.77 (20)	$ * # 254.2 ±2.55 (20)	$ * # 349.81 ±12.37 (20)	# 35.8 ±1.39 (20)	$ * # 148.45 ±3.28 (20)	$ # 0.24 ±0.01 (20)
Angina Non Diabetic	# 92.37 ±1.50 (18)	# 237.16 ±1.98 (18)	# 291.87 ±10.87 (18)	# 37.97 ±1.82 (18)	# 139.76 ±3.03 (18)	* # 0.27 ±0.01 (18)

* P<0.05 statistically significant as compared to heart attack non diabetic

#P<0.05 statistically significant as compared to control

$P<0.05 statistically significant as compared to angina non diabetic

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