PREVALENCE OF HYPERLIPIDEMIA IN OBESE AND NON OBESE CORONARY ARTERY DISEASE PATIENTS

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ABSTRACT

Objective: *To determine the prevalence of hyperlipidemia in obese and non-obese patients with diagnosed coronary artery disease.*

Methodology: *This hospital based descriptive study was conducted in Cardiology Department of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from 15th March 2005 to 30th May 2006. A total of 200 patients with diagnosed coronary artery disease were enrolled, 100 were classified as obese and 100 as non-obese.*

Results: *There were 139 males and 61 females in total 200 CAD patients. Serum triglycerides level was 184±82 in obese patients and 158±68 in non-obese patients (p = 0.015). Serum cholesterol level was 208±61 in obese and 180±67 in non obese (p = 0.001). Serum HDL level was significantly more in non obese (48±36) as compared to obese (37±8) (p =0.005). Serum LDL was more (157±49) in obese as compared to (148±44) in non obese but with no statistical difference (p =0.156).*

Conclusion: *Obese CAD patients had significantly had higher levels of triglycerides, total cholesterol with lower HDL levels as compared to non obese CAD patients.*

Key Words: *Coronary artery disease, Body Mass Index, hyperlipidemia, obese and non obese patients*

INTRODUCTION

The total mortality due to cardiovascular disease in Pakistan during 2002 estimated by WHO was 154338[1, 2]. On average national mortality in Pakistan from coronary artery disease (CAD) is 410/10,0000 [3].

The established risk factors for these CAD patients are: i. hypertension ii. diabetes iii. hyperlipidemia iv. smoking & v. positive family history. The prevalence of these risk factors are more in obese CAD patients as compared non obese CAD patients[4]. The precise prevalence of obesity-related hyperlipidemia varies and is yet unknown in our population.

Body weight and prevalence of obesity and its complications are rising so rapidly in many countries of the world, that WHO has recognized that there is "Global epidemic of obesity"[5,6] which is clear from the fact that world wide more than one billion adults are overweight and at least 30 million are obese[6]. And up to 130 million people through out the Asia-Pacific region will suffer from obesity by the year 2010[5].

Data from the Framingham study showed that CAD mortality and morbidity increase as blood cholesterol level rises[7]. A study published in journal of Ayub Medical College has shown a direct correlation between obesity and high triglyceride level[8]. Dyslipidemia is a part of metabolic syndrome. A high level of low density lipoprotein (LDL)- cholesterol leads to coronary artery disease and stroke, while high density lipoprotein (HDL) reduces the risk of myocardial infarction and stroke[9]. Worldwide, high cholesterol

levels are estimated to cause 56 percent of global ischemic heart disease and 18 percent of strokes, amounting to 4.4 million deaths annually[6].

BMI is positively correlated with associated plasma triglyceride levels, total and low-density lipoprotein (LDL)-cholesterol levels, and inversely related to high-density lipoprotein (HDL) cholesterol levels[10]. Further evidence that obesity leads to dyslipidemia comes from a meta-analysis to evaluate the effect of weight loss on plasma lipid levels indicated that, based on the results of 70 clinical trials, for each 1 kg of weight loss, total cholesterol was reduced by 0.05 mM; LDL-cholesterol decreased by 0.02 mM; triglyceride levels decreased by 0.015 mM; and HDL-cholesterol increased by 0.009 Mm, if measured at a stabilized body weight, but decreased by 0.007 mm, if measured during active weight loss[11]. Coronary artery diseases can be controlled with effective treatment of hyperlipidemia. The control of this risk factors is possible if preventive measures are adopted. This study will highlight that as hyperlipidemia is more common in obese patients, we should focuss our attention on epidemics of obesity.

METHODOLOGY

This hospital based descriptive study was conducted in Cardiology Department of Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from 15th March 2005 to 30th May 2006. A total number of 200 patients were included through purposive, non probability sampling.

Patients admitted with an acute coronary syndrome with either i) a positive ETT (ii) abnormal coronary angiogram and iii) ST elevation in ECG were included in the study. Patients with acute coronary syndrome but in cardiogenic shock and patients with unstable angina and Non ST elevation MI with normal previous report of either ETT or coronary angiogram were excluded from the study.

Informed consent was obtained from all the patients, and approval of the hospital ethical committee sought. A detailed history was obtained, and physical examination was done, especially recording the height, weight, hip circumference and waist circumference. BMI was calculated for all patients as weight in kg divided by height in m^2. Exercise tolerance test and coronary angiogram report were also documented.

On the basis of the BMI calculated, patients were categorized either as "obese" or "non-obese". In accordance with the WHO expert consultation on appropriate BMI for Asian population, patients with BMI $\leq$ 24.9 kg/m^2 were classified into the "non-obese" group, while those with BMI $\geq$ 25 kg/m^2 into "obese" group[12].

The patients having their cholesterol above the normal range were considered abnormal.i.e Cholesterol: Normal: (2.58- 5.17 mmol/l or 100-200 mg/dl). Triglycerides: Normal :(0.8-1.92 mmol/l or 70- 170 mg/dl). HDL: Normal (0.4-0.7 mmol /l or 35-65 mg/dl). LDL: Normal (<1.7 mmol/l or <150 mg/d)l[13].

All the continuous variables were expressed as mean $\pm$ SD and analyzed with Independent *t*-test. Discrete variables were expressed as percentages and analyzed by *chi-square* test. A P value < 0.05 was considered as statistically significant. Calculations were performed with statistical software package SPSS version 13.

RESULTS

In this study, a total of 200 patients were enrolled; 100 obese and 100 non-obese. In all 200 patients, there were more males patients (69.5%) as compared to female (30.5%). In non-obese group, the age range was 32 to 95 years (mean 53 ±12), while in the obese group, it was 30 to 80 years (mean 54±10). In this study, mean BMI in obese was 29.22±3.22 and in non-obese was 22.99±1.38, with significant statistical difference (p<0.001).

All the baseline characteristics of the patients are shown in Table 1.

In this study, in both gender, the frequency of hyperlipidemia increased with body mass index. Serum triglycerides level was more in obese i.e. (184±82) as compared to non obese patients i.e. (158±68). (p = 0.015). Serum cholesterol level was more in obese i.e. (208±61) as compared to non obese i.e.(180±67) (p = 0.001). Serum HDL level was more in non obese i.e. (48±36) as compared to obese i.e. (37±8) (p = 0.005). Serum LDL was more in obese i.e. (157±49) as compared to non obese i.e. (148±44) but with no statistical difference. (p= 0.156 Table-2)).

Table 1: Baseline characteristics of patients

Total number of patients n = 200	Obese patients N = 100	Non-obese patients n = 100
Gender		
Male	66	73
Female	34	27
Age (years)	54±10	53±12
<25	00	01
25-40	12	15
41-60	70	57
>60	18	27
Mean waist circumference (inches)	38±4	33±3
Mean hip circumference (inches)	41±4	35±3
Mean BMI (kg/m^2)	29.22±3.22	22.99±1.38
Clinical presentation		
Unstable angina	41%	43%
NSTEMI	10%	04%
STEMI	49%	53%
Past history of CAD	81%	88%
Positive ETT result	82%	79%
Coronary angiographic findings		
Normal coronaries	07%	11%
One-vessel disease	19%	35%
Two-vessel disease	24%	25%
Three-vessel disease	50%	29%

Table 2: Lipid Profile

		Obese n = 100	Non Obese n = 100	*P* - Value
Serum Triglycerides Level	**Mean ± SD**	184 ± 82	158 ± 68	0.015
Serum Cholesterol Level	**Mean ± SD**	218 ± 61	180 ± 67	< 0.001
Serum HDL	**Mean ± SD**	37 ± 8	48 ± 36	0.005
Serum LDL	**Mean ± SD**	157 ± 49	148 ± 44	0.156

DISCUSSION

The gender statistics of our study correlate well to a study done at Aga Khan Hospital who concluded that CAD has been shown to be more prevalent in male than females[14]. This finding correlates well to GISSI-2[15], MILLIS[16] and GUSTO[17] trials, where male patients were 70.4%, 72.6% and 75% respectively[18].

In this study obese males were 66 and females were 34, while in non obese males were 73 and females were 27, with no statistical difference.

In non obese group the minimum age was 32 years and maximum 95 years (mean 53 ±12), and obese the minimum age was 30 years and maximum 80 years (mean 54±10). This is accordance to a study done at Sir Ganga Ram Hospital Lahore, where mean age was 52.5±11.95[19].

In this study age group of 41-60 years was more common in both obese (70%) and non obese (57%) CAD patients, followed by age above 60 years in both groups i.e. in obese (18%) and in non obese (27%), with no statistical difference. The reason for this trend is clear from Framingham

heart study, which has shown that incidence of IHD increases almost linearly with advancing age[20]. In another local study age 40 years (67.9%) were the most dominant risk factors for CAD in both sexes [21]. In this study patients under 40 years of age were 15% in obese and 12% in non obese, with no significant difference. Overall this pattern is similar to a study published in journal of King Edward Medical College, in which patients who had acute MI were 19 % under 40 years of age[22].

In this study mean BMI in obese was 29.22±3.22 and in non obese was 22.99±1.38, with significant statistical difference. In this study BMI is positively correlated with associated plasma triglyceride levels(statistically significant), total cholesterol (statistically significant)and low-density lipoprotein (LDL)-cholesterol levels(statistically not significant), and inversely related to high-density lipoprotein (HDL) cholesterol levels (statistically significant).These correlates well to a local study published in Journal of Ayub Medical College [8] as well as to international studies published in Arch internal Medicine [10] .These results are also similar to results obtained in large study by Frederique Thomas et al, [4]as well as to data from the National Health and Nutrition Examination Survey which were used to investigate the relationships between BMI and serum lipid [23].

CONCLUSION

This study concludes that obese CAD patients had significantly higher levels of triglycerides, total cholesterol with lower HDL levels as compared to non obese CAD patients.

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