ORIGINAL ARTICLE NORTH BENGAL MEDICAL COLLEGE JOURNAL [2017], VOL., 3, No. 2 : 31-35

Serum Lipid Concentration and Prevalence of Dyslipidemia in Patients with Coronary Heart Disease in Tertiary Hospitals of Bangladesh

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Received : October 25, 2015 Accepted : January 10, 2016

Abstract

Introduction: *Coronary heart diseases (CHDs) are the most common form of heart disease and most important cause of premature death in developed countries. It was estimated that CHDs will become the major cause of death in all regions of the world by 2020. There were several modifiable risk factors for development of CHDs. Among them dyslipidemia was an important modifiable risk factor. Lipid abnormalities, including high levels of total cholesterol, high levels of low-density lipoprotein cholesterol (LDL-C), elevated triglycerides and low levels of high-density lipoprotein cholesterol (HDL-C), are associated with an increased risk of CHDs, thereby serving as contributors to this process.*

Methods: *The study was conducted in department of Biochemistry of BSMMU over a period of one year extending from July 2006 to June 2007. This cross- sectional study was done among 300 diagnosed patients of CHD of both sexes. Dyslipidemia was diagnosed by estimation of fasting blood lipid profile.*

Results: *The study revealed a higher rate of dyslipidemia (27.7 %) among the study subjects.*

Conclusion: *It can be concluded that the prevalence of dyslipidemia (an important modifiable risk factor) was relatively higher among the patient of CHD.*

Key words: *Risk factors, Dyslipidemia, Lipid profile, Coronary heart disease*

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Introduction

Coronary heart disease is a disease due to narrowing of the small blood vessels that supply blood and oxygen to the heart.[1] It has two principal forms, angina and myocardial infarction (MI). Both occurs because the arteries carrying blood to the heart muscle become narrowed or blocked, usually by a deposit of lipid substances, a process known as atherosclerosis. Angina is a severe pain in the chest brought on by exertion and is relieved by rest. Myocardial infarction (MI) is due to obstruction of coronary arteries either as a result of atherosclerosis or by a blood clot. Part of heart muscle is deprived of oxygen and dies.[2] At

different times, the heart has a varying need for blood flow and the oxygen it carries. The heart receives their blood flow through its own set of blood vessels called the coronary arteries. With the relatively decreased blood flow and oxygen, the heart muscle produces chemicals that produce pain and other symptoms of angina.[3] Myocardial infarction (MI) is the irreversible necrosis of heart muscle secondary to prolong ischemia. The appearance of cardiac enzymes in the circulation generally indicates myocardial necrosis.[4]

There are several risk factors for the development of coronary heart disease (CHD). Dyslipidemia is recognized as a prominent risk factor for CHD.[5] The link between CHD and lipid has been firmly established first by epidemiologic studies and more recently by long term outcomes trials that demonstrated that lowering low density lipoprotein cholesterol levels significantly reduced the risk of major coronary events. Genetically determined and metabolically induced disturbances in lipid metabolism, as manifested in several types of dyslipidemia, have been shown to be causally related to the development of CHD. A reduction in serum total cholesterol (TC) levels has been shown to reduce mortality in patients with CHD and to decrease the need for revascularization.[6]

National Cholesterol Education Programme (NCEP), USA guidelines were used for definition of dyslipidemia as follows: (i) Hypercholesterolemia–serum cholesterol levels ≥200 mg/dl (≥5.2 mmol/l); (ii) Hypertriglyceri-demia–serum triglyceride levels ≥150 mg/dl (≥1.7 mmol/l); (iii) Low HDL cholesterol–HDL cholesterol levels <40 mg/dl (<1.04 mmol/l); (iv) High LDL cholesterol–LDL cholesterol levels ≥130 mg/dl (≥3.4 mmol/l) calculated using the Friedewald equation.[7] The present study was designed to evaluate the prevalence of dyslipidemia in CHD patients on context of our country.

Materials and Methods

A cross sectional study was conducted in the department of Biochemistry, BSMMU from July 2006 to June 2007. For this study, 300 diagnosed patients (209 male and 91 female) of coronary heart disease were selected from department of cardiology of BSMMU, NICVD and Enam medical college, Savar, Dhaka. Consents were taken from all study subjects preserving their rights, privileges and freedom. Fasting blood samples were collected after 14 hours fasting. Lipids were measured by using cholesterol oxidase para aminoantipyrine, lipase/glycerol kinase (LIP/GK), enzymatic reaction respectively and low density lipoprotein (LDL) cholesterol was calculated by Freidwald formula. Dyslipidemia was considered when anyone of the NCEP lipid profile criteria was satisfied in a case. All data were recorded systemically in a data collection form. Statistical analyses were performed by using SPSS for windows version 12.

Results

Among the 300 patients selected, 209 were male and 91 were female. Mean ± SD age of the patients was 51.56 ± 24.04 with the range of 25-74 years (Table I).

Table I: Sex distribution of study subjects

Sex	Number	Percentage
Male	209	73.49%
Female	91	26.51%

The study subjects were divided on the basis of presence or absence of dyslipidemia. Among them 83 (27.7%) had dyslipidemia whereas 217 (72.3%) had no dyslipidemia (Table II).

Table II: Incidence of dyslipidemia in study subjects

Status of dyslipidemia	Prevalence	Percentage
Present	83	27.7 (%)
Absent	217	72.3(%)

The mean ± SD of serum total cholesterol of CHD patients with hypercholesterolemia and CHD patients without hypercholesterolemia were 206.38 ±4.44 mg/dl and 151.31± 17.97 mg/dl respectively, t value is 51.52 and p value is 0.0001. The difference between mean ± SD is statically significant indicated hypercholesterolemia increase the risk of CHD (Table III).

Table III: Comparison of serum total cholesterol between CHD patients with hypercholesterolemia and CHD patients without hypercholesterolemia

Variable	Means ± SD mg/dl	*t* value	*p* value
CHD patient without hypercholesterolemia	151.31 ± 17.97	51.52	0.0001
CHD patient with hypercholesterolemia	206.38 ± 4.44		

The mean ± SD of serum LDL cholesterol of CHD patients with high LDL cholesterol and CHD patients with normal LDL cholesterol were 171.31 ± 17.14 mg/dl and 97.25 ±18.18mg/dl respectively, t value is 51.34 and p value being 0.0001. The difference between mean ± SD is statically significant. That means high LDL cholesterol increase the risk of CHD (Table IV).

Table - IV: Comparison of serum LDL cholesterol between CHD patients with high LDL cholesterol and CHD patients with normal LDL cholesterol

Variable	Means ± SD mg/dl	*t* value	*p* value
CHD patient with LDL ≥130 mg/dl	171.31 ± 17.14	51.34	0.0001
CHD patient with LDL <130 mg/dl	97.25 ±18.18		

The mean ± SD of serum HDL cholesterol of CHD patients with low HDL cholesterol and CHD patients with normal HDL cholesterol were 34.91 ±3.56 mg/dl and 45.91 ±4.66 mg/dl respectively, t value is 32.48 and p value being 0.0001. The difference between mean ± SD is statically significant. That means low HDL cholesterol increases the risk of CHD.

Table V: Comparison of serum HDL cholesterol between CHD patients with low HDL cholesterol and CHD patients with normal HDL cholesterol

Variable	Means ± SD mg/dl	*t* value	*p* value
CHD patient with HDL ≥40 mg/dl	45.91 ± 4.66	32.48	0.0001
CHD patient with HDL <40 mg/dl	34.91 ± 3.56		

The mean ± SD of serum triglyceride of CHD patients with between CHD patients with hypertriglyceridemia and CHD patients without hypertriglyceridemia were 156.38 ± 4.44 mg/dl and 108.78 ± 15.93 mg/dl respectively, t value is 49.85 and p value being 0.001. The difference between mean ± SD is statically significant. That means hypertriglyceridemia increase the risk of CHD.

Table VI: Comparison of serum triglyceride between CHD patients with and without hypertriglyceridemia

Variable	Means ± SD mg/dl	*t* value	*p* value
CHD patient without hypertriglyceridemia	108.78 ± 15.93	49.85	0.001
CHD patient with hypertriglyceridemia	156.38 ± 4.44		

Discussion

In our study we measured fasting blood lipid profile. We found age range of the study subjects (300 CHD patients) 25-74 years, among them 209 were male and 91 were female. This study showed that the total cholesterol in CHD patients with hypercholesterolemia (206.38 ± 4.44 mg/dl) significantly differs from the total cholesterol in CHD patients without hypercholesterolemia (151.31 ± 17.97 mg/dl) which is statistically significant. We observed that total LDL in CHD patients with high LDL cholesterol (171.31 ± 17.14 mg/dl) significantly differs from total LDL in CHD patients with normal LDL cholesterol (97.25 ± 18.18 mg/dl) which is statistically significant. We also observed that total HDL cholesterol in CHD patients with low HDL cholesterol (34.91 ± 3.56 mg/dl) significantly differs from HDL in CHD patients with normal HDL cholesterol (45.91 ± 4.66 mg/dl) which is statistically significant. In addition serum triglyceride of CHD patients with hypertriglyceridemia (156.38 ± 4.44 mg/dl) significantly differs from serum triglyceride in CHD patients without hypertriglyceridemia (108.78 ± 15.93 mg/dl) which is statistically significant. In our study, 27.7% of the CHD patients had dyslipidemia. Above findings revealed that the incidence of dyslipidemia in CHD patients was 27.7% and differences between mean of abnormal and normal level of parameter of lipid profile (serum total cholesterol level, serum LDL level, serum HDL level and serum triglyceride level) are

statistically significant. Similar type of findings were also observed by Gupta et al,[8] in which dyslipidemia represent 28% of the CHD patients in the city of Rajasthan, India. But different findings was also observed by Namita et al,[9] in which dyslipidemia account for 41.3% of the CHD patients in India.

We found in our study the incidence of dyslipidemia in CHD patient different from the findings of other studies in different places probably due to low socio-economic condition, lack of education and variation of sample number selection. So, further study on larger sample size should be carried out in future.

Acknowledgements

We gratefully acknowledge the professors, doctors, clinical assistants and staff nurses of department of cardiology of BSMMU, NICVD and Enam medical college for their active support and cooperation.

Contribution of the Authors

First author designed and conducted the study and wrote the manuscript. Second and third authors critically reviewed the manuscript. Fourth author helped in data collection and statistical analysis. Last one was the supervisor of this study.

References

1. Newby DE, Grubb NR, Bradbury A. Cardiovascular disease. In: College NR, Walker BR, Ralston SH (eds). Davidson's Principles and Practice of Medicine, 21st ed. Philadelphia, USA: Churchill Livingstone, 2010: p.525-529.
2. Gopinath N, Chandha SL, Jain P, Shekhawat S and Tendon, 'An epidemiological study of coronary heart disease in different ethnic groups in Delhi urban population.' 1995;1: 30-33
3. Toscano J. 'Angina; A Patient Guide. HEARTINFO. ORG, 2003 Retrieved on March 11, 2003 from "http// www.ml. 2mdm.net".
4. Panju AA, Hemmelgarn BR, Guyatt GSimel DL. 'Is this patient having a Myocardial Infarction?; 1988; 2008: 256-263.
5. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, et al.; INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with MI in 52 countries (the INTERHEART study): case-control study. Lancet 2004; 364: 937-952.
6. Kuo PT. 'Dyslipidemia and coronary artery diseases', Pub Med, Clin. Cardiol. 1994; 17(10); 519-527.
7. Executive summary of the Third Report of the National Cholesterol Education Program (NCEP). Expert panel on detection, evaluation and treatment of high blood cholesterol in adults (Adult Treatment Panel III). JAMA. 2001; 285: 2486–2497.
8. Gupta R, Prakash H, Kaul V. Cholesterol lipoproteins, triglycerides, rural-urban differences and prevalence of dyslipidaemia among males in Rajasthan. J Assoc Phys Ind. 1997; 45: 275–279.
9. Gupta R, Vasisht S, Bahl VK, Wasir HS. Correlation of lipoprotein (a) to angiographically defined coronary artery disease in Indians. Int J Cardiol. 1996; 57: 265–270.