Apolipoprotein A-I and B levels in Bangladeshi patients with coronary artery disease

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Abstract

Coronary arteay disease (CAD) is an important cause of morbidity and mortality in developed as well as developing countries like Bangladesh. In this study, the status of serum apolipoprotein A-I (Apo A-1) and apolipoprotein B (Apo B) levels were assessed in Bangladeshi patients with coronary artery diseases.

The study was carried out in the Department of Cardiology, University Cardiac Centre (UCC), Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Total study population was 100, of which 50 were patients with CAD and 50 were individuals without CAD (control). The patients with CAD and controls were enrolled following the inclusion and exclusion criteria. About 5 ml blood was collected by venepuncture from each individual and apolipoprotein A-1 and B were determined by automated nephelometry.

The mean age of total study population was 51.4 ± 10.8 years while the mean age of the patients and control was 51.3 ± 10.9 and 51.4 ± 10.9 years respectively.

The Apo A-I level was significantly ($p < 0.01$) different in CAD patients compared to control group (95.10 ± 20.50 mg/dl vs 113.47 ± 20.96 mg/dl). The ratio of Apo B and Apo A1 was also significantly higher ($p < 0.01$) in CAD patients than that of controls (1.25 ± 0.40 vs 0.95 ± 0.26 while Apo B levels was not different among the two groups.

The study revealed significant alteration of serum Apo A-I level and Apo B/Apo A-I ratio in patients with CAD compared to those without CAD. Further large-scale study is needed to evaluate the exact influence of apolipoproteins on coronary artery disease in Bengali ethnic population.

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Introduction

Cardiovascular disease is an important health problem in Bangladesh. Studies in Bangladesh reported the prevalence of hypertension as 11, rheumatic fever and heart disease as 7.5 and ischemic heart disease as 3.3 per thousand Bangladeshi populations.[1,2] Another study conducted among five hundred rural people of Bangladesh reported the prevalence of cardiovascular diseases as 4.6%.[3] Acute myocardial infarction (AMI) has been reported as the leading cause of death in Bangladesh in the 4th decade of life.[4] The prevalence of ischemic heart diseases (IHD) in Bangladesh and other developing countries are gradually increasing due to rapid urbanization, migration of people from village to the cities, change in life style and food habits. Hypertension, diabetes mellitus, dyslipidaemia, smoking and family history of ischemic heart disease are some established risk factors for coronary artery disease. Now a days, altered triglycerides, low and high density lipoproteins (LDL, HDL), total cholesterol-HDL cholesterol ratio, apolipoprotein A-I and apolipoprotein B are considered as risk factors for coronary artery disease.

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Several studies showed strong association of coronary artery disease with the altered levels of apolipoproteins and the ratio of Apo B to Apo A-I.[5-8] Therefore, serum concentrations of apolipoprotein A-I and B can be used as marker to predict the presence of coronary artery disease. At present, enough information is not available on the levels of apolipoproteins of the Bangladeshi people with coronary arterial disease.

In light of the above, the present study was undertaken to determine the blood levels of apolipoproteins in Bangladeshi patients with coronary artery disease.

Methodology

Study place and population

The study population was recruited from University Cardiac Centre, Bangabandhu Seikh Mujib Medical University (BSMMU), Dhaka from April, 2005 to June, 2005. Fifty consecutive patients with coronary artery disease, documented by coronary angiogram (CAG), were included in the study. Patients with valvular and congenital heart disease and hypertrophic cardiomyopathy were excluded. Fifty individuals of similar age and sex having no electrocardiographic or CAG evidence of coronary artery disease were included as control.

Collection of blood samples and estimation of apolipoproteins

About 5 ml of blood was collected from each participants by venepuncture after over night fasting. Serum was separated and preserved at -20^0 C until tested. The samples were tested to measure serum Apo A-I and Apo B levels by automated nephelometry method with Behring Nephelometre 100 (BN100).

Ethical approval and statistical analysis

The research protocol was approved by the Thesis committee. The aims and objectives of the study along with its diagnostic procedures were explained to the patients/attendants of the patients in easy understandable language and then informed written consent was obtained from each participant. The collected data were computed and analyzed by SPSS 12.0 program. The difference between groups was evaluated by student's t test.

Results

Total 100 participants were enrolled in the study. Among them, 50 were cases admitted in CCU of BSMMU had demonstrable coronary artery disease on coronary angiogram and 50 were controls with ETT negative and/or normal CAG. The mean age of the total studied population was 51.4 ± 10.8 years. The mean age of control group was 51.3 ± 10.9 years and that of case was 51.40 ± 10.9 years. There was no statistically significant mean age difference between the two groups ($p = 0.987$). Highest number of participants was within 45 - 54 years age range (40%) in both groups. The male female distribution was equal in both groups (40 vs 10).

Table-1: *The levels of apolipoproteins A1 and B of study population. Apolipoproteins*

Serum Apolipoproteins	Patients with CAD	Control (without CAD)	p value
Apo-AI level (Mean±SD; mg/dl)	95.10±20.50	113.47±20.96	<0.01
Apo-B level (Mean±SD; mg/dl)	113.33±25.96	104.27±24.30	0.08
Apo-B/Apo-A1 (Mean ± SD)	1.25±0.40	0.95±0.26	<0.01

Table -1 shows the levels of different apolipoproteins in both patients with coronary artery disease and individuals in control group. Apo B level of cases was 113.33 ± 25.96 mg/dl compared to that of 104.27 ± 24.30 mg/dl of control group. There was no significant difference ($p = 0.08$) of Apo-B levels between the two groups. Serum level of Apolipoprotein-A1 was significantly lower ($p < 0.01$) in patients (95.10 ± 20.5 mg/dl) compared to individuals in control group (113.47 ± 20.9 mg/dl). The ratio of Apo B and A1 levels was significantly higher ($p < 0.01$) in the patients (1.25 ± 0.40) than that of control group (0.95 ± 0.26).

Discussion

The objective of the present study was to find out the status of serum apolipoprotein B and A1 levels in Bangladeshi ethnic patients with coronary artery disease. These markers are considered as potential risk factors associated with CAD. Determination and monitoring of these markers would therefore help in better management of CAD. We have found significantly raised mean Apo B level in patients with CAD compared to

our control group. The ratio of Apo B to Apo AI is also found to be significantly raised from control group (1.25 vs 0.95). It has been reported over the last several years that assessment of serum Apo B, Apo AI and their ratio are better markers of CAD than LDL cholesterol. In 2004, the global INTERHEART study of risk factors for acute myocardial infarction in 52 countries demonstrated that raised Apo B/A-I ratio was the most important risk factor in all geographic regions.[9] Similar observation was also reported by CARDS study involving type 2 diabetes patients.[10,11] The mean level of Apo A-I in CAD patients was significantly lower than that of control group. Similar observation was also reported by other.[12] It is to be noted that the levels of serum apolipoproteins seem to be lower in Indian population as compared to those reported from the West.[8]

Our data suggests that apart from measuring conventional lipid profile to ascertain the risk of coronary artery disease, it is also essential to estimate serum Apo A-I, Apo B and Apo B/A1 ratio. In addition, further studies are required to determine the normal range of serum apolipoprotein levels in Bangladeshi population of different age and socioeconomic background.

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