

Correlation of ECG changes and lipid profile among coronary artery disease: A cross sectional study

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Abstract

Introduction: Coronary Artery Disease (CAD) will be the leading cause of death in developing countries by the year 2020. The reason for high prevalence rate of CAD was risk factors most commonly hypertension, dyslipidemia and obesity. **Objectives:** 1) To determine electrocardiogram changes is associated with strong involvement of coronary angiography morphology changes. 2) To determine lipid profile among patients of coronary artery disease. **Material and Methods:** A cross sectional study was carried out for the period of one Year in Department of Cardiology, NIMS Medical Hospital. 108 patients above 20 years of age, symptomatic patient, asymptomatic patient with electrocardiogram changes, patients who are willfully opting for coronary angiography were included in the study. Patients with previously diagnosed ischemic heart disease and underwent PTCA or CABG are excluded. The complete records showing detailed lipid profiles on 12 h fasting plasma samples was done among patients in the study. Coronary angiography either from femoral or radial artery was done. The patients were divided into three groups depending on ST segment elevation or depression. Coronary angiography was done and carefully interpreted. Statistical analysis software was used where necessary. **Results:** Majority of patients were in age group 50-60 years (42.59%). Male patients were predominant with 52.78%. The majority of patients presented with double vessel occlusion (44.44%) The association between lipid levels and coronary artery stenosis was highly significant. ($P < 0.001$) The association between ECG findings and coronary occlusion was not statistically significant. ($X^2 = 2.52$ with $p > 0.05$ not significant) **Conclusion:** Hence, patient with significant ECG changes had more extensive coronary artery involvement. The lipid levels also increased in patients with coronary artery disease with significant correlation.

Keywords: Correlation, ECG.

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INTRODUCTION

Coronary Artery Disease (CAD) will be the leading cause of death in developing countries by the year 2020.^{1,2} According to WHO statistics the age-standardized mortality rates from CAD are one of the highest worldwide.³ The reason for high prevalence rate of CAD were risk factors most commonly hypertension, dyslipidemia and obesity. The factors responsible for the

increased prevalence of CAD in India include adoption of unhealthy lifestyles comprising lack of exercise and tobacco consumption, nutrition transition towards an atherogenic, cholesterol rich diet and socioeconomic transition associated with urbanization and industrialization.⁴ In addition, the average of high density lipoprotein (HDL) level lowered in the CAD group, and low density lipoprotein (LDL) level, total cholesterol and triglycerides were higher in the CAD patients.⁵ The prevalence, type of lipid abnormalities and its association with CAD were reported among general population in few studies only. The knowledge about the determinants of disease in persons within populations and of lipid profile in this group of relatively high-risk patients could be used to make recommendations on lipid management. Prevention programs will give priority to the most common risk factors and possibly the predominant type of dyslipidemia. The detailed analysis of electrocardiography may give insights to any electrical and mechanical complications (diagnosis), the site of

occlusion and coronary anatomy (topography), and predict short and long-term outcome (prognosis).⁶ 12 lead electrocardiogram is considered as an essential part of the diagnosis and initial evaluation of the patient with coronary artery disease. Patient with or without symptoms irrespective of electrocardiogram changes may or may not have significant coronary angiography changes. Whatever changes are seen on ECG findings may not be the actual lesion seen in coronary angiography. Even asymptomatic patients with ECG changes on routine evaluation may show coronary lesion patients having severe chest pain with or without ECG changes may have normal coronaries. The present study tries to find out electrocardiogram changes and lipid profile among patients of coronary artery disease.

OBJECTIVES

- To determine electrocardiogram changes is associated with strong involvement of coronary angiography morphology changes.
- To determine lipid profile among patients of coronary artery disease.

MATERIAL AND METHODS

A cross sectional study was carried out for the period of one Year in Department of Cardiology, NIMS Medical Hospital. A total of 108 patients above 20 years of age, symptomatic with or without electrocardiogram ST-T changes, asymptomatic patient with electrocardiogram changes, patients who are will fully opting for coronary angiography were included in the study. Patients with previously diagnosed ischemic heart disease and underwent PTCA or CABG are excluded. The Ethical clearance from college ethical committee was taken. After inclusion, the patients were properly interviewed; meticulous history taking and physical examination were performed. The standard 12 lead electrocardiogram with 25 mm per sec speed with 10 mv standardization was recorded for every patient. The patients were divided into three groups.

- Group 1:** Comprised ST segment elevation of 1mm and /or marked T wave inversion with or without chest pain
- Group 2:** comprised patients with ST segment depression less than 1mm or T wave inversion with or without chest pain.
- Group 3:** Patient with normal ECG with chest pain.

The complete records showing detailed lipid profiles on 12 h fasting plasma samples was done among patients in the study. Coronary angiography either from femoral or radial artery was done. The results of coronary angiography were carefully interpreted. The groups among patients again divided on basis of percentage of

vessel blockage as <50% and > 50%. Statistical analysis was done using Microsoft excel and necessary statistical analysis software was used where necessary.

RESULTS

Table 1: Age and sex distribution among patients

Age	Male	%	Female	%	Total	%
20-30	02	1.85	01	0.93	03	2.78
30-40	05	4.63	04	3.70	09	8.33
40-50	14	12.96	10	9.26	24	22.22
50-60	25	23.15	21	19.44	46	42.59
>60	11	10.19	15	13.89	26	24.08
Total	57	52.78	51	47.22	108	100.00

As per table 1, majority of patients were in age group 50-60 years (42.59%) followed by >60 years (24.08%). Male patients were predominant with 52.78% as compared to females 47.22%.

Table 2: Distribution according to CAD severity

CAD Severity	Frequency	Percentage
Normal	16	14.82
Single vessel	26	24.07
Double vessel	48	44.44
Triple vessel	18	16.67
Total	108	100

The majority of patients presented with double vessel occlusion (44.44%) followed by single vessel (24.07%) and triple vessel (16.67%). 14.82% of patients were having normal coronary angiography.

Table 3: Distribution according to lipid profile and CAD among Patients

Mean Lipid levels	CAD (<50%)	CAD (≥50%)	P value
LDL (mg/dl)	134.08± 8.56	162.46± 10.12	<0.001*
HDL (mg/dl)	42.36± 7.38	32.58 ± 8.59	<0.001*
Triglycerides (mg/dl)	132.04± 10.28	148.72± 11.35	<0.001*
Total Cholesterol (mg/dl)	192.67± 12.72	208.56± 16.36	<0.001*

(* P<0.001 Highly significant)

In the table 3, it was observed that mean lipid levels among coronary artery stenosis >50% was on the greater side as compared to other group in respect to LDL, triglycerides and total cholesterol. The mean HDL levels was low in CAD >50% stenosis. The association between lipid levels and coronary artery stenosis was highly significant. (P<0.001)

Table 4: Correlation of ECG changes and severity of Coronary findings among patients

Group	CAD <50% (%)	CAD ≥50% (%)	Total (%)
Group I	12 (42.86)	48 (60.00)	60 (55.56)
Group II	08 (28.57)	17 (21.25)	25 (23.15)
Group III	08 (28.57)	15 (18.75)	23 (21.29)
Total	28 (100)	80 (100)	108 (100)

(X₂=2.52 d.f=2 p=0.28 Not significant)

60% of patients in Group I with extensive ECG involvement showed coronary occlusion >50%. The association between ECG findings and coronary occlusion was not statistically significant. ($X^2=2.52$ with $p>0.05$ not significant)

DISCUSSION

The present study was a hospital based cross sectional study conducted for a period of one in XYZ College to study correlation of ECG changes and lipid profile among coronary artery disease patients. A total of 108 patients above 20 years satisfying inclusion criteria during study period were included in the study. In the present study, majority of patients were in age group 50-60 years (42.59%) followed by >60 years (24.08%). Male patients were predominant with 52.78% as compared to females 47.22%. The similar findings were seen in the study done by Dangus *et al.*,⁷ Haque *et al.*⁸ and Siddique *et al.*⁹. The disease is very common in westernized population affecting the majority of adults over the age of 60 years. It is also rising in developing countries. The majority of patients presented with double vessel occlusion (44.44%) followed by single vessel (24.07%) and triple vessel (16.67%). 14.82% of patients were having normal coronary angiography. (Table 2) It was observed that mean lipid levels among coronary artery stenosis >50% was on the greater side as compared to other group in respect to LDL, triglycerides and total cholesterol. The mean HDL levels was low in CAD >50% stenosis. The association between lipid levels and coronary artery stenosis was highly significant. ($P<0.001$) Thus, it shows that increase in lipid levels cause greater vessel blockage and increase the severity of disease. Similar findings was seen in study done by M. Mohsen Ibrahim¹⁰ *et al* where lipid profile in patients with coronary artery disease was on higher level. In the study 60% of patients in Group I with extensive ECG involvement showed coronary occlusion >50%. The association between ECG findings and coronary occlusion was not statistically significant. ($X^2=2.52$ with $p>0.05$ not significant) This finding was consistent with De Servi *et al.*¹¹ who showed a larger number of patients with unstable angina showing ST segment change had multi-vessel disease.

CONCLUSION

Thus we concluded that patient with significant ECG changes had more extensive coronary artery involvement than the patients with less significant ECG change. The lipid levels also increased in patients with coronary artery disease.

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