



The Study of Predictive Factors in the Contribution and Progression of Coronary Artery Disease: A Hospital Based Cross Sectional Study

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Abstract

Coronary Artery Disease is an insidious disease which can present clinically with sudden onset of Symptoms that necessitate hospitalization and life saving intervention. The spectrum of clinicopathological entities can range from Stable Angina, Unstable Angina and Acute Coronary Syndrome. The last but not the least entity is life threatening condition with significant Morbidity and Mortality unless timely treatment is given. There are many factors which can initiate and lead to development of the disease. The Aim of this study is to identify the Risk Factors in the causation of the coronary artery disease and there by reinforce the Knowledge of Medical Fraternity about the conditions which can predict coronary artery disease, especially Acute Coronary Syndrome[Unstable Angina, Myocardial Infarction].

Key Words: Variable, Study, Coronary Artery Disease, Prediction, Atherosclerosis.

Introduction

The most important pathologic event underlying Coronary Artery Disease is Atherosclerosis of Coronaries, which is characterized by formation of fibrofatty plaque in intima of coronaries which begins in childhood and progress over the years leading to gradual ischemia[Stable Angina] and then finally as sudden ischemia[Acute Coronary Syndrome]. There are many factors which initiate and leads to disease progression, and acceleration which can be Smoking, Hyperlipidemia, Diabetes Mellitus, Hypertension, Inflammation, Obesity[high

BMI] along with Age, Sex, Family History and Racial Background¹. Studies have established connection between Hypertension and Hypercholesterolemia with subsequent Cardio Vascular incidents². In addition the presence of threathful conditions such as Diabetes Mellitus, Hypertension and Hypercholesterolemia were associated with acceleration of Coronary artery disease, even with or without control of the former entities³. Studies conducted in Japan in Diabetics to assess the risk of Coronary artery disease has proven that TC/HDLC, non-HDLC for men and Triglycerides for Women were the best determinants⁴. The Forecast

prototype studies to assess coronary artery disease risk has proven the value of existing determinants in general population along with a suggestion to add Calcium score in coronaries, which can improve the prediction value⁵. Studies have found out that the prevalence of disease is highest in Male obese smokers along with significant risk of the disease in persons in fourth decade who are Hypertensive and Diabetic also ⁶. In addition new techniques in Echocardiography has shown to be an indicator of Coronary artery disease progression⁷. Markers of Cardiac injury such as Troponin can predict disease progression ⁸. Studies performed in Europe showed that Incidence of disease is high in those who are Diabetics due to the fact that hypercholesterolemia is widely prevalent among these group, which along with history of Ischemia also predicted the disease⁹. Present

Measures focus on early recognition of Individuals at preclinical stage to stop their progression to well established disease¹⁰.

Materials and Methods:

Three groups of Patients were selected based on their Clinical Presentations, ECG and Lab findings into Stable Angina, Unstable Angina and Myocardial Infarction and data about risk factors for these entities, such as Hypertension, Diabetes Mellitus, Hypercholesterolemia, Smoking, Inflammation is collected from these patient records and data is subjected to SPSS 16.0 [Chi Square Test and Multivariate Logistic Regression] for Analysis and Prediction of Disease. The Statistical Findings are compared with other studies.

Results:

Table 1: Chi Square Test

Coronary Artery Disease[100]	Hypertension	Female Risk [60%]	Age > 40	Diabetes Mellitus	Hyper Cholesterolemia	Smoking	Inflammation
Stable Angina[32]	30	24	23	29	28	0	1
Unstable Angina[33]	29	14	30	30	21	1	0
Myocardial Infarction [35]	30	22	27	28	31	2	3
P Value	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table 2: Multinomial Regression Test

Coronary Artery Disease[100]	Hypertension	Female Risk [60%]	Age > 40	Diabetes Mellitus	Hyper Cholesterolemia	Smoking	Inflammation
Stable Angina[32]	30	24	23	29	28	0	1
Unstable Angina[33]	29	14	30	30	21	1	0
Myocardial Infarction [35]	30	22	27	28	31	2	3
P Value	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Odds Ratio	1.2	1	1.1	1.4	1.5	1	1
Confidence interval	0.3	0.5	0.6	0.4	0.3	0.3	0.3

Discussion

Atherosclerosis is considered to be a complex process with an interplay of various factors that range from Modifiable and Non Modifiable factors. Modifiable factors include Hypertension Anxiety Stress Diabetes Mellitus Hypercholesterolemia Smoking ,Infection and Inflammation .Whereas Non Modifiable factors are Age ,Sex ,Family History.

Atherosclerosis is an insidious pathological process which begins in childhood and gradually progress over the years¹¹ .In the present study 2/3 of cases were attributed to female sex along with 80% of the cases after 40 years ,which coincided with previous studies¹².This phenomena is attributed to relative estrogen deficiency in post menopausal women ,which contributes to high incidence of Metabolic Syndrome and thereby risk of Endothelial Dysfunction ,which leads to development of clinically manifestable Atherosclerosis¹².With regards to patients with Diabetes Hyperglycemia is critical in the development of Cardio Vascular events ,which is proved by the fact that Hba1C confers an independent predictive value ,which is confirmed by decline in Cardiovascular risk with control of Hba1C¹³.The findings with regards to predictability of disease by use of variables in the present study were comparable to previous studies ¹⁴.Studies conducted for testing the model for disease prediction has proved that SVM predictor model is superior to ANN model in terms of positive predictive value and sensitivity ¹⁵.The current study variables were tested by case control study performed in Lebanon which proved the utility of risk factors in disease prediction¹⁶.With regards to pathogenesis of Atherosclerosis role of Endothelial Nitric Oxide Synthase[ENOS] is studied by Elfi EF et al which suggested the role of free radical injury, thrombosis and expression of adhesion molecules in progression of Atherosclerosis .It was found that the normally protective role of ENOS is reversed in Atherosclerosis wherein it

contributes to Atherosclerosis by generation of free radicals as proved by increase concentrations of ENOS in patients with risk factors of Coronary artery disease¹⁷.Hypertension contributes to Atherosclerosis by way of Endothelial Injury and there by making Endothelium more prone for Atherosclerosis, but the risk of Atherosclerosis is doubled if Hypertensives are also smokers, diabetic and dyslipidemic ¹⁸.Computer Tomography Angiography [CTA] identifies patients with risk factors who are at high risk to develop coronary events, there by helping the Clinician to manage the patient more vigorously by way of early Coronary Catheterization¹⁹.In a study conducted to evaluate the progress of Unstable Angina ,Male sex was found to be predictor of obstructive coronary artery disease²⁰.

Conclusion: The present study proved the value of predictor variables in the prediction of coronary artery disease .In view of the findings of the study it can be suggested that the control of risk factors for Coronary Artery Disease is mandatory to prevent the onset and progression of Coronary Artery Disease.

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