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Risk factor analysis in patients of early onset coronary artery disease reporting to a tertiary care hospital in Rajasthan

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Abstract

Introduction: Number of patients with ischemic heart disease has tremendously increased in South East Asia during last 25 years. India has witnessed similar epidemic of coronary artery disease, especially among the urban individuals during this period. Early onset ischemic heart disease is more common in Indians (12-16%) if we compare with people of western countries (5%). Here we have planned this investigation to identify various risk factors which are responsible for relatively higher episodes of ischemic heart disease in young population (< 40 years).

Materials and Method: The study was carried out on young (<40 years) patients attending Jaipur National University Medical College and Hospital from Aug 2015 to April 2017 for coronary artery disease. Total 50 persons were investigated for this study.

Results: In patients with early onset IHD deranged lipid profile was seen in 74% cases, elevated blood pressure in 27 patients (54%), impaired fasting glucose or diabetes mellitus in 12 patients (20%). Tobacco use was seen in 36 patients (72%). 34 patients (68%) had one or more first degree relatives with history of CAD. 25 patients (50%) were obese. 25 patients (50%) had STEMI. In that, 20 patients had AWMI and only 5 had IWMI. 3 had new onset LBBB. 14 had NSTEMI and 8 had unstable angina. On echocardiography, 36 patients (72%) had LV dysfunction.

Conclusion: Most common clinical presentation was STEMI and AWMI. Males were commonly affected especially in the younger age group. Major risk factors like smoking, high blood sugar, and high blood pressure were also evident.

Keywords: LDL - low density lipoprotein, CAD - coronary artery disease, HDL - high density lipoprotein, DM - diabetes mellitus, Lpa - lipoprotein A, AMI - acute myocardial infarction, SVD - Single vessel disease, MVD-Multi vessel disease, STEMI- ST Elevated MI, NST

Introduction

Nearly, one-sixth of world's population lives in India and coronary artery disease is the commonest cause of mortality in India.[(1)] South Asian population especially Indian sub-continent has higher chance and wider prevalence of ischemic artery disease as compared to rest of ethnic groups.[(2,3)] Mortalities related to coronary artery disease have been found to occur 10 years earlier in Indian sub-continent than in Western people.[(4)]

Various risk factors contributing to increased incidences and prevalence of coronary artery disease in different age groups. Increased blood pressure, increased blood sugars, tobacco consumption and dyslipidemia are common risk factors of ischemic heart disease.[(5,6)] The increased prevalence of risk factors for coronary artery disease in young individuals is increased blood pressure, increased tobacco use whereas increased blood sugar and dyslipidemia is common within the elderly individuals. In elderly individuals aging is associated with degeneration in beta cells and relative increase in insulin resistance that may be responsible for elevated blood sugar blood sugar.

It has been well understood by earlier researches that certain risk factors and baseline characteristics such as family history of ischemic heart disease, increased weight, disturbed blood lipids, and use of tobacco products, are more potent predictors of outcomes in the early onset ischemic heart disease persons.[(7,8,9)] Keeping in view of limited data in India related to risk factors of ischemic heart disease in young, this investigation was planned.

Materials and Method

It is an observational study done on individuals attending Cardiac OPD, physician OPD, ICU and wards in Jaipur National University Medical College and hospital group from Aug 2015 to April 2017. A total 50 persons aged up to 40 years, with clinical and electrocardiogram findings of coronary artery disease were evaluated. Detail history and examination was recorded for every individual. The examination includes a thorough physical examination, assessment of vitals (BP, Pulse etc.) and systemic assessment. Persons were investigated for parameters like - electrocardiogram, echocardiography, fasting Lipid Profile, plasma Glucose, kidney function test, liver enzymes, complete blood counts, urine examination, Troponin-T, homocysteine, hsCRP, and Lp(a). Persons were considered diabetic if fasting and 2 hours post prandial blood glucose was more than 126 mg/dl and/or more than 200mg/dl respectively or persons who were on diabetic treatment. Following guidelines were followed for dyslipidemia- serum cholesterol >200mg/dl or HDL <35mg/dl or LDL >100mg/dl or

triglycerides >150mg/dl. Novel risk factors like Lp(a), homocysteine and fibrinogen were also checked in few persons. Echocardiography was carried out in all individuals to look for regional wall motion abnormality, mitral regurgitation and left ventricular ejection fraction.

Observation

Age: Gender Distribution: Age and gender are the important determinant of coronary artery disease cases. In current investigation fifty percent of individuals were in the age group 35-40 years. Out of 50 cases 45 are males and 5 are females. Males are relatively younger than female. Most of females were in age group of 35-40 years. (As shown in Table 1)

Family History: Out of 50 persons, 34 (68%) had positive family history of coronary artery disease and 16 (32%) had no family history of such disease.

Smoking: Smokers are having ischemic heart disease more commonly than non smokers. In current investigation 36 (72%) persons were smokers. Out of non smokers (14), 3 were females.

Diabetes Mellitus: Out of total individuals, 12 (24%) were detected to have increased blood sugar.

Lipid Profile: Fasting lipid profile (total cholesterol, LDL, HDL, VLDL, triglyceride) were measured in all individuals. Out of total investigation group 74% were found to have dyslipidemia. It has been observed that incidence of coronary artery disease increased if levels of LDL Cholesterol increase. Triglycerides also follow the LDL levels in investigation group (As shown in Table 2).

Hypertension: BP > 140 / 90 were taken as hypertensive. 54% that is 27 persons were found to have increased blood pressure in past or newly detected to have hypertension.

Obesity: Fifty percent of the investigation group was found to have obesity (Body mass index more than 30) as shown in Table 3.

Left Ventricle Systolic Dysfunction: 72% that is 36 out of fifty admitted persons had left ventricular dysfunction while 14 had normal left ventricular function (As shown in Table 4).

ECG Findings: Out of the investigation group, 25 persons had ST Elevation myocardial infarction (20 patients had Anterior Wall Myocardial Infarction and only 5 persons had Inferior Wall Myocardial Infarction). Out of 20 persons who had anterior wall Myocardial Infarction, 3 were females and remaining 17 were males. Three individuals had LBBB who were males. 14 persons had non ST elevation Myocardial Infarction and 8 persons had unstable angina. (As shown in Table 5)

Homocysteine & Lp(a): Only ten individuals were tested for these two investigations due to shortage of money. All these individuals were admitted in CCU who had AWMI. All these persons were smokers. Out of 10 individuals, 3 were having elevated Lp(a) and none was found to be elevated homocysteine. All 3 individuals who had increased Lp(a) had positive family history of ischemic heart disease and were obese (body mass index >30).

Eleven persons out of total investigation group came for coronary angiography (CAG). Five persons had single vessel disease, 3 in left anterior descending artery (LAD) and 2 in left circumflex artery (LCX). Six persons had triple vessel involvement; three of them were suggested for coronary artery bypass grafting (CABG) while 3 underwent multiple stents insertion.

Table 1: Age and Sex distribution of studied subjects

Age	Males	Females	% of females
20-28	8	0	0% of females
29-34	15	2	13.3% of females
35-40	22	3	13.6% of females

Table 2: Distribution of subjects as per lipid profile

HDL cholesterol level	**Value**	**No. of patients**
	<20	1
	21-40	36
	41-60	12
	>60	1
Level of LDL	<130	9
	130-160	15
	>160	26

Table 3: Distribution of subjects as per BMI

BMI	No. of patients	%
18.5-25	18	36%
25-30	7	14%
>30	25	50%

Table 4: Distribution of subjects as per LV dysfunctions

LV dysfunction	No. of patients	%
Present	36	72%
Absent	14	28%

Table 5: Distribution of subjects as per ECG findings

ECG findings	No. of patients
AWMI	20
IWMI	5
LBBB	3
NSTEMI	14
USA	8

Discussion

In current investigation of early onset ischemic heart disease persons, the most common symptom was chest pain and chest discomfort. Further analysis of risk factors revealed that smoking, dyslipidemia, family history of coronary artery disease, hypertension and increasing body mass index were common associations

of early onset ischemic heart disease. Here is a comparison between results of current investigation and earlier researches.

In current investigation, males were 90% while females were 10% (Male and Female ratio was 9:1). Risk factors like smoking, mental stress and increased blood pressure were significantly high among men, compared to women. In males coronary artery disease develops 10 years before. Hormones plays important role in delay of ischemic heart disease among females. Maximum number of patients falls in late forties (37-40 years). Same claims were made by Dwivedi et al.[11,12]

In our investigation, more than seventy percent of persons were using tobacco, mainly they are males. Earlier case control researches in premature ischemic heart disease from India reported tobacco, increased blood pressure and low HDL cholesterol as significant risk factors[13]. Tobacco is the main risk associate for ischemic heart disease in young individuals and increase in mortality and morbidity. Earlier researches had same observations i.e. Gupta et al.[15] 1987, Gower MC et al.,[17] Dwivedi et al,[12] Jeyachandran et al[14] in 1987 (53%), Bergstrand R et al.[16] (89%)

In current investigation, 74% of individuals were having deranged lipid levels. Dyslipidemia with obesity, insulin resistance also produces a prothrombotic state due to increased level of PAI - 1 and Fibrinogen. Same observations have been made in earlier researches i.e. David JE et al in (68%) 1987.[18]

In current investigation around seventy percent of the individuals had family history of coronary artery disease. It signifies that genetic factors also contribute to the chance of ischemic heart disease. In earlier researches, same observation have been made i.e., Dwivedi et al[12] (42.8%) in 2000.

In current investigation, 54% individuals were found to have hypertension. Same findings have been made in earlier researches also i.e. Dwivedi et al.[12]

In current investigation, 50% of individuals were found to have BODY MASS INDEX more than 30. Obesity is one of the significant risk factor in the onset of coronary artery disease. Same findings have been made in earlier researches also i.e. Dwivedi et al.[12]

In current investigation, 24% of individuals were having diabetes. Same observations have been made in earlier researches also i.e. PK Biswas A38 (9.7%), Marty AK Das AK et al[19] (18%), Dwivedi et al[12] (7.14%) in 2000.

In current investigation, fifty percent individuals had STEMI. Out of these 25 individuals 20 had anterior wall myocardial infarction. Five persons had inferior wall myocardial infarction. Out of remaining 25 persons 3 persons had left bundle branch block and 14 persons had ST-T changes suggestive of reduced blood supply and out of these 14 persons 10 persons were having increased troponin-T levels which were labeled as NSTEMI. Seven individuals had normal ELECTROCARDIOGRAM and four out of these were positive for troponin test. Same findings were observed in investigation done by I.WEINBERGER IN 1987.

Persons, who had anterior wall myocardial infarction, were having hypokinesia in LAD territory. Persons who had inferior wall myocardial infarction had hypokinesia in RCA & LCx territory. Persons who had LBBB were having generalized hypokinesia. Out of 50 persons 36 had reduced left ventricle functions. Only five individuals had severe left ventricle systolic dysfunction, rest 31 persons had moderate to mild left ventricle systolic dysfunction.

Conclusion

Early onset coronary artery disease among Indians is due to thrombotic and atherosclerotic risk factors are more common among us. Common presentation of ischemic heart disease was STEMI and anterior wall myocardial infarction was commonest in STEMI cases.

Males were more common victims especially in younger age group. Tobacco, mental stress, and increased blood presser are significantly more associated in males if compared with females. These factors along with hormonal differences are the reason behind higher proportion of early onset ischemic heart disease in Males.

Current investigation generalizes the importance of tobacco use and deranged blood lipids as important targets for prevention of early onset ischemic heart disease in Indians but only these risk factors do not explain the increased burden of ischemic heart disease in Indians. Besides this some risk factors like genetic predisposition, sedentary life style and homocysteinuria also responsible for early onset ischemic heart disease. Primary prevention of premature ischemic heart disease in India needs immediate curb on such common risk associates. Newer life style with control of tobacco, diet alteration which include more fruits and vegetables and lesser fat and mono carbohydrates (Simple sugar and carbohydrates) intake, and increased physical exertion are critical, avoiding reheating of oil while cooking which is mostly done in junk foods (increases Trans Fatty acids), control of increased BP, lipid levels and control of blood glucose is necessary. In current investigation history of ischemic heart disease in family members is also come out as one of the important risk factor contributing to early onset ischemic heart disease. This is due to interplay of both internal and external risk factors.

Thus early diagnosis and effective control for all such risk factors may be helpful in saving mortality and morbidity of individuals at higher chance for early onset ischemic heart disease.

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