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REDUCING THE CARDIOVASCULAR MORBIDITY IN SIBLINGS OF PATIENTS OF CORONARY ARTERY DISEASE BY USING SIMPLE SCREENING AND DIAGNOSTIC TESTS

General Medicine

Dr. Sachin Shivnitwar Assistant Professor, Department of General Medicine, DYPMC, Pimpri, Maharashtra, India

Dr. Anita Basavaraj* Head of Department of General Medicine, Goverment Medical College , Miraj, Maharashtra, India *Corresponding Author

ABSTRACT

Background : Siblings of patients coronary artery disease are overlooked in prevention of non communicable diseases like coronary artery disease.

Objectives : To study lipid profile of patients of coronary artery disease and their siblings to identify risk factors among siblings like diabetes, hypertension, smoking, tobacco, alcohol.

Methodology : To study the lipid profile and other risk factors in 60 patients of coronary artery disease and their 120 siblings.

Results : Siblings of cases of coronary artery disease have abnormal lipid profile and risk factor like diabetes which is statistically significant when compared with the cases.

Conclusion: We conclude that there is significant abnormal lipid profile and other risk factors among siblings of patients coronary artery disease when compared with the patients.

KEYWORDS

coronary artery disease, lipid profile, diabetes

Introduction

India is witnessing a dramatic rise in myocardial infarction, especially in the young. Deaths due to cardiovascular diseases (CVD) account for 28% of all deaths in India and they occur a decade earlier than in developed countries[1]. The levels of traditional risk factors like serum lipids, diabetes, hypertension, smoking, tobacco, lack of moderate consumption of alcohol have increased steeply due to rapid changes in lifestyle. The premature heart attack in young Indians is explained by the higher levels of these risk factors at a younger age in Indians as compared to individuals from other countries[2] . The Centre for Disease Control estimates that life expectancy might be increased by sevenyears if Coronary Artery Disease & its complications were eradicated.[3]The key to preventing myocardial infarction in young Indians is primary prevention – identifying, preventing and controlling risk factors for myocardial infarction. It is likely that risk factor levels are elevated not only in individuals with Coronary Heart Disease (CHD), but also among the individuals siblings. Increased risk factors in siblings may in turn explain familial aggregation of Coronary Heart Disease (CHD) events. The basis of risk factor and disease aggregation in siblings has been attributed to a combination of shared genetic endowment and lifestyle behaviour. Siblings of myocardial infarction patients are overlooked in primary prevention of cardiovascular disease[4]. Sibling lipid profiles, Blood pressure and smoking patterns in a study demonstrated a high degree of correlation from early to middle adulthood, and showed no tendency to decrease over time[5]. A study evaluating the familial aggregation of components of the metabolic syndrome demonstrated a high sibling correlation for lipid variables, systolic blood pressure and Body Mass Index[6]. Understanding how Coronary Heart Disease (CHD) risk factors may aggregate in siblings of individuals with Coronary Heart Disease (CHD) may aid in developing both local and global strategies for primary and primordial prevention of Coronary Heart Disease (CHD). Cardiovascular Risk Factors in Family Members of Individuals with CHD:we have taken lipid profile of patient and compared with the siblings and also done screening of risk factors like diabetes , hypertension and smoking , tobacco use and lack of consumption of alcohol among siblings. Identifying this constellation of risk factors that account for the significant Population Attributable Risk worldwide would allow for further exploration into the patterns by which these risk factors aggregate within siblings and families of the individual with CHD. It is evident that assessing Coronary Heart Disease risk factor levels should not be limited to examination of individual risk factors in cases but the patterns of familial aggregation of risk factors in siblings should also be assessed. There are complex genetic and environmental interactions that lead to the clustering of many CHD risk factors among individuals and families.

Methodology

Study design: Hospital based case-control study- A hospital based case control study designed to determine whether high risk individuals with acute myocardial infarction (AMI) are markers of high risk siblings by virtue of increased risk factor levels in siblings. By collecting data on risk factors for AMI from cases of first AMI and the sibling who do not have heart disease or family history of coronary heart disease or stroke, we were able to determine whether there is a clustering of risk factors between cases and their siblings.

Inclusion Criteria (cases):

1. Men and women age more than 20 years but less than 70 years, presenting with acute myocardial infarction (AMI) admitted to Intensive care unit (ICU) and wards.
2. Cases having atleast 2 siblings.

Criteria for diagnosis of acute myocardial infarction:
(Presence of at least 2 of following 3 criteria)

1) History of typical chest discomfort (heaviness in chest, retrosternal constricting chest pain, accompanied by diaphoresis, palpitation vomiting, nausea or syncope).
2) Presence of >1mm ST elevation in 2 contiguous ECG leads. Only ST segment elevated myocardial infarction (STEMI) will be included.
3) Presence of elevated cardiac enzymes (> 2.5 times normal value).

Exclusion Criteria (cases):

1) Patients not giving consent for investigation.
2) patients on statins or lipid lowering agents.
3) age less than 20 years.

Case Siblings:
Siblings were contacted. If the case had many siblings, the selection of the sibling was prioritized on

1) same gender as the case.
2) Closest to the age of the case .
3) Living in the same household was preferred.

Study variables:

1) Abnormal lipid profile
   [sr.TG > 150mg%, sr.TC > 200mg%, sr.LDL-C > 100mg%, sr.HDL- C≤40mg% in men or < 50 mg% in women
2) Current or former smoking
3) Hypertension
   [Systolic BP > 140mmHg, Diastolic BP > 90mmHg, past history of hypertension or on anti-hypertensive medication]
4) Diabetes mellitus
   Fasting plasma glucose > 126mg%
   Postprandial plasma glucose > 200 mg%

Results

Table 1 : Lipid profile of the cases and siblings

	CASES (60)	SIBLINGS (120)	P VALUE
SR CHOLESTEROL MEAN SD	189.33	170.42	<0.001
	24.90	30.61	
SR TRIGLYCERIDES MEAN SD	169.00	140.67	<0.001
	19.55	30.51	
HDL MEAN SD	42.42	39.50	<0.001
	5.33	4.82	
LDL MEAN SD	171.50	141.63	<0.001
	16.55	27.27	
VLDL MEAN SD	33.67	27.98	<0.001
	3.90	6.08	
TOTAL/HDL RATIO MEAN SD	4.54	4.43	0.532
	0.95	1.23	

Lipid profile of cases and their siblings studied and evaluated for any correlation. Lipid profile of cases with their siblings are evaluated by using 2 independent sample t- test to find out correlation. p value <0.001 is considered as statistically significant.

The mean serum cholesterol of cases was 189.33, whereas mean serum cholesterol among siblings was 170.42 which is statistically significant (P<0.001).

The mean serum triglycerides of cases was 169; and in siblings it was 140.67 which is statistically significant (P<0.001).

The mean serum HDL among cases was 42.42; and in siblings it was 39.50 which is also statistically significant (P<0.001).

The mean serum LDL in cases is 171.50 and in siblings it was 141.63 which is statistically significant. (P<0.001).

The mean VLDL in cases was 33.67 and in siblings it was 27.98 which is again statistically significant (P<0.001).

However, total/ HDL ratio in cases is 4.54 and in siblings it was 4.43, which is not statistically significant (P< 0.532)

So, in our study we found out that abnormal lipid profile has great impact on coronary artery disease in patients and in siblings too.

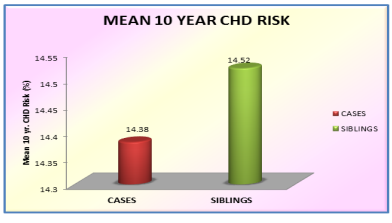

Figure 1. Mean 10 year risk in cases and siblings

We also found that 10 year risk score among cases , the mean is 14.38 and in siblings it was 14.52 which not statistically significant (P value is 0.87)

Table 2: -Comparison of conventional risk factors in cases and siblings

Risk factor	Cases (60)	Siblings (120)	P value
Hypertension	39 (65%)	60 (50%)	P=0.059 OR=1.8 95%CI=0.97 - 3.52
Diabetes Mellitus	15 (25%)	12 (10%)	P=0.014 OR=3.0 95%CI=1.30 - 6.91
Tobacco	9 (15%)	12 (10%)	P=0.33 OR=1.58 95%CI=0.62 - 4.0
Smoking	15 (25%)	19 (15.83%)	P=0.159 OR=1.77 95%CI=0.8 - 3.79
Lack Of Moderate Consumption Of Alcohol(< Once/week)	45 (75%)	96 (80%)	P=0.44 OR=0.7 95%CI=0.35 - 1.56

Out of the 60 cases 39 (65%)patients had the hypertension, whereas 60(50%) siblings out of 120 had hypertension. although the frequency of hypertension more in cases it was not statistically significant (p 0.059)

Out of the 60 cases , 15 (25%) were diabetic, whereas 12(10%) had diabetes in siblings. the frequency of the diabetes more in cases and it is statistically significant (p= 0.014)

Out of the 60 cases, 9 (15%)patients were tobacco chewer, whereas 12(10%) of the 120 siblings were the tobacco chewer. the frequency of tobacco chewing though high in cases, it is not statistically significant.(p= 0.33)

Out of the 60 cases, 15 (25%)patients were smoker, whereas 19(15.83%) of the 120 siblings were the smoker. the frequency of smoking though high in cases, it is not statistically significant.(p=0.159)

Out of sixty siblings, lack of moderate alcohol consumption (<once per week) was found in 45 (75%) siblings whereas 96 (80%) of the 120 siblings had lack of alcohol consumption (<once per week). Although the frequency of lack of alcohol consumption was more in siblings as compared with cases, the difference failed to reach statistical significance (p=0.449)

Discussion

We studied 60 consecutively admitted patients of coronary artery disease admitted to ICU and wards of our institute and who fulfilled the eligibility criteria. 120 siblings of the cases who fulfilled the eligibility criteria and were preferably of the both gender and closest in age to the case were recruited and studied

In our study, the frequency of various traditional risk factors was statistically significantly higher in cases as compared with siblings which included Diabetes mellitus (p=0.014),abnormal lipid profile; cholesterol (p<0.001),triglycerides(p<0.001),HDL (P<0.001), LDL(P<0.001), VLDL(P<0.001).

A statistically significant difference was not observed between cases and siblings for smoking (p=0.159), hypertension (p=0.059) which can be explained by a small sample size. We calculated the mean 10 year CHD risk (as assessed by the Framingham risk score) in 120siblings.

Out of total 120 siblings, 24(20%) had a 10 year CHD risk of >20 %, as calculated by the Framingham 10 Year CHD risk score. A 10 year CHD risk of >20% is considered as a CHD equivalent by the US **NCEP ATP III** .Out of the 120 siblings, male 15(25%) and female 9(15%) had a 10 year CAD risk score of >20%.

We would require a multivariate analysis to know whether this association of increased coronary artery disease risk in siblings was because of the aggregation of the risk factors or, in addition, there was an independent effect of positive history of coronary artery disease in sibling.

Our findings suggested markedly higher levels of cardiovascular risk factors in siblings of cases with AMI.

Despite this, we observed that there was a significantly low awareness in this easily identifiable, high risk group regarding the high burden of cardiovascular risk factors and the high 10 year risk for CAD.

Conclusion

We conclude that siblings of cases of CAD have significant abnormal lipid profile which could be a great coronary impact in future and which predispose them in to high risk group since they are at higher risk for the development of CAD. The levels of cardiovascular risk

factors are higher and aggregate within individuals with CAD and their siblings. The ten year risk for developing a cardiovascular event (as calculated by the Framingham score) is higher in siblings of coronary artery disease.

Limitations:

The study includes only 60 cases and 120 siblings, a larger study will be needed for better results.

Clinical implications

Our findings demonstrate that there is correlation of abnormal lipid profile of cases of coronary artery disease and their siblings. abnormal lipid profile with other risk factor like diabetes pose increased risk of developing coronary artery disease in siblings. The markedly adverse high levels of modifiable risk factors found in siblings of cases of CHD offer a potential for prevention in families with heart disease, and emphasize the need for more aggressive screening and treatment in this easily identifiable high risk population.

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Conflicts of interest: None declared

Ethical approval: The study was approved by institutional ethical committee.

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