Section: Medicine

The Study of Major Modifiable Risk Factor in Established Coronary Artery Disease Patients at a Tertiary Care Centre in Moradabad.

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ABSTRACT

Background: The coronary artery disease (CAD) is multi factorial and the sequential development of CAD has been directly or indirectly linked with several risk factors. The present study was conducted to evaluate the presence of major modifiable risk factors in an established CAD patients. **Methods:** It was an observational hospital based study. A sum of 200 consecutive patients was admitted in the department of medicine and cardiology for coronary angiography (CAG) at TMMC & RC, after fulfilling the inclusion criteria during March 2015 to August 2016. All these cases had CAD confirmed on angiography. Presence of Diabetes, Hypertension, Smoking, Dyslipidemia, and Obesity was looked for in these patients. **Results:** A total of 200 patients were studied during this period. Single risk factor was found to be significantly more among 30-45 and 46-55 years age groups. Multiple risk factors were found to be significantly more among 56-65 and above 65 years age groups. Of the patients studied, smoking was present in 112 (56.0%), hypertension was present in 54 (27%), dyslipidemia was present in 72(36%), diabetes was present in 38 (19%), 60 (30%) were overweight and 4 (2%) were obese. **Conclusion:** Most of the patients with coronary artery disease have at least one of the major modifiable risk factors for CAD. Modification of these factors may well reduce the disease burden of CAD and reduce the cardiovascular mortality.

Keywords: Coronary Artery Disease, Major Modifiable Risk Factors, Hypertension, Smoking, Diabetes, Dyslipidemia, Obesity.

INTRODUCTION

Coronary artery disease (CAD) develops because of atherosclerotic plaque construction and deposition in the epicardial coronary blood vessel with the ultimate outcome of myocardial ischemia. CAD comprises a range of disease manifestations extending from Acute Coronary Syndromes (ACS) to Chronic Coronary Syndromes (CCS). ACS comprises ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina while CCS includes silent ischemia, stable angina, variant angina & micro-vascular angina. The etiology of CAD is multi factorial and the sequential development of CAD has been directly or indirectly linked with several risk factors. These risk factors can be further divided into modifiable and non-modifiable as shown in [Table 1].

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Table 1: Modifiable and Non-modifiable risk factors

Non-modifiable risk factors	Modifiable risk factors
Age	Tobacco smoking
Sex	High blood pressure
Genetic factors	Dyslipidemia
Family history	Diabetes
	Obesity
	Sedentary habits
	Stress

[From "PARK'S textbook of preventive and social medicine 23rd edition, reproduced with permission"]

Much of our knowledge regarding the risk factors for CAD has been gained from research studies conducted in the Western world. It is strongly and widely believed that the association of these risk factors with CAD in other populations needs to be verified. India is a land of diversities with various regional beliefs which hide the correct scenario of the disease while it is only the tip of iceberg that is visible to the medical fraternity. This provides an illusion of the real estimate of the disease which remains submerged in the society thereby extorting a heavy social and economic price. Keeping this idea as the cornerstone of our research this study

attempts to assess the relative importance of association between the major modifiable risk factors for CAD in a tertiary care centre.

AIM

To study the modifiable risk factors in established Coronary Artery Disease (CAD) patients at a tertiary care center, Moradabad, U.P, India.

MATERIALS AND METHODS

The study was conducted at a tertiary care hospital in Moradabad in the state of Utter Pradesh located in the northern part of India. Ethical approval for the study was obtained from the Institutional Ethical Review Committee. It was an Observational Hospital based study conducted on 200 consecutive patients, who was admitted in the department of medicine and cardiology for coronary angiography (CAG) at TMMC & RC, after fulfilling the inclusion criteria during March 2015 to August 2016. The inclusion criteria were:
Age: 18-75 years

Diagnostic criteria of CAD

CAD had proved by CAG with complete documentation of risk factors and diagnosis.

Diagnostic criteria of major modifiable risk factors
Hypertension

Levels of the hypertension was decided as per the guidelines of "Joint National Committee" (JNC 7).

Diabetes mellitus

Diagnosis of DM was made as per American Diabetes Association (ADA) criteria.

Dyslipidemia

Criteria for dyslipidemia were decided as per "National Cholesterol Education Programme" (Adult Treatment Panel - ATP III) guidelines.

Smoking

Smoking of tobacco either in the form of cigarette and bid along with the mentions of number per day. How many packets of cigarettes/Bidi had smoked per day and for how many years (number of pack years of smoking.[i] Patient was considered non-smoker only if they have never smoked. One bidi was considered to one cigarette for calculating "pack-years" of smoking.

Obesity

Measured by Body mass index (BMI): Weight (kg)/height (m2)[ii] and IOTF guidelines.[iii]
The exclusion criteria were:

Exclusion criteria

1. Patient not giving consent for the study
2. The presence of chronic kidney disease
3. Known endocrinal diseases (except diabetes mellitus)
4. Rheumatic heart disease
5. Congenital anomalies of heart
6. Hookah smoker

All patients included in the study were subjected to a standardized clinical and investigations protocol.

RESULTS

A sum of 200 consecutive patients were admitted in the department of medicine and cardiology for coronary angiography at TMMC & RC, Moradabad for chest pain or post MI during March 2015 to August 2015. All these cases had CAD confirmed on coronary angiography. Among 200 patients males were 177 (88.5%) and females were 23 (11.5%). Of the patients studied 52(26%) were under the age of 45 and 55(27.5%) were in the age group of 46 to 55, 57(28.5%) were in the age group of 56 to 65 and 36(18%) were above the age of 65. It was observed that on coronary angiography, SVD was present among 95 (47.50%) patients, DVD was present among 69 (34.50%) patients and TVD was present among 36 (18.0%) patients shown in [Figure 1]. Of the patients studied, smoking was present in 112 (56.0%), hypertension was present in 54 (27%), dyslipidemia was present in 72(36%), diabetes was present in38 (19%), 60(30%) were overweight and 4(2%) were obese shown in [Figure 2].

The distribution of single vessel disease, double vessel disease and triple vessel disease patients were compared between different age groups using the chi-square test. Single vessel disease was found to be significantly more among 30-45 and 46-55 years age groups. Double and Triple vessel disease was found to be significantly more among 56-65 and above 65 years age groups shown in [Figure 3].

Single risk factor was found to be significantly more among Single and Double vessel disease patients. Multiple risk factors were found to be significantly more among Triple vessel disease patients. Single risk factor was found to be significantly more among 30-45 and 46-55 years age groups. Multiple risk factors were found to be significantly more among 56-65 and above 65 years age groups shown in table 2 and 3. Amongst the risk factors it was observed that smoking and dyslipidemia were more prevalent in the younger age group while the prevalence of hypertension increased with advancing age. Diabetes was observed to be more prevalent in the older age group.
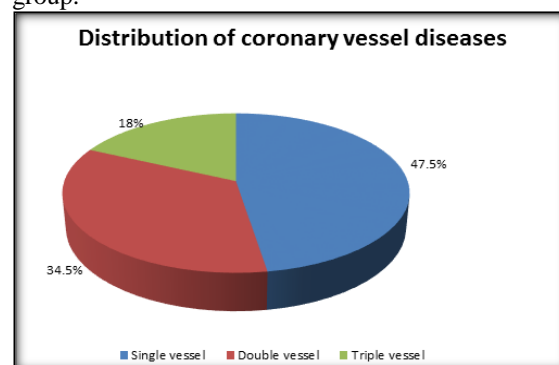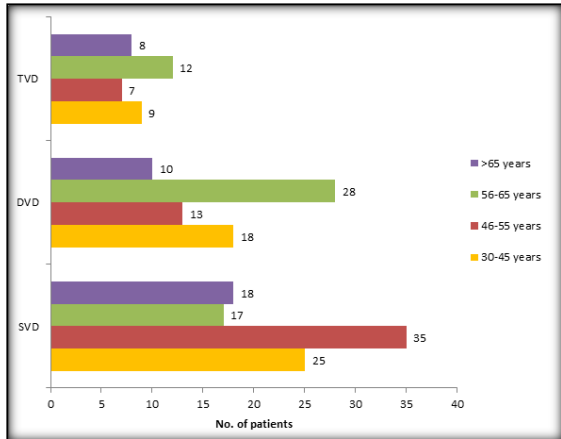

Figure 1: Shows distribution of CAD

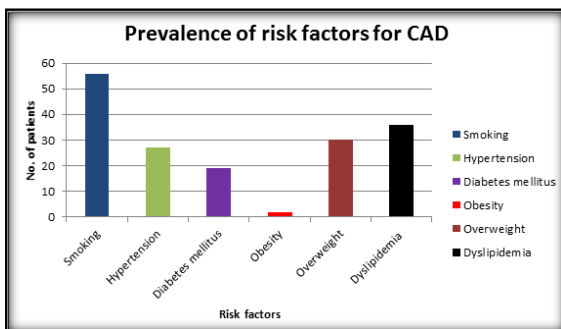**Figure 2: Distribution of vessel diseases in different age groups.**

Figure 3: shows the prevalence of risk factor for CAD.

Table: 2 Comparison of risk factors in different vessel diseases.

Risk factors	SVD	DVD	TVD	Total
No risk factor	26 (52%)	20 (40%)	4 (8.0%)	50 (26.0%)
Single risk factor	54 (54.0%)	32 (32.0%)	14 (14.0%)	100 (50.0%)
Multiple risk factor	15 (30.0%)	17 (34.0%)	18 (36.0%)	50 (24.0%)
Total	95 (100.0%)	69 (100.0%)	36 (100.0%)	200 (100.0%)
p-value = 0.001* * Significant difference				

DISCUSSION

This study describes a comprehensive summary of major modifiable cardiovascular risk factors in north Indian population. CAD was diagnosed using CAG which is the gold standard for diagnosis of CAD with a minimum false negative or positive error rate. In the present study, CAD was present in 88.3% males and 11.7% females. Males generally have a higher predisposition towards CAD in comparison to females and this gender disparity cannot be explained only on the basis of risk factors for CAD. Previously published data by ICMR task force study, Gupta AK, Mohan V and Kutty VR also report similar conclusion regarding the dominance of male

sex in CAD incidence. This can be attributed to the unhealthy social behavior which is easily acceptable in the male dominant society and that includes tobacco smoking, sedentary lifestyle and a higher exposure to work related stress.

Published literature focused on classical risk factors of CAD points towards a growing trend in our country and these risk factors include high blood pressure, tobacco smoking and dyslipidemia. Tobacco smoke contains hundreds of toxic and carcinogenic chemicals with resultant possibilities like atherothrombotic phenomenon, vascular damage thereby increasing the risk of CAD, although the exact mechanism is still unknown. WHO has also endorsed tobacco smoking as one of the major contributing risk factor for CAD in India. In the present study, smoking was observed in 56% of our younger age group patients clearly suggesting that smoking is one of the important risk factor for the development of CAD in the younger population. This rise in smoking pattern can be attributed to the lack of education as well as awareness in the younger age group of lower socio-economic strata regarding the health hazards of smoking.

Physicians had previously observed that patients with high blood pressure are more vulnerable to develop CAD even before it was mentioned in the published research works. The Framingham study had established hypertension as a risk factor for coronary artery disease. In the present study hypertension was reported in 27% of all patients and the incidence increases with the advancing age. These results are in congruence with those of the EUROSPIRE, PURE, and Thankappan et al.

Due to the phenomenon of insulin resistance and genetic predisposition, diabetes mellitus is more commonly found in the Indian population. In the current study diabetes mellitus was seen in 19% patients, of which 13% were of the older age group. The increase in incidence of DM with advancing age has been previously reported by Kutty VR9, Ramachandran A et. al, Kinra et al, Menon J et al, CSI CRP and Krishnan MN et al.

In the present study group, the total cholesterol, LDL and HDL levels were found to be either normal or low while the triglyceride level was found to be raised. It was also seen that low HDL level and high triglyceride level were significantly related to CAD in younger age group which ultimately progresses to angiographically established coronary artery disease. Similar findings have been previously reported by Huxley et al in their meta-analysis.

BMI does not take into account the amount of body weight associated with augmented muscle mass or the dispersal of excess fat in body, as both are related to each other and found to be increased in the obese patients. This implies that individuals even with a same BMI profile will have a different visceral fat distribution in their body. Keeping the BMI cut-off criterion in mind in the present study, out of 200

only 2% were found to be obese and 30% were found to be overweight in younger age group.

The current study is the premier study from this part of the country involving comparison of multivariate CAD risk factors in a large population group. In the current study, we compared the distribution of risk factor between single, double and triple vessels diseases in different age groups. It was observed that a single risk factor was more significant in SVD and DVD patients in fourth and fifth decade of their life. Smoking and dyslipidemia were more prevalent as a single risk factor amongst younger age group. Multiple risk factors were found to be significantly more among TVD (23.5%) and older age group people (>65 years). As the age advance the prevalence of multiple risk factor increases, with increase in severity of coronary artery disease. In the present study an attempt has been made successfully to prove the impact of known coronary risk factors on the extent and magnitude of involvement of coronary arteries in patients of CAD as seen on coronary angiography.

Limitation of the study

There were few limitations observed in this study. Firstly, the total numbers of patients enlisted were 200, generating a relatively small sample size with respect to the magnitude of the disease. Secondly gender distribution was skewed, not correctly representing the general population with most of the subjects being males. The physical activity, life style and diet assessment could not be carried out due to time limitation and short period of hospital stay.

CONCLUSION

In this study, different age group of patients had a unique profile of risk factors. These risk factors point towards the need of swift action for prevention of disease. In the coming era of medicine, prevention has become more important than treatment. It is concluded from the study that smoking and dyslipidemia in younger population while overweight, hypertension and diabetes in older age groups are the risk factors leading to CAD which was established via coronary angiography. Primary prevention should be focused on screening and better control of risk factors (hypertension, dyslipidemia, and diabetes) to inhibit occurrence of CAD. Secondary prevention should be focused on evidence based quality management of acute and chronic events, thereby preventing premature mortality and morbidity.

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