RISK PROFILE IN YOUNG PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

Objective: The objective of this study was to determine the frequency of risk factors in young patients with acute myocardial infarction and thus with ischemic heart disease (IHD), aged 20 to 40 years, in our population.

Study Design: A descriptive study.

Place and Duration of study: This Study was carried out at Combined Military Hospital, Kharian Cantonment Pakistan from January 2007 to December 2008.

Patients and Methods: All patients who fulfilled the inclusion criteria who presented to emergency reception of the hospital with a diagnosis of Acute MI were included. The patients were admitted to coronary care unit (CCU) and were managed for Acute myocardial infarction (MI). Their detailed history was then taken including symptoms at presentation and their risk factors were assessed with the help of history and laboratory investigations.

Results: A total of 137 patients were included during the study period. Mean age was 36 years (SD=3.67). Majority of patients were males. Smoking was the major risk factor (64.2%) followed by family history of IHD (30.7%).

Conclusion: Most frequent risk factor for Acute myocardial infarction (MI) at young age is smoking followed by family history.

Keywords: Smoking, Myocardial Infarction, Risk factors.

INTRODUCTION

Ischemic heart disease (IHD) is the leading cause of morbidity and mortality world wide[1]. In the United States, approximately 650,000 patients get a new acute myocardial infarction (AMI) and 450,000 experience a recurrent myocardial infarction (MI) each year[2]. In the United Kingdom, coronary artery disease is responsible for 180,000 admissions to hospital each year. Atherosclerotic coronary artery disease (CAD) causing myocardial ischemia may manifest itself either as AMI, unstable angina or effort angina. Among these the most life threatening is AMI[3]. Vessel obstruction is commonly caused by the formation of a thrombus; therefore timely treatment with thrombolytic drugs such as streptokinase has improved the immediate and long term outcome after AMI[4].

Similar to the rest of the world, IHD is a leading cause of death in Asian countries too, including Pakistan[5,6]. The incidence of AMI is on the increase in our population[7]. Traditionally IHD had been considered as a disease of middle and old age but in recent years AMI is been recognized in younger age groups more frequently[8-10]. AMI in persons under the age of 40 years accounts for approximately 19% of AMI cases[11]. The disease seems to follow an accelerated course with ischemic event occurring a decade earlier in Pakistani population compared to those reported from developed world[5]. IHD in young people constitutes an important problem for the patient and the treating physician because of the devastating effect of this disease on the more active lifestyle of young patients.

There are a number of risk factors associated with development of CAD. Of these some factors like age, gender, race and family history cannot be changed and are called 'fixed factors' while other major risk factors, such as serum cholesterol, smoking habit, diabetes and hypertension, can be modified[12]. Young patients with MI usually have multiple risk factors for IHD. In some studies, as many as 90 to 97 percent had one or more traditional risk factors for IHD[9]. Cigarette smoking is the most common and a modifiable risk factor in young

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patients[11,13-15]. Moreover, a higher incidence of a positive family history in young patients was noted[16, 17]. Hypercholesterolemia is common in young patients with IHD, but its prevalence is similar to that in older patients[17]. Obesity appears to be an independent risk factor for IHD in young men[18,19].

The objective of the study was to determine the frequency of various conventional risk factors in the patients aged 20 to 40 years presenting with Acute MI, so as to guide our planning for primary and secondary prevention of this disease in this young age group.

PATIENTS AND METHODS

This descriptive study was conducted at cardiology unit of Combined Military Hospital Kharian Cantonment from January 2007 to December 2008. Written informed consent was obtained from all the participating patients. Research and ethical committee of the hospital approved the study.

All Pakistani patients with ages between 20 to 40 years, including both males and females, with acute myocardial infarction were included in the study on the basis of non probability convenience sampling. Foreigner patients and those brought in dead to emergency were excluded.

Clinical diagnosis of AMI was established based on symptoms, signs and ST-segment elevation on electrocardiography. Cardiac enzymes were sent to laboratory in all patients. All the patients were asked about past history of hypertension, diabetes mellitus, hyperlipidemia (patients with total cholesterol >5.7 mmol/l or LDL cholesterol >3.5 mmol/l or with cholesterol lowering treatment), previous episodes of angina pectoris, smoking habit in personal history; and family medical history. Blood samples for lipids and glucose levels were obtained in the morning after eight hours fast. Brachial venous blood samples were collected into EDTA tubes and were immediately sent to laboratory where they were centrifuged at 4°C for 15 minutes. Then the sera were analyzed for lipid profiles by enzymatic calorimetric technique. Blood glucose analysis was also performed on the same blood sample. All data was entered in a pro forma. Patients were disposed off according to existing hospital regulations. There was no follow up.

Data was entered and analyzed by using SPSS version 10. Descriptive statistics were used to calculate frequencies, mean and standard deviation. Mean ± S.D. was calculated for age and cardiac enzymes. Frequencies and percentages were presented for gender, type of Acute MI, and risk profiles (i.e. smoking, diabetes mellitus, and hypertension, positive family history of premature IHD in family, obesity and hyperlipidemia).

RESULTS

A total of the 137 patients with acute myocardial infarction were studied for the presence or absence of various conventional risk factors of IHD. All the enrolled patients were studied and there was no missing value. Mean age was 36 years (SD=3.67) (range 20-40 years) and 92.7 % were male. Details of age distribution are given in table 1. Out of 137 patients with acute MI, 64.2% were smokers and 69% of them smoked heavily i.e., more than 20 cigarettes per day. Gender distribution of smokers is given in table 2. Forty two patients had a positive family history of CAD. Gender distribution of family history is given in table 3. The frequency of other risk factors was low in comparison with smoking habit and positive family history of CAD. It was 14.6%, 12.4%, 7.3% and 5.1% for hypercholesterolemia, obesity, hypertension and diabetes mellitus, respectively (Table-4). Gender distribution of the type of AMI is given in figure.

Table-1: Age distribution of the study population

Age (Years)	Frequency	Percent
20-25	6	4.4
26-30	6	4.4
31-35	30	21.9
36-40	95	69.3
Total	137	100

Table-2: Smoking habit in patients according to gender

	Smoker	Non-smoker	Total	P-value
Males	86	41	127	0.004
Females	2	8	10	
Total	88	49	137	

Table-3: Family history of ischemic heart disease Vs gender

	Family history of Ischemic heart disease		Total	P-value
	Positive	Negative		
Male	39	88	127	0.63
Female	3	7	10	
Total	42	95	137	

Table-4: Description of risk factors (n=137)

Risk Factors	Frequency	Percentage
Smoking	88	64.2%
Positive Family History	42	30.7%
Hypercholistrolemia	20	14.6%
Obsity	17	12.4%
Hypertension	10	7.3%
Diabetes Mellitus	7	5.1%

* There are multiple risk factors in one patient.

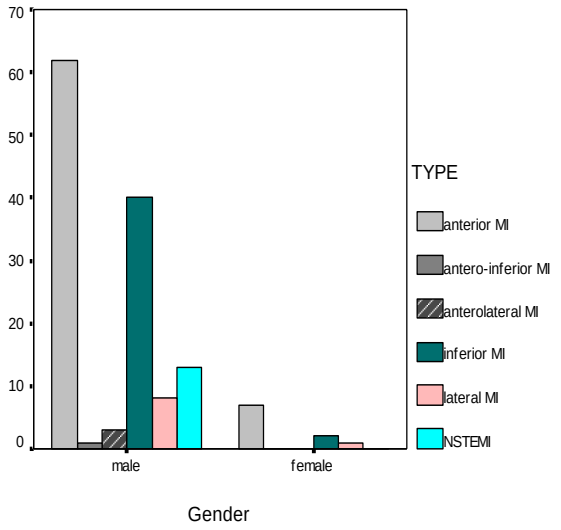

Figure: Type of myocardial infarction Vs gender

DISCUSSION

Cigarette smoking is one risk factor that has been widely studied. Epidemiologic studies have established worldwide that cigarette smoke exposure is an important cause of cardiovascular morbidity and mortality[20,21]. As an example, a 1990 review of 10 cohort studies involving 20 million person – years of observation reported a higher incidence of IHD among smokers compared with nonsmokers[22]. This is mediated by multiple deleterious effects of smoking on atherogenesis, thrombosis, vasomotion and arrythmogenesis. It is uniformly the most common risk factor in young patients with MI with variations ranging from 61% to 93% in different studies. The risk declines rapidly after stopping smoking by as much as 50% within the first year after quitting[23], and by three years reaches that of survivors who have never smoked. In our study population, 64.2% were smokers, 69% of them smoked more than 20 cigarettes per day. 30.7% had a positive family history and of those having a positive family history, 64.3% were also smokers. Thus in young patients of MI, smoking history is frequently noted and can be of significance. This fact is in accordance with the results obtained by Weinberger in his study conducted in 1984.

A positive family history defined as premature incidence of overt IHD in first degree relative, has a wide range of reported prevalence in the young population, varying from 14% to 69%. Rissanen and Sikkila determined that younger the patient is when the first MI occurs; the more common was IHD in relatives. In the present study, the frequency of positive family history for IHD was found to be 30.7% and thus is the next most frequent risk factor.

Prevalence of hyperlipidemia, ranging from 41% to 80% in different studies, has been established. Studies conducted by Uhl and Farrel[24] and Gofman et al[25] have also suggested that hyperlipidemia is a more reliable predictor of recurrent MI in patients aged 30 to 39 years than in older age group. In contrast to this, in present study hyperlipidemia was present in only 14.6% patients of study population. Several large scale randomized trials have demonstrated a benefit of lowering the serum cholesterol in patients without clinical evidence of IHD. The West of Scotland Coronary Prevention Study (WOSCOPS) showed that lowering cholesterol reduced both the number of coronary events and coronary mortality in people with a serum LDL-cholesterol concentration above 4.0mmol/L[26]. In contrast, in a subset of patients from ALLHAT (Antihypertensive and Lipid-Lowering Treatment to prevent Heart Attack Trial), lipid lowering was not associated with a significant reduction of IHD events[27].

Hypertension is a well-established risk factor for adverse cardiovascular outcomes, including IHD, IHD related mortality, stroke, congestive heart failure, and sudden death[19]. Hypertension as an attributable risk factor is 17.9%[23]. In contrast to these, in our study hypertension was found in 7.3% of cases. Systolic blood pressure is at least as powerful a coronary risk factor as the diastolic blood pressure and isolated systolic hypertension is now established as a major hazard for CHD and stroke[28]. The recommendations of the Seventh Joint National Committee (JNC 7) provide guidelines for therapy according to stratifications based upon blood pressure level and presence or absence of underlying conditions[19]. Despite side effects and cost of antihypertensive medications, the beneficial effects of treatment may outweigh the risks. Antihypertensive drug therapy should be considered among patients with co-morbid conditions like diabetes, or patients with end-organ damage.

Diabetes mellitus as an attributable risk for IHD in young patients is 9.9% in international studies. In this study, frequency of diabetes was 5.1%. If at all diabetes is present in young patients whether type I or type II, there are conflicting data on the importance of glycemic control on the development of macrovascular disease. Despite the unclear benefits of glycemic control with regard to cardiovascular risk, a substantial reduction in mortality in diabetics could be achieved by stopping smoking, weight loss, aggressive treatment of hypertension and dyslipidemia[29].

Obesity is associated with a number of risk factors for atherosclerosis and IHD, including hypertension, insulin resistance and glucose intolerance, high cholesterol, hypertriglyceridemia, low serum HDL cholesterol concentrations, and high plasma fibrinogen concentrations. Furthermore, data from the Framingham Heart Study, the Nurses' Health Study, and elsewhere have documented a positive association between body weight and coronary heart disease[30]. A number of studies have demonstrated that individuals with higher body weights experience higher mortality from cardiovascular disease while those with lower body weight have significantly lower cardiovascular mortality. Internationally, obesity defined as BMI of more than 25kg/m2 has been found as positive risk factor in 7.7%[23]. In our study, frequency of obesity was 12.4%.

Although the aetiology of coronary artery disease is multi-factorial, an increased number of conventional risk factors were observed in this study with cigarette smoking being the most frequent followed by a family history of early cardiac disease. There is also a large body of evidence from prospective cohort and case-control studies that smoking cessation reduces the risk of IHD and IHD mortality[22]. One year after quitting, the risk of myocardial infarction and death from IHD is reduced by one-half, and after several years begins to approach that of nonsmokers[22].

CONCLUSION

This study suggests the higher frequency of smoking habit in young patient with IHD. Moreover, IHD was more frequent in those who smoked 20 or more cigarettes per day. Next common risk factor is family history of IHD at young age. As compared to middle aged and elderly patients with IHD, other conventional risk factors like diabetes, hypertension, hyperlipidemia and obesity are present in lesser number of young patients with MI.

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