ABSTRACT

Background: Acute Myocardial Infarction (AMI) continues to be a major public health problem in the industrialized world and it is becoming an increasingly important problem in the developing countries also.

Method: The diagnosis of myocardial infarction (MI) was based on the WHO criteria. Patients who were aged <15 years and >40 years, who did not meet the WHO criteria for the diagnosis of MI were excluded.

The data were prospectively recorded as per the protocol. In all the participants, details of the age, sex and occupation were recorded, together with details of smoking, alcohol use, a known history of diabetes mellitus and hypertension and a significant family history of ischaemic heart disease. Weight, height, fasting blood glucose, cardiac enzymes (CPK-MB) and the echocardiographic status was evaluated in all the patients.

Results: The mean age of the patients with myocardial infarction was 37.03 years, with a maximum number of patients (70%) in the age group of 35-40 years. There were no patients from the below 25 years age group. Smoking was most common risk factor of MI (70%) in young adults. A family history of ischaemic heart disease (IHD) was present in 13.33% of the patients. Hypertension, diabetes and a body mass index of >25kg/m², each formed 10% of the risk factors. The most common symptom was chest pain (90% patients). Two third of the patients had anterior wall MI. A majority of the patients (57.14%) had single vessel disease, which was seen on coronary angiography.

Conclusion: Smoking was most common cause of the MI (70%) in young adults. The mean time of presentation of MI after the onset of the symptoms was 20.73hrs. Two third of the patients had anterior wall MI.

Key Words: Cluster headache, Demographic details, Migraine, Symptoms, Tension type headache

BACKGROUND

Overall, 4-8% of the patients with acute myocardial infarction (AMI) are less than 40 years of age. A recent Bethesda Conference proposed a classification scheme according to the strength of the evidence that risk factor intervention favourably affected the outcome of AMI [1].

This was partly due to the increased prevalence of the risk factors for atherosclerosis in the younger age group; especially, the increased incidence of impaired fasting glucose, high levels of triglycerides, low high-density lipoprotein levels and an increased waist to hip ratio. However, non-atherosclerotic coronary artery disease or hyper-coagulability should also be investigated or at least suspected in the younger patients [2]. Acute myocardial infarction (AMI), in young adults, presents a typical pattern of the risk factors and the clinical, angiographic and the prognostic characteristics. Consequently, it is possible to hypothesize the presence of a genetic background at the origin of this predisposition [3].

The best estimates for the magnitude of the associated risk were derived from a meta-analysis of nine large prospective observational studies with 4,20,00 participants, who occurred over 4850 CHD events during the follow up [4].

A large series of cross-sectional and retrospective studies indicated a positive relationship between mild to moderate hyper homocystinaemia and atherosclerosis. However, because the homocysteine levels increase after MI and stroke [5], such data cannot be used to establish a cause and effect relationship.

Coronary arteriography remains the “GOLD STANDARD” for identifying the presence or absence of the arterial narrowing which is related to atherosclerotic coronary artery disease and it was found to provide the most reliable anatomical information for determining the appropriateness of the medical therapy, percutaneous coronary intervention or coronary artery bypass surgery in patients with ischaemic coronary artery disease [6]. Coronary arteriography can establish the presence or absence of coronary stenosis and it can define the therapeutic option, and determine the prognosis of the patients with AMI at a young age.

So, a study was conducted to learn the profile of young patients (15-40 years) with acute myocardial infarction with an emphasis on:

- Assessment of the risk factors
- Mode of presentation
- Coronary angiographic characterization.

METHOD

The approval of the ethics committee of J.J.M. Medical College, Davangere was obtained. This study was conducted at Bapuji Hospital which was attached to J.J.M. Medical College Davangere, Karnataka, India for 2 years in order to obtain 49 patients. The patients were all below 40 years of age. This was a cross-sectional study (case series) which enrolled the study subjects who fell into the inclusion criteria consecutively for 2 years.

The diagnosis of myocardial infarction was based on the WHO criteria, which required at least 2 of the following 3 to be present:
1. A history of an ischaemic type of chest discomfort  
2. Evolutionary changes on the serially obtained ECG tracings.  
3. Rise and fall of the serum cardiac markers.

The data were prospectively recorded as per the protocol. In all the participants, details of the age, sex and occupation were recorded with the details of smoking, alcohol use, a known history of diabetes mellitus and hypertension and a significant family history of ischaemic heart disease. Weight, height and waist and hip circumference was recorded for each person. Fasting blood glucose, fasting lipid profile, serial ECGs and the cardiac enzymes (CPK-MB) were evaluated (as at the start of the study, only CPK-MB testing was available at the hospital and Troponin-T and K came up later, which was not considered for study purposes, as (CPK-MB with ECHO gave a good diagnosis), Echocardiography was done in all the patients. All these patients were taken up for coronary angiography which was performed by the standard Judkin’s technique after adequate preparation. The risk factors which were studied were hypertension, diabetes mellitus, smoking habits, overweight (a BMI of > 25 kg/m²), the waist to hip ratio, (a WHR of >0.91 cms was considered as a risk factor), hyperlipidaemia (serum cholesterol of 200 mg%), a past history of IHD (ischaemic heart disease), and a family history of ischaemic heart disease. The patients with a past history of diabetes and/or with a fasting blood sugar value of >125mg% were considered to be diabetic. The patients who were currently smoking and those who claimed to have stopped smoking since one year were considered as smokers and others were considered as non-smokers. The coronary angiographic profile was studied in all these patients to assess the number of vessels which were involved and the type of the vessels which were involved.

**RESULTS**

The mean age of the patients with myocardial infarction was 37.03 years, with a maximum number of patients (70%) being within the age of 35-40 years and 3.33% of the patients being in the age group of 25-30 years. The youngest patient was age 27 years old. 90% of the patients were males. All the patients had a WHR ratio which ranged from 0.87cms to 0.92cms and so the WHR ratio was not an important risk factor in our study.

Smoking was most common risk factor for myocardial infarction (70%) in the young adults, hyperlipidaemia being the second common risk factor (36.67%). 20% of the patients were diabetic, of which 10% were newly detected. 13.33% of the patients had a family history of ischaemic heart disease (IHD). Hypertension and a BMI value of >25kg/m², each formed 10% of the risk factors. The most common symptom was chest pain, which was present in 90% of the patients, followed by sweating (50%), breathlessness (20%), restlessness (6.7%) and palpitations (3.3%). The mean time of presentation after the onset of the symptoms was 20.73hrs. 46.67% of the patients had multiple risk factors for acute MI. 46.67% had a single risk factor, while 6.67% had none of the risk factors.

Anterior wall MI was found in 2/3rd of the patients and 1/3rd of them had inferior wall MI. 66% of the patients had septal and apical defects with anterior wall hypokinaesia in the electrocardiogram findings and the remaining 34% had inferior and posterior wall hypokinaesia. A majority of the patients (57.14%) had single vessel disease which was seen on coronary angiography, followed by normal coronaries (22.45%). 16.3% had double vessel disease and 4% had multi vessel disease. 63.33% of the patients had involvement of the left anterior descending artery, 20% had involvement of the right coronary artery and 16.6% had involvement of the left circumflex coronary artery, which was seen on coronary angiography.

**DISCUSSION**

The distribution of the ages of our patients showed a striking increase of the disease with ageing, even in young adults, which...
was a very obvious fact which was seen in earlier studies also [6,7]. One of the best documented and the most consistent risk factors for coronary atherosclerosis seems to be the male sex. The protective effects of oestrogens in preventing atherosclerosis have been clearly demonstrated in epidemiologic studies [8]. In another study [9], a profile of acute MI in young patients showed a male: female ratio of 20.1 [9,10,11], where as in our study, it was 9:1, but the trend remains the same.

Among the many factors that have been shown to be important are hyperlipidaemia, hypertension, cigarette smoking, the male sex and diabetes mellitus. These have generally been associated with an increased incidence of fibrous plaques and their sequelae. The associations are relatively strong and they are made on a group comparison basis, although all the studies have demonstrated a high degree of variability among individuals within even the most homogenous of groups [12]. Smoking was the most common risk factor (87%) which was seen in a study [13], which showed a profile of acute MI in young patients (below 40 years) in a rural/ semi-urban population. Smoking was established as the main cause of MI and other chronic cardiovascular diseases in many other studies [14-18] and it was established as the main cause in our study also. Cigarette smoking accelerates CHD and increased atherosclerosis, which increase thrombus formation and this could contribute to MI at an earlier age. Most of the MI cases (80-90%) are mostly caused due to cigarette smoking. So, a reduction in smoking, which is one of the main causative factors, can reduce AMI in young adults.

The results of the Lipid Research Clinics Trail [19,20] demonstrated a direct association between the plasma lipoprotein profile, the cholesterol levels and the morbidity and mortality from coronary atherosclerosis. Hyperlipidaemia, which is very common in young Asian adults as per earlier studies [15,19-25], was the second common risk factor in our study. Diabetes and hypertension were more common as the risk factors among the older MI patients but they were less common in young adults in our study, which was seen in earlier studies also [15, 25]. A positive family history of IHD had been found as a significant cause only among the young adults as compared to the older patients in earlier studies [25-28]. Whereas only 13.3% of patients had a positive family history of IHD in our study [29].

A body mass index of >30kg/m² was the common cause in all the earlier studies which were done [26,27] but a majority of them were western studies. But Indian studies reported BMI [18] to pose a lesser risk, which was seen in our study also. Chest pain was the most common presentation in our study, which was similar to that which was seen in earlier studies also [30]. The arrival of the patients at the health care facility was mostly delayed by >10 hrs, as in earlier studies also [31-33]. We too had a mean arrival time of 20.73hrs. As in earlier studies [34,35], in our study too, anterior wall MI was very common among the patients, irrespective of their ages. We could see that single vessel disease was evidently more common among the young adults, which had been reported by others also earlier [15, 35].

**LIMITATIONS**

This study did not have any control group and so the risk of each factor could not be analyzed. Also, the statistical significance of the factors couldn’t be analyzed. There were few lab tests like Troponin-T and K for which the facilities weren’t available and so they were not done. As this study was the thesis topic of a postgraduate student, the required sample size wasn’t calculated. This was because this study had a time limit and the samples which were available in two years (49) were used to determine the objectives.

**CONCLUSION**

Smoking was the most common risk factor of MI (70%) which was seen in young adults. The mean time of presentation after the onset of the symptoms was 20.73hrs. 2/3rd of the patients had anterior wall MI. A majority of the patients (57.14%) had single vessel disease which was seen on coronary angiography. The cessation of smoking would play a major role in preventing MI in young adults. Also, on the early hospitalization of these patients, they need to be educated on this topic.

**REFERENCES**


Sricharan K.N. et al., Study of Acute Myocardial Infarction in Young Adults

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