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Original Research Article

Clinical and angiographic profile of acute myocardial infarction in young patients: A prospective 2 years study

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ABSTRACT

Context : Acute myocardial infarction (AMI) is the leading cause of death in the world.

Aims and Objectives: To study clinical and angiographic profile of AMI in young patients.

Materials and Methods: It was two years study conducted at a tertiary care hospital, Sher-i-Kashmir Institute of Medical Sciences Soura, Srinagar. Patients aged equal or less than 40 years, who presented with AMI were included in the study.

Results and Observations: There were total 38 patients in our study population. Mean age of presentation was 35.79±4.83 years. There was male preponderance [34(89.47%) vs 4 (10.52%)]. Among risk factors, smoking constituted the most 32(84.21%), followed by hypertension 9(23.68%), diabetes 4(10.52%) and dyslipidemia 3(7.89%). Anterior wall MI in 18(47.36%) patients was the most common type, followed by inferior wall MI in 13(34.21%) and non-ST segment elevation MI in 7(18.42%). Thrombolysis was done in 26(68.42%), out of which it was successful in 25(96.15%) patients. Angiography was done in 35(92.10%) of patients. SVD in 23(65.71%) patients was the commonest, followed by DVD in 4(11.42%), TVD in 2(5.26%) and LM in 1(2.85%). 5(14.28%) patients had normal coronary angiography. LAD 16(45.71%) was singularly the most common vessel involved. PCI was done in 28(80%) of patients. No death occurred in our study population.

Conclusion: In our study population of AMI in young, males were commonly affected, smoking was the commonest risk factor. AAMI was the most common STEMI and LAD was singularly the most common vessel involved.

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1. Introduction

Coronary heart disease (CHD) is the leading cause of death in the world.¹ There is difference in opinion about the definition of “young” with respect to myocardial infarction (MI). The term “young” varies from ≤40²⁻⁴ to ≤55 years of age.⁵ There is vast data available in literature about CHD, but data focusing about premature CHD and acute myocardial infarction (AMI) in young is lacking.

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Consequences of AMI in young can be devastating as it has greater impact on patient's psychology, work and socioeconomic burden. MI in young can have negative economic effect as sometimes he/she may be the sole earner in the family. AMI in very young is estimated to be less than 2%.⁶ Though there is limited data about MI in young, it has been observed that the clinical and coronary angiographic profile is quite different in young patients as compared to those who develop CAD at an older age.⁷ Apart from conventional risk factors, like smoking, hyperlipidaemia,

ST-segment elevation myocardial infarction (STEMI) in the very young (30 years) patients has been linked to substance abuse and non-traditional risk factors. As far as young patients with CHD is concerned, SVD or non-obstructive vessel is involved.⁶

The present study was carried out to study clinical, angiographic profile and outcome of MI in young patients as there is limited data available about it in this part of world.

2. Materials and Methods

This observational study was conducted in the Department of Cardiology at Sher-I-Kashmir Institute of Medical Sciences (SKIMS), Sri Nagar from August 2015-July 2017.

Patients admitted with diagnosis of AMI defined as: Increase in cardiac biomarkers plus one or more of the following: a) typical symptoms of myocardial ischemia. b) Q wave in the ECG. c) ST segment elevation >1mm in contiguous leads or ST depression in ECG were included in the study. Cardiac biomarkers include cardiac troponin I or T and MB-CPK more than two times upper limit of normal. A detailed history was taken regarding time of onset of pain, time of reporting to hospital, time of receiving reperfusion therapy, type of reperfusion therapy. Detailed history was taken about various risk factors like hypertension, smoking, alcoholism, substance abuse, dyslipidemia, family history of MI. Clinical examination was done to look out for complications of AMI like congestive heart failure, any abnormal heart sound, features of pericardial involvement. Patient was admitted in Cardiac Care unit (CCU) and continuously monitored. Patients were stratified at presentation according to the Killip classes into following classes:

Killip class I patients were those without heart failure.

Killip class II had mild heart failure with rales involving one third or less of the posterior lung field and systolic blood pressure of 90 mm Hg or higher.

Killip class III had pulmonary edema with rales involving more than one third of the lung field and systolic blood pressure of 90 mm Hg or higher.

Killip class IV were those in cardiogenic shock with any rales and systolic blood pressure less than 90 mm Hg.

STEMI patients who reached hospital within window period (pain<12 hours) and who had no contraindications to thrombolysis but could not undergo primary PCI due to financial or logistic reasons were subjected to thrombolysis. After 90 minutes, ECG was taken to document successful thrombolysis. Successful thrombolysis was defined as >50% resolution of ST changes along with subsidence of pain. Failed thrombolysis was defined as <50% resolution of ST changes. Patients who reached to hospital within 12 hours and who could afford were subjected to primary PCI. Patients who had failed thrombolysis were subjected to rescue PCI. Another reperfusion therapy was pharmacoinvasive, which was done on those patients having

successful thrombolysis. It was done within 24 hours of successful thrombolysis. Coronary angiographic profile was classified as normal, non-obstructive and obstructive CAD. Non-obstructive CAD was defined as stenosis < 50% of any vessel while as obstructive CAD was defined as stenosis > 50% of any vessel. Depending upon number of vessels with obstructive disease, CAD was classified as SVD, DVD and TVD.

Routine investigations like random blood sugar, complete blood count, blood urea, serum creatinine along with other investigations like lipid profile and cardiac specific enzymes were done in all the patients. Echocardiography was done in all patients to detect the wall motion abnormalities and to assess the left ventricular function. Written informed consent was taken from patient or guardian.

2.1. Statistical analysis

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were summarized in the form of means and standard deviations and categorical variables were summarized as frequencies and percentages.

3. Results and Observations

Table 1: Demographic, clinical and echocardiographic characteristics of our study population

Variables	Number (%)
Males	34(89.47%)
Females	4(10.52%)
Age in years (Mean \pm SD) 35.79\pm4.83	
Risk factors	
Smoking	32(84.21%)
Hypertension	9(23.68%)
Diabetes	4(10.52%)
Dyslipidemia	3(7.89%)
Type of MI	
AWMI	18(47.36%)
IWMI	13(34.21%)
NSTEMI	7(18.42%)
Killip classes	
Killip class I	29(76.31%)
Killip class II	4(10.52%)
Killip class III	3(7.89%)
Killip class IV	3(7.89%)
Ejection Fraction (%)	
≥ 60	12(31.57%)
50-60	20(52.63%)
40-50	4(10.52%)
<40	2(5.26%)

The mean age of presentation was 35.79 \pm 4.83 years and there was male preponderance. Most of the patients were in

Table 2: Angiographic profile of study population

Variables	Number (%)
Normal	5(14.28%)
Single vessel disease	23(65.71)
LAD 16(45.71%) RCA 4(11.42%) LCX 3(8.57%)	
Double vessel disease (DVD)	4(11.42%)
Triple vessel disease (TVD)	2(5.71%)
Left main (LM)	1(2.80%)

Table 3: Type of PCI in study population

Type of PCI	Number (%)
Primary	1(3.57%)
Pharmacoinvasive	26(92.85%)
Rescue	1(3.57%)

the age group of 30-40 years and youngest patient was aged 19 years old.

Among risk factors, smoking 32(84.21%) was the most common. At the time of admission, 29(76.31%), 4(10.52%), 3(7.89), 3(7.89%) were in Killip class I, II, III, IV respectively. 52.63% patients had mild LV dysfunction (EF 50-60%) (Table 1).

AWMI in 18(47.36%) patients was the most common, followed by IWMI in 13(34.21%) and NSTEMI in 7(18.42%). Thrombolysis was done in 26(68.42%) patients.

Angiography was done in 35(92.10%) patients. It was not done in rest 3 patients because they could not give proper consent, some had financial issues, and azotemia. SVD in 23(65.71%) patients was the most common type, followed by DVD in 4(11.42%), TVD in 2(5.71%). 5(14.28%) of patients had normal coronary arteries while as 1(2.85%) had Left Main (LM) artery involvement. LAD (45.71%) was the most singularly vessel involved in our cohort study (Table 2). 28(80%) of patients underwent PCI. Pharmacoinvasive type was done in 26(92.85%), while as rescue and primary PCI done equally in 1(3.57%) of patients (Table 3).

4. Discussion

Various studies have consistently shown male sex as the most reported risk factor for CAD accounting for skewed gender distribution.⁶⁻⁸ Our study is also consistent with these studies as 89.47% constituted males (Table 1). It could be due to protective effect of estrogen in females and high prevalence of smoking in males.⁶ Study suggests smoking may be the most important modifiable risk factor among “young” MI patients.⁹ Yusuf et al. identified it as one of the most important risk factors associated with “young” MI.¹⁰ They suggested the association of smoking and MI in the “young” has an odds ratio (OR) of 3.33 (99% confidence interval (CI), 2.86-3.87) compared to controls. Smoking among young MI is found to be between 51% to 89%^{2,4} almost consistent with our present

study 84.21%. Systemic hypertension and diabetes are well-established risk factors for CAD. Hypertension and diabetes constituted 23.68% and 10.52% respectively in our study population (Table 1). This is almost consistent with various studies that have shown prevalence of hypertension between 10 and 44%^{7,8,11,12} and diabetes to be less than 10%.^{7,11,12} Dyslipidaemia is in low frequency (7.89%) in our population as compared to other studies^{2,13} in which half of young MI has dyslipidaemia. Possible reason could be our population has different life style and dietary habits.

AMWI was the most common STEMI in our study population as observed in other studies.^{6,11} Angiography was done in 35(92.10%) of patients, which revealed prevalence of 28(80%) of obstructive CAD (Table 2). It is consistent with studies^{6,8,12} in which more than 80% of patients had obstructive CAD. More than 60% of patients underwent thrombolysis. Besides thrombolysis, coronary spasm may be responsible for 14.28% of normal coronary artery in our patients (Table 2).

Our study demonstrated SVD (65.71%) as the most common vessel involved in commensurate with other studies.^{7,8,11,12,14} Our study revealed infrequent involvement of DVD and TVD as 11.42 and 5.71% respectively (Table 2). This is in concordance with studies that showed involvement of DVD 10-16% and TVD 3.3-6.6%.^{7,8,11} Our present study showed involvement of LAD as the commonest culprit artery being involved singly in 45.71% of patients followed by RCA, LCX and LM (Table 2). This finding is in close concordance with other studies^{7,8,11,12,14,15} where LAD was the most common vessel involved followed by RCA, LCX, LM respectively. Lacunae in our study was that we could not find other risk factors like factor V mutation, homocystenemia etc. We could not follow them beyond hospitalization to see their mortality and morbidity pattern.

5. Ethical Committee Clearance

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

6. Conclusion

In our study population, MI in young has male preponderance with smoking the most common risk factor. AMWI is the most common STEMI. As far as CAG is concerned, SVD is the most common vessel involved with LAD singularly the commonly vessel involved. Pharmacoinvasive was the most common type of PCI done in our cohort study. There was no death in our population.

7. Source of Funding

None.

8. Conflict of Interest

None.

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