Original Research Article

Study of clinical profile of acute myocardial infarction in young adults at a tertiary care hospital

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Abstract

Background: The incidence of acute myocardial infarction in young adults has been reported to account for 0.4-19%. Various conventional and less common vascular risk factors encountered in the middle-aged population presenting with myocardial infarction, in age less than 40 years. Present study was planned with objective to study the clinical profile of acute myocardial infarctionin young adults presenting at our tertiary care hospital. **Material and Methods:** This cross sectional, prospective, observational study conducted in patients aged ≤ 40 years and with confirmed diagnosis of myocardial infarction or acute coronary syndrome. **Results:** Total 50 patients were included in our study. The mean age of the patients in present study was 33.98 ± 5.09 years. Most common age group was of patients from age group of 36–40 years (44 %), followed by age group of 31–35 years (36 %). Male patients were 96 % and only 4 % were female. Smoking (74 %), type A personality (62%), sedentary life style, no exercise (54%), diabetes (48%), dyslipidemia (42%), hypertension (26%) were common risk factors noted. Obesity (BMI>25), Family history of IHD, past history of AMI were other risk factors.96 % patients have ECG finding of ST segment elevation, only 4 % patients have non-ST-segment elevation myocardial infarction. Anterior wall MI was the commonest type seen on ECG in 90 % patients. In present study cardiogenic shock was commonest complication seen in 12 % patients. **Conclusion:** Multiple factors when present simultaneously such as smoking, type A personality, sedentary life style, lack of exercise, obesity increases likelihood of diabetes, dyslipidemia and hypertension which are considered as precursor of coronary artery disease and ischemic heart disease thus predisposes individual to acute myocardial infarction.

Key Word: myocardial infarction less than 40, risk factors, smoking

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INTRODUCTION

Coronary artery disease (CAD) is a major cause of morbidity and mortality in the general population worldwide[1]. Although atherosclerosis is considered as main cause of coronary artery disease, it starts developing in the early stage of life, symptomatic coronary artery disease and acute coronary syndrome (myocardial infarction) rarely occur in young adults less than 40 years of age. The incidence of acute coronary syndrome young adults has been reported to account for 0.4-19%[2,3]. Moreover, people in our part of the world suffer from CAD at relatively younger age, i.e., about half of MI occurs under the age of fifty years[4]. An acute myocardial infarction (MI) is a subset of a spectrum of coronary artery Disease, includes unstable angina and acute MI with or without ST elevation[5]. Conventional vascular risk factors encountered in the middle-aged population in the Framingham study were smoking, hypercholesterolemia, and low high-density lipoprotein (HDL) levels associated with CAD in young patients[6]. Obesity, insulin resistance, and hypertriglycemia are also considered high risk factors for CAD in the young population[7]. Other less common

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factors such as cocaine use, high homocysteine levels, connective tissue diseases, and hypercoagulopathy, including antiphospholipid syndrome and nephrotic syndrome, may precipitate CAD in some individuals[8]. Earlier studies have mentioned important differences in various clinical risk factors and demographics of young patients presenting with MI compared to older adults and young age was defined as age of less than or equal to 45 years[9,10]. Present study was planned with objective to study the clinical profile of acute myocardial infarctionin young adults presenting at our tertiary care hospital.

MATERIAL AND METHODS

Present study was a cross sectional, prospective, observational study conducted at department of Medicine, NIMS Medical college and Hospital Jaipur. Total study duration was 1 year (from January 2018 to December 2018). Study approval was taken from the institutional ethics committee.

Inclusion criteria: *P*atients aged ≤ 40 years and admitted to the hospital with an initial diagnosis of myocardial infarction or acute coronary syndrome. The final diagnosis of acute myocardial infarction was done when two out of three of the following criteria were present:

1. Electrocardiogram (ECG) evidence of acute myocardial infarction.
2. Ischemic chest pain for at least 10 min.
3. Rise/fall of the cardiac biomarker troponin.

Exclusion criteria

1. Patients with stable angina,
2. Patients less than 18 years and more than 40 years
3. Patients not willing to participate in the study

Written informed consent was obtained from the participants prior to inclusion. Complete history, clinical examination, investigations and other workup of acute MI patients was done on admission. Coronary angiography was performed in all patients to assess the number and type of vessels which were involved. Further necessary management was done in all cases. Follow up was kept for 3 months from discharge. Collected data was entered in Microsoft excel sheet and analysed accordingly.

RESULTS

This study was done to assess clinical profile of acute myocardial infarction in young adults presenting at our hospital. After applying inclusion and exclusion criteria, total 50 patients were included in our study. The mean age of the patients in present study was 33.98 ± 5.09 years. Most common age group was of patients from age group of 36–40 years (44 %), followed by age group of 31–35years (36 %)and rest 20% of the patients were from age group of 21–30 years. Male patients were 96 % and only 4 % were female.

Table 1: Age and gender wise distribution of patients

Characteristic	Number of Cases	Percentage
Age distribution (years)		
Less than 20	0	0
21-25	3	6
26-30	7	14
31-35	18	36
36-40	22	44
Gender distribution		
Male	48	96
Female	2	4

Symptom wise chest pain was most common complaint (86 %), other common complaints were difficulty in breathing (78 %), profuse sweating (74%)and pain at other sites like backache, epigastric pain (62 %). Symptoms like shoulder pain (56 %), nausea and vomiting (48%), restlessness and palpitations (12 %) were also noted.

Table 2: symptom wise distribution of patients

Symptoms	No of patients	%
Chest pain	43	86
Difficulty in breathing	39	78
Profuse sweating	37	74
Other pain (epigastric, back, etc.)	31	62
Shoulder pain	28	56
Nausea and vomiting	24	48
Restlessness, palpitations	6	12

Multiple high-risk factors were evaluated for patients in this study. Most of the patients had more than 2 risk factors. Total 9 (18 %) patients had no high-risk factors. Smoking (74 %), type A personality (62%), sedentary life style, no

exercise (54%), diabetes (48%), dyslipidaemia(42%), hypertension (26%) were common risk factors noted. Obesity (BMI>25),Family history of IHD, past history of AMI were other risk factors.

Table 3: High risk factors

High risk factor	No of patients	Percentage
Smoking	37	74
type A personality	31	62
sedentary life style, no exercise	27	54
Diabetes	24	48
Dyslipidemia	21	42
Hypertension	13	26
BMI>25	9	18
Family history of IHD	7	14
past history of AMI	3	6

96 % patients have ECG finding of ST segment elevation, only 4 % patients have non-ST-segment elevation myocardial infarction. Anterior wall MI was the commonest type seen on ECG in 90 % patients, rest 8 % have anterior and inferior wall myocardial infarction, while only 2 % had anterior and lateral wall myocardial infarction.

Table 4: ECG characteristics

Characteristics	*N*	%
ST-segment elevation myocardial infarction	48	96
Non-ST-segment elevation myocardial infarction	2	4
Anterior wall myocardial infarction	45	90
Anterior + inferior wall myocardial infarction	4	8
Anterior + lateral wall myocardial infarction	1	2

On angiography evaluation 82 % patients had single vessel disease, 10 % have more than one vessel involved and 8 % patients had normal coronaries arteries. In present study cardiogenic shock was commonest complication seen in 12 % patients. Other complications were congestive heart failure (8%), acute left ventricular failure (4%), cerebrovascular stroke (2%), post-infarct angina (2%).

Table 5: complications

Complications	Number of Cases	Percentage
Cardiogenic shock	6	12
Congestive heart failure	4	8
Acute left ventricular failure	2	4
Cerebrovascular stroke	1	2
Post-infarct angina	1	2

DISCUSSION

Acute Myocardial Infarction is common in individuals more than 50 years, but recently its incidence in young individuals is increasing and its incidence varies between 2% and 10%.[11] The mean age of the patients in present study was 33.98 ± 5.09 years. The peak incidence of MI occurred between the age group 31-40 years around 80%. Male (96 %) predominance was noted in our study. Other studies also noted similar findings[12].Male sex is an important risk factor for IHD especially at a younger age. Western studies noted a lifetime risk of developing coronary artery disease at 40 years of age is 50% for men and 33% for women[13]. We noted very low incidence in female (4 %), other study noted 5 % prevalence of in young Indian females[14]. Women less than 40 years age are premenopausal, presence of estrogen is cardio-protective. Also, Indian women have low incidence of smoking, diabetes, which are high risk factors in development of myocardial infarction. Though development of MI in young age group is unusual, various studies have identified different causes and risk factors for the same. Proposed mechanisms are rupture of a vulnerable plaque or erosion of the endothelial layer, hypercoagulable states, coronary artery spasm, inflammation, etc. with atherosclerosis remaining the major cause[15]. It is well known that atherosclerotic changes begin at birth and considerable lesions in coronary arteries may be apparent as early as the age of 25 or 30 years[16].Presence of high-risk factors such as smoking, type A personality, sedentary life style, lack of exercise, diabetes, dyslipidemia, hypertension accelerates the disease progression. Also, simultaneous presence of multiple risk factors increases the risk of myocardial infarction in an individual. We noted smoking as most common high-risk factor. Various studies noted smoking (70- 90 %) as a high-risk factor in young patients presented with AMI[11.12]. Smoking is the most important preventable cause of any vascular disease and mainly

coronary artery disease. Smoking aggravates all phases of atherosclerosis, it fastens thrombotic process, promotes endothelial dysfunction, augments pro-inflammatory effects on endothelium, and induces coronary vasoconstriction even in patients with normal coronary vasculature[17].Smoking also have unfavorable effects on lipoprotein and decreases HDL, thus dyslipidemia which is an independent risk factor[18].Hypertension and diabetes mellitus earlier thought as diseases of old, now increasing in young individuals and both are well established cardiovascular risk factors. Present study noted diabetes and hypertension in 48% and 26% patients respectively. Other studies also noted these high-risk factors in significant patients[19,20]. Dyslipidemia is also a major modifiable risk factor for myocardial infarction. High triglyceride levels and low HDLC levels, which characterize the dyslipidemia of metabolic syndrome, have major role in atherosclerosis and coronary artery disease development. We noted 42 % patients with dyslipidemia, which is similar to other studies[21]. In our study 18% patients had BMI more than 25 (obese). Obesity is now growing concern in young individuals as it is an independent risk factor for coronary artery disease in both men and women. Weight reduction, exercise is associated with favorable changes in lipid profile and blood pressure and hence reduces the risk of IHD[22]. All the patients were managed with medical line of treatment. We noted mortality in 3 patients, had multiple risk factors and came with significant myocardial damage. Cardiogenic shock and congestive heart failure were major complications. These were managed effectively. Most patients were discharged on day 4-5. Main limiting factor in this study was small size of patients.

CONCLUSION

Multiple factors when present simultaneously such as smoking, type A personality, sedentary life style, lack of exercise, obesity increases likelihood of diabetes, dyslipidaemia and hypertension. These all are considered as precursor of coronary artery disease and ischemic heart disease thus predisposes individual to acute myocardial infarction. Life style modification can prevent acute myocardial infarction in low risk individuals.

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