

Original Research Article**Myocardial Infarction in Young Indian Patients Risk Factors Analysis**

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Abstract

Background: Coronary artery disease (CAD) mostly occurs in persons older than 45 years of age. In India, CAD manifests almost a decade earlier than in Western countries. This study was done to study the risk factors and in some patients angiographic profile of young patients presenting with myocardial infarction (MI).

Patients and Methods: Three hundred and fifty one consecutive patients presenting with MI in less than and equal to 45 years of age were studied for risk factors. Coronary angiography was done in some patients.

Results: Out of 351 patients, 321 were male (91.45%). Most common age group was 36-45 yrs (68.66%), 322 had ST elevation myocardial infarction (MI) (91.74%) and 29 had non ST elevation MI (8.26%). Anterior wall MI was present in 234 patients (66.67%), inferior wall MI in 84 patients (23.93%) and lateral wall MI in 04 patients (1.14%), 162 patients (46.15%) were smoker. Dyslipidemia was present in 120 patients (34.19%), 50 patients were hypertensive (14.25%), 36 patients were diabetic (10.25%). Family history of CAD was present in 35 (9.97%) patients, 32 patients (9.12%) were obese or overweight and 16 patients (4.56) had history of illicit drug use.

Conclusion: MI in young almost exclusively occurs in male, and ST elevation MI is the main presentation. Anterior wall MI is most common. Smoking, low HDL, high triglycerides and hypertension are the major risk factors. Diabetes mellitus type 2, positive family history, obesity and illicit drug use are the other risk factors.

Keywords: Coronary artery disease, myocardial infarction, risk factors.

Introduction

Myocardial infarction (MI) among young is relatively uncommon. Still, it is an important problem for the patient and the treating physician, as these patients have different risk factors, clinical presentation and prognosis than the older

patients. There are few studies of risk factor profile and pattern of coronary artery involvement in MI in young, so the purpose of the study.

Acute coronary syndromes (ACS) in very young patients have been poorly described. We therefore evaluate ACS in patients aged 45 years and

younger. Myocardial infarction (MI) is the lethal manifestation of CHD and can present as sudden death. Although MI mainly occurs in patients older than 45, young men or women can suffer MI. Fortunately, its incidence is not common in patients younger than 45 years. However the disease carries a significant morbidity, psychological effects, and financial constraints for the person and the family when it occurs at a young age. The protection offered by young age has been slowly taken away by the increased prevalence of risk factors for CHD in adolescents such as smoking, obesity, and lack of physical activity.

Materials and Methods

The study was conducted in G.R. Medical College associated with J.A. Group of Hospitals, Gwalior during Nov. 2015 – Oct. 2016 for a period of one year. This was an observation study to look into mainly the contributing factors to this calamity. All the routine investigations like blood sugars, renal and liver function tests, lipid profile were done along with ECHOCARDIOGRAM. Diagnosis of MI was done as per the W.H.O. criteria. Some of the patients underwent coronary angiography.

Three hundred and fifty one consecutive patients of less than 45 years presenting with MI were studied for the conventional risk factors.

Chi square test was applied for measuring any significant association between different variables (Calculating P value < 0.05 was called as significant).

MI was defined as typical rise and fall of cardiac markers of myocardial necrosis with at least one of the following:

- Ischaemic symptoms
- Electrocardiogram (ECG) changes indicative of ischaemia (ST elevation or depression)
- Development of Pathological Q waves in ECG
- Echocardiographic evidence of new regional wall motion abnormality.

Diabetes was defined as having a history of diabetes diagnosed and/or treated with medication and/or diet or fasting blood glucose 126 mg/dl or greater and postprandial blood sugar 200 mg/dl or greater. Hypertension was defined as having a history of hypertension diagnosed and/or treated with medication, diet, and/or exercise, blood pressure greater than 140 mmHg systolic or 90 mmHg diastolic on at least two occasions. Hyperlipidaemia was defined as history of Dyslipidaemia diagnosed and/or treated by a physician or total cholesterol greater than 200 mg/dl, low-density lipoprotein greater than or equal to 130 mg/dl, or high-density lipoprotein <40 mg/dl. Current smoker was defined as a person smoking cigarettes within 1 month of index admission. A positive family history for Coronary artery disease (CAD) was defined as evidence of CAD in a parent, sibling, or children before 55 years of age. Overweight was defined as body mass index (BMI) greater than 25 kg/m². Obesity was defined as BMI greater than 30 kg/m².

Some patients were subjected to coronary angiography during the index admission or on follow up. Significant stenosis was defined as more than 50% stenosis in any of the coronary arteries, insignificant disease as less than 50% stenosis or plaques in any of the coronary arteries.

Results

Out of total 351 patients studied, 322 had ST elevation MI and 232 of these received thrombolytic therapy. Youngest patient was 18 years of age. Most of the patients had anterior wall MI. Six patients presented in cardiogenic shock. There were 07 deaths, 06 due to cardiogenic shock and one had sudden cardiac death.

Table No. 1 Gender wise distribution

S.No.	Gender	No. of patients (n=351)	%
1.	Male	321	91.45
2.	Female	30	8.55

Chi sq. -241.26 DF= 1 P value =0.002 Significant

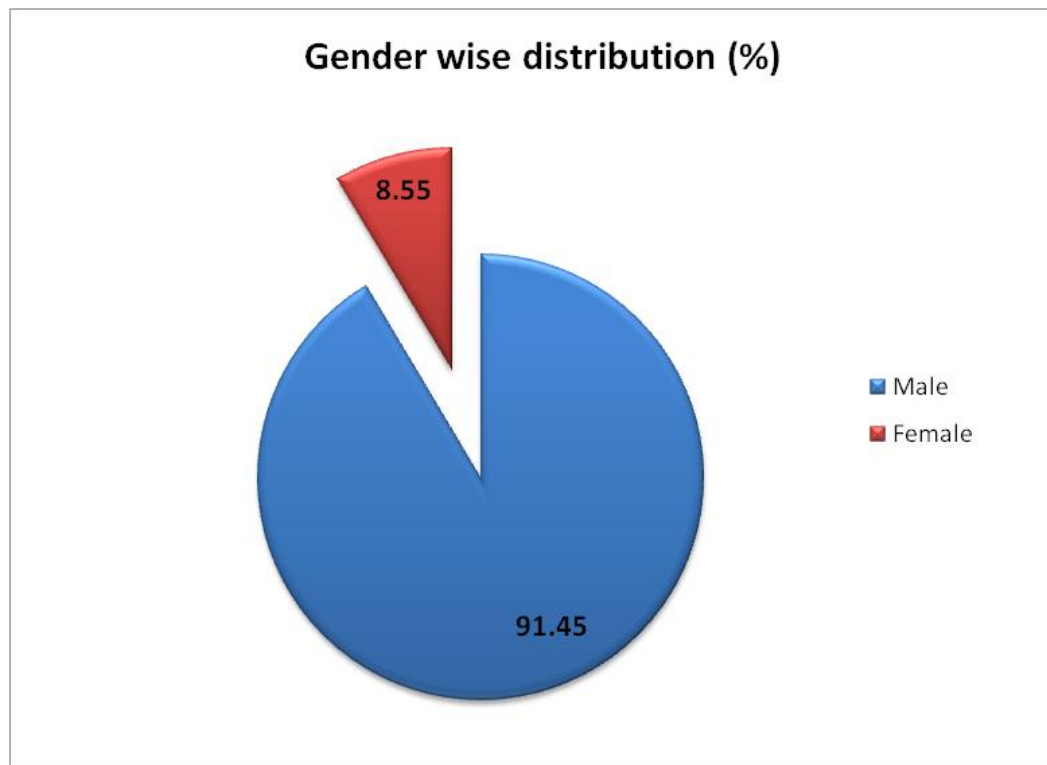


Table No. 2 Age group wise distribution

S.No.	Age group (yrs)	No. of patients (n=351)	%
1.	≤ 25	10	2.84
2.	26-35	100	28.50
3.	36-45	241	68.66

Chi sq. -231.74 DF=2 P value =0.001 Significant

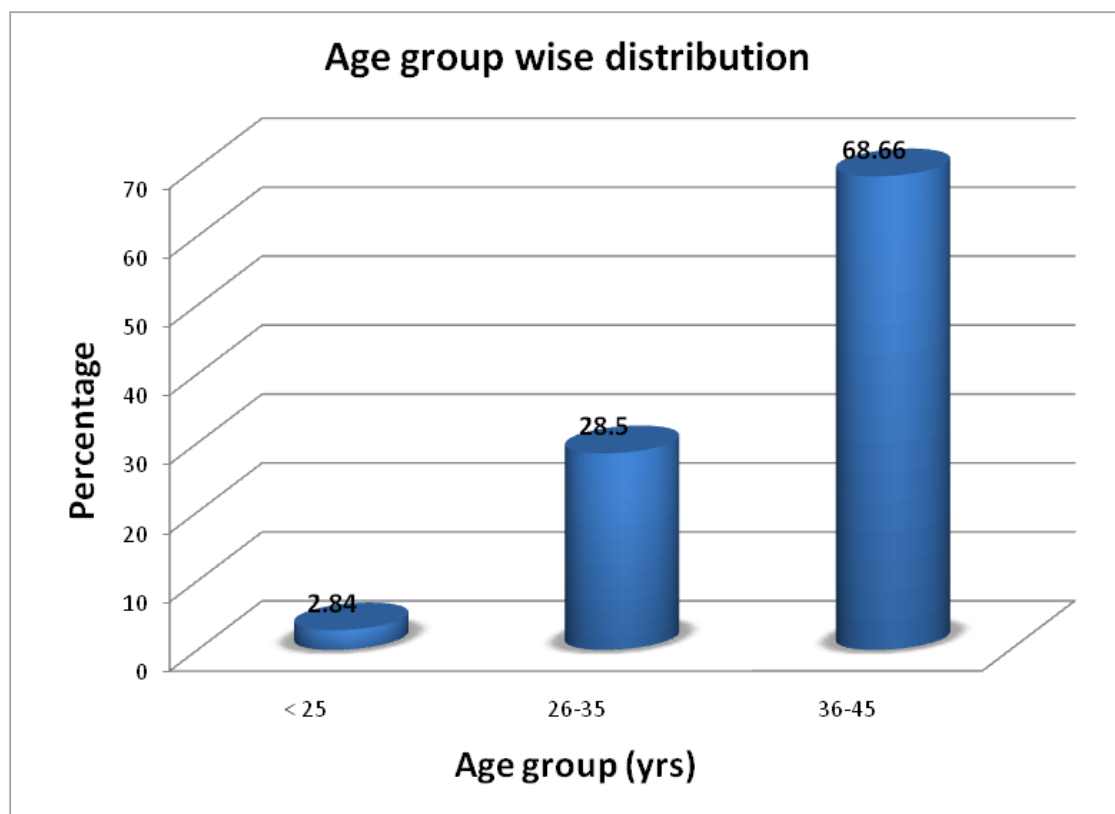


Table No. 3 Month wise distribution

S.No.	Months	No. of patients (n=351)	%
1.	January 2016	36	10.26
2.	February 2016	40	11.40
3.	March 2016	26	7.41
4.	April 2016	23	6.55
5.	May 2016	30	8.55
6.	June 2016	25	7.12
7.	July 2016	35	9.97
8.	August 2016	29	8.26
9.	September 2016	22	6.27
10.	October 2016	35	9.97
11.	November 2015	25	7.12
12.	December 2015	25	7.12

Chi sq. =13.14 DF= 11 P value =0.28 Not Significant

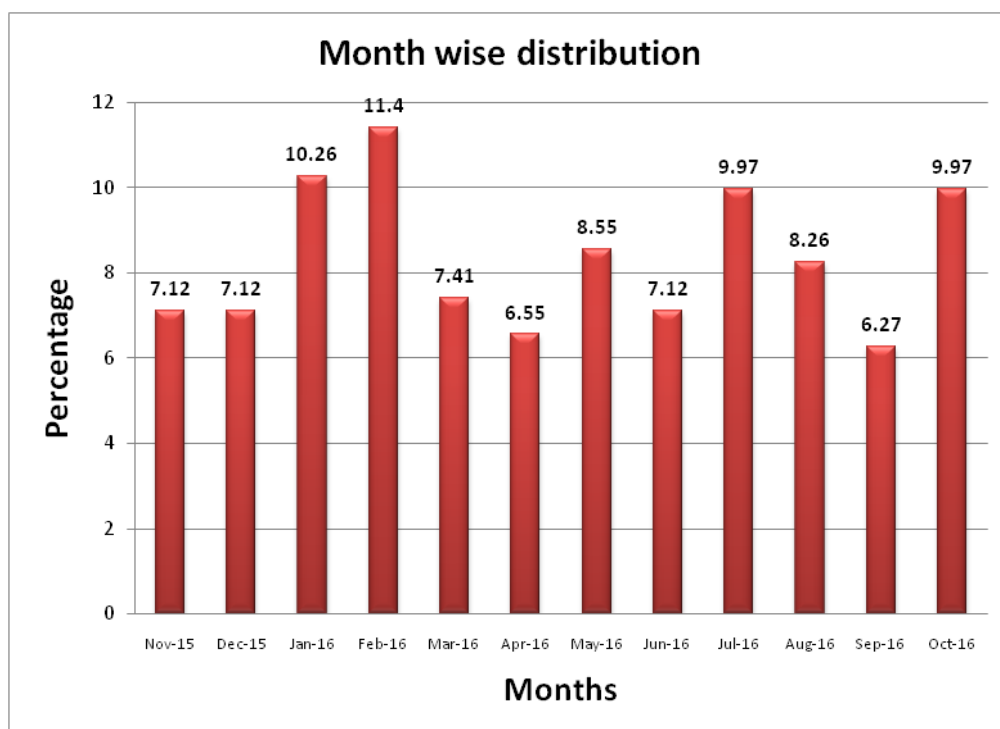


Table No. 4 Clinical symptoms/signs

S.No.	Symptoms/signs	No. of patients (n=351)	%
1.	Chest pain ± sweating	342	97.44
2.	Heaviness in chest	19	5.41
3.	Breathlessness	12	3.42
4.	Nausea and vomiting	06	1.71
5.	Systolic murmur	15	4.27
6.	Crepitations in chest	10	2.85
7.	Signs of cardiogenic shock	10	2.85
8.	Gallop rhythm	07	1.99

P value =0.001 Significant

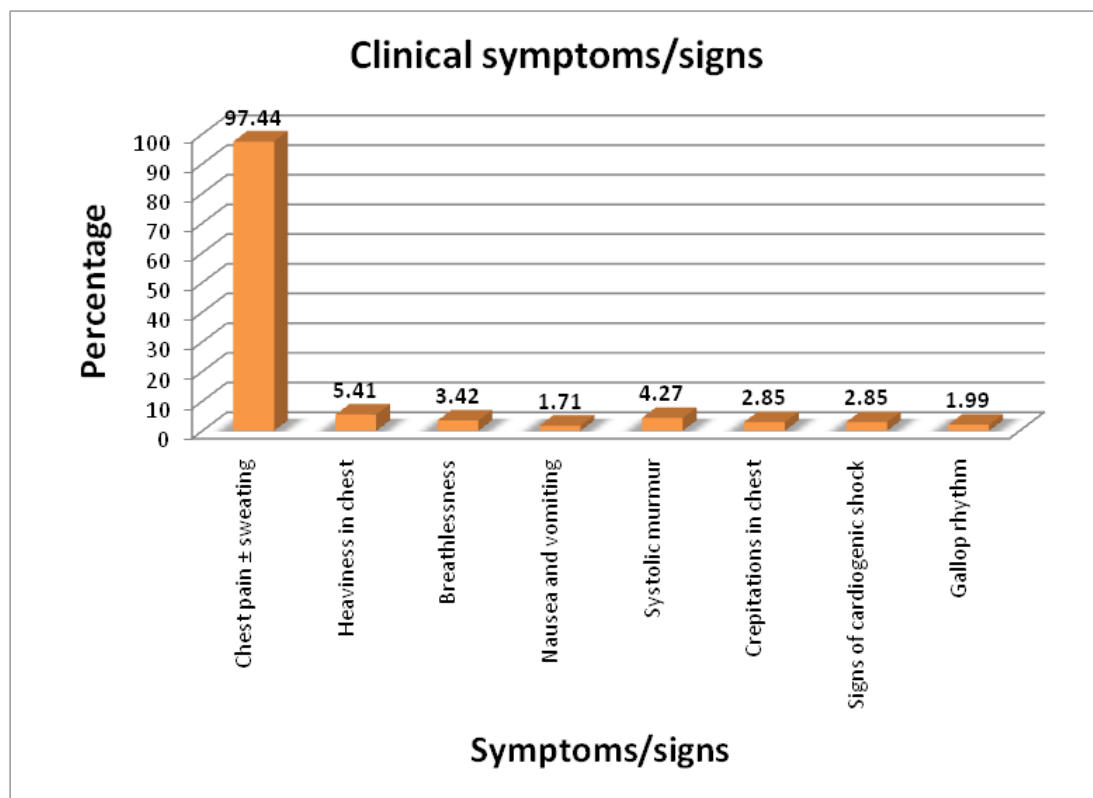


Table No. 5 Type of MI

S.No.	Type of MI	No. of patients (n=351)	%
1.	AWMI	234	66.67
2.	IWMI	84	23.93
3.	LWMI	04	1.14
4.	NSTEMI	29	8.26

Chi sq. =363.18 DF= 3 P value =0.002 Significant

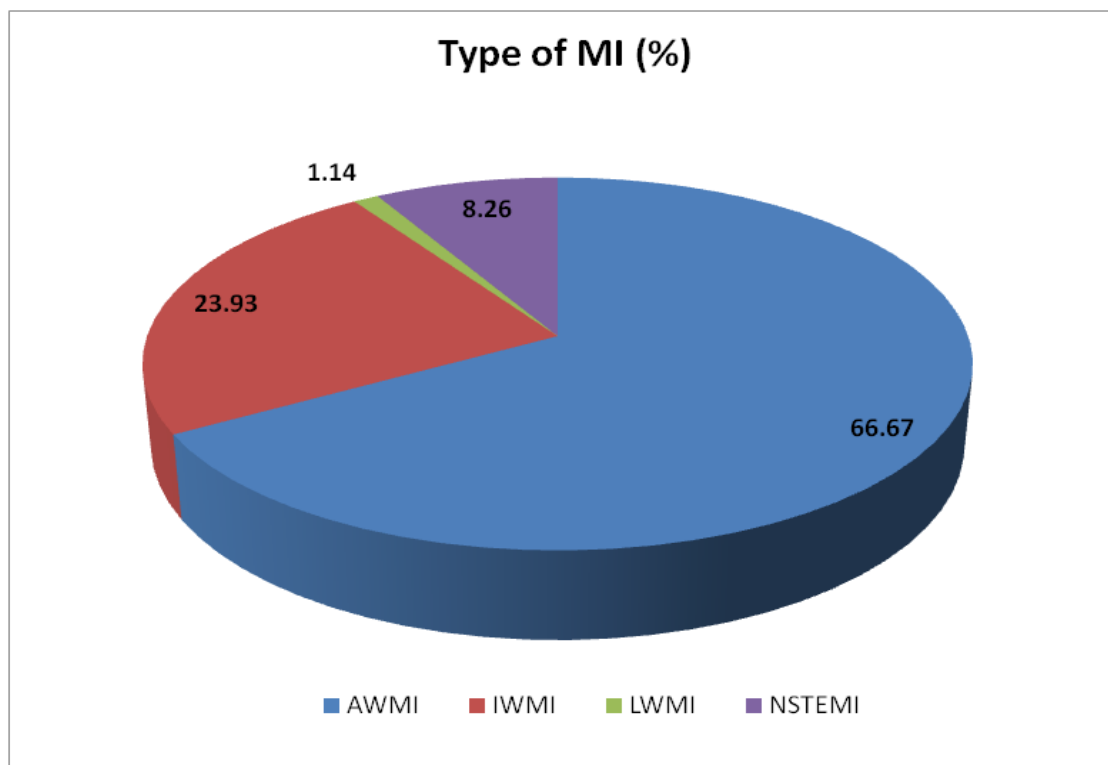
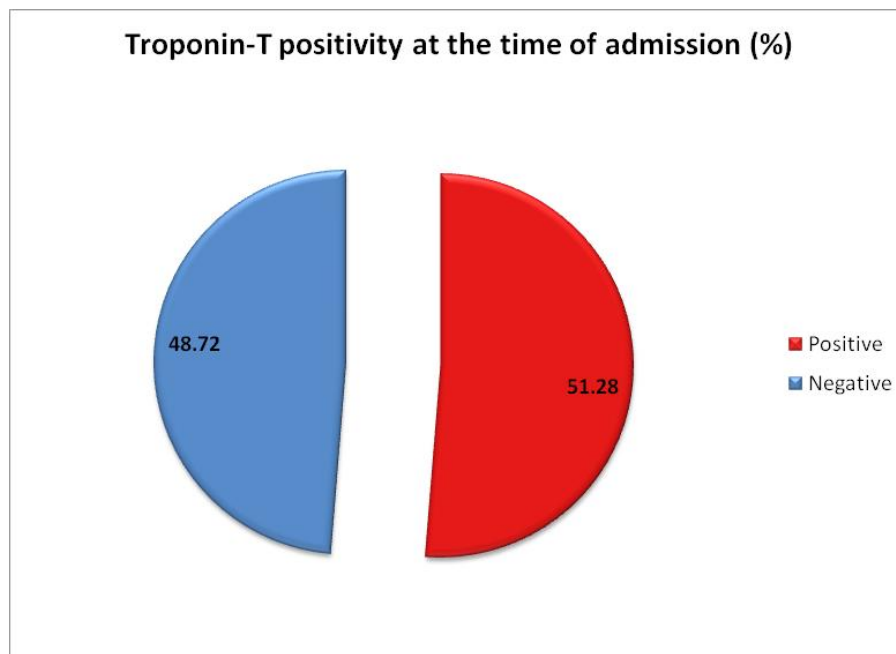


Table No. 6 Troponin-T positivity at the time of admission

S.No.	Troponin-T	No. of patients (n=351)	%
1.	Positive	180	51.28
2.	Negative	171	48.72

Chi sq. =0.23 DF= 1 P value =0.63 Not Significant

**Table No. 7** Thrombolytic therapy

S.No.	Thrombolysis	No. of patients (n=351)	%
1.	Done	232	66.10
2.	Not done	119	33.90

Chi sq. =36.38 DF= 1 P value =0.001 Significant

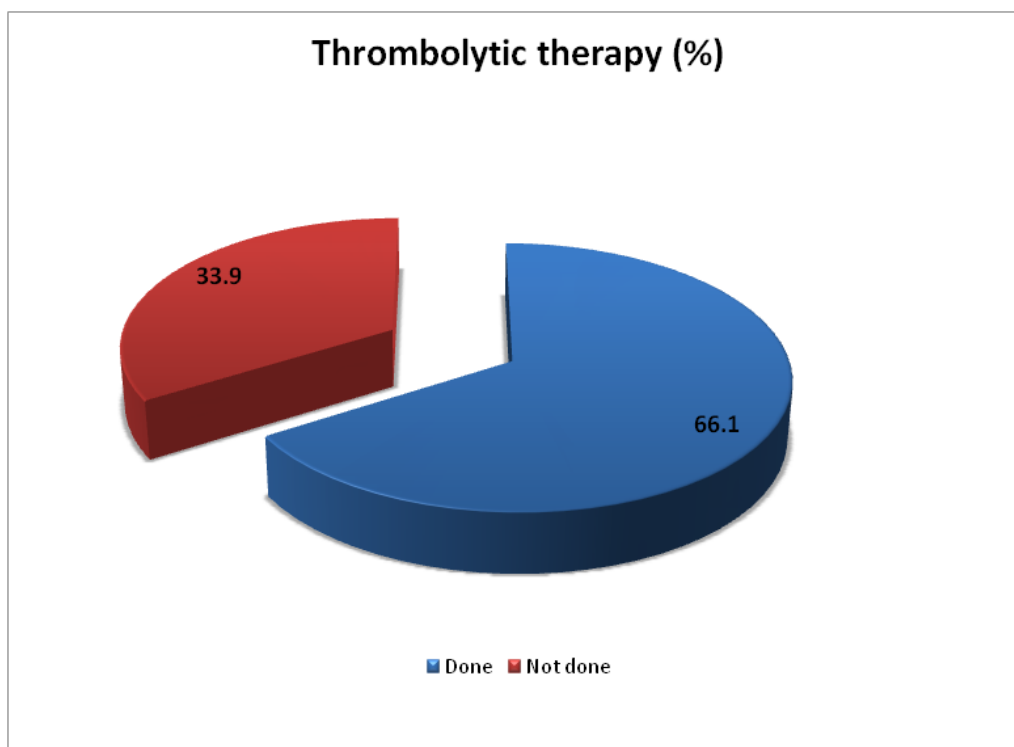


Table No. 8 Presence of risk factors

S.No.	Risk factors	No. of patients (n=351)	%
1.	Smoking	162	46.15
2.	Dyslipidemia	120	34.19
3.	Hypertension	50	14.25
4.	Diabetes	36	10.25
5.	Family history of CAD	35	9.97
6.	Overweight/obesity	32	9.12
7.	Illicit drug use	16	4.56

Chi sq. =385.26 DF= 6 P value =0.001 Significant

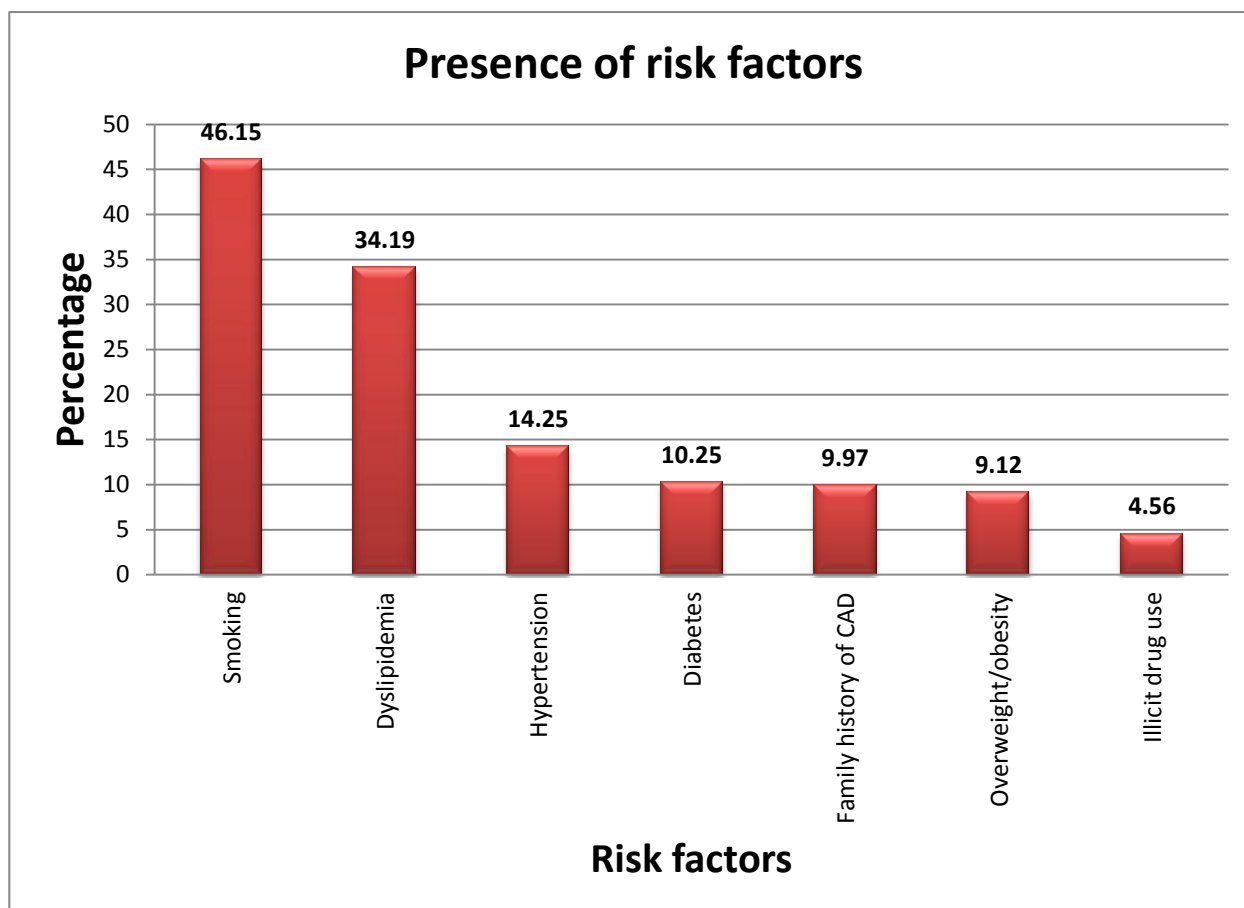


Table No. 9 Mortality

S.No.	Risk factors	No. of patients Expired (n=7)	%
1.	ST elevation MI	05	1.42
2.	Non ST elevation MI	02	0.57

Chi sq. =1.29 DF= 1 P value =0.256 Not Significant

It can be seen that smoking, dyslipidemia and hypertension were the major risk factors. Diabetes, positive family history, obesity and illicit drug use were the other risk factors.

Discussion

MI is a disease of older population and is uncommon in young, though it occurs at younger

age in India compared to Western population. In Global Registry of Acute Coronary Events (GRACE) study, the prevalence of young acute coronary syndrome (ACS) was 6.3%,¹ in Thigh ACS Registry, it was 5.8%² and in Spain Registry, it was 7%.³

MI in young can be divided in to two groups, those with angiographically normal coronary

arteries and those with coronary artery disease (CAD). Some young MI patients have normal coronary arteries. The MI in them can be caused by arteritis, thrombosis, embolisation or spasm. As is the case with venous thrombosis, coronary thrombosis can be seen in hypercoagulable states, such as protein C and protein S deficiency, antiphospholipid syndrome or nephrotic syndrome.^{4,5,6,7} Coronary artery spasm can cause MI in patients with cocaine abuse⁸ and also in association with alcohol binges.⁹ In the second group of young MI (those with CAD), it is mostly a result of atherosclerotic process, which starts in early childhood. Milanig *et al.*, in a necropsy study of 760 young patients, dying of various causes found that 20% of men and 8% of women in the age group between 30-34 yrs had evidence of Coronary heart disease (CHD).¹⁰

Etiology of athermanous CHD is limited to conventional risk factors, as in adults, with some differences. Zimmerman *et al.*, found prevalence of smoking in 92% of young CAD patients.¹¹ Mukherjee *et al.*, found prevalence of smoking to be higher in those less than 40 yrs of age, compared to those above 60 yrs (58.7 Vs 43%),¹² in patients who underwent Percutaneous transluminal coronary angioplasty (PTCA). We found smoking to be the most common risk factor, present in around 46% of young MI patients. Family history of CAD was found in around 10% of our patients. This is much less than in a study done in London by Chen *et al.*, who, found family H/O CAD in 39% of patients.¹³ Lipid abnormalities, especially raised TG and low HDL were found in around 34% of our patients. Xie *et al.*, also found diabetes mellitus, hypertension and hyperlipidaemia as important risk factors in young women with acute MI.¹⁴ They found that each of these risk factors had around 50% prevalence.

Spontaneous coronary dissection is one of the rare causes of MI, especially in young women, in peripartum period. Coronary artery aneurysm may also be a cause of MI in young. These may be congenital or acquired, secondary to Kawasaki's disease in childhood.¹⁵

Fibromuscular dysplasia (FMD) is another very rare cause of MI in young, especially in women. It is an idiopathic, nonatherosclerotic and noninflammatory vasculopathy affecting small-to medium-sized arteries. The renal arteries (60-80%) and cervicocranial arteries (20-30%) are most commonly involved. Regardless of the type of FMD, the disease can cause dissection, rupture, or occlusion leading to a wide range of clinical presentations and even death. Fibromuscular dysplasia of the coronary arteries has only rarely been described, since the first report of two probable cases in 1965.¹⁶ Pate *et al.*, described seven cases of coronary angiographic characteristics of seven women with acute coronary syndromes and unusual coronary anatomy who also had renal artery FMD.¹⁷ In each case, the proximal vessel appeared normal but in the middle or distal segment there was a well-demarcated abrupt transition to diffuse obliterative disease.

Younger patients with MI have a better prognosis. We had in-hospital mortality of just around 2%.

Conclusion

MI in ≤ 45 yrs of age is almost exclusively seen in male. Smoking, dyslipidemia and hypertension are major risk factors. Diabetes, positive family history, obesity and illicit drug use are other risk factors. Anterior wall MI is most common type. In hospital, mortality is low.

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