

## Original Research Article

# Risk factor analysis and angiographic findings in young myocardial infarction patients in tertiary care centre of rural population in South India

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### ABSTRACT

**Background:** Coronary Artery Disease (CAD) is the leading cause of death and accounts for around 12million deaths annually worldwide. The pattern of coronary artery involvement and clinical outcome varies with age suggesting different underlying pathophysiology. Better understanding this specific problem will lead to further improvement in management. The aim was to study the risk factors and angiographic findings in young patients with acute myocardial infarction.

**Methods:** Thirty-nine patients were included in this study. Patients included in the study underwent elective angiographic performed by the percutaneous femoral approach using standard angiographic techniques. Echo and lipid profile were done to all patients. Data were analysed using MS-Excel.

**Results:** In this study, 39 patients were included, 37 male and 2 female patients, the average age of the patients was 35.12 years. 59% of patients had hypertriglyceridemia, 23.1% of patients hypercholesteremia. 45.9% of male patients were having a history of smoking and alcoholism. 84.6% of patients had obstructive CAD, single vessel disease was observed in 59%, double vessel disease in 7.7%, triple vessel in 2.6% patients.

**Conclusions:** Acute myocardial infarction in young predominantly affects males. Dyslipidemia, smoking and alcoholism were found to be common associated factors in young MI. This emphasizes the need for lifestyle modification for primary prevention. Coronary angiography revealed normal coronaries in 12% suggesting different underlying process other than atherosclerosis. With timely intervention and appropriate management, prognosis is good in young MI patients.

**Keywords:** Coronary angiography, Risk factors, Young male

### INTRODUCTION

Coronary Artery Disease (CAD) is the major cause of morbidity and mortality burden in the world.<sup>1</sup> Young patients with CAD are a specific subset of the population requiring attention. According to the Global Burden of Disease study age-standardized estimates (2010), nearly a quarter (24.8%) of all deaths in India are attributable to CVD. The age-standardized CVD death rate of 272 per 100,000 population in India is higher than the global

average of 235 per 100,000 population.<sup>2</sup> However, there is a major gap in knowledge, especially regarding the causes of death in rural India as global burden of disease estimates is based on smaller community-based studies. In recent years, whereas the mean age of Coronary Artery Disease (CAD) has decreased, its prevalence seems to have been on the increase. A number of studies, including author's previous report have shown significant differences in the risk factor profile and coronary angiographic patterns between young and older patients

with acute STEMI.<sup>3,4</sup> Angiographic studies also showed major differences with the higher incidence of normal coronary arteries, mild luminal irregularities and single vessel coronary artery disease.<sup>5</sup> It is estimated that, currently, 275million individuals in young patients with myocardial infarction aged  $\geq 15$  years consume tobacco in India.<sup>5</sup> The mortality burden attributable to tobacco in India is huge because it is estimated to cause nearly 1million deaths annually.<sup>6,7</sup> The aim was to study the risk factors and angiographic findings in young patients with myocardial infarction.

**METHODS**

This retrospective study was conducted in the Department of Cardiology at Tirunelveli Medical college hospital. Coronary artery disease was diagnosed by clinical and non-invasive evaluation. The patients with acute ST elevation myocardial infarction, both sexes, both thrombolysed and non thrombolysed patients were included. The patients with chronic stable angina, unstable angina, patients who underwent PCI/CABG and previous MI were excluded.

Myocardial infarction was diagnosed if all of three of the following criteria were present in the study. Sustained chest pain or discomfort typical of cardiac ischemia, lasting longer than 30minutes and not relieved by nitroglycerin. Initial ST elevation of 1mm or more in atleast 2 or more consecutive ECG leads along with elevation of cardiac enzymes such as CK-MB or Cardiac Troponin.

Patient’s detailed history including demographic details, smoking history, alcohol use, family history of heart diseases was recorded. Patients included in the study underwent elective angiographic performed by the percutaneous femoral approach using standard angiographic techniques. Echo and lipid profile were done to all patients. Data were analyzed using MS-Excel.

**RESULTS**

In this study, 39 patients were included, 37 male and 2 female patients. The average age of the patients was 35.12years with a maximum number of patients (60.2%) being within the age of 25-30years. The youngest patient was 23years old. Only two female patients with acute MI were admitted during the study period and both were 40 years old. The average age of male patients with acute MI was 34.86 years. 7.7% of patients had a history of hypertension and 10.3% of patients were diabetic. 45.9% of male patients were having a history of smoking and alcoholism (Table 1).

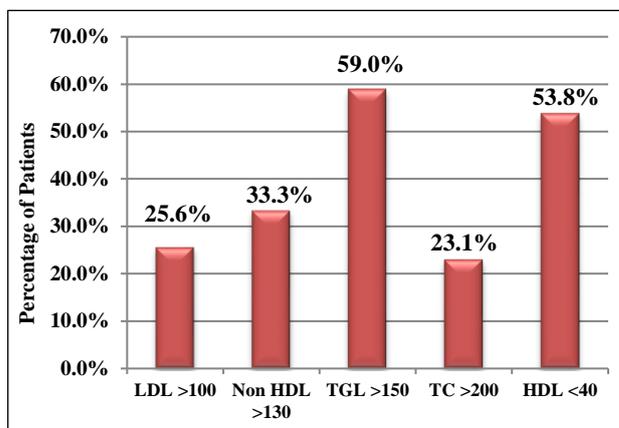
The most common presentation was chest pain, radiation of pain, sweating, nausea/vomiting, breathlessness, palpitations. 59% of patients had hypertriglyceridemia, 23.1% of patients hypercholesteremia (Figure 1). Anteroseptal myocardial was higher in this study patients

28% followed by anterior wall myocardial infarction and Inferior wall myocardial infarction (IWMI), 26% each, inferior wall MI (IWMI) with right ventricular MI (RVMI) was seen in 10% of patients (Figure 2).

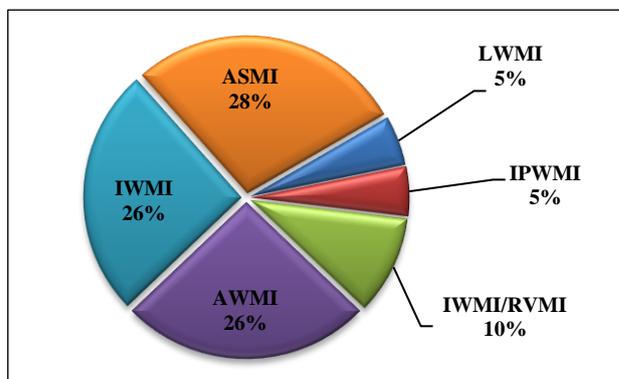
Total 84.6% of patients had obstructive CAD, single vessel disease was observed in 59%, Left Anterior Descending (LAD) artery was involved in 38.5%, Right Coronary Artery (RCA) in 17.9% and the Left Circumflex Coronary Artery (LCX) in 2.6% patients. Double vessel disease was seen in 7.7%, LAD and LCX involvement in 5.1%, and the least common was RCA and LCX involvement in 2.6% patients. TVD was seen in 2.6%. Left main diseases was seen in 61.5% of patients. Non-obstructive CAD was seen in 17.9%. Spontaneous dissection was seen in 2.6% patients. Normal coronaries were seen 12.8% of patients (Table 2).

**Table 1: Distribution of clinical variables.**

Variables	Frequency	Percentage
Male	37	94.9%
Female	2	5.1%
Hypertension	3	7.7%
Diabetes	4	10.3%
Smoking (male)	17	45.9%
Alcohol (male)	17	45.9%



**Figure 1: Distribution of lipid profile.**



**Figure 2: Distribution of myocardial infarction types.**

**Table 2: Coronary angiographic characteristics of the patients.**

Variables	Frequency	%
Obstructive CAD	33	84.6
Single vessel disease	23	59.0
• LAD	15	38.5
• RCA	7	17.9
• LCX	1	2.6
Double vessel disease	3	7.7
• LAD and LCX	2	5.1
• RCA and LCX	1	2.6
Triple vessel disease	1	2.6
Left main disease	24	61.5
• With SVD	23	59.0
• With DVD/TVD	1	2.6
Non-obstructive CAD	7	17.9
Spontaneous dissection	1	2.6
Normal coronaries	5	12.8
<b>Lesion characteristics (lengthwise)</b>		
• Type A	12	30.8
• Type B	12	30.8
• Type C	3	7.7
Thrombus containing lesion	3	7.7
<b>Management plan</b>		
Optimal medical management	15	38.5
PCI to LAD	14	35.9
PCI to LCX	2	5.1
PCI to RCA	7	17.9

## DISCUSSION

With the rising prevalence of CAD in India, the World Health Organization (WHO) estimates that by the end of 2020, India will be the cardio-diabetic capital of the globe. CVD tends to be more aggressive and starts manifesting at a younger age which was also noted in present study. Age of youngest patient in this study diagnosed with acute MI was 23. One of the most consistently demonstrated risk factors for CAD is male sex.<sup>8</sup> Among the many factors associated with occurrence of myocardial infarction, most important factors are hyperlipidemia, 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.<sup>9</sup> Young patients with significant coronary obstruction have the less extensive disease than older patients. The present findings of predominantly single-vessel disease in young patients in this study also suggests the same.<sup>10</sup> Moreover, the predominance of angiographic single vessel disease in these young patients as in this study primarily suggest that premature myocardial infarction probably result from a rapid

progressive event, such as thrombosis or plaque rupture, rather than a gradually evolving process such as atherosclerosis and thus substantiate the need for an intense and aggressive approach directed towards primary and secondary preventions of premature cardiovascular disease.<sup>11</sup> The management of MI generally is not dependent on age and guideline-suggested therapies are just as applicable to younger patients as they are to their older counterparts.<sup>12,13</sup> Concerning STEMI management, the benefits of primary angioplasty over thrombolysis are as applicable in “young” patients as they are in older individuals and no particular age cohort has a greater relative benefit.<sup>14</sup> Young age is an independent predictor for favorable prognosis following thrombolysis and hence, thrombolysis should still be utilized where timely primary angioplasty cannot be offered.<sup>15</sup> Given the longer expected survival of younger patients, the rate of repeat revascularization would be expected to be high. One study suggests a rate of about 50% at a median of 4.7years.<sup>16</sup>

## CONCLUSION

People with myocardial infarction at young age constitute a different group of the population requiring special attention when compared older patients with MI. The study showed that young MI occurred predominantly in male with hypertriglyceridemia, smoking, and alcoholism as commonly occurring risk factors. Despite the lack of long-term follow-up or the small sample size of this study, the risk factors described to be associated with young MI are the attributes requiring special attention. Greater emphasis should be laid on lifestyle modifications such as smoking cessation and regular physical activity for primary prevention of myocardial infarction in the young population. Anteroseptal myocardial infarction was the commonest type followed by anterior and inferior wall MI. Majority of the patients had single vessel disease with LAD being the commonest affected artery. Around 12% had normal coronaries in angiography suggesting mechanisms other than progressive atherosclerosis for infarction. PCI and appropriate medical management were the preferred treatment in most of the patients. Majority of patients had normal LV function or mild LV dysfunction, if timely intervention and proper management can be done, myocardial infarction in young has a good prognosis.

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