International Journal Dental and Medical Sciences Research
Volume 3, Issue 5, Sep-Oct 2021 pp 510-515 www.ijdmsrjournal.com ISSN: 2582-6018

# "Correlation of risk factors and role of various biochemical parameters in preventing incidence of MI in younger population."

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Submitted: 10-09-2021 Revised: 22-09-2021 Accepted: 25-09-2021

**ABSTRACT**

**Background**: Correlation of riskfactors androle of various biochemical parameters in preventing incidence of MI in younger population.

**Objective**: To correlate the risk factors and the role of biochemical parameters in prevention of Myocardial Infarction.

**Method**: This comparative prospective randomized study includes 100 patients aged < 45 years admitted with MI and excludes patients aged <18 years and > 45 years and those who refused for consent. The final diagnosis was based on ischemic chest pain for at least 30 mins, ECG evidence of myocardial injury and increase in cardiac markers. The following Investigations done were CBC, Cardiacbiomarkers,ECG, Lipid profile and 2D Echocardiography.Complete history was taken.

**Results**: Majority patients were of age group 36-40 years (53.92%) having BMI25-30 kg/m2 presented with chest pain (88.24%). ECG findings revealed the most common site as anterior (57.84%) followed by inferior wall (42.16%). Out of 48 patients with AWMI, majority had EF between 30-40%. Most common treatment modality was primary PTCA (72.55%) followed by thrombolysis (14.71%). Lipid profile revealed 59.38% had TG >150 mg/dl, abnormal LDL reported in 70.31% and Low HDL in 90.63% of patients.

**Conclusion**: Acute MI in young patients is on rise presenting as chest pain. Smoking being the most common risk factor contributing to atherosclerosis followed by dyslipidemia. Even though clinical course and outcomes are better, early diagnosis and interventions are essential to reduce mortality. Young patients with MI are predominantly male smokers; therefore, the community should be educated about smoking cessation and control of other modifiable risk factors along with routine screening.

**Keywords:** Myocardial infarction, biochemical parameters, young age.

## I. INTRODUCTION

Acute coronary syndrome (ACS) is an umbrella term representing a common end result, acute myocardial ischemia: Including ST-segment elevation myocardial infarction (STEMI), non-ST-STEMI (NSTEMI), and unstable angina (UA)[1].It is simply a situation where the blood supply to the heart muscle is suddenly blocked.

Myocardial Infarction (MI) is a condition characterized by necrosis of the myocardium due to prolonged irreversible ischemia following coronary artery occlusion. It is more commonly seen in developed nations.

The incidence of myocardial infarction in the world varies greatly. Worldwide, more than 3 million people have STEMIs and 4 million have NSTEMIs**.** [2]Indians are four times more prone to AMI as compared to the people of other countries due to a combination of the genetic and lifestyle factors promoting metabolic dysfunction. [3]The incidence of myocardial infarction in India is 64.37/1000 people. (Lim SS 2012) The mortality rate of myocardial infarction is approximately 30% and for every 1 in 25 patients who survive the initial hospitalization, dies in the first year after AMI. [3] MI usually affects the middle and older age groups and is uncommon in young adults and its incidence varies between 2%-10%. [4]Moreover people in other part of the world suffer from CAD at relatively younger age, i.e., about fifty years of age. The etiology of MI is multifactorial, the major being coronary artery disease with atherosclerosis which is influenced by various risk factors. The young MI patients may have different risk factor profiles, clinical presentations, and prognosis compared to older patients. [5]Young patients are more likely to have a history of smoking and dyslipidemia, but less likely to have other comorbidities, such as diabetes mellitus, hypertension, or prior coronary artery disease. In addition, patients with premature MI tend to present fewer diffuse atherosclerotic coronary arteries.[6]. For chest pain in young age group, physiciansare less likely to consider cardiac cause and may be misdiagnosed for other diseases. In

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addition, these patients may have different risk factor profiles, clinical presentations, and prognosis.

Risk factors for an MI can be classified into three categories: (i) non-modifiable: age, sex, and family history; (ii) modifiable: smoking, alcohol intake, physical inactivity, poor diet, hypertension, type 2 diabetes, dyslipidemias, and the metabolic syndrome; and (iii) emerging: C-reactive protein (CRP), fibrinogen, coronary artery calcification (CAC), homocysteine, lipoprotein(a), and low-density lipoprotein (LDL). [7]This study was done to know the clinical profile, risk factors and outcome in young individuals with acute MI.

## II. MATERIALS AND METHODS

It is a comparative prospective randomized study done in Index Medical College Hospital & Research Centre, Indore for the duration of Eighteen months (2020 to 2021).A total of 100 patients were included in the study.

**Inclusion Criteria:**

1. All the patients aged 45 years or younger admitted to IMCHRC hospital diagnosed with acute MI

**Exclusion Criteria:**

1. Patients aged <18 years and > 45 years.
2. Patients with acute MI who refused to give consent.

The final diagnosis of acute MI was based on two of the following criteria;

1. Ischemic chest pain for at least 30 mins.
2. ECG evidence of myocardial injury.
3. An increase in serial CKMB or serial trop-I.

The following Investigations were done;

- Complete blood count
- Cardiac biomarkers
- ECG
- Lipid profile
- LFT
- Chest X ray
- 2D Echocardiography to assess the left ventricular function.

**Methods of collection of data:**

Diagnosis of myocardial infarction was based on the WHO criteria which require two of the following three to be present;

1. History of an ischemic type of chest discomfort.
2. Evolutionary changes on the serially obtained ECG change
3. Rise and fall of the serum cardiac markers.

Details of age, sex, occupation, history of smoking, known case ofdiabetes mellitus and hypertension and significant family history of ischemic heart disease were recorded.

**Statistical analysis:**

All the data analysis was performed using IBM SPSS version 20 software. Frequency distribution and cross tabulation was used to prepare the tables. Quantitative variables were expressed as the mean and standard deviation. Categorical data was expressed as percentage. PRISM and Microsoft office was used to prepare the graphs. No statistical analysis was performed.

**Observation**

**Table 1: Sex distribution of patients**

| Gender | No of patients | Percentage |
|---|---|---|
| Male | 91 | 89.22 |
| Female | 11 | 10.78 |
| Total | 102 | 100 |

Majority of the patients were male (89.22%) followed by female (10.78%).
Male preponderance was noted.

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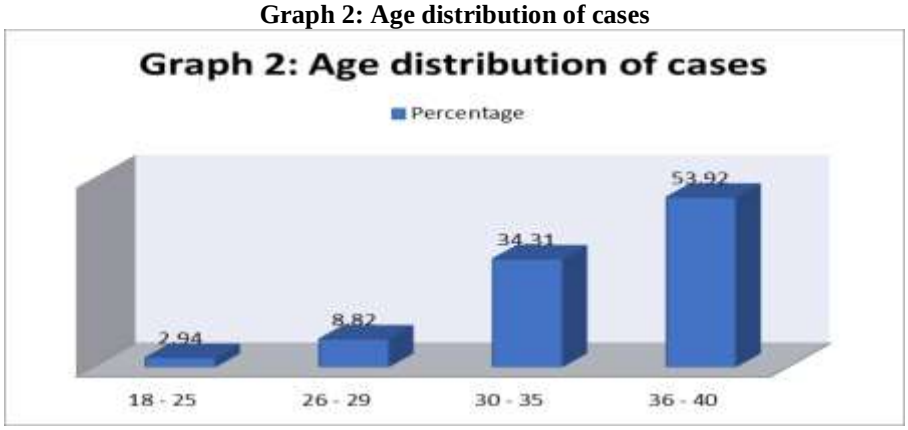
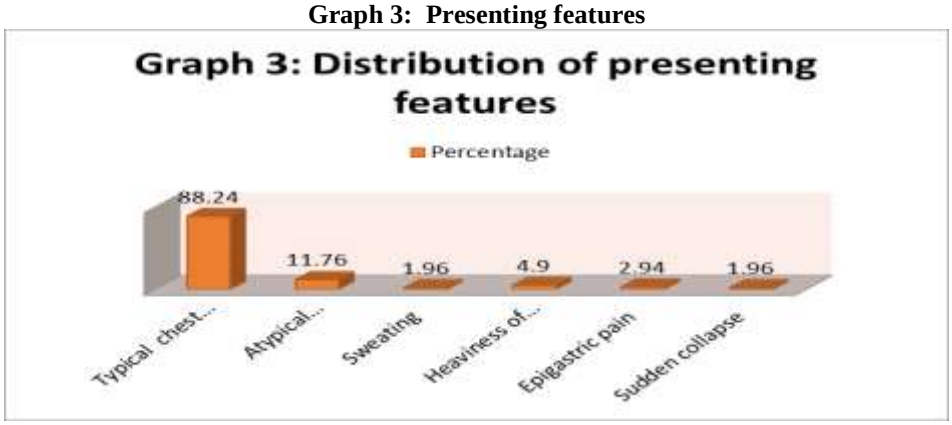
**Graph 2: Age distribution of cases**

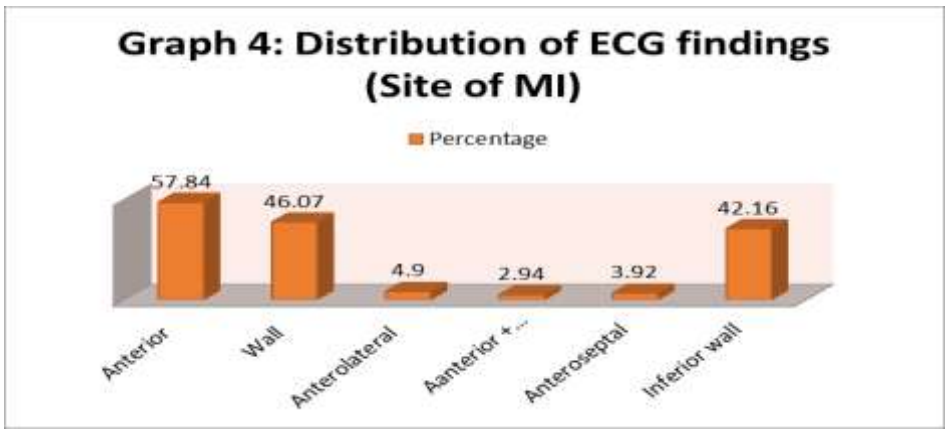



Majority of the patients were in the age group of 36-40 years (53.92%) followed by 30-35 years (34.31%)

**Graph 3: Presenting features**




Most common presenting symptoms in present study was chest pain (88.24%) followed by atypical symptoms (11.76%).




ECG findings revealed that most common site for MI was anterior (57.84%) followed by wall (46.07%) and inferior wall (42.16%).

**Table 5: Results of Cardiac biomarkers**

| Serial CKMB | Elevated | Normal | Total |
|---|---|---|---|
| Count | 90 | 12 | 102 |
| Percentage | 88.24 | 11.26 | 100 |
| Trop T | Positive | Negative | |

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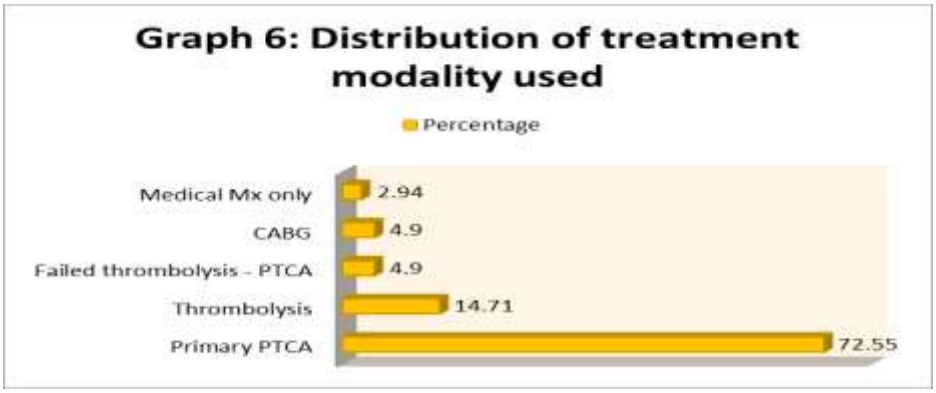
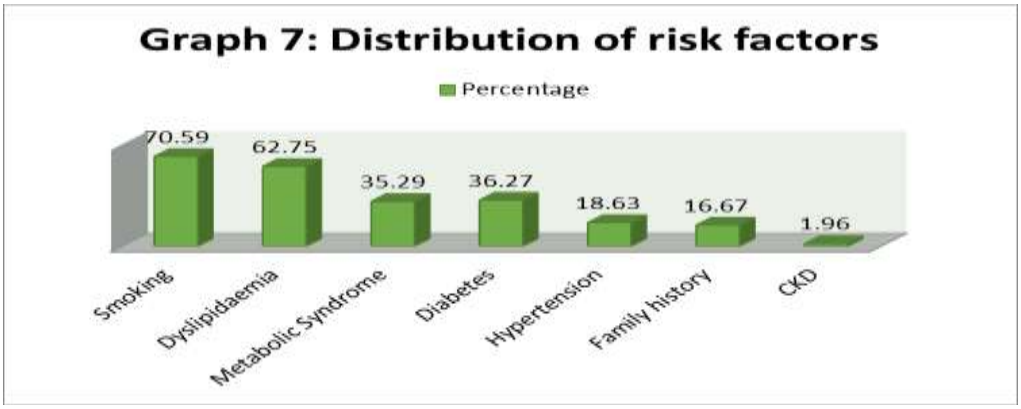
| | | | |
|---|---|---|---|
| **Count** | **92** | **10** | **102** |
| **Percentage** | **90.20** | **9.80** | **100** |

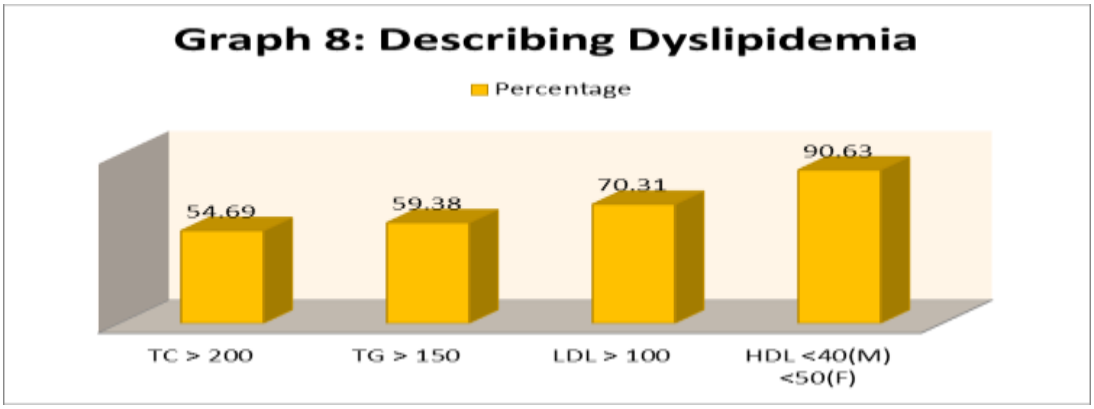
Results of cardiac biomarkers revealed that in 88.24% of the patients CKMB was elevated and positive troponin T was reported in 90.20% of the patients.




Most common treatment modalities used in present study was primary PTCA (72.55%) followed by thrombolysis (14.71%).




Most common risk factors observed in present study were smoking (70.59%) followed by Dyslipidaemia (62.75%). Diabetes was reported in 36.27%, Metabolic Syndrome in 35.29% and Hypertension in 18.63% of the patients.




Analysis of lipid profile revealed that 54.69% had TC >200mg/dl, 59.38% had TG >150 mg/dl), abnormal LDL was reported in 70.31% and Low HDL was reported in 90.63% of the patients.

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## III. DISCUSSION

The Myocardial Infarction (MI) is uncommon in young individuals with incidence varying between 2% and 10%. [1]Atherosclerotic course begins at birth and considerable lesions in coronary arteries may be apparent as early as the age of 25 or 30 years[8]. In present study majority of the patients were in the age group of 36-40 years (53.92%) followed by 30-35 years (34.31%).

One of the most common risk factors for CAD is male sex. The gender distribution among males (89.2%) versus females (10.78%) is attributed to the protective effects of estrogens in preventing atherosclerosis and prevalence of smoking which was much more common amongst male.

In present study majority of the patients had BMI in the range of 25-30 kg/m2. A total of 15.69% patients had BMI in the range of 31-35 kg/m2. Obesity was the infrequent cause in all the earlier studies with incidence of 3.3%–20%.

In present study most common presenting symptom was chest pain (88.24%) followed by atypical symptoms (11.76%). Similar results were revealed in the study done by **Desai Vet al**[9]

ECG findings revealed that most common site for MI was anterior (57.84%) followed by wall (46.07%) and inferior wall (42.16%).

In present study echocardiography findings revealed that out of 48 patients with AWMI, majority had EF between 30-40% followed by 15 patients who had EF between 41-50%. Out of 44 patients with IWMI, majority had EF between 41-50% followed by 13 patients who had EF >50%. This is similar to earlier studies among those ≤ 35 years. [10]In present study most common treatment modalities used in present study was primary PTCA (72.55%) followed by thrombolysis (14.71%).

In present study 36.27% patients had diabetes. But various other studies reported high prevalence of diabetes along with young MI. [11,12]The study conducted by **Akhtar et al in 1993** on young patients of IHD, 35.7% were diabetic. [13]**Gandapur et al**, reported 14% of their patients to be diabetic in their study. [14]Following age, cigarette smoking is the most important risk factor for CAD. Like previous studies, smokers comprised 70.59% of the population.[15]. It adversely affects all phases ofatherosclerosis. Hypertension is another conventional risk factor for CAD. In present study we found 18.63% of the patients to be hypertensive.

In present study analysis of lipid profile revealed that 59.38% had TG >150 mg/dl, abnormal LDL was reported in 70.31% and Low HDL was in 90.63% of the patients. **Hughes et** al in a similar study reported that among Asian Indians in contrast with western world increased low-density lipoprotein (LDL) is more responsible for CAD. [16]Complications as VSR, cardiogenic shock, free wall rupture and pulmonary edema were more common in women and in patients with diabetes as explained by other studies.[17]

## IV. SUMMARY

1. Majority of the patients were male (89.22%) followed by female (10.78%). Male preponderance was noted.
2. Majority of the patients were in the age group of 36-40 years (53.92%) followed by 30-35 years (34.31%).
3. Majority of the patients had BMI in the range of 25-30 kg/m2. A total of 15.69% patients had BMI in the range of 31-35 kg/m2.
4. Most common presenting symptoms in present study was chest pain (88.24%) followed by atypical symptoms (11.76%).
5. ECG findings revealed that most common site for MI was anterior (57.84%) followed by wall (46.07%) and inferior wall (42.16%).
6. Results of cardiac biomarkers revealed that in 88.24% of the patients CKMB was elevated and positive troponin T was reported in 90.20% of the patients.
7. Echocardiography findings revealed that out of 48 patients with AWMI, majority had EF between 30-40% followed by 15 patients who had EF between 41-50%. Out of 44 patients with IWMI, majority had EF between 41-50% followed by 13 patients who had EF >50%.
8. Most common treatment modalities used in present study was primary PTCA (72.55%) followed by thrombolysis (14.71%).
9. Most common risk factors observed in present study were smoking (70.59%) followed by Dyslipidaemia (62.75%). Diabetes was reported in 36.27%, Metabolic Syndrome in 35.29% and Hypertension in 18.63% of the patients.
10. Abnormal HbA1c was reported in 18 patients out of 102. 12.75% patients had it between 8-10% and similar percentage had between 11-12%.
11. Analysis of lipid profile revealed that 59.38% had TG >150 mg/dl, abnormal LDL was reported in 70.31% and Low HDL was reported in 90.63% of the patients.

## V. CONCLUSION

Acute MI in young patients is becoming a raising problem in India being more common in men. Smoking is the most common risk factor of MI indicating that atherosclerosis could be the commonest cause followed by dyslipidemia. The incidence of hypertension and diabetes was less in present study.

The chest pain was the most common clinical presentation and STEMI is the commonest type. Even though clinical course and outcomes are better in present study, early diagnosis and interventionsare essential to reduce mortality. The present study demonstrated that young patients with MI are predominantly male, smokers and haddyslipidemia.

So the community should be educated about smoking cessation and also about the control of other modifiable risk factors along with routine screening. Diabetes Is less in these patients compared to elderly.

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