

ETIOLOGY OF MYOCARDIAL INFARCTION IN YOUNG AND OLD MALES IN TAMILNADU POPULATION

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ABSTRACT

Background: Myocardial infarction is a noncommunicable disease that includes ischemic heart disease (IHD) are major cause of premature mortality in adults. **Materials and Methods:** 130 (one hundred thirty) young and old patients with a confirmed diagnosis of MI were studied, and physical examination was as per Killip's classification. ECG and angiography were tools to diagnose the condition of MI. Elevated lipid profile, CPKMB, Trop-T, and new modalities of imaging were also used. **Results:** The major group was 41-50, 38 (29.2%), followed by 32 (24.6%) in 36-40 years of age and 3 (2.30%), in 21-25 years of age. In clinical manifestation 113 (86.9%) had chest pain, followed by 63 (48.4%) perspiration, 20 (15.3%) palpitations, and 26 (20%) vomiting. In the signs, 55 (42.3%) had tachypnea, and 35 (26.9%) had hypertension, and 81 (62.3%) had the 1st classification of Killips. The rate of infarction was highest in 69 (53.07%) anterior septal, followed by 67 (51.5%) anterolateral. Elevation of ST wave in 115 (88.4%). **Conclusion:** The clinical study suggests risk factors of MI in adults and old age due to type-II DM, smoking, sedentary life (obesity), and hypertension, which have elevated ST waves, which is a bad prognosis, as it leads to premature mortality.

INTRODUCTION

Noncommunicable diseases, which include ischemic heart disease (IHD), are a major cause of premature mortality and claim 15 million lives annually. Myocardial infarction in young adults can be broadly classified into two groups. Those with angiographically normal coronary arteries and those with coronary artery disease of varying etiology. There is significant overlap in pathophysiology between these two groups.^[1]

Angiographically normal coronary arteries. The definition of normalcy is arbitrary. The normal angiographic coronary arteries can have significant atherosclerotic plaque burden when assessed using intra-coronary ultrasound.^[2] The pathophysiology of myocardial infarction in the presence of normal coronary arteries remains unclear or controversial but can be explained on the basis of coronary artery thrombosis (5-6%), embolism (5%), spasm, or a combination of these processes. Coronary thrombosis is observed in hypercoagulable states such as in the nephritic syndrome, antiphospholipid antibody syndrome, protein, and factor XII deficiencies.^[3] Coronary embolism is rare but has been reported with endocarditis, usually affecting the aortic valve.^[4] Coronary artery spasms cause myocardial ischemia. All of these factors must be taken into consideration while treating the patients with myocardial infarction.

Hence, an attempt is made to evaluate the etiology of MI in young and old age males.

MATERIALS AND METHODS

130 (one hundred thirty) male patients having MI admitted at Arunai Medical College hospital Thiruvanamali, Tamil Nadu-606603, were studied.

Inclusion Criteria: Male patients of different age groups, young and old (20 to >50 years), with definite evidence of acute MI. The patients who gave their consent in writing for study were selected.

Exclusion Criteria: The patients already under treatment for cardiovascular disease, renal disease, undergone bypass surgery hypothyroidism were excluded from the study.

Method: As per WHO guidelines, the diagnosis of myocardial infarction depends on the following

- Typical chest pain.
- ECG changes with development bundle block or ST segment elevation or depression of a least 0.1% MV for 24 hours
- Increased cardiac enzyme (creatinine phosphokinase, Troponines)

Hyperactive Phase:

1. ST segment elevation, tall and widened T waves
2. Reciprocal ST segment depression

Evolved Phase: Pathological Q waves duration 0.04 sec or more and amplitude 4mm or more or >25% of respective 'R' wave

Localisation of AMI:

Anterior Wall:

- Anteroseptal infarction pattern in V1 to V4
- Antero lateral infarction pattern I, avL, V5 to V6
- Extensive/Trans anterior wall combination of both

Inferior wall: II, III and avF posterior wall – along with inferior wall tall T Waves in V1 and V2.

Sub-endocardial: Deep symmetrical, arrow head and inverted T waves.

R V infarction: ST elevation of >1mm in V₃R and V₄R in association with inferior wall changes R with ST depression and tall T waves in V₁ and V₂.

Past history of coronary artery disease, socio-economic status, family history of CAD (coronary artery disease) physical and clinical examination was carried out in every patient physical examination of acute MI was done as per the Killip's classification.

Killip Classification	Symptoms and Sign	Predicted mortality
I	No sign of pulmonary or Venous congestion	85-95%
II	S3 gallop, RVF, Tachy- pnoea, rales at the lung bases	0-5%
III	Severe heart failure pulmonary edema	10-20%
IV	Shock cyanosis, cold extremities, confusion, oliguria	35-45%

Every patient undergone ECG studies and angiographic evaluation if needed

Duration of study was from March 2023 May 2025.

Statistical Analysis: Various parameters like age distribution grades of physical activity, clinical manifestation, sites of MI were classified with percentage. The statistical analysis was carried out SPSS software.

RESULTS

Table 1: Distribution of age in Myocardial infarction patients:

- Age in years: 3 (2.30%) 21-25 years, 9 (6.9%) 26-30 years, 20 (15%) 31-35 years. 32 (24.6%) 36-40 years, 38 (29.2%) 41-50 years, 28 (21.5%) > 50 years of age.

Table 2: Study of grades of physical activity in male patients of MI 26 (20%) grade-I, 46 (35.6%) grade-II, 43 (33%) grade-III, 15 (11.5%) grade-IV

Table 3: Clinical manifestations:

- (1) Symptoms – 113 (86.9%) chest pain, 26 (20%) breathlessness, 63 (48.4%) perspiration, 20 (15.3%) palpitation, 3 (2.30%) syncope, 26 (20%) vomiting, 17 (13%) apprehension, 8 (6.15%) cold extremities, 9 (6.92%) Cough.

- (2) Signs – 20 (15.3%) tachycardia, 8 (6.15%) bradycardia, 55 (42.3%) tachypnoea, 35 (26.9%) hypertensive, 2 (2.30%) not recordable, 20 (15.3%) jugular venous elevation, 8 (6.15%) cyanosis.

- (3) Killips Class – 81 (62.3%) I, 29 (22.3%) II, 11 (8.46%) III, 9 (6.92%) IV

Table 4: Study of site of infarction ST segment and lipoprotein level in the male patients

- Wall of ventricle: 69 (53.9%) antero-spetal, 67 (51.5%) antero-lateral, 49 (37.6%) inferior, 8 (6.1%) Inferior+posterior, 8 (6.1%) Inferior+posterior, 8 (6.1%) Inferior + RV
- ST Segment: 15 (11.5%) ST depression, 115 (88.46%) ST elevation

Table 5: Risk factors associated with MI patients

- (A) Conventional – 72 (55.38%) smoking, 18 (13.8%) type-II DM, 35 (26.9%) hypertension, 49 (37.6%) alcoholism, 37 (28.4%) family history of IHD, 58 (44.6%) obesity.
- (B) Lipoprtien – 67 (51.5%) hypercholestremia, 41 (31.5%) hypertrygly ceridemia, 41 (31.5%) HDL (< 35 mg %), 72 (55.3%) LDL (> 130 mg %).

Newer risk factors: 46 (35.3%) type A personality 3 (2.3%) increased LP (a), 3 (2.3%) hyper homocystenemia, 3 (2.3%) protein c deficiency, 6 (4.6%) structural aortic disease.

Table 1: Distribution of age in Myocardial infarction		(130 Male patients)
Age in years	Number of patients	Percentage %
21-25	3	2.30%
26-30	9	6.9%
31-35	20	15%
36-40	32	24.6%
41-50	38	29.2%
> 50	28	21.5%

Table 2: Study of grades of physical activity in male MI patients		
Grades of physical activity	Number of patients	Percentage %
I	26	20.7%
II	46	35.3%
III	43	33%
IV	15	11.5%

Table 3: Clinical manifestation of the MI patients

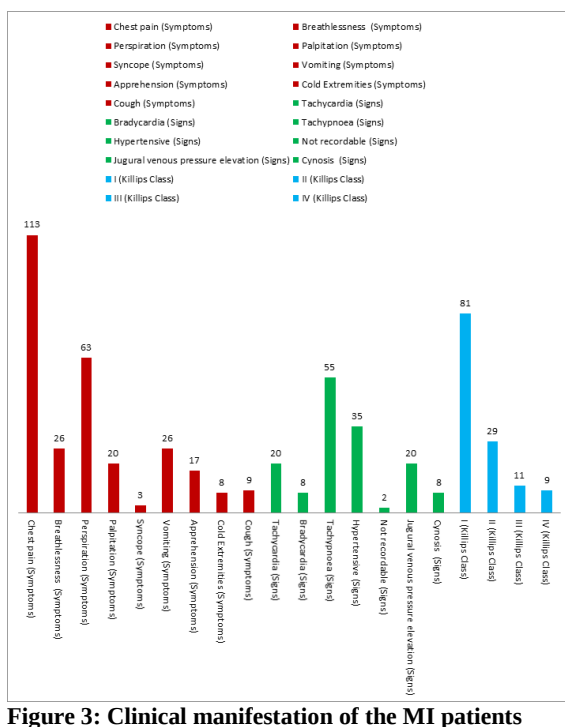
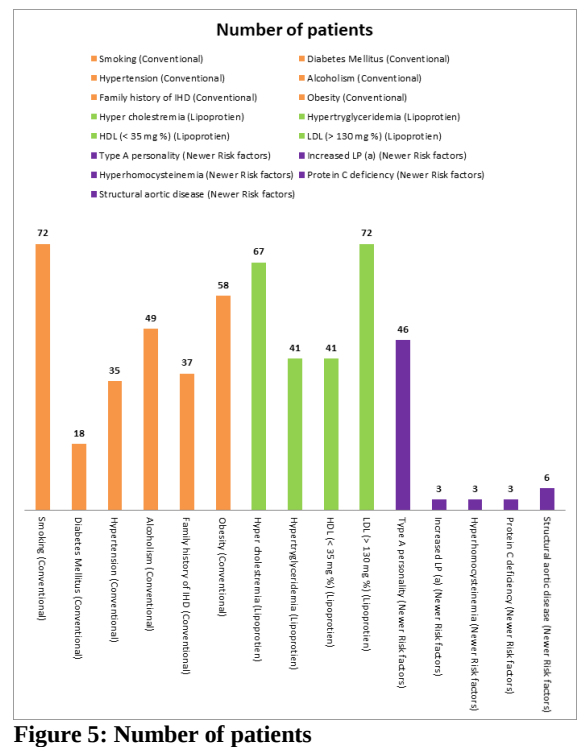
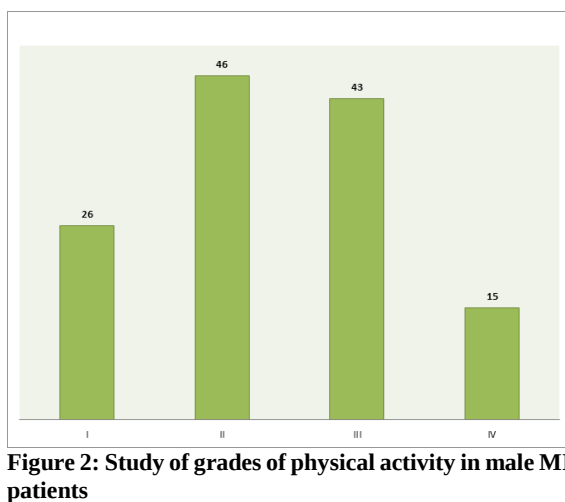
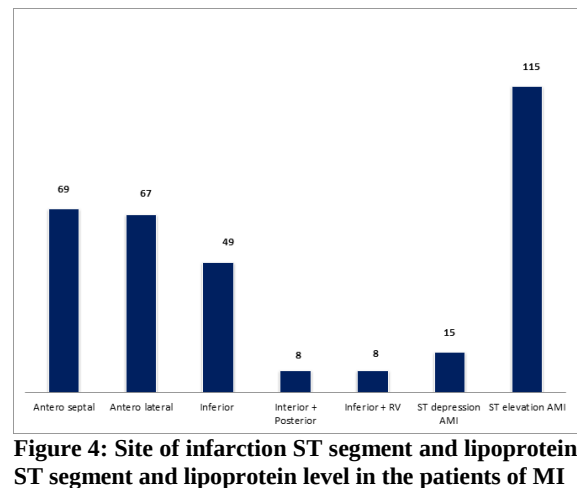
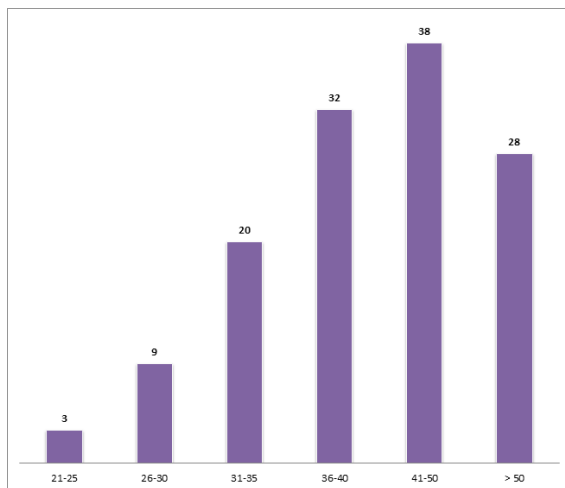
(1) Symptoms	Number of patients	Percentage %
Chest pain	113	86.9
Breathlessness	26	20
Perspiration	63	48.4
Palpitation	20	15.3
Syncope	3	2.30
Vomiting	26	20
Apprehension	17	13
Cold Extremities	8	6.15
Cough	9	6.92
(2) Signs	Number of patients	Percentage %
Tachycardia	20	15.3
Bradycardia	8	6.15
Tachypnoea	55	42.3
Hypertensive	35	26.9
Not recordable	2	2.30
Jugular venous pressure elevation	20	15.3
Cynosis	8	6.15
(3) Killips Class	Number of patients	Percentage %
I	81	62.3
II	29	22.3
III	11	8.46
IV	9	6.92

Table 4: Site of infarction ST segment and lipoprotein ST segment and lipoprotein level in the patients of MI

Presentation	Number of patients	Percentage %
(A) Wall of ventricle		
Antero septal	69	53.07
Antero lateral	67	51.5
Inferior	49	37.6
Interior + Posterior	8	6.1
Inferior + RV	8	6.1
(B) Wall of ventricle		
ST depression AMI	15	11.5
ST elevation AMI	115	88.46

Table 5: Risk factors associated with MI patients**(No. of patients: 130 Males)**

Risk factors	Number of patients	Percentage %
(A) Conventional		
Smoking	72	55.38
Diabetes Mellitus	18	13.84
Hypertension	35	26.92
Alcoholism	49	37.69
Family history of IHD	37	28.46
Obesity	58	44.61
(B) Lipoprotien		
Hyper cholestremia (TG >200 mg %)	67	51.5
Hypertryglyceridemia (TG >200 mg %)	41	31.5
HDL (< 35 mg %)	41	31.5
LDL (> 130 mg %)	72	55.3
(C) Newer Risk factors		
Type A personality	46	35.3
Increased LP (a)	3	2.3
Hyperhomocysteinemia	3	2.3
Protein C deficiency	3	2.3
Structural aortic disease	6	4.6



DISCUSSION

Etiology of myocardial infarction (MI) in young and old males of the Tamil Nadu population. The distribution of age in MI patients. The highest number was 38 (29.2%) in the 41-50 years of age group, followed by 32 (24.6%) in 36-40 years of age group; above 50 (> 50) were 28 (21.5%) and least were 3 (2.3%) in 21-25 years of age (Table 1). In the grades of physical activities the highest number was 46 (35.5%) grade-II, followed by 46 (33%) in grade-III, and 15 (11.5%) were grade-IV (Table 2). In the study of clinical manifestations, 113 (86.9%) had chest pain, followed by 63 (48.4%) perspiration, and the least was 3 (2.3%) syncope. In the study of signs – 55 (42.3%) had tachypnea, followed by 35 (26.9%) hypertensive and 20 (15.3%) tachycardia and elevation of jugular venous pressure, and the least was 8 (6.15%) cyanosis grade-I Killip class (Table 3).

The site of MI, ST segment, and lipoprotein level studies. The highest infarction was 69 (53.07%) in the anterior septal wall of ventricle anterior septal followed by 67 (51.5%) anterolateral, and least was 8 (6.1%) in the inferior + RV and inferior + posterior, 115 (88.4%) ST segment elevation (Table 4). Risk factors associated were 72 (55.38%) smoking, 49 (37.6%) alcoholism, 58 (44.6%) obesity, 37 (28.4%) family history of IHD, 72 (55.3%) LDL, 67 (51.5%) hypercholesterolemia (Table 5). These findings are more or less in agreement with previous studies.^[5,6,7]

It is interesting to note that coronary artery disease (CAD) affects the Indian population at the younger age as compared with the western population. The reasons might include unhealthy food habits; addictions such as tobacco smoking or tobacco chewing; and psychosocial stress, which are more prevalent in young adults of middle and lower socioeconomic classes, as 85% Indian society belongs to the middle and lower classes. The modified risk factors diabetes mellitus, smoking, and obesity lead to higher levels of cholesterol and cause atherosclerosis. Atherosclerotic process,^[8] begins at birth and significant lesions in coronary arteries may be present at the age of 40-50 years. The atherosclerotic process is programmed by external influences during intra uterine growth, for example mother's hypercholesterolemia. It is also reported that, environmental influences on genotype may the development of coronary artery disease in young adults.^[9]

Premature ischemic heart disease in the first degree relatives is recognized as an independent risk factor at the age of 40. Many proatherogenic genetic factors were discovered. E4 allele of the lipoprotein, E is an important risk factor for atherosclerosis and ischemic heart disease obesity doubles the risk of myocardial infarction in men and increases the risk in women 2.5 times.^[10]

Cocaine and amphetamine use is a factor associated with an increasing number of myocardial infarction by increasing sympathetic output and increase in coronary artery spasm and triggering coronary artery thrombosis spontaneous coronary artery thrombosis occurs secondary to imbalance between coagulation and fibrinolytic process.^[11] It is noted that, importance of many polymorphism of platelet receptors cyclophosphamide 1b and 11b/11 la). The patients with polymorphism have six times greater risk of coronary artery thrombosis.^[12]

CONCLUSION

The present study of the etiology of MI in young and old males in Tamil Nadu. The prevalence of MI is quite common in young adults between the ages of 36-40 and 41-50 than in old-age males. The coronary artery diseases have multifactorial etiologies. The present study demands further pathophysiological, immunological, nutritional, and and angiological studies because the exact mechanism and factors of embolism and infarction is still unclear.

Limitation of study: Owing to remote location of research centre, small number of patients, lack of latest techniques, we have limited findings and results.

- This research work was approved by the ethical committee of Arunai Medical College hospital Thiruvananthali, Tamil Nadu-606603.
- No Conflict of Interest
- Self Funding

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