



# Study of pattern of acute myocardial infarction in tertiary care hospital of Ahmedabad, Gujarat

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## Abstract

**Background:** Myocardial infarction is one of the most common causes of death in adult and elderly people.

**Aim and objectives:** To study age and sex wise incidence, various risk factors, involvement of anatomical site and mortality in cases of acute myocardial infarction.

**Material and Methods:** The present study included 100 cases of acute myocardial infarction admitted in the intensive coronary care unit of tertiary care hospital, Ahmedabad. Patients with classical ECG changes of hyper-acute or acute MI with transient rise in cardiac enzyme levels and presence of pathological q waves accompanied by elevation of ST segment and symmetrical inversion of T waves with rise in cardiac enzyme levels were included.

**Results:** Maximum MI cases occurred in sixth decade and more common in male. Smoking was the most common risk factor and anterior wall MI was most common. Maximum mortality was found in MI involving anterior wall, inferior wall and right ventricle all together.

**Conclusion:** Study of pattern of myocardial infarction, age and sex wise incidence, risk factors, anatomical site and mortality in cases of myocardial infarction is very useful for the treatment and prevention purposes.

## Key words

Myocardial infarction, Gujarat, Risk factors.

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## Introduction

Human life has undergone a tremendous change from the days of the golden era to a life of

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exclusive luxury in today's age of computers and internet. Technology has made human life very easier to live, compared to struggle faced by our ancestors. However, in spite of comparatively sedentary existence, we today have our own unique stresses and strains. Statistics have shown that over 9,50,000 deaths occur annually due to cardiac causes all over world. Myocardial infarction is one of the commonest causes of morbidity and mortality. India is undergoing very rapid health transition with increasing burden of coronary heart disease (CHD) [1]. Among adults over 20 years of age, the estimated prevalence of CHD is around 3-4% in rural areas and 8-10% in urban areas, representing a two-fold rise in rural areas and a six-fold rise in urban areas between the years 1960 and 2000 [2]. Every life has an end on one day [3] and death due to myocardial infarction is routine to hear among all. Inherent property of heart to beat rhythmically is impaired by numerous changes induced by myocardial infarction, which may lead to cardiac arrhythmias. It also adds significantly to the health care costs and the duration of stay in hospital.

### Material and methods

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The present study included 100 cases of acute myocardial infarction admitted in the intensive coronary care unit (I.C.C.U.) of tertiary care hospital, Ahmedabad irrespective of past history of ischemic heart diseases (IHD), age, sex etc. The criteria for inclusion were presence of classical ECG changes of hyper-acute or acute MI with transient rise in cardiac enzyme levels and presence of pathological q waves accompanied by elevation of ST segment and symmetrical inversion of T waves with rise in cardiac enzyme levels. A detailed history regarding the onset of the symptoms, duration, presence of risk factors, past history of IHD and family history of coronary artery diseases (CAD) was obtained. A

thorough physical examination of patients was done to assess the hemodynamic stability, congestive cardiac failure, and cardiogenic shock. All patients were put on continuous cardiac monitoring with serial ECG taken at regular intervals of 1, 2, 3, 6, 12, 24, 48 and 72 hours after admission and as and when necessary. Various investigations were done like complete blood count (CBC), random blood sugar (RBS), cardiac enzyme levels (CPK-MB, TROP-I) serum creatinine, BUN, serum electrolytes, Serum Cholesterol and X-ray chest (PA view). All the patients were kept in intensive cardiac care for varying periods ranging from 2 to 10 days as indicated and thereafter shifted in ward before discharge.

### Results

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In the present study, maximum MI cases (46%) occurred in Six<sup>th</sup> decade (51-60 years) as per **Table - 1**. MI was more common in males (76 cases) with a male to female ratio of 3.2:1 as per **Table - 2**. Smoking was the most significant risk factor (57 cases) in our study, followed by hypertension (36 cases), S. Cholesterol (32 cases), past history of IHD (26 cases), obesity (24 cases), family history of CAD (22 cases), DM (20 cases) and Alcohol (10 cases) as per **Table - 3**. Anterior wall MI (52 cases) was the most common MI in present study followed by inferior wall MI (25 cases) as per **Table - 4**. In present study, death occurred in 6 cases (6%), maximum with anterior wall + inferior wall + right ventricle (2 cases – 100%) and least (0%) with inferior wall and right ventricle MI as per **Table - 5**.

### Discussion

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The importance of coronary arteries was demonstrated by Chirac three centuries ago. William Harvey is honoured as the father of Cardiology because he described the coronary

circulation. First documented description of angina pectoris was given by William Heberden in 1768. In 1787, James Johnstone first authorised a death due to myocardial infarction, which was confirmed at autopsy. Ziegler, in 1879, described the pathological aspect of MI. Wilson, Wolters and Wood introduced electrocardiography in 1896. An early version of modern ECG was developed in 1901 by William Einthoven, who used a modified string galvanometer [4].

Patients with ischemic heart disease fall into two groups: patients with (1) stable angina secondary to chronic coronary artery disease (2) acute coronary syndromes (ACS). This is composed of patients with acute MI with ST-segment elevation on ECG (STEMI) and those with unstable angina (UA) and non-ST-segment elevation MI (NSTEMI) [5]. Myocardial infarction can be one of the causes of sudden death [6].

In present study, maximum age incidence of 46% was found in 6<sup>th</sup> decade of life, which was similar with that of study of Fluck [7] and M.S. Khan [8]. Young infarcts, i.e. below age of 40 years contribute 10% of cases. The youngest patient in the series was 28 years old, while the oldest was 78 years old. In present study males to female ratio was 3.2: 1. Julian [9] observed M: F ratio of 3.1: 1, while Hung I Yeh [10] noted ratio of 2.7: 1. Higher incidence in males is associated with increased prevalence of risk factors such as tobacco chewing, smoking, alcoholism etc.

Smoking increases the risk of CAD. This is been attributed to atherosclerotic process induced by the increased level of carboxyhemoglobin, by increasing adhesiveness of platelets, and by decreasing high density lipoprotein (HDL) cholesterol. Hypertension accelerates development of atherosclerosis and is a risk factor for CAD. Diabetes Mellitus (DM) may cause microangiopathies in small coronary

vessels [11, 12] and hyper insulinemia may promote the development of atherosclerosis by stimulating the proliferation and migration of arterial smooth muscle cells. The rate of CAD is linearly related to increasing fasting levels of triglycerides and cholesterol.

It has been noted by various researchers and in the present study as per **Table - 6**, that there is a direct correlation between the risk factors and the rate of complications. This may suggest that avoidance or modification of all or possible risk factors would help in reducing the risk of infarction and its complications. Imperial [13] and M.S. Khan [8] also observed higher incidence of anterior wall MI (53% and 76% respectively) as per **Table - 7**.

Incidence of mortality in present study was 6%. It is similar to that observed by Guidry UC [14]. The decreasing rate in mortality is attributed to greater use of thrombolytics, aspirin and  $\beta$  blockers. Also widespread application of continuous cardiac monitoring enables us to identify and treat life threatening arrhythmias in time. Out of total 6 deaths, 2 occurred with anterior wall MI out of 52 patients (3.8%) while 1 death occurred with inferior wall MI out of 25 patients (4.0%). Mortality was 100% with global MI as per **Table - 8**.

## Conclusion

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MI is more common in 5<sup>th</sup> decade (41-50 years) and 6<sup>th</sup> decade (51-60 years), while least in 3<sup>rd</sup> decade (21-30 years). Males are more prone to MI than females (ratio 3.2:1). Risk factors in the order of the percentage incidence are: smoking (57%), Hypertension (36%), P/H of IHD (26%), F/H of CAD (22%), obesity (24%), Diabetes Mellitus (20%). Incidence of AW (52%) and associated MI (6%) is more common than IW (25%). 2% patients have AW with IW with RV myocardial infarction. Compared to overall mortality of 6%,



global MI carried the risk of mortality of 100%. AW and IW MI individually has mortality rate of about 4%, but patients with combined AW + IW MI have mortality of 17%.

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**Table – 1:** Age incidence in acute myocardial infarction.

Age (Years)	No. of Cases	Percentage (%)
20-30	3	3
31-40	7	7
41-50	36	36
51-60	46	46
61-70	4	4
Above 70	4	4

**Table – 2:** Sex incidence in acute myocardial infarction.

Sex	No. of Cases	Percentage (%)
Male	76	76
Female	24	24

**Table – 3:** Various risk factors in acute myocardial infarction.

Risk factors	No. of Cases
Smoking	57
Hypertension	36
Serum cholesterol (>250 mg)	32
Past history of ischemic heart disease (IHD)	26
Obesity	24
Family history of coronary artery disease (CAD)	22
Diabetes mellitus	20

Tobacco chewing	17
Alcohol	10

**Table – 4:** Incidence of anatomic sites of acute myocardial infarction.

Anatomic site	No. of Cases	Percentage (%)
Anterior wall	52	52
Inferior wall	25	25
Inferior wall + Right ventricle	15	15
Anterior wall + Inferior wall	6	6
Anterior wall + Inferior wall + Right ventricle	2	2

**Table – 5:** Overall mortality and its relation to anatomic site of myocardial infarction.

Anatomical site	Total Cases	Cases expired	Mortality (%)
Anterior wall	52	2	3.8
Inferior wall	25	1	4.0
IW + RV	15	0	0
AW + IW	6	1	16.7
AW + IW + RV	2	2	100.00
Total	100	6	6.0

**Table – 6:** Incidence of risk factors as observed in various studies.

Studies	Smoking (%)	Hypertension (%)	Diabetes mellitus (%)	S. cholesterol (%)	Obesity (%)
Annika [15]	52	-	-	-	23
M.S. Khan [8]	-	47	-	-	-
Rajeev Gupta [16]	-	33	21	50	-
Present Study	57	36	20	32	24

**Table – 7:** Anatomical sites of myocardial infarction as observed by various studies.

Anatomic site	Imperial [13] (%)	M.S. Khan [8] (%)	Present study (%)
Anterior wall	53	76	52
Inferior wall	32	22	25
I/W + RV	-	-	15
A/W + I/W	8	-	6
A/W + I/W + RV	-	-	2

**Table – 8:** Mortality as reported in various studies in myocardial infarction.

Studies	Mortality (%)
V. Krishnaswami [17]	12.35
H.T. Mukhtar [18]	9.80
Guidry UC [14]	6.00
Present study	6.00