Study of Clinical Profile of Myocardial Infarction in Indian Rural Women

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Abstract

Introduction: Prevalence of coronary heart disease (CHD) is rising at rapid pace among urban as well as rural population in India due to rise in prevalence of major cardiovascular risk factors. An important change in risk factor pattern is more rapid rise in risk factors for CHD among rural and slum population in comparison with urban population in India. Present hospital based study was conducted to evaluate the clinical profile, presentation, risk factors and lipid profile of patients with AMI from rural area.

In this observational study, 40 patients with definite evidence of acute myocardial infarction (AMI) were studied with reference to clinical profile and risk factors. In detail medical, personal, family and past history was explored and socio-demographic data was recorded. After complete physical examination and ECG, blood samples were collected for biochemical assays.

Results: Out of 40 patients female Inferior and anterior wall infarcts were more common. Rhythm disturbances and left ventricular failure (LVF) were the most common complication.

Our study findings suggest clustering of multiple traditional risk factors. There was clustering of multiple traditional risk factors like smoking, hypertension, dyslipidemia, diabetes and advanced age.

Keywords: Acute myocardial infarction, rural India, dyslipidemia, hypertension, clinical profile.

Introduction

The mortality from coronary artery disease is increasing rapidly in developing countries like India. It is estimated that mortality from cardiovascular diseases in developing countries has doubled from 1970 to 2015. In India alone there had been 1.2 million deaths from coronary heart disease in 1990 and an increase in cardiovascular deaths by 11.1% is predicted by 2020. Multiple risk factors are implicated for this rise, ranging from cigarette smoking, hypertension, diabetes mellitus, and obesity to various psychosocial stresses imposed by social dynamics and urbanization [1].

Acute Myocardial Infarction (MI) is said to have occurred when there is biochemical evidence of

myonecrosis in a patient with chest pain suggestive of coronary ischemia for prolonged period (>30 min). They are classified as ST segment elevation MI and non-ST-segment elevation MI[2]. ST segment elevation MI (STEMI) represents the most lethal form of myocardial insult. The thrombus results in total cessation of coronary blood flow in the territory of occluded artery that leads to ST segment elevation on the ECG.

The rising incidence of ACS in Indians may be related to the changes in the lifestyle, the westernization of the food practices, the increasing prevalence of diabetes mellitus and probably genetic factors. CREATE registry, the largest data from Indian patients with ACS, has shown that the pattern of ACS among Indians is much different from that of the Western populations [3].

Diagnosis and management of AMI in females present a unique challenge for physicians. Apart from its less prevalence and incidence, previous studies on AMI in Western populations have shown that women have a different risk factor profile, more atypical presentations and a different pathophysiology compared to men[4]. Hence in the present study an attempt is made to study the risk factors and clinical profile of myocardial infarction in Indian rural women.

An important change in the risk factor pattern is a more rapid rise in risk factors for CHD among rural and slum population in comparison with urban population in India. Several surveys have been conducted on CVD across India, but most of them reported clinical picture, risk factors and outcome among urban population.[5,6] There is scarcity of literature about clinical profile of AMI and associated risk factors among rural region of India. Hence present hospital based study was conducted to evaluate the clinical profile, presentation, risk factors and lipid profile of patients with AMI from rural area. Also we aimed to study the ratio of serum total cholesterol to high-density lipoprotein (TC/HDL-C) among the cases of AMI.

Background

Cardiovascular Diseases

Over past two centuries, the industrial and technological revolutions and their associated economic and social transformations have resulted in dramatic shifts in the diseases responsible for human illness and death [7].

Cardiovascular disease has emerged as the dominant chronic disease in many parts of the world and early in the 21st century it has become the main cause of disability and death worldwide[7].

In the beginning of 20th century CVD accounted for less than 10% of all overall death worldwide. At beginning of 21st century, CVD accounts for nearly half of all death in developed world and 25 % in the developing world[8]. In India, though there is no accurate country wise data on cause specific mortality rate and no registry for CVD death, it is assumed that CVD accounts for 24 % of total deaths by 2020. It is predicted that CVD will claim 25 million lives annually and coronary heart disease will surpass infectious disease as the world's number one cause of death and disability. This shift in the diseases that account for the lion's share of mortality and morbidity is known as epidemiological transition[9].

Ischemic Heart Diseases

IHD is the generic designation for a group of closely related syndromes resulting from myocardial ischemia—an imbalance between the supply and demand of the heart for oxygenated blood. In more than 90% of cases, the cause of myocardial ischemia is

the reduction in coronary blood flow due to atherosclerotic coronary arterial obstruction[9]. Thus, IHD is often termed coronary artery disease (CAD). In most cases ,there is long period of silent, slowly progressive, coronary atherosclerosis before these disorders become manifest .Thus ,the syndromes of IHD are only late manifestations of coronary atherosclerosis that probably began during adolescence. The clinical manifestations of IHD can be divided into 4 syndromes[9]

Acute Myocardial Infarction

Acute myocardial infarction is said to have occurred when there is biochemical evidence of myonecrosis in a patient with chest pain suggestive of coronary ischeamia for prolonged period (>30 min). They are classified as ST segment elevation MI and non-ST-segment elevation MI.[10]

NSTEMI: It represents a clinical condition presenting very similarly to unstable angina but with evidence of myonecrosis by some form of cardiac markers without ST segment elevation on ECG. Patients presenting with NSTEMI have an intermediate risk of acute complications when compared to unstable angina (low risk) and STEMI (high risk).

Scope Of The Problem In Women[11]

Mentioned that, cardiovascular disease is the leading cause of death among women, regardless of race or ethnicity, accounting for deaths of 1 in 3 women[12]. Mentioned that, experts in industrialized societies have long recognized that the first presentation with coronary heart disease occurs approximately 10 years later among women than among men, and most commonly after menopause[13]. Mentioned that, the worldwide interheart study, a large study of more than 52,000 individuals with MI, first demonstrated that this approximate 8- to 10-year difference in age at onset holds widely around the world, across various socioeconomic, climatic, and cultural environments.

Sudden cardiac death (SCD)

Among patients who have had an MI and are followed for about four years, approximately one-half of sudden deaths occur in the first year and one-quarter in the first three months[14,15].The risk is markedly increased in patients with a left ventricular ejection fraction ≤35 percent.

Material and Methods

Study duration: 18 months

Study Area: Department of Medicine, at a tertiary care hospital in rural area.

Study Population: Patients with confirmed diagnosis of myocardial infarction who signed the informed consent form before study.

Sample Size Calculation: Consecutive type of non-probability sampling was used for the selection of study subjects. A total of 40 diagnosed patients of myocardial infarction coming to our hospital and giving informed consent were included in the study.

Present observational study included all consecutive incident AMI patients admitted to intensive coronary care unit of SAIMS Hospital Indore. In detail medical, personal, family and past history was explored and socio-demographic data was recorded. After complete physical examination and ECG, blood samples were collected for biochemical assays. Biochemical investigations included serum creatinine phosphokinase-MB, blood sugar, serum total cholesterol; LDL, HDL, TG, serum bilirubin, Alanine and Aspartate transaminase. Patients on lipid lowering drugs, presented only with angina, cardiogenic shock,

and other significant major illness and pregnancy were excluded from the study.

Myocardial infarction was diagnosed upon the basis of:

Cardiac chest pain: It is deep and visceral. Adjectives commonly used to describe it are heavy, squeezing and crushing, although occasionally it is described as stabbing or burning.

Electrocardiographic changes: Electrocardiogram is sensitive for detecting myocardial infarction. ECG criteria for diagnosis of ST segment elevation myocardial infarction are presence of any of the following:

- New or presumably new ST-segment elevation
- ST- elevation of at least 0.1 mv in two or more extremity leads.
- ST- elevation of at least 0.2 mv in two or more precordial leads.

Serum cardiac biomarkers: Diagnostic rise in CPK-MB level/ Trop t (qualitative).

Result

Table 1: Distribution of study cases with respect to age distribution

Age group (yrs)	N	%
</= 40	1	2.5%
41-50	4	10.0%
51-60	9	22.5%
61-70	11	27.5%
> 70	15	37.5%
Total	40	100.0%
Mean age - 63.32 +/- 9.16 years		

Mean age of the study cases 63.3 years with over a third of the cases (37.5%) were over 70 years of age.

Table 2: Distribution of study cases with respect to menstrual status

Menstrual Status	N	%
Pre-menopausal	3	7.5%
Post-menopausal	37	92.5%
Total	40	100.0%

Out of 40 patients, 7.5% of females were premenopausal while 92.5% females were post-menopausal.

Table 3: Distribution of study cases with respect to risk factors

Risk Factors	N	%
Hypertension	29	72.5%
DM	14	35.0%
Dyslipidaemia	16	40.0%
OCPs	2	5.0%
Obesity	9	22.5%

Hypertension was present in 72.5% of patients, which was the most observed risk factor, while Diabetes Mellitus, Dyslipidemia, Oral Contraceptive Pills and obesity (>30kg/m2), Were observed in 35%, 40%, 5% and 22.5% of patients respectively.

Table 4: Distribution of study cases with respect to physical examination

Physical Examination	N	%
Locomotor Brachialis	8	20.0%
Arcus Senilis	6	15.0%
Xanthelasma	3	7.5%
Gallop	3	7.5%
JVP raised	19	47.5%
Crepitation	20	50.0%
Bilateral Pedal edema	10	25.0%

Out of 40 MI patients, JVP was raised in 47.5%, crepitations were observed in the 50%, while bilateral pedal edema and gallop were observed in the 25% and

7.5% of the patients respectively. Locomotor brachialis, arcus senilis and xanthelasma were observed in 20%, 15% and 7.5% of the patients respectively.

Table 5: Distribution of study cases with respect to vital signs.

Vital Signs	N	%
Tachycardia	7	17.5%
Bradycardia	3	7.5%
Hypertension	28	70.0%
Hypotension	4	10.0%
Tachyapnea	9	22.5%

Out of 40 MI patients, 17.5% had tachycardia, 7.5% had bradycardia, 10% had hypotension and 70% were having hypertension. Respiratory rate was more than 22 in 22.5% cases.

Table 6: Distribution of study cases with respect to ECG changes

ECG Changes	N	%
Absent P- wave	4	10.0%
Irregular RR interval	8	20.0%
ST elevation	40	100.0%
T wave changes	40	100.0%
SVT	1	2.5%
Atrial Fibrillation	4	10.0%
VPCs	7	17.5%
LBBB	1	2.5%

All patients had ST-elevation myocardial infarction (100%), while all patients had primary or secondary T wave changes (100%). Absent P wave and Irregular R-R interval was seen in 10% and 20% of patients respectively. Arrhythmias seen were atrial fib. (10%), Ventricular Premature Contractions (17.5%), Left Bundle Branch Block (2.5%) and supraventricular tachycardia (2.5%).

Table 7: Distribution of study cases with respect to associated complications

Complications	N	%
Cardiogenic Shock	4	10.0%
Pulmonary edema	3	7.5%
Atrial fibrillation	4	10.0%
CCF	18	45.0%
Ventral Tachycardia	3	7.5%
Ventricular Fibrillation	2	5.0%

Out of 40 MI cases, complications observed were congestive cardiac failure, cardiogenic shock, pulmonary edema and atrial fibrillation in 45%, 10%, 7.5% and 10% of patients. Ventricular tachycardia developed in the 7.5% of the patients and ventricular fibrillation in 5% MI patients.

Table 8: Distribution of study cases with respect to final outcome

Outcome	N	%
Alive	32	80.0%
Dead	8	20.0%
Total	40	100.0%

Mortality rate was 20% among study group.

Discussion

Present research aimed to study the clinical profile and risk factors of myocardial infarction in Indian rural women. A total of 40 consecutive diagnosed patients of myocardial infarction coming to our hospital and giving informed consent were included in the study. A detailed history with special reference to the cardiovascular system was taken. A thorough physical examination was done with emphasis on the cardiovascular system followed by relevant investigations.

Demography

Mean age of the study cases in present study was 63.3 years with over a third of the cases (37.5%) were over 70 years of age[16]. Conducted the study on 10,387 females with STEMI and found that the maximum 41.7% of females were above 69 yrs of age, while the minimum 12.8% females were of the age of 18 to 49 yrs of age. While 23.6% and 21.9% of females were within the age group of 50 to 59 yrs and 60 to 69 yrs of age respectively.

Obstetric history

Out of 40 patients in present study, 7.5% of females were premenopausal while 92.5% females were post-menopausal[17]. Also observed that, acute myocardial infarction was more common in menopausal women (90.7%).

Risk factors

In present study, Hypertension was present in 72.5% of patients, which was the most observed risk factor, while Diabetes Mellitus, Dyslipidemia, Oral Contraceptive Pills and obesity (>30kg/m2), Were observed in 35%, 40%, 5% and 22.5% of patients respectively.

ECG Findings

Anterior wall infarction were present in 47.5%, Inferior wall infarction were present in 40%, While inferolateral wall and lateral wall infarction were observed in 10% and 2.5% of MI females. All patients on admission had ST-elevation myocardial infarction (100%), while all patients had primary or secondary T wave changes (100%). Absent P wave and Irregular R-R interval was seen in 10% and 20% of patients respectively. Arrhythmias seen were atrial fibrillation (10%), Ventricular Premature Contractions (17.5%), Left Bundle Branch Block (2.5%) and supraventricular tachycardia (2.5%). In our study left bundle branch block were observed in 2.5% of women at the time of admission[18]. In their study with sample size of 2,033 patients observed that, 5.9% of STEMI women presented with left bundle branch block on admission.

Management & Outcome

Thrombolysis was done in 87.5% cases while in 5 cases, thrombolysis was contra-indicated due to late presentation. Mortality rate was 20% among study group. Mortality was 60% in cases where thrombolysis was not done while it was 14.3% in cases where thrombolysis was done[19]. Mentioned that, females with STEMI who does not received thrombolysis therapy had higher mortality rate than who received thrombolytic therapy.

Conclusion

Present study concludes that myocardial infarction in Indian rural women increases with the advancing age. Common risk factors include hypertension, dyslipidemia, diabetes mellitus, obesity and OC pills. Commonest presentation is by left sided chest pain with pressure like character of pain associated with the dyspnea. Anterior wall myocardial infarction was the common site of infarction with CCF being the commonest complication and the cause of death.

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