

Original Research Article

# Angiographic profile of female patients having myocardial infarction aged less than 65 years in eastern India

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## Abstract

**Background:** Coronary artery disease (CAD) in women worldwide causes a third of all deaths annually. Women have a higher proportion of CAD deaths than men in low- and middle-income countries. After age change and other risk factors, the total short-term and long-term mortality following a MI is around 40 percent higher in women. A cost-effective preventive policy to concentrate on reducing risk factors in developing countries such as ours and to avoid the ruthless attack of CAD.

**Aims:** To define the clinical profile of women (less than 65 years presenting with acute myocardial infarction) with CAD in terms of risk factors, clinical presentation, biochemical parameters e.g. glycemic and lipid profile and angiographic characteristics in terms of number and severity vessel involvement in our tertiary care centre.

**Materials and methods :** A total 50 female patients of aged below 65 years presenting acute myocardial infarction with complications at Heart failure, Arrhythmias, Shock, MR or VSD and NYHA class at outset were included in study their Physical Examination and Cardiovascular system examination.

**Results:** Among 50 consecutive female patients highest incidence of AMI was found in the 50-59 years age group and mean age was just below 55 years. 22 (44%) patients were in the 50-59 age groups. Typical symptoms were commonly seen, atypical presentation (in the form of shoulder pain,

breathlessness, vomiting, chest pain etc.) was also seen in 30% of the study subjects. 57% of subjects had hypertension and 58% have type 2 diabetes mellitus. More than 70% of the subjects were menopausal and 70% of the subjects have no previous history of CAD. Right coronary dominance was seen in 76% of the subjects. We have shown 82% involvement and did not have any complications which were common in other studies in elderly women.

**Conclusion:** As seen by the higher prevalence of obstructive CAD in the elderly population, the atherosclerotic burden is greater in older than younger women. In order to avoid catastrophic cardiovascular events, it is important to recognise atherosclerotic risk factors in these women and treat them.

## Key words

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Coronary artery disease, M mode Echocardiography, Coronary Angiography.

## Introduction

Coronary artery disease (CAD) causes 8.6 million female deaths per year, a third of all female deaths worldwide. Women have a higher proportion of CAD deaths in low and middle income countries than men [1]. Most of the CAD studies are focused on the male population and it is an unresolved question if we can impose the same recommendations on female counterparts [2]. In recent years, the Women's Ischemia Syndrome Evaluation Study (WISE) and other new studies have produced new data on sex disparities. In their presenting signs, access to study, care, and overall prognosis, women and men with cardiac disease appear to differ [3]. Women have more atypical symptoms than men, making it more challenging to diagnose and risk factors for CAD vary between men and women [4]. Women with CAD tend to develop the disease around 10 years later in life than men do but the effects are worse.

When women suffer from myocardial infarction (MI), they have a poorer prognosis. The one-year mortality following MI was 44 percent in women vs. 27 percent in men in the Framingham Heart Report. In women, the total short-term and long-term mortality after a MI is around 40 percent higher after age change and other risk factors.

Women make up 48 percent of the total population, 4 a cost-effective preventive strategy to concentrate on reducing risk factors in developing countries like us and to avoid the

brutal attack of CVD. The present study is to define the clinical profile of women with CAD in terms of risk factors, clinical presentation and angiographic characteristics in terms of number and severity vessel involvement in our tertiary care centre.

## Materials and methods

We evaluated through cross sectional observational study of 50 consecutive effort female patients aged below 65 years for a period of 6 months at tertiary care center with acute myocardial infarction admitted in cardiology ward or ICCU of Medical College and Hospital, Kolkata. We excluded the valvular heart disease patients, patients having neoplasm, retroviral disease, patients presenting for second time, patients with pericarditis, inflammatory, malignant pericardial effusion, CKD, liver disease, anaemia and chronic obstructive lung disease from our study. Age, sex, risk factors for coronary artery disease was obtained as data from the details entered at the time of diagnoses.

Patients were thoroughly investigated regarding their clinical background, risk profile, biochemical parameters, echocardiographic and electrocardiographical profile, in-hospital morbidities, angiographic profile in respective department of our institution by the same investigator using the same setup in each patients. After that, these parameters were tabulated and descriptive statistical analysis was done.

Clinical Parameters gives patient characteristics (Age, sex, body weight and BMI, Past history of MI, angina pectoris, heart failure, stroke or any vascular events), risk profile (Smoking, form and number of cigarettes per day, pack years and duration, consumption of alcohol, Family history of CAD, duration, medications and complications for diabetes, hypertension and Lipidopathy), complication at outset (Heart failure, Arrhythmias, Shock, MR or VSD and NYHA class), physical examination (general survey and systemic examinations) and Cardiovascular system examination. The Radiological parameters provide Electrocardiography, Echocardiography and Coronary angiography report.

### Electrocardiography

STEMI was diagnosed using ACC/AHA 2013 for the management of STEMI guidelines. Both in the setting of absence of LBBB and in the presence of LBBB.

New ST elevation at the J point in two contiguous leads with the following cut points:

- $\geq 0.1$  mV in all leads (except V2-V3)
- In leads V2-V3 the following cut points apply:
  - $\geq 0.2$  mV in men  $\geq 40$  years
  - $\geq 0.25$  mV in men  $< 40$  years
  - $\geq 0.15$  mV in women

In the setting of LBBB as

- ST segment elevation  $> 1$ mm and concordant with the QRS complex
- ST segment depression  $> 1$ mm in lead V1, V2, or V3
- ST segment elevation  $> 5$ mm and discordant with the QRS complex.

### Echocardiography

Echocardiography was done with GE VIVID 7, using standard regional wall motion estimation using 17 segment models, as per ACC guidelines.

**Coronary Angiography** (GE Healthcare VIVID 7 Dimension Echocardiography machine, BPL CARDIART 108T-DIGI ECG machine and

Siemens axiom senses XP Angiography machine were used to perform the study) – Coronary angiography was done in all patients through femoral approach, using left and right Judkin's diagnostic catheter. In Siemens's machine, significance of the stenosis was considered as used in ACC/AHA STEMI GUIDELINES 2013, Single vessel disease means the presence of  $\geq 50\%$  diameter luminal narrowing in one of the three major epicardial vessel system. Double-vessel diseases mean the presence of  $\geq 50\%$  diameter luminal narrowing in two of the three major epicardial vessel systems. Triple-vessel disease was defined as the presence of  $\geq 50\%$  diameter luminal narrowing in all three major epicardial vessel systems or in the left anterior descending and proximal circumflex arteries in patients with non-dominant right coronary arteries.

Data collection preformed through pre structured checklist, laboratory/investigation reports and BHT/OPD ticket were used as routine study tools.

### Results

A total of 50 consecutive female patients were enrolled in this study.

Age was divided in three age groups reveals most of the patients (44%) in the 50-59 age group which was quite early. Regarding the presenting symptoms, 28% of the patients presented with atypical symptoms like atypical chest pain, vomiting, dyspnea, etc. Only 26% of the patients presented within 12 hours of symptom onset. The mean duration after symptom onset was more than 25.4 hours (**Table – 1**).

Regarding the traditional risk factors for ischemic heart disease in the study population, hypertension was the most common (68%). The next one was diabetes mellitus. Dyslipidemia and tobacco chewing were also present in  $> 50\%$  of them. 74% of the study participants were menopausal (**Table – 2**).

**Table - 1:** Incidence of myocardial infraction in association variables.

Variable	No. of patients	Percentages
40-49	14	29
50-59	23	46
60-65	13	26
Total	50	
<b>Presentation</b>		
Typical	36	72%
Atypical	14	28%
<b>Time</b>		
Within 12 hours	13	26%
After 12 hours	37	74%
Mean	25.4 hours	-

**Table - 2:** Ischemic Heart Disease Risk factor profile.

Risk factor	No. of patients	Percentages
Hypertension	34	68
Diabetes Mellitus	30	60
Dyslipidemia	28	56
Tobacco Chewing	25	50
Obesity	24	48
Dyslipidemia		
<b>Menopausal status</b>		
Premenopausal	13	26%
Postmenopausal	37	74%

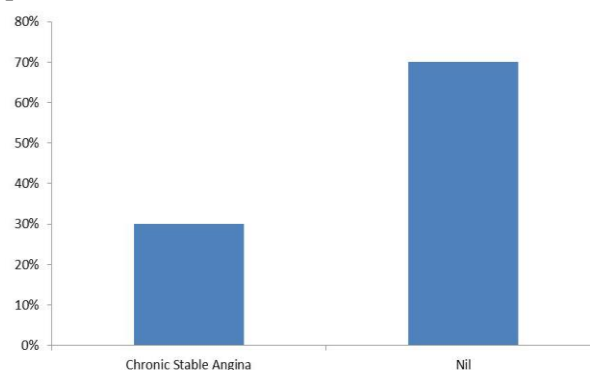
Taking detailed history revealed that 70% of the patients had nothing significant. Regarding others, chronic stable angina was also quite common (**Figure – 1**).

After performing the relevant investigations, more than 50% of them had anterior wall infarct, followed by inferior wall (40%) and lateral wall (**Figure – 2**).

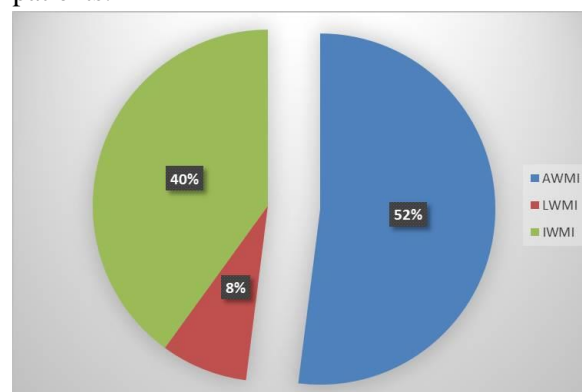
Coronary angiogram of the study subjects had shown right coronary dominance in 76% of the subjects while left coronary dominance was seen in the rest. In terms of the number of the diseased coronary artery(ies), single vessel disease was

the most common (48%). Among the large coronary arteries, LAD was the most commonly involved (**Table – 3**).

**Figure - 1:** Previous History of angina in patients.



**Figure - 2:** Diagnosis of myocardial infraction in patients.



**Table - 3:** Vessels diseased in patients in study.

Side of vessels involved	No. of patients	Percentage
Left	12	24%
Right	38	76%
<b>Number of vessels involved</b>		
Single	24	48%
Double	9	18%
Triple	17	34%
<b>Coronary Artery involved</b>		
LAD	42	84%
RCA	25	50%
LCX	24	48%

## Discussion

In our study, 50 consecutive female patients presenting with AMI and below 65 years of age

were taken as a sample. Among them in the 50-59 age group, the highest incidence of AMI was found and the average age was just under 55 years. The mean age of NCEP ATP III was 55 years and the Health Survey of Nurses revealed 60 years as the mean age of MI presentation. Sharma, et al. [10] has shown 62 years as the mean age in a sample from North India, Sahni, et al. [9] and from South India. Shree Ranga PC, et al. [11] showed 50-60 years as the most common age group in another study from South India.

In terms of presentation, while normal symptoms were usually seen in 28 percent of the study participants, atypical presentation (in the form of shoulder pain, breathlessness, vomiting, etc.) was also seen. A research by Mikhail has shown that atypical presentations are very normal in women with CAD [4]. The key presenting symptom was chest pain in a study from South India by Shruti, et al. [12] and by Sahni, et al. from North India [9].

Regarding the traditional risk factors, hypertension (68%) was the commonest. Sree Ranga PC, et al. [11] has shown similar findings in South India. Sahni, et al. has shown 30% from North India [9]. In Framingham Heart Study has shown 22% of subjects and in WISE phase 1 study, 57% of subjects had hypertension which is similar to us [13].

Type 2 diabetes mellitus was the next significant risk factor. It has been shown by Rout, et al. [14] that 25.4% of subjects have diabetes. 23.75% from North India was shown by Sahni, et al. [9] and 54 percent in our study. In 50 percent of the sample population, another study by Shruti, et al. has shown diabetes [12]. In our study, type 2 diabetes mellitus was present in 58 percent of the subjects and 4 percent of them had reduced glucose tolerance more than the Palestinian population with similar dietary habits. In 60 percent of women with IHD, one study from South India has shown diabetes.

Hypertriglyceridemia was found to be the most common dyslipidemia after examining the lipid

profile. LDL-C was on the higher side, however in the Framingham Heart Report. A research by Sahni, et al. from North India showed 66 percent dyslipidemia with low HDL-C and high LDL-C values and higher TG and low LDL-C values by Bettgowda from South India, which is close to our study [9]. High TG level increases the proportion of more atherogenic small dense LDL particles thus conferring CVD risk. Similar findings were seen from South India [12].

In our study, none of the study participants were smokers. Same as of South Indian population by Shruti, et al. [12] and also Palestinian women. 30% and 20% in Framingham and WISE respectively similar to north Indian population as study by Sahni, et al. showed 32.5% to be smokers. [9] But tobacco chewing was found in more than 50% in our study. There is not much data regarding chewing form of tobacco. As smoking is a major risk factor for CAD.

Obesity was found in 48% of our study subjects. It is commonly associated with insulin resistance and metabolic syndrome which are the emerging risk factors. Dave, et al. found in 58.3% patients with angiographic CAD had obesity [15]. Memon and Samad [16] found 10% and Oomman, et al. [17] found that 41% of women with CAD were obese so prevalence of obesity was variable in different studies. Central/Abdominal obesity is generally regarded as a more important predictor of ischemic heart disease than generalized obesity.

In present study 74% of the subjects were menopausal and in 70% of the subjects, no previous history of CAD was found. Similar findings were found in a study done by Balakrishnan [18]. In premenopausal women endogenous estrogens provide protection from IHD. Additionally estrogens enhance elasticity of vessel wall, reduces hypertrophy of cells and has anti-inflammatory and antioxidant properties [19].

As only 26% of sample population presented in hospital within 12 hours thus eligible for



thrombolysis. The prehospital delay was significantly longer in this study when compared to the delay observed in other studies i.e., 170 min in European Heart Survey 1 (EHS), 145 min in EHS 2 and in GRACE registry in India 180-330 min. In CREATE registry median symptom to door time was 300 minutes. In the study by Praveen, et al., Jose and Gupta and Shahane, et al. [20]. The mean time from symptom onset to the emergency department presentation was 4.45 h,  $10.8 \pm 12.4$  and  $220 \pm 174.23$  min respectively. In another study by Malhotra, et al. [21] only 53% of patients with AMI presented within 6 h of symptoms onset while 30% patients had pre-hospital delay >12 hours.

The diagnosis of anterior wall myocardial infarction was the commonest. After performing coronary angiography, right coronary dominance was seen in 76% of the subjects. In terms of the number of vessels involved, single vessel disease was the commonest. All the affected arteries have shown significant lesion ( $\geq 50\%$ ). But Dave, et al. showed in Indian women that triple vessel disease was more common [15]. As in our study population single vessel disease was more common, chance of success of PTCA is also more.

Among the coronary arteries, in our study, LAD was the most frequently affected one (84 percent). In the WISE study, major LAD lesions were identified in 62 percent of women. Sharma, et al. [10]; Routh, et al. [14]; both reported that 85 percent, 46.2 percent, 71.8 percent of South Indian women were interested in LAD, North Indian women reported similar figures in women as in the South, reported by Kumar, et al. [9].

A retrospective examination of a relatively small number of patients from a single centre, research population consisted of AMI patients admitted to a tertiary care hospital was confined to the study, so it does not represent the entire spectrum of manifestations -clinical characteristics -level of understanding -treatment choices -morbidity or mortality. Finally, in the post discharge era, the study population was not extensively followed

up, so our research lacks adequate data on the prognosis of post discharge, morbidities, survival, events of the entire Eastern Indian population.

## Conclusion

Women are neglected victims of heart disease, so in countries such as India, it is important to slow the momentum of CVD and major interventions to combat CVD are needed. Younger patients (<65 years) who have demonstrated localized involvement (SVD) were included in our study.

CAD-affected women are of great concern; more research is required to understand how females are affected by this disease and how morbidity can arise in our population. To avoid cardiovascular avoidance, early education, active monitoring of risk factors, quick access to diagnosis and serious care need to be avoided.

As understood from the higher incidence of obstructive coronary artery disease in the elderly population, the atherosclerotic burden is greater in elderly people than in young women. The results underline the significance of multiple interventions to avoid adverse cardiovascular outcomes. To avoid devastating cardiovascular events, it is important to recognise atherosclerotic risk factors in these women and manage them more aggressively.

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