ORIGINAL RESEARCH ARTICLE

Clinical and Biochemical Profile of Female Patients Presenting with Acute Myocardial Infarction

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ABSTRACT

Introduction: Indian women are neglected victims of heart disease and grossly underrepresented in epidemiological studies. Coronary artery disease though considered as men's disease has worse outcomes in females. With changing lifestyles and genetic influence Indian women are affected by CAD earlier in their lives in recent times. Our aim was to study the clinical, biochemical and angiographic profile of females less than 65 years presenting with acute myocardial infarction.
Material and methods: This observational study was done in the Department of Cardiology of Medical College, Kolkata over last 1 year. Clinical, biochemical & angiographic profile of the women below 65 years of age presenting with acute myocardial infarction for the first time were determined. A total of 50 consecutive female patients were enrolled in the study after thorough check of the inclusion & exclusion criteria and obtaining consent.
Results: Thrombolysis was given to the eligible patients i.e. presenting within 12 hours of symptom onset. But majority of the patients presented quite late. The standard 12 lead ECG was done followed by 2D & M mode echocardiography. The average age of presentation was below 55 years suggesting involvement of younger women. The major risk factors of CAD e.g., hypertension, diabetes mellitus, dyslipidemia, obesity etc. were found to be quite common. The presenting symptoms were atypical also on few occasions. Regarding angiographic profile, single vessel disease was far more common compared to double vessel or triple vessel disease. Among the coronary arteries, LAD was most commonly affected.
Conclusion: Our study included younger patients (<65 years) who have shown localized involvement (SVD) while other studies have shown more diffuse involvement i.e. TVD(Triple vessel disease). As SVD(Single vessel disease) is more common, chance of successful and complete revascularization.

Keywords: Coronary Artery Disease, Triple Vessel Disease, Angiographic Profile

INTRODUCTION

Coronary artery disease (CAD) is leading cause of death and accounts for approximately 12 million deaths annually worldwide.[1] CAD causes 8.6 million deaths among women annually, a third of all deaths in women worldwide. Every year more women than men die of CAD. Women in low and middle income countries have worse situation than men, experiencing higher proportion of CAD deaths than men.[1] Women continue to be under represented in research on heart disease. Most of the studies conducted on CAD are based on male population and whether we should implement the same guidelines on women counterparts is an unanswered question.[2] Women's Ischemia Syndrome Evaluation Study (WISE) and other new studies in last few years have generated new data regarding sex difference in CAD. Women and men with heart disease tend to differ in their presenting symptoms, access to investigations, treatment and overall prognosis.[3] Women present with more atypical symptoms than men like back pain, shortness of breath, burning in the chest, nausea, or fatigue, which makes the diagnosis more difficult. Risk factors for CAD vary between males and females.[4] Women are more likely to have misleading, or "false positive" non-invasive tests for CAD than men. Women with CAD tend to develop the disease about 10 years later in life than men do, but the consequences are worse.

Persistent health inequalities are a worldwide problem. It is widely believed that CAD is a men's disease and women are the neglected victims of heart disease. Despite differences between the sexes in risk factors, presentation, and response to treatment, women in our country continue to receive similar treatments to men on the basis of trials that include mainly male participants. Women have worse prognosis when they suffer from myocardial infarction (MI). In the Framingham Heart Study, the one year mortality following MI was 44% in women versus 27% in men. The overall short

term and long term mortality following an MI are about 40% higher in women after adjustment for age and other risk factors. Women constitute 48% of the total population.[4] Very few studies have addressed this issue of CAD in women worldwide including India but negligible from eastern India. A cost-effective preventive strategy to focus on reducing risk factors and to stop the ruthless assault of CVD in developing countries like ours, there is an urgent need to represent the disease in the health agenda. The present study is to define the clinical profile of women with CAD in terms of risk factors, clinical presentation, biochemical parameters e.g. glycemic & lipid profile &angiographic characteristics in terms of number & severity vessel involvement in our tertiary care centre.

MATERIAL AND METHODS

It was a Cross sectional Observational study done for a period of one year in 50 female patients aged below 65 years presenting with acute myocardial infarction admitted in cardiology ward or ICCU of Medical College &Hospital, Kolkata. Written informed consent was obtained.

Inclusion Criteria: All Female patients aged below 65 years, presenting with acute myocardial infarction, admitted in cardiology ward or ICCU.

Exclusion Criteria: Female patients aged above 65years, Patients with valvular heart disease, with underlying neoplasm, retroviral disease, Patients presenting for second time Patients with pericarditis and inflammatory, malignant pericardial effusion, CKD, liver disease, anaemia, chronic obstructive lung diseases. Data collected was maintained in strict confidentiality with access to Principal Investigator

Definition of terms of the risk factors
Diabetes: Patients on oral hypoglycemic drugs, Insulin or those having fasting blood sugar > 126 g/dl were regarded as having diabetes mellitus according to ADA 2015 guidelines.

Hypertension: Those with blood pressure > 140 / 90 mmHg taken twice or those on antihypertensive drugs were defined as hypertensive as per criteria given in JNC 7.

Hyperlipidemia: A diagnosis of hyperlipidemia was made if total Cholesterol is > 160 mg/dl, Triglycerides > 150 mg/dl, and LDL > 130 mg/dl according to NCEP ATP III guidelines.

Obesity: Height, waist and hip circumference were measured in centimetres by using a non-stretchable standard tape with a metal buckle at one end over the light clothing. Waist circumference was measured in the centre of the iliac crest and the coastal margin, and hip circumference was measured at the widest point on buttocks below the iliac crest. Patients were divided in to non-obese and obese on the basis of body mass index (BMI). A BMI of 27.3 Kg/m2 or more in female indicates obesity. BMI was calculated using the Quetlet s formula (Body weight (Kg) /Height^2 (meters)).

Parameters studied were Age, sex, body weight and BMI, Past history of MI, angina pectoris, heart failure, stroke or any vascular events. Risk profile was noted as Smoking, form and number of cigarettes per day, pack years and duration,

Consumption of alcohol, Hypertension (its duration, medications), Diabetes(its duration, medications and complications), Lipidopathy (duration and medications) and family history of CAD (first degree relatives before the age of 65 yr in females 55 in males.

Complications at outset recorded were as Heart failure, Arrythmias, Shock, MR or VSDand NYHA class at outset. Physical examination was done and systemic examination was done in detail of Cardiovascular system examination.

Biochemical parameters investigated were TROPONIN-T and CPK-MB, Fasting blood sugar, post prandial blood sugar, HbA1C, Fasting lipid profile, Complete hemogram, Urea, creatinine

Radiological parameters noted were
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:
- ≥0.1 mV in all leads (except V2-V3)
- In leads V2-V3 the following cut points apply:
- ≥0.2 mV in men ≥40 years
- ≥0.25 mV in men <40 years
- ≥0.15 mV in women

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

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

Coronary angiography: Coronary angiography was done in all patients through femoral approach, using left and right Judkin's diagnostic catheter.in Siemen's machine, significance of the stenosis was considered as used in ACC/AHA Stemi Guidelines 2013, Single vessel disease means the presence of ≥50% diameter luminal narrowing in one of the three major epicardial vessel system. Double-vessel disease mean the presence of ≥50% diameter luminal narrowing in two of the three major epicardial vessel systems. Triple-vessel disease was defined as the presence of ≥50% diameter luminal narrowing in all three major epicardial vessel systems or in the left anterior descending and proximal circumflex arteries in patients with nondominant right coronary arteries.

After that, these parameters, were tabulated and descriptive statistical analysis was done.

RESULTS

A total of 50 consecutive female patients were enrolled in this study. Dividing them in three age groups reveals most of the patients (44%) in the 50-59 age group which is quite early (table-1).

Regarding the presenting symptoms, 30% of the patients presented with atypical symptoms like atypical chest pain,

Age interval	Number of patients	Percentages
40-49	15	30
50-59	22	44
60-65	13	26
Total	50	
Symptoms		
Typical	35	70%
Atypical	15	30%
Risk factors		
Hypertension	33	66
Diabetes Mellitus	29	58
Tobacco Chewing	26	52
Dyslipidemia	27	54
Obesity	25	50
Premenopausal	13	26%
Postmenopausal	37	74%
Chronic Stable Angina	15	30%
Nil	35	70%

Table-1: Demographic and risk factors associated in patients of present study

Presentation after Onset of Symptoms	Number of patients	Percentages
Within 12 hours	14	28%
After 12 hours	36	72%
Mean	25.2 hours	
Diagnosis		
AWMI	26	52%
LWMI	4	8%
IWMI	20	40%

Table-2: Onset of Symptoms and Diagnosis of patients

Glycemic Profile	Number of patients	Percentages
Impaired Glucose Tolerance	2	4%
Type 2 Diabetes Mellitus	29	58%
Type of dyslipidemia		
LDL-C>130mg/dl	5	10%
HDL-C< 40mg/dl	5	10%
TG>150 mg/dl	24	48%

Table-3: Biochemical parameters details

Dominance	Number of patients	Percentages
Left	12	24%
Right	38	76%
No. of diseased Coronary arteries		
Single	24	48%
Double	9	18%
Triple	17	34%

Table-4: Angiographic profile of patients in study
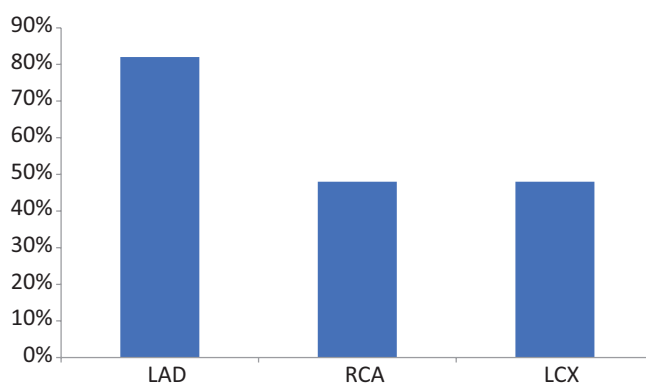

Figure-1: Specific Coronary Artery involved in patients

vomiting, dyspnea etc.

Regarding the traditional risk factors for ischemic heart disease in the study population, hypertension was the most common (66%). The next one was diabetes mellitus. Dyslipidemia& tobacco chewing were also present in >50% of them. More than 70% of the study participants were menopausal.

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

Only 28% of the patients presented within 12 hours of symptom onset. The mean duration after symptom onset was more than 25 hours.

After performing the relevant investigations, more than 50% of them had anterior wall infarct, followed by inferior wall (40%) & lateral wall (table-2).

Type 2 Diabetes mellitus was also found in 58% of the study participants & another 4% had impaired glucose tolerance which increase the risk of cardiovascular disease. Lipid profile of the study subjects revealed hypertriglyceridemia to be the commonest lipid abnormality (table-3).

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%) (table-4).

Among the large coronary arteries, LAD was the most commonly involved (figure-1).

DISCUSSION

In the present study 50 consecutive female patients presenting with AMI and below 65 years of age were recruited from our tertiary care centre in Eastern India. Among them highest incidence of AMI was found in the 50-59 years age group and the average age was just below 55 years. NCEP ATP III had shown mean age of women as 55 years & Nurses' Health study has shown 60 years[5] as mean age of presentation of MI. In a study from North India, Sahni et al[6] has shown 62 years as mean age of presentation. Sharma et al has shown similar mean age in STEMI patients in a study on South Indian population[82]. In another study from South India, Shree Ranga PC[47] et al has shown 50-60 years as the most common age group. But as per another study by Shruti Bettegowda,[84] 6th decade as also Framingham Heart Study. But in our study mean age was less than 55 years.

Regarding the presentation, though typical symptoms were commonly seen, atypical presentation (in the form of shoulder pain, breathlessness, vomiting etc. was also seen in 30% of the study subjects. A study by Mikhail has shown that atypical presentations are quite common in women with CAD.[4] In a study from South India by Shruti et al chest pain was the main presenting symptom. [7]Sahni et al has also shown typical chest pain as the commonest presenting symptom in their study from North India whereas atypical chest pain was seen only in 25% of cases.[6]

Regarding the traditional risk factors, hypertension was the commonest. Similar association was observed in other studies. Sree Ranga PC[8] et al has shown similar findings in a study on women in South India. Sahni et al has shown hypertension in 30% of the study participants in a study from north India.[6] In Framingham Heart Study, hypertension was seen in 22% of subjects & in WISE phase 1 study, 57% of subjects had hypertension which is similar to our study.

The next important risk factor was type 2 diabetes mellitus. Rout et al has shown that 25.4% of the subjects have diabetes.[9] In a study from North India Sahni et al has shown 23.75% of diabetes in study population. In our study, diabetes was found in 54% of the study population. Another study by Shruti et al has shown diabetes in 50% of the study population.[7] So it is more than Palestinian population having similar dietary habit., type 2 diabetes mellitus was present in 58% of the subjects & 4% of them had impaired glucose tolerance in our study. As mentioned earlier it is more dangerous in women compared to men. One study from South India has shown diabetes in 50% of women with IHD.

After analyzing the lipid profile, hypertriglyceridemia was found to be the commonest dyslipidemia which is shown by other studies like WISE. However in Framingham Heart Study, LDL-C was on the higher side. A study by Sahni et al from North India has shown 66% dyslipidemia with low HDL – C and high LDL-C values.[6] A study by Bettegowda from South India has shown higher TG & low LDL-C values which is similar to our study. High TG level increases the proportion of more atherogenic small dense LDL particles thus conferring CVD risk. Similar findings were seen in a study from South India.[7]

Smoking habit is quite less in women in India. In our study, none of the study participants were smokers. same as of south Indian population by Shruti et al and also palestenian 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. But tobacco chewing was found in more than 50% in our study. There is not much data regarding chewing form of tobacoo. As smoking is a major risk factor for CAD, quitting can be of greater benefit.

Obesity was found in 50% of our study subjects. It is commonly associated with insulin resistance & metabolic syndrome which are the emerging risk factors. Due to sedentary lifestyle, obesity is seen more now-a-days. Dave et al. found in 58.3% patients with angiographic CAD had obesity.[10] Memon and Samad found 10% and Oomman et al 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.[11,12]

More than 70% of the subjects were menopausal & in 70% of the subjects, no previous history of CAD was found. It shows the importance of screening esp. after menopause. Similar findings were found in a study done by Balakrishnan.[13]In premenopausal women endogenous estrogen provide protection from IHD. Additionally estrogen enhances elasticity of vessel wall, reduces hypertrophy of cells,and has anti-inflammatory and antioxidant properties.

Presentation to the hospital was quite late as only 28% of them presented within 12 hours thus eligible for thrombolysis. It may be due to lack of awareness. The prehospital delay was significantly longer in this study when comparedto the delay observed in other studies i.e., 170 min in EuropeanHeart Survey 1 (EHS), 145 min in EHS 2 and in GRACE registryin India 180-330 min. In CREATE registry median symptom to door time was 300 minutes. In the study by Shahaneet al.[14] the mean time from symptom onset to the emergency department presentation was 4.45 h, 10.8 ± 12.4 hand 220 ± 174.23 min respectively,. In another study by Malhotra et al.[15] only 53% of patients with AMI presented within 6 h of symptoms onset while 30% patients had pre-hospital delay >12 h.

The diagnosis of anterior wall myocardial infarction was the commonest. It matches with the pattern shown by many studies. Sree Ranga PC[8] et al in a South Indian study.

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 (≥50%). But Dave et al showed in Indian women that triple vessel disease was more common.[10] As in our study population single vessel disease was more common, chance of success of PTCA is also more.

Among the coronary arteries, LAD was the most commonly affected one (82%). WISE study reported significant LAD lesion in 62% of women. Srinivasanet al[16] (2002) Sharma et al, Routh et al, Sree ranga et al all reported LAD to be involved in 85%, 46.2%,71.8%,40% of south Indian women.[8,9] Our study we have shown 82% involvement.

Our study did not have any complications which were common in other studies in elderly women. no hospital mortality present in our study.

CONCLUSION

Persistent health inequalities are a worldwide problem. Alleviation of preventable human suffering caused by inequitable access to healthcare facilities is being advocated globally. This study reiterates the need of establishing systems for early recognition and awareness of CAD among women in India. Women affected by CAD are of great concern; more researches are needed to understand how this disease affects women and how morbidity can be presented in our population. Education early, aggressive control of risk factors, rapid access to diagnosis and serious treatment need to prevent cardiovascular events and will directly benefit women.

Finally, Women are neglected victims of heart disease this study has thrown light on the different aspects of CAD

in younger women from Eastern region who are usually underrepresented in studies. The atherosclerotic burden is greater in elderly women than young women as understood from the higher prevalence of obstructive coronary artery disease in elderly group The findings highlight the importance of different measures to prevent adverse cardiovascular outcome. It is essential to identify atherosclerotic risk factors in these women and treat them more aggressively to prevent devastating cardiovascular events.

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