Original Research Article

Clinical Outcomes of Women with Acute Coronary Syndrome Treated with Percutaneous Coronary Intervention

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ABSTRACT

Aim: Coronary heart disease (CHD) has traditionally been considered a disease of men. Thus, the present study aimed to determine the acute coronary syndrome in women.

Methods: This was a retrospective observational study conducted at a tertiary-care center in India between August 2016 and October 2018. Women with age ≥18 years, the first-time presentation with the acute coronary syndrome (ACS) or with symptoms of ACS were included in the study. Demographic details, medical history, risk factors, investigations, complications rate, treatment, and hospitalization details were collected from the patient medical records.

Results: Total of 125 patients were included in this study. The average age of the study population was found to be 56.3 ± 11.7 years. Risk factors such as diabetes [49 (39.2%) patients] was found in the majority of the population followed by hypertension [42 (33.6%) patients], dyslipidemia [19 (15.2%) patients], tobacco chewing [12 (9.6%) patients], and family history of CAD [3 (2.4%) patients], respectively. Echocardiography revealed that higher number of the patients had good LV function [105 (84%) patients], mild LV dysfunction [15 (12%) patients] and moderate LV dysfunction [5 (4%) patients] but none of them had severe LV dysfunction at the time of discharge.

Conclusions: Dyslipidemia, diabetes mellitus, hypertension and Family history of Coronary artery disease were the main risk factors in patients with ACS. Coronary angiogram (CAG) showed the majority of the patients had a single-vessel disease with LAD being the most common culprit vessel.

Keywords: Coronary artery disease; coronary angiogram; coronary heart disease.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of mortality for women in India and globally. Coronary heart disease (CHD) has traditionally been considered a disease of men. A study conducted by the global burden of diseases reported that the disability-adjusted life years lost by CHD in India during 1990 was 5.6 million in men and 4.5 million in women. Nonetheless, the annual CVD mortality rate has remained greater for women than for men. There are important sex differences in the pathophysiology, clinical presentation, and clinical outcomes of coronary artery disease (CAD) in women. Women's health involves two aspects: Sex differences resulting from biological factors and gender differences affected by broader social, environmental, and community factors.

Obstructive atherosclerotic diseases of the epicardial coronary arteries remain the basic cause of acute myocardial infarction (AMI) in both sexes and differ in plaque characteristics for women. Additionally, recent data have suggested a greater role of microvascular disease in the pathophysiology of coronary events among women. [1] Women are often older when they present with their first AMI, at an average age of 71.8 years compared with 65 years for men. Recently, an increase in CHD incidence and deaths among women 45 to 54 years of age has been observed in various studies. Due to more comorbidities (diabetes, hypertension, heart failure, and obesity) at the time of presentation with AMI in younger age patients, [2] Asian Indian women have a greater proportionate mortality burden from CHD compared with non-Hispanic white women.

Certain risk factors are more potent in women including tobacco abuse, type-2 diabetes, depression, and other psychosocial risk factors. The INTERHEART study data identified nine potentially modifiable risk factors (smoking, HTN, DM, waist-hip ratio, dietary patterns, physical activity, alcohol consumption, plasma apolipoproteins, and psychosocial factors) that account for 96% of the population attributable risk of MI in women. [3] Thus, this study was conducted to determine the acute coronary syndrome in women.

MATERIALS AND METHODS
Study Design and Patient Population
This was a retrospective observational study conducted at a tertiary-care center in India between August 2016 and October 2018. Women with age ≥18 years, first-time presentation with the acute coronary syndrome (ACS) or with symptoms of ACS were included in the study. Patients with known CAD, previous revascularization (coronary artery bypass graft (CABG), Percutaneous transluminal coronary angioplasty (PTCA), and stenting), left main coronary artery disease, and women with prior heart failure/ prior ischemic heart disease were excluded from the study. Signed inform consent forms were obtained from all the patients.

Study intervention
During hospital admission, a selective coronary angiogram was done by using the standard technique unless the patient was not willing for a coronary angiogram or has significant renal disease. As per institutional protocol, all patients received treatment of either statin, angiotensin-converting enzyme inhibitors, anticoagulants, antiplatelet, thrombolytic therapy agents, diuretics, revascularization, beta-blockers, or other medications according to individual patient scenario. Demographic details, medical history, risk factors, investigations, complications rate, treatment, and hospitalization details were collected from the patient medical records.

Definitions
In this study, dyslipidemia is defined as the presence of total cholesterol >240 mg/dl, triglycerides >150 mg/dl, low-density lipoprotein >130 mg/dl and high-density lipoprotein <50 mg/dl for females. Diabetes is defined as the plasma glucose concentration ≥200 mg/dl or fasting blood sugar ≥126 mg/dl and hypertension is defined as systolic blood pressure (SBP) ≥140 and/or diastolic blood pressure (DBP) ≥90 mmHg. Obesity is calculated using Quetelet's formula. Significant CAD is defined as diameter stenosis >70% in each major epicardial artery. Normal vessels are defined as the complete absence of any disease in the left main coronary artery (LMCA), left anterior descending (LAD), right coronary artery (RCA), and left circumflex (LCX) as well as in their main branches.

Statistical Analysis
Continuous variables were expressed as mean ± standard deviation and categorical variables were expressed as counts and percentages. The event-free survival curve was calculated according to the Kaplan-Meier method. The analysis was performed by using statistical package for

social sciences (SPSS version 15; Chicago, Illinois, USA) software.

RESULTS

Total of 125 patients were included in this study. The average age of the study population was found to be 56.3 ± 11.7 years. Risk factors such as diabetes [49 (39.2%) patients] was found in the majority of the population followed by hypertension [42 (33.6%) patients], dyslipidemia [19 (15.2%) patients], tobacco chewing [12 (9.6%) patients], and family history of CAD [3 (2.4%) patients], respectively. Associated symptoms in this study population showed that 120 (96%), 23 (18.4%), 98 (78.4%), 11 (8.8%), 10 (8%), and 8 (6.4%) patients had chest pain, dyspnea, sweating, palpitations, syncope, and vomiting, respectively. The baseline characteristics of ACS patients are summarized in **Table 1**.

Table 1: Baseline Characteristics of the Study Population

Variables	Patients (N=125)
Age (Mean ± SD, years)	56.3±11.7
Risk factors	
Diabetes mellitus, n (%)	49 (39.2%)
Hypertension, n (%)	42 (33.6%)
Dyslipidemia, n (%)	19 (15.2%)
Tobacco chewing, n (%)	12 (9.6%)
Family history of CAD, n (%)	3 (2.4%)
Symptoms	
Chest pain, n (%)	120 (96%)
Dyspnea, n (%)	23 (18.4%)
Sweating, n (%)	98 (78.4%)
Palpitations, n (%)	11 (8.8%)
Syncope, n (%)	10 (8%)
Vomiting , n (%)	8 (6.4%)

On admission, all ACS patients underwent a coronary angiogram. In this study, majority of the patients had single-vessel disease [95 (76%) patients] followed by double vessel disease [27 (21.6%) patients], and triple vessel disease [03 (2.4%) patients]. Coronary angiogram identified left anterior descending artery (LAD) as the most common culprit vessel in 62 (42.7%) patients followed by left circumflex artery in 48 (33.1%) patients and right coronary artery in 35 (24%) patients. Echocardiography revealed that higher number of the patients had good LV function [105 (84%) patients], mild LV

dysfunction [15 (12%) patients] and moderate LV dysfunction [5 (4%) patients] but none of them had severe LV dysfunction at the time of discharge. Angiographic and Procedural Characteristics of the study population are displayed in **Table 2**.

Table 2: Angiographic and Procedural Characteristics of the study population

Variables	Patients (N=125)
Number of diseased vessels	
Single vessel disease, n (%)	95 (76%)
Double vessel disease, n (%)	27 (21.6%)
Triple vessel disease, n (%)	03 (2.4%)
Target coronary artery lesions (n=145)	
Left anterior descending, n (%)	62 (42.7%)
Left circumflex, n (%)	48 (33.1%)
Right coronary artery, n (%)	35 (24%)
Left ventricular (LV) function	
Good LV Function, n (%)	105 (84%)
Mild LV Function, n (%)	15 (12%)
Moderate LV Function, n (%)	5 (4%)

DISCUSSION

Women have been considered a lower risk for coronary artery disease till they attain menopause due to hormonal protection from estrogen. Bahl et al. studied CAD in 9702 patients, out of this, 2344 (24.2%) were women with 45 (1.9%) being in the age group 20 to 40 years and showed that none of the study population belonged to below 25 years' age which is similar to our study. [4] Similar to this study, Xie et al. in their comparative study showed three ethnic groups in Singapore and reported that dyslipidemia was more common among the Indian ethnic group (81.8%) as compared to the Chinese (41.2%) or Malay population (50%). [5-7] In this study, chest pain was the most common presenting symptom reported in 96% of patients which is similar to a study by Worrall-Carter et al., and displayed that diagnosis of non–ST-segment elevation myocardial infarction (NSTEMI-ACS) was more prevalent among women than men (86% vs. 80%; p < 0.001). [8]

In another study, 7,304 patients, the higher prevalence of NSTEMI-ACS in women was repeated, accounting for 70.7% of the presentations in the female gender (p < 0.01). [9] In 2012 a study showed 1,640 patients with ACS there were no differences in mortality according to gender (1.3% vs.

2.7%, p = 0.18) at the end of one year follow up after post PCI for men and women. [10] Similar mortality findings between men and women in the context of less invasive treatment in the female group may seem odd. Drug treatment adequacy, early diagnosis and distinct pathophysiology between the genders may help to explain this finding. [11] Swaminathan et al., the female gender remained an independent predictor of mortality after the multivariate adjustment (OR = 1.40, 95%CI: 1.36-1.43, p < 0.001) in all age groups. However, in-hospital mortality decreased at a faster rate in women (3.8% to 2.7%) than in men (2.2% to 1.6%) between 2003 and 2012. [12] The increased STEMI rates in women aged <65 years are in keeping with data from the French USIC and FAST-MI hospital registries, which showed an increase in the proportion of women aged<60 years among patients with STEMI from 1995 to 2010. [13-15] In the United States of America, and European countries, studied on ACS, Acute MI, or UA admissions did not consistently show similar patterns in younger women. In several studies, the incidence rates decreased or plateaued changes in both women and men. [16-20]

CONCLUSION

Thus, this study concludes that dyslipidemia, diabetes mellitus, hypertension and Family history of Coronary artery disease were the main risk factors in patients with ACS. Coronary angiogram (CAG) showed the majority of the patients had a single-vessel disease with LAD being the most common culprit vessel. Also, the majority of the patients recovered with no mortality and preserved LV function at discharge.

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