

Assessment of the risk factors and clinical profile of CAD in female patients

PranavAshokrao shende¹, S. K. Malani², Ravindra K. Jain³, Chandrakant S. Upadhayay⁴, Snehal A Shende⁵, Vivek V. Manade⁶

¹Senior Resident, Department of Cardiology, Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune 18, Maharashtra, India;

²HOD & Professor, Department of Cardiology, Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune 18, Maharashtra, India;

³Associate Professor, Department of Cardiology, Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune 18, Maharashtra, India;

⁴Assistant Professor, Department of Cardiology, Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune 18, Maharashtra, India;

⁵Reader, Department of Prosthodontics and crown and bridge, Tatyasaheb Kore dental college and research centre, New Paragaon (MUHS)

⁶Senior resident, Department of Cardiology, Dr. D Y Patil Medical College, Hospital & Research Centre, Pimpri, Pune 18, Maharashtra, India (Corresponding author);

¹Email: edneshvanarp@gmail.com;

²Email: drmalani2003@gmail.com;

³Email: ravindrajain.heartclinic@gmail.com;

⁴Email: drch82@gmail.com;

⁵Email: snehalshende22@gmail.com;

⁶Email: dr.vivek.manade7@gmail.com

Abstract

Background: Coronary artery disease (CAD) has emerged as the major cardiovascular disease of the era and also the commonest cause of premature death. For several decades, conventional invasive angiography (CIA) has been considered as the well-established gold standard for making the diagnosis of CAD. Hence; the present study was undertaken with the aim of assessing the risk factors and clinical profile of CAD in female patients.

Materials & methods: A hospital-based descriptive observational study was conducted with 100 patients to evaluate clinical profile and angiographic pattern in women with Coronary Artery Disease. Baseline demographics, clinical and risk factor profile was collected. Disease is defined as presence of stable angina, unstable angina or myocardial infarction. Baseline demographics, clinical and risk factor profile was collected. Appropriate statistical software, including but not restricted to MS-Excel. SPSS version 20 was used for statistical analysis. Graphical representation was done in MS-Excel 2010.

Results:*The mean age of the patients was 62.98 ± 12.60 years. The most common symptom was chest pain (82%) followed by shortness of breath (56%), sweating (38%), burning sensation in epigastrium (33%), palpitation (30%) and vomiting (9%). The most common vessel involved was Left Anterior Descending (LAD) (47.4%) followed by Right Coronary Artery (RCA) (28.9%) and Left Circumflex (LCX) (23.7%). There was no Left Main Coronary Artery (LMCA) lesion in our study.*

Conclusion:*Chest pain is most common presenting symptom followed by shortness of breath, so these symptoms should never be ignored and should be investigated thoroughly to prove or to rule out CAD in women.*

Key words: *Clinical Profile, Female, Coronary artery disease*

Introduction

Coronary artery disease has emerged as the major cardiovascular disease of the era and also the commonest cause of premature death. Developing countries now experience a much greater burden of cardiovascular disease than do developed countries. In addition, developing countries like India are expected to experience the greatest rise in cardiovascular disease burden over the next few years. In large part, this increase can be explained on the basis of major ongoing sociodemographic changes in developing countries, and associated effects on the number of individuals at risk and the levels of cardiovascular risk factors.¹⁻²

Atherosclerosis of the coronary vessels commonly cause ischemic heart diseases. The past decade has witnessed an increasing recognition that inflammatory mechanisms play a central role in the pathogenesis of atherosclerosis and its complications. Chest pain is a frequent presenting symptom in patients attending the emergency department, with significant resource implications for healthcare providers. Although the majority of patients with chest pain do not have an acute myocardial infarction, prompt and accurate exclusion of this diagnosis remains challenging in clinical practice, and unnecessary hospital admissions often result.³⁻⁴

For several decades, conventional invasive angiography (CIA) has been considered as the well-established gold standard for making the diagnosis of CAD. Conventional invasive angiography (CIA) is highly reliable compared to other indirect evaluation methods such as stress testing. CIA has a high diagnostic ability to determine the extent, location, and severity of coronary obstructive lesions.^{4, 5}

Hence; the present study was undertaken with the aim of assessing the risk factors and clinical profile of CAD in female patients.

Materials & methods

A hospital-based descriptive observational study was conducted with 100 patients to evaluate clinical profile and angiographic pattern in women with Coronary Artery Disease. The study was done at our tertiary care centre in the department of cardiology. 100 adult female patients admitted in cardiology department at our tertiary care hospital with signs and symptoms suggestive of IHD who fulfilled the inclusion criteria.

Inclusion criteria

- Female patients of age greater than 18 years with or without Family history or personal history of Ischemic heart disease with or without conventional or non-

conventional CAD risk factors and along with ECG, biomarkers and/ or imaging evidence of CAD undergoing Coronary Angiography.

Exclusion criteria:

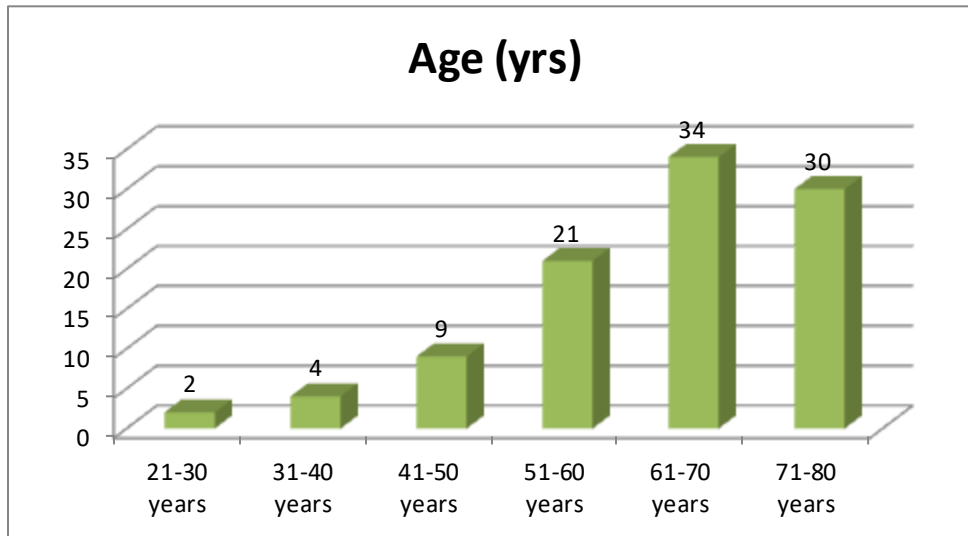
- Patients below 18 years of age.
- Females with normal ECG, normal bio-markers and normal invasive and/or non-invasive coronary angiogram.
- History of prior CABG or PTCA.
- Patients who expired before diagnostic angiogram.
- All patients undergoing coronary angiography for surgical fitness e.g., patients of rheumatic heart disease and congenital heart disease
- Patients with diagnosed acute or chronic liver disease, renal impairment or having secondary conditions that could precipitate angina (anaemia, arrhythmias, fever) were also excluded from the study.

Baseline demographics, clinical and risk factor profile was collected. Disease is defined as presence of stable angina, unstable angina or myocardial infarction. Baseline demographics, clinical and risk factor profile was collected. Appropriate statistical software, including but not restricted to MS-Excel. SPSS version 20 was used for statistical analysis. Graphical representation was done in MS-Excel 2010.

Results

Majority of the patients (34%) were in the age group of 61-70 years followed by 30% in the age group of 71-80 years, 21% in the age group of 51-60 years, 9% in the age group of 41-50 years, 4% in the age group of 31-40 years and 2% in the age group of 21-30 years. The mean age of the patients was 62.98 ± 12.60 years. The most common symptom was chest pain (82%) followed by shortness of breath (56%), sweating (38%), burning sensation in epigastrium (33%), palpitation (30%) and vomiting (9%). The major risk factor in our study was dyslipidemia (64%), hypertension (48%), diabetes mellitus (40%), obesity (26%), hypothyroidism (14%) and addiction (13%). The most common presentation was Non-ST elevation myocardial infarction (NSTEMI) (34%) followed by STEMI (31%), Unstable Angina (UA) (19%) and Stable Ischemic Heart Disease (SIHD) (16%).

The most common vessel involved was Left Anterior Descending (LAD) (47.4%) followed by Right Coronary Artery (RCA) (28.9%) and Left Circumflex (LCX) (23.7%). There was no Left Main Coronary Artery (LMCA) lesion in our study.

Graph 1: Age-wise distribution**Table 1:** Distribution of patients according to Symptoms

Symptoms	N	%
Chest Pain	82	82%
Shortness of breath	56	56%
Sweating	38	38%
Burning sensation in epigastrium	33	33%
Palpitation	30	30%
Vomiting	9	9%

Table 2: Distribution of patients according to Risk Factors

Risk Factors	N	%
Dyslipidemia	64	64%
Hypertension	48	48%
Diabetes Mellitus	40	40%
Obesity	26	26%
Hypothyroidism	14	14%
Addiction	13	13%

Table 3: Distribution of patients according to Presentation

Presentation	N	%
NSTEMI	34	34%
STEMI	31	31%
UA	19	19%
SIHD	16	16%
Total	100	100%

Table 4: Frequency Distribution of SVD Lesion of patients (n=38)

SVD Lesion	N	%
LAD	18	47.4%
RCA	11	28.9%
LCX	9	23.7%
LMCA	0	-
Total	38	100%

LAD: Left anterior descending; LCX: Left circumflex; RCA: Right coronary artery; LMCA: Left main coronary artery

Discussion

Menopause, permanent cessation of menstruation following loss of ovarian activity, has considerable impact on social, reproductive, physical and psychological health. Women in India are prone to an earlier menopause and all its implications on their health at an earlier age than their counterparts in the industrialized world. Estrogen has protective effects on the cardiovascular system due to which there is an increase in the prevalence of cardiovascular diseases in postmenopausal women. Estrogen also has a favorable effect on body fat distribution and improvement in the insulin sensitivity. Cardiovascular disease is one of the leading causes of death in women. The incidence of myocardial infarction in women, although lower than in men, increases dramatically after menopause, which can be attributed mainly to the lack of estrogen and its direct and indirect cardio-protective effects.^{5- 8}

In the present study, the mean age of the patients was 62.98 ± 12.60 years. Satapathy C et al prospective, observational, hospital-based study determining the clinical profile and angiographic characteristics of women with CAD found minimum age of women with CAD was 35 years and the maximum was 74 years. The mean age of presentation was 57 years. Maximum incidence of CAD occurred in age group of > 65 years i.e. 32%, compared to 14%, 28%, 26% in 35-44, 45-54, 55-64 years age group respectively.⁹

Kandoria A et al single center prospective observational study assessing risk factors and coronary angiographic pattern of disease among pre- and post-menopausal women found mean age in premenopausal group was 42.05 ± 4.40 years, which was around 17 years younger than the mean age of postmenopausal women (59.05 ± 8.01).¹⁰

In the present study, the most common symptom in our study was chest pain (82%) followed by shortness of breath (56%), sweating (38%), burning sensation in epigastrium (33%), palpitation (30%) and vomiting (9%). Satapathy C et al prospective, observational, hospital-based study observed all patients (100%) had typical chest pain. Vomiting was seen in 60% of patients, followed by sweating (40%), palpitation (34%), and the least common symptom was shortness of breath (12%).⁹ Unnikrishnan KTD et al study analyzing the clinical profile of premenopausal women with CAD found 62% of study population presented with chest pain.¹¹

In the present study, the most common presentation in the present study was Non-ST elevation myocardial infarction (NSTEMI) (34%) followed by STEMI (31%), Unstable Angina (UA) (19%) and Stable Ischemic Heart Disease (SIHD) (16%). Satapathy C et al prospective, observational, hospital-based study found 60% of patients were diagnosed as

STEMI, 28% with NSTEMI-UA, 12% with SIHD. Among STEMI group (n=60) 26 patients (43%) with inferior wall myocardial infarction and 34 patients (57%) with different combination of anterior wall myocardial infarction.⁹Kandoria A et al single center prospective observational study observed main presentation diagnosis in both the groups was chronic stable angina. However, a significantly higher number of premenopausal women presented with atypical chest pain than postmenopausal women (23.4% vs 10.2%, $p<0.0001$). STEMI as the presenting diagnosis was more commonly seen in postmenopausal women (7.6% vs 2.9%, $p<0.0001$). Significantly higher proportion of postmenopausal women presented with LV systolic dysfunction in comparison to premenopausal women. Although a significantly high number of postmenopausal women did not undergo exercise stress test (60.6% vs 31.9%, $p<0.0001$), positive result was seen more frequently in premenopausal women (62.1% vs 38.3%, $p<0.0001$).¹⁰

It was observed in our study that 12 (12%) patients were pre-menopausal with normal cycle while 88 (88%) patients were post-menopausal.Satopathy C et al prospective, observational, hospital-based study observed 70% of study patients were postmenopausal and only 30% were pre-menopausal with normal cycle. None of their patients were on OC pill or any hormone replacement therapy.⁸

In the present study, the angiographic distribution of CAD in patients showed single vessel disease (SVD) was most frequent type of CAD in pre-menopausal patients (50%) while double vessel disease (DVD) was most frequent in menopausal patients (44.3%). Normal coronaries were found in 25% premenopausal and 7.9% of postmenopausal women. There was no significant difference between the groups as per Chi-Square test ($p>0.05$). Satopathy C et al prospective, observational, hospital-based study observed angiographic distribution of CAD in women showed normal coronaries in 19% of young women and 7% of elderly women. Single vessel disease (SVD) was most frequent type of CAD (64%) in young women, whereas in elderly women TVD was most frequent (38%).⁹Rout S et al study assessing the risk factor and angiographic profile of coronary artery disease in Indian women observed 64 (60.3%) patients had significant coronary artery disease, 24 (22.8%) patients had normal coronaries and 18 (16.9%) patients had $<50\%$ stenosis of coronary artery. Out of 64 patients with significant CAD, 43 (67.2%) patients had single vessel disease, 13 (20.3%) patients had double vessel disease and 5 (7.8%) patients had triple vessel disease. 3 (4.7%) patients had left main coronary artery involvement.¹²

Conclusion

Chest pain is most common presenting symptom followed by shortness of breath, so these symptoms should never be ignored and should be investigated thoroughly to prove or to rule out CAD in women. Hence prompt management of modifiable risk factors is necessary to reduce the incidence of CAD and associated mortality.

References

1. Makam AN, Nguyen OK. Use of cardiac biomarker testing in the emergency department. *JAMA Intern Med.* 2015;175:67–75.
2. Zhelev Z, Hyde C, Youngman E et al. Diagnostic accuracy of single baseline measurement of Elecsys troponin T high-sensitive assay for diagnosis of acute

- myocardial infarction in emergency department: systematic review and meta-analysis. *BMJ*. 2015;350:h15.
3. Goodacre S, Cross E, Arnold J et al. The health care burden of acute chest pain. *Heart*. 2005;91:229–230.
 4. Skinner JS, Smeeth L, Kendall JM et al. Chest Pain Guideline Development Group. NICE guidance: chest pain of recent onset: assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin. *Heart*. 2010;96:974–978.
 5. Thom T, Hasse N, Rosamond W et al. Heart disease and stroke statistics-2006 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 2006;113:e85.
 6. Yusuf S, Hawken S, Ounpuu S et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet*. 2004;364:937.
 7. Gupta RV. Trends in hypertension epidemiology in India. *J Hum Hypertens*. 2004;18:73–78.
 8. Prabhakaran D, Chaturvedi V, Shah P et al. Differences in the prevalence of metabolic syndrome in urban and rural India: a problem of urbanization. *Chronic Illn*. 2007;3:8–19.
 9. Satapathy C, Gupta MK, Routray SN et al. Clinical profile, angiographic characteristics in women with coronary artery disease, admitted in a tertiary care hospital of Eastern India. *J. Evid. Based Med. Healthc*. 2018,5(12):1053-1058.
 10. Kandoria A, Bhardwaj R, Mahajan K et al. Comparison of Risk Factor Profile and Angiographic Pattern Among Pre-Menopausal and Post-Menopausal Women Presenting with Angina: Results from a Prospective Single Center Observational Study. *J Cardiovasc Dis Diagn*. 2017;5(2)266.
 11. Unnikrishnan KTD, Ambili NR, Mathew D et al. Clinical profile of premenopausal female patients with coronary artery disease. *Int J Res Med Sci* 2018;6:2285-90.
 12. Rout S, Fathima N, Vishwakarma SK et al. High Risk Factors and Angiographic Investigation among Indian Women with Coronary Artery Disease. *International Journal of Recent Trends in Science And Technology*. 2014; 10(3):476-479