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Review Article

Coronary artery disease in women

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ABSTRACT

Background: Despite the importance of CAD for women, there is persistent perception that CAD is a man's disease. Contributing to this notion is the observation of differences in incidence rates according to age; the incidence of CAD in women is lower than men, but rises steadily after fifth decade. The distribution of CAD risk factors varies between men and women across age ranges and failure to consider these differences may have contributed to the belief that women are at lower risk of CAD compared with men. In addition, women are more likely to have symptoms considered atypical compared with men. There is an urgent need to better understand the presentation of cardiac symptoms in women, in order to facilitate diagnosis and treatment, to initiate aggressive risk factor intervention and to improve the quality of life.

Methods: We studied clinical and angiographic profile of women undergoing coronary angiogram over a period of 6 years at Nanavati Hospital, Mumbai. The objectives were to examine the distribution of risk factor and coronary angiographic patterns of CAD in women.

Results: It was observed that coronary artery disease is most commonly involving females between the age 60 to 80 years. Raised LDL-C was found to be most common risk factor involved in development of coronary artery disease in females. Most common presentation of CAD in women is unstable angina or non-ST segment elevation MI. Most common coronary angiography finding was single vessel disease.

Conclusion: Though coronary artery disease is late to present in women it significantly hamper quality of life. The clinical presentation of coronary artery disease in women varies from asymptomatic to severe unstable angina to myocardial infarction. Stress testing and 2D-ECHO helps to some extent for prediction of coronary artery disease but false positive as well as false negative test results are not negligible. Coronary angiography is the conclusive test to determine spectrum and characterization of coronary artery anatomy in women. As this study is based on experience at single center, various biases may be possible. Widespread data collection involving multiple center and multiple operators will be helpful.

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1. Introduction

Coronary artery disease is the leading cause of mortality and morbidity of both men and women accounting for over one third of total deaths.¹ It has reached epidemic proportion among Indians. It accounts for 1 out of 3 women death regardless of the race or ethnicity.² In women, the annual mortality rate from CAD is high. The worldwide INTERHEART Study,³ a large cohort study of more than 52000 individual with myocardial infarction, have revealed that women have their first presentation of coronary heart disease approximately 10 years later than men, most commonly after menopause. Despite this delay in onset, mortality is increasing more rapidly amongst women than men.³ Epidemiological studies from various parts of India have reported the rising trends and a high burden in the levels of conventional risk factors such as diabetes, hypertension and metabolic syndrome.^{4,5}

From 1960 to 1995, the prevalence of CAD in adults increased from 3% to 10% in urban Indians and from 2% to 4% in rural Indians with women having rates similar to men.⁷

Our study is a single center based study based on all women undergoing coronary angiography for various indications. We studied clinical and angiographic profile of women undergoing angiography at our center in 6 years. This study provides in depth understanding about distribution of coronary artery disease amongst various age group of women and its possible cause. It also compares various risk factors, clinical presentation and angiographic picture of women undergoing coronary angiography. The study helps to understand the need for coronary evaluation in women and its importance on well-being and quality of life of women.

2. Cad mortality in women

Women have poorer prognosis and more severe outcome than men after myocardial infarction, percutaneous coronary intervention and coronary artery bypass grafting. Women are more likely than men to die after a first MI, and for survivors, there is higher risk of recurrent MI, heart failure or death.⁸ In Framingham heart study the one-year mortality following an MI was 44% in women vs. 27% in men.⁹ The overall short term and long term CAD mortality following an MI are about 40% higher in women after adjustment for age and other risk factors. The excess in hospital CAD mortality in women compared to men almost balances their lower pre-hospital mortality.⁹ Despite their excess risk, women are only half as likely as men to receive aspirin, beta-blockers or thrombolytic therapy or to be referred for revascularization

procedure. Vaccarino et al¹⁰ found that mortality from MI in women <50 years of age was double that of men and excess mortality in women is limited to <60 years of age.

3. Risk factors in women

Women, in comparison with men, tend to have a better risk factor profile at younger ages, whereas the opposite is true at older ages. Although most risk factors for CAD are similar in men and women, gender differences have been documented, particularly for diabetes, central obesity and dyslipidemia. Among Indian women, the presence of hypertension, diabetes, low levels of high-density lipoprotein and high levels of total cholesterol, triglycerides, low-density lipoprotein and Lp (a) are correlated with CAD.¹² Compared with whites, Indian men and women have a lower prevalence of hypertension, hypercholesterolemia, obesity and smoking, but a higher prevalence of high TG, low HDL, glucose intolerance and central obesity.² Prevalence of most risk factors is lower in rural than in urban India with exception of smoking/tobacco use (Tobacco Paradox).¹³

3.1. Age

Women are about 10 years older than men at first manifestation of CAD, although they have similar plaque burden.¹⁴ Women lose this 10-year advantage if they smoke, have diabetes, or had premature menopause. Prevalence of CAD is higher in men prior to fifth decade of life. During sixth decade it equalizes and subsequently it becomes greater in women. Postmenopausal increase in the risk of CAD is related to a higher incidence of hypertension, diabetes, dyslipidemia and obesity. Younger women with ACS have up to 50% higher risk for mortality than their young male counterparts.^{11,15} The higher risk of mortality in these young women may be due in part to the perception that younger women are at very low risk of CAD and therefore diagnostic and therapeutic management is minimal.

3.2. Family history

Among women, a history of an MI or sudden death before the age of 55 in a sister is more strongly associated with risk of MI than that in a brother or parent. Family history of CAD in a sister is associated with 12-fold higher risk vs. 6-fold for a brother and 3-fold for a parent.¹⁶ Stromelysin-1, members of the matrix metalloproteinase family of enzymes that are believed to be involved in plaque rupture and plasminogen activator inhibitor-1

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