

Prevalence Of Cad In Rheumatic Heart Disease: Is Time To Redefine The Age For Screening Coronary Angiography?

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Abstract: Background and aim of the study: With coronary artery disease (CAD) on rise, age for performing screening coronary angiography in Indian patients with rheumatic heart disease (RHD) due to undergo valve replacement surgery is unclear. Because of varied prevalence of CAD in RHD patients between Indian and western patients. Here we analyse the CAD prevalence in RHD group awaiting for surgery and percentage CAD involvement in aortic and mitral valve groups. Also, we analyse the cut-off age when the CAG (coronary angiography) can be indicated for these patients. A retrospective analysis of RHD patients undergoing CAG was conducted. Results: The overall prevalence of CAD was 10% (12% in men, 8% in women). CAD was highest in patients with aortic stenosis (AS) and lowest in those with aortic regurgitation (AR). AR patients also showed an independent inverse association with the occurrence of CAD. Conclusion: The overall prevalence of CAD among Indian patients with RHD was lower than that in patients from western countries. A cut-off age of 40 years in males and women in postmenopausal age group can used for performing coronary angiography in all RHD patients. A paradox of higher incidence of CAD in AS patients with very lower incidence in AR patients is observed. Further studies are required to identify markers for lower risk of CAD in RHD patients similar to markers like high- sensitivity CRP seen in high risk CAD population.

Keywords: Rheumatic heart disease, Coronary artery disease, Screening Coronary angiography

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I. Introduction

Rheumatic heart disease (RHD) is one the most common cause for valvular heart disease in developing countries like India. It follows rheumatic fever in childhood by group A beta haemolytic streptococcal infection and incidence is about 1 per 1000 population. RHD is associated with major morbidity and mortality. These patients require valve interventions like valve repair or replacement depending on the severity of the lesion. Several series showed, combined CABG had little or no adverse effect on operative mortality.^{1,2} The American College of Cardiology/the American Heart Association recommends routine pre-operative coronary angiography (CAG) in patients with valvular heart disease before valve surgery in men aged ≥ 35 years, in pre-menopausal women aged ≥ 35 years who have coronary risk factors and in post-menopausal women.³ In India, CAG is usually performed routinely in RHD patients before valve replacement surgery if there is any suspicion of CAD or the patient is aged >40 years. Many studies have been done to observe the prevalence of CAD in various countries, association of the risk factors with CAD in RHD patients. If CAG required, at what age can CAG be performed in RHD patients.^{4,5,6} The prevalence of CAD in patients who are undergoing valve replacement is 20-40% in most of the developed countries.⁷ There are no large studies to see the association of inflammation (found in RHD) in causation of CAD in RHD patients. Here we analyse the CAD prevalence in RHD group awaiting for surgery and percentage CAD involvement in aortic and mitral valve groups. Also, we analyse the cut-off age when the CAG can be indicated for these patients.

II. Material And Methods

Study design: Retrospective study, with data collected from the records of patients who underwent coronary angiogram before valve replacement surgery for RHD between January 2012 to December 2017 in the department of cardiology, Stanley medical college.

Objectives: To investigate the prevalence of coronary artery disease (CAD) and Percentage CAD involvement in aortic and mitral valve groups.

Study Duration: January 2012 to December 2017.

Sample size: 122 patients.

Inclusion criteria: Data of Patients above 35 years who underwent valve surgery for Rheumatic valvular heart disease after coronary angiogram from the hospital records.

On coronary angiogram, > 70% stenosis of LAD, Left circumflex and RCA is defined as significant stenosis; > 50% stenosis of Left Main was considered significant; occlusions in the Diagonals, Obtuse Marginals, PDA measuring < 2 mm in diameter were defined as minimal coronary artery disease. Established risk factors for CAD - Diabetes Mellitus, Systemic Hypertension, Dyslipidemia was recorded. Presence of anginal symptoms was recorded.

Exclusion Criteria:

1. Patients with valvular heart disease less than 35 years
2. Non Rheumatic valvular heart disease

III. Result

The study involved a retrospective analysis of the records of 122 patients

Males - 78; females - 44

RHD patients who underwent CAG were in age groups between 35 years to 64 years. The majority of the CAD occurrence in RHD were in their 50 to 60 years of age. The overall prevalence of CAD among RHD patients was 11.5% (14 patients). Of these, males were ten and females were four. Based on gender, the prevalence was 13% in males and 9% in females. (table 1)

Table 1 shows CAD prevalence in RHD patients based on gender wise data

	No CAD (in %)	CAD present (in %)	Total
Male	68 (87%)	10 (13%)	78
Female	40 (91%)	4 (9%)	44
	108 (88.5%)	14 (9%)	122

Effect of dominant valve lesion on CAD prevalence:

With regard to their dominant valve lesion, mitral valve disease was most common about 58 cases (32 patients with mitral stenosis (MS), 22 patients with mitral regurgitation (MR). 22 patients had an aortic stenosis (AS), 16 patients with aortic regurgitation (AR), and 26 patients had a codominant valvular lesion. Among the individual valve lesions, patients with dominant AS had the highest prevalence of CAD with five patients (36%), while those with AR had the lowest prevalence with one patient (7%). The prevalence of CAD in patients with MS and MR was 22% (three patients) and 14% (two patients), respectively. In combined lesions (aortic and mitral), presence of CAD was 21% with three patients affected. (table 2)

An independent inverse association was noted between CAD and AR. The majority of patients with TVD were in their sixth decade of life.

Table 2 shows CAD prevalence in individual valve lesions

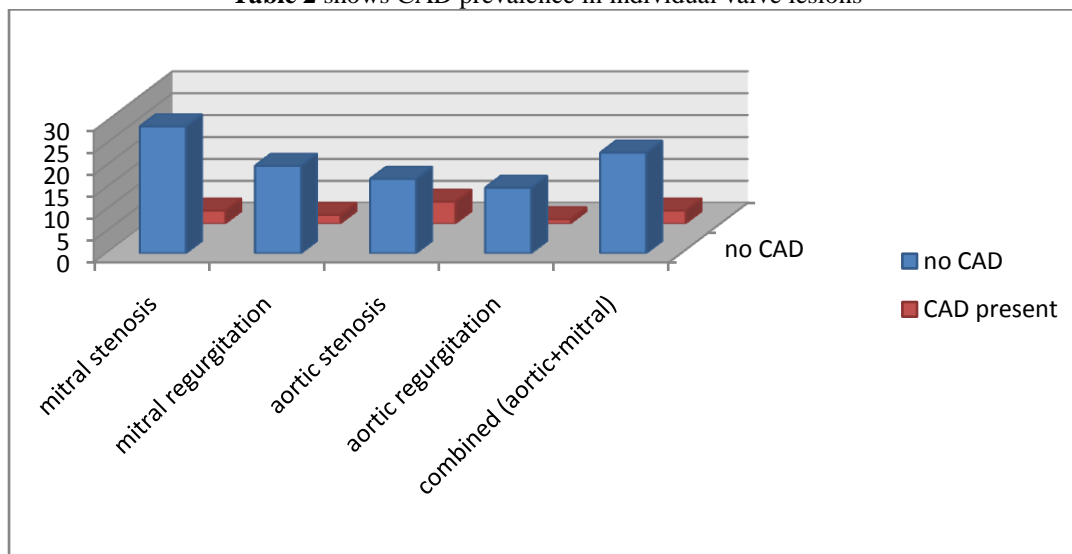


Table 3 shows CAD prevalence in percentage

Valve lesions	Total cases	CAD present	CAD in %
Mitral stenosis	32	3	22%
Mitral regurgitation	22	2	14%
Aortic stenosis	22	5	36%

Aortic regurgitation	16	1	7%
Combined (mitral+aortic)	26	3	21%
Total	122	14	11.5%

IV. Discussion

The prevalence of CAD of 11.5% noted in RHD in our study was much lower than that of western patients, where values approaching 20% have been reported.⁸ The overall prevalence of CAD among RHD patients undergoing valve replacement has been shown to range from 5% to 30% in different countries^{9,10}. Prevalence of CAD was uniformly found to be higher in males and in the older age group. Among patients with aortic valve disease, the prevalence of CAD ranged from 17 to 30%^{11,12}, and for mitral valve disease from 7 to 23%. Mitral stenosis patients have lower prevalence of CAD may be due to younger mean age and a female predominance in this group. A higher frequency in aortic lesions especially aortic stenosis, in contrast, an inverse association between CAD and aortic regurgitation (AR) was identified. The larger-sized coronary arteries, changes in the vascular endothelium and the coronary microcirculation may be responsible for the reduced prevalence of CAD in aortic regurgitant lesions.

Several Indian studies compared to western counterpart have low incidence of CAD among RHD. Gupta et al.⁴ and Jose et al.⁵ reported the prevalence of CAD as 7% and 12% respectively among Indian patients with RHD. A lower prevalence of CAD in Indian RHD patients as compared to western patients led to the conclusion that RHD might confer a degree of protection against the development of coronary atherosclerosis⁵. This was based on the fact that these patients had received prophylaxis for rheumatic fever with intramuscular antibiotics for 21-day periods over many years, and this might have had a protective antibacterial and anti-inflammatory effect on the genesis of coronary atherosclerosis¹³. Low incidence of CAD among RHD patients may also be related to the demographic, clinical and environmental characteristics of the population.

V. Conclusion

Unlike western patients, in India, a cut-off age of 40 years in males and women in postmenopausal age group can be used for performing coronary angiography in all RHD patients, because of lower prevalence of CAD based on multiple Indian studies and our study. Among RHD patients, mitral lesions have less propensity for CAD compared to aortic lesions. But, a paradox of higher incidence of CAD in AS patients with very lower incidence in AR patients is observed. Further studies are required to identify markers for lower risk of CAD in RHD patients similar to markers like high-sensitivity CRP seen in high risk CAD population.

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