


Original Research Article

# Incidence of coronary artery disease in patients with rheumatic heart disease undergoing surgery

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	International Archives of Integrated Medicine, Vol. 6, Issue 3, March, 2019. Copy right © 2019, IAIM, All Rights Reserved. Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>
	ISSN: 2394-0026 (P)                      ISSN: 2394-0034 (O)
	Received on: 27-02-2019                      Accepted on: 05-03-2019 Source of support: Nil                      Conflict of interest: None declared.
<b>How to cite this article:</b> B. Suresh Prabu, P. Pachaiyappan. Incidence of coronary artery disease in patients with rheumatic heart disease undergoing surgery. IAIM, 2019; 6(3): 206-211.	

## Abstract

**Background:** To know the incidence of significant coronary artery disease in rheumatic valvular heart patients undergoing preoperative valve replacement surgery by coronary angiogram. This very important prognostic indicator after surgery if we miss the CAD the morbidity and mortality was high.

**Aim:** To assess the CAD-related RHD in various valve involvement and associated risk factors like systemic hypertension and diabetic mellitus.

**Materials and methods:** In this study, we analyzed 100 patients undergoing preoperative coronary angiogram in our department to know the incidence of significant CAD. This study also detected a correlation between the CAD, various valve involvement, sex, comorbidities like DM, SHT and Dyslipidemia were analyzed and also the incidence of CAD with duration of disease, the age of the patients and associate with post CMC or PTMC.

**Results:** In this study, out of 100 patients undergone preoperative coronary angiogram, 8 had significant CAD. 5 patients were male and 3 were female and involvement of valves LCX was 4, LAD was 2, RCA was 1 and LMCA was 1 (p-value <0.05). In this study, the incidence of CAD was high in patients had comorbidities like DM, SHT, and dyslipidemia. Insignificant CAD group 2 had SHT, 2 had DM, 2 had both DM and SHT remaining 2 had no comorbidities. This study showed 5 patients of Aortic valve disease and 3 patients of Mitral valve disease had significant CAD.

**Conclusion:** From this study, the incidence of CAD in our department is 8% most common in males than females and Aortic valvular RHD patients are mostly affected than other valvular RHD. Incidence increased with Age and associated comorbidities.

## Key words

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Coronary Artery Disease, Rheumatic Heart Disease, Connective Tissue Disorders.

## Introduction

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Rheumatic heart disease (RHD) is the disease that occurs following rheumatic fever. It is a non – suppurative feature of  $\beta$  hemolytic streptococcal group A (GAS) pharyngitis [1]. It's an immunological disorder after GAS infection. It is presented as an inflammatory process of collagen fibrils and connective tissue. It presented as an inflammatory process of collagen fibrils and connective tissue. It mostly affects the heart, joints, and central nervous system [2]. It ends with RHDs. In developing countries, RHD is the main cause of morbidity and mortality. In India ARF and rheumatic heart disease is a health problem in children, adolescents, and young adults. In spite of advancement in cardiology ARF and RHD is a major burden sector of India because most of the health sector concentrating ACS [3]. Before 400 BC the written document is given by Hippocrates. the first criteria to diagnose RHD in 1944 by Jones after that only diagnosis and treatment were easy. Four periodic revisions, modifications were done till date. It was underdiagnosed and 1/2 of RHD not getting any prophylaxis [4]. Nowadays echo will provide a clue to diagnosing early. It is important to know the coronary anatomy before going to valve replacement surgery. In case of patients have significant stenosis in coronaries we definitely address the lesion at the time of valve replacement so that this study is very important to know the incidence of CAHD in the population [5]. Even though economic development in India still the incidence and prevalence are high compared to other developing nations it affects the younger age group that create big drawback for their family [6].

## Materials and methods

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Total of 100 patients having rheumatic valvular heart disease planed for valve replacement surgery undergoing preoperative coronary angiogram in multiple angulated views in the

Department of Cardiology, Govt. Mohan Kumar Mangalam Medical College, Salem. The study period was from October 2017 to December 2018.

**Inclusion criteria:** Patients with Rheumatic valvular heart disease planned for valve replacement surgery undergoing preoperative coronary angiogram and patients has involvement of any valve.

**Exclusion criteria:** Bicuspid aortic valve disease, Hb < 8gm/dl, Active cancer, CAD or Cardiomyopathy, Chemotherapy/ immunosuppressive drugs, Connective tissue disorders, Thyroid disorders.

Informed consent was obtained from each patient participating in this study. In each case, a detailed history was taken and particularly the duration of RHD, breathlessness and T2DM, Hypertension and treatment including the history of previous surgery or balloon valvotomy. Detailed physical examination including Height, weight BMI, pulse rate, BP all was recorded from each patient. The investigations like Hb, Blood sugar and urea, Serum creatinine all were collected from the patient records. ECG was analyzed to rule out IHD producing LV dysfunction. All patients posted for CAG were undergo detailed Echocardiogram by Philips IE 33 Echo machine used with a frequency of probe with 2.5 Mhz to do echo in parasternal long and short axis views and also in apical four chamber views. An echocardiogram was taken in the following modes: 2D mode and M Mode, Pulse wave Doppler, Tissue Doppler Imaging. LV EDD, LVESD, EF, IVSd, IVSs, PWDs, PWD, Left atrium size were all measured by Teicholz method and helped by eyeball assessment. To measure valve disease severity by various methods e.g. mitral valve orifice by planimetry and PHT and Aortic valve by continuous wave Doppler study and continuity equation.

**Statistical analysis:** The data was entered and managed on an Excel spread sheet and analyzed systematically using SPSS 6 Statistical software. All data were presented as frequency distribution and simple percentages. Descriptive statistics were presented in the form of mean SD for all continuous variables. Categorical variables were expressed as percentages and analyzed using the chi-square test. A p-value < 0.05 was considered to be statistically significant.

## Results

In this study total 100 RHD patients posted for preoperative coronary angiogram if anyone coronary artery involvement of 50% or more than that luminal narrowing (stenosis) was taken as positive for CAG. Total of 100 patients taken

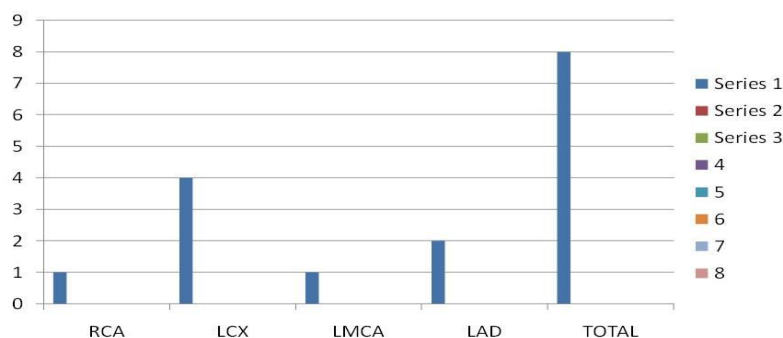
for the study of which mean age was 54 years. In sex differentiation, the male was 55 and female 45. In this study population, 16 patients had Systemic Hypertension, 12 patients had Type 2 Diabetic mellitus. In this study involvement of valve wise 28 had aortic valve disease, 44 had mitral valve disease and 28 patients had both mitral and aortic valve disease. This 100 samples total of 8 patients had a significant CAD of which males 5 and female 3 as per sex difference (**Table – 1**). In this involvement of LCX were 4 pts, LAD-2 pts, RCA-1 pt, and LMCA -1pt. in these 4 patients had pulmonary hypertension. The patients with significant CAD aortic valve were 5 and the mitral valve was 5 in numbers (**Graph – 1**).

**Table – 1:** Baseline characteristic of patients.

Characters	Numbers	Percentage
Male	55	55%
Female	45	45%
Typical angina	2	2%
Atypical angina	12	12%
Diabetic	15	15%
Systemic hypertension	14	14%
Aortic valve disease	28	28%
Mitral valve disease	44	44%
Aortic + Mitral valve	28	28%
Obesity	23	23%
Dyslipidemia	26	26%

**Graph – 1:** Distribution of cad in rheumatic heart disease.

## Distribution of CAD coronary vice



## Discussion

Rheumatic heart disease (RHD) is an important feature of acquired heart disease in children and young adults in developing countries (3/4 of the total population). RHD accounts for about 15 percent of all patients with failure in endemics [7]. It affects poor population mostly. The incidence was 6 times more common in the rural population than urban in various studies conducted in schools. These differences show the impact of socioeconomic factors on RHD [8]. The overall prevalence of CAD in patients undergoing valve replacement has been shown to vary widely from 9% to 41%. It must be kept in mind that the majority of these patients are elderly, have degenerative valve disease and have multiple coronary risk factors [9]. However, in India and other developing countries where the major etiology of VHD is rheumatic, the prevalence of coexistent CAD is much lower as compared to western patients. In this study, the overall prevalence of CAD in all groups was 8.0% which is much lower than in the western population [10]. It has been postulated that rheumatic fever may lead to arteritis in intramyocardial coronaries. However, it has not been proven and the actual prevalence of CAD in RHD patients is not more than in the general population [14]. In the present study, CAD was found in 8.0% of patients of RHD patients. The prevalence is much lower as compared to previous studies [11]. Marchand, et al. analyzed CAG of 100 patients with RHD and reported the prevalence of significant CAD to be 14%. In that study, CAG was performed in patients over the age of 50 years, those having angina or ECG signs of ischemia, which can explain the higher prevalence [12]. Otto CM, et al. reviewed medical records of 144 patients and found CAD in 25% patients of RHD. This may be related to the very high frequency of DM, HT, and dyslipidemia in the study population [13]. Jose, et al. [10] have reported a prevalence of CAD to be 12.2% in patients with RHD undergoing valve replacement. However, the baseline characteristics of patients with regards to CAD risk factors were not mentioned in the study by.

Also, the symptoms were not assessed in the study [14]. Rangel A, et al., in his study of 294 patients with rheumatic and non - rheumatic VHD reported that patients with rheumatic VHD had a lower prevalence of CAD (8.4%) when compared to those with non-rheumatic VHD (33.61%). The prevalence of CAD (8.4%) in this study is similar to that of our study (8%) in patients with rheumatic VHD. The prevalence of CAD in non-rheumatic etiology was still higher (33.61%) as compared to the present study (15.6%). This higher prevalence has been attributed to more frequency of male sex, older age and major coronary risk factors in non – rheumatic group. The prevalence of CAD in patients of DVD in most of the study was 20-30%. which is higher as compared to other groups. This is related to the fact that this population was characterized by a predominance of male sex and older age, in opposition to what was observed in other groups [15]. Typical angina was also significantly higher in the DVD group. In isolated degenerative aortic stenosis, the prevalence of CAD is reported to be as high as 37% in patients aged between 40 and 59 and 64% in those aged between 60 and 82 years, which was also much higher as compared to our study (23.4%). It is likely to be related to the genetic, racial and environmental factors [16]. Also, most patients in our study were from a lower socioeconomic status, where the prevalence of CAD would likely to be lower. Patients with non – valvular heart disease are not enrolled in this studies. In present study, only one patient was found to have LMCA disease. However, the patient was 72 years old, smoker and had typical angina on exertion [17]. Hence, it can be concluded that preoperative angiography in this subset of patients can be restricted to those patients who are older, symptomatic and or have another major risk factor for CAD [18]. However larger studies focusing on these issues are in patients with age required to further enlighten the exact prevalence and need for CAG in these patients. Only 4.8% of patients <50 years of age as compared to 12.2% of patients with ≥50 years of age. In patients of <50 years CAD was found

only in patients with  $\geq 2$  major coronary risk factors [19, 20].

## Conclusion

This study provides data on the incidence of CAD in Indian patients with valvular Rheumatic heart disease undergoing surgical treatment. The overall prevalence of significant CAD in this group of patients was 8.0%. The incidence of CAD in patients with Aortic valve disease is high than the Mitral valve. Patients have DM/SHT/Obesity and advanced age is a higher rate of CAD than others. The involvement of vessel LCX has been more affected than other vessels and mostly single vessel disease. The Double and Triple vessel disease is not seen in this study.

## Acknowledgments

Authors would like to thank the Department Cardiology and Cardiothoracic Surgery faculties, Govt. Mohan Kumaramangalam Medical College, Salem for their humble support to complete the research work.

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