Research Article

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Prevalence of Coronary Artery Disease in Rheumatic Patients Undergoing Valve Surgeries in Nepal

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ABSTRACT

Background: *Preoperative coronary angiogram is routinely performed in high risk age-group in rheumatic population undergoing valve surgery at our centre. Preoperative angiogram itself carries risks. We sought to evaluate the prevalence of coronary artery disease in those patients so that recommendations on preoperative angiogram can be made.*

Methods: *We reviewed medical records of patients above 35 years who underwent valve surgery from January 2015 to July 2017. We defined significant coronary artery disease as ≥50% stenosis in one or more major coronaries. Overall prevalence and age-specific prevalence were determined.*

Results: *A total of 675 patients above 35 years of age undergoing valve surgery were assessed for eligibility. Among them, 563 (84.3%) patients had rheumatic heart disease. However, only 337 patients had undergone preoperative angiogram and were included in the analysis. Overall prevalence of coronary artery disease was 13(2.3%). Age-specific prevalence was as follows: age-group 40-50 years 0 of 127 patients (0%), 51-55 years 6 of 95 patients (6.3%), 55-60 years 1 of 56 patients (1.7%), and more than 60 years 6 of 52 patients (11.5%). Prevalence did not significantly differ between male and female population.*

Conclusion: *The prevalence of coronary artery disease in rheumatic patients requiring valve replacement seems to be lower compared to the available prevalence data of general Nepalese population. There were no cases of angiographically significant coronary heart disease in the age between 40-50 years. However, the results of this study should be inferred with caution and prospectively planned study with risk factor analysis is warranted.*

Keywords

Coronary angiogram, Prevalence, Rheumatic heart disease, Valve replacement surgery.

Introduction

Rheumatic Heart Disease (RHD) which has been nearly eradicated in high-income countries is still one of the major health burdens in our part of the world. It ranks among the important non-communicable diseases. Many patients with valvular and non-valvular heart disease have concomitant coronary artery disease (CAD). The American College of Cardiology/American Heart Association (ACC/AHA) guidelines for coronary angiography (CAG) in Valvular Heart Disease (VHD) states that CAG is indicated before valve intervention in patients with symptoms of angina, objective evidence of ischemia, decreased LV systolic function, history of CAD, or coronary risk factors (including men age >40 years and postmenopausal women). Once the diagnosis of associated coronary obstruction has been made, it warrants intervention. Hence CAG is usually performed if there is suspicion of CAD or after a certain age before valvular heart surgeries.

However, in our context, the major etiology of VHD is rheumatic. And in clinical practice, we have observed a low prevalence of CAD among patients with valvulopathies, especially those with rheumatic etiology. But there are only limited data regarding optimal strategies for diagnosis and treatment of CAD in such

patients [1]. The decision regarding strategies for diagnosis of CAD has been driven by data from smaller published series of patients undergoing surgical treatment with degenerative etiology for VHD (1). The studies in rheumatic population are yet to be done. Although, preoperative CAG has a very low mortality, itself is an invasive procedure and carries risk. It has an incidence of complications that vary from less than 1% to as much as 5%. When such complications occur, they can have significant adverse effects. It is also costly and non-morbidity-free method. In our opinion, the routine indication of preoperative CAG based solely on the age criterion must be reconsidered. This observational retrospective study is an attempt to quantify the prevalence of CAD in rheumatic population undergoing valve surgery.

Methods

This study retrospectively reviewed the hospital records of consecutive patients above 35 years with different cardiac valvular etiologies who underwent valve surgery from January 2015 to July 2017 in the department of cardiothoracic surgery in Shahid Gangalal National Heart Centre. All patients with rheumatic etiology in the discharge diagnosis were included in the analysis. We defined significant CAD as ≥50% Stenosis in one or more major coronaries. Overall prevalence and age-specific prevalence were determined. Patients with known case of CAD, prior CABG or percutaneous coronary intervention or age <35 years were excluded from the study.

Statistical analysis

The data was entered and managed and analyzed systematically using SPSS 16 statistical software (SPSS Inc., Chicago, USA). 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

675 patients above 35 years of age undergoing valve surgery were assessed for eligibility. Among them, 563 (84.3%) patients had RHD. However, only 337 patients had undergone preoperative angiogram and were included in the analysis.

The age distribution of the participants has shown that, the mean age of the study patients was 53.29 ± 7.9 years. Males constituted 155(46%) of the study population compared to 182 (54%) females. The most common valve involved in study participants was mitral (54%), followed by aortic (14.5%) and double valve (26.7%) (Table 1). Overall prevalence of CAD (>50%) was only 13 (2.3%) among study population (Table 1). Age-specific prevalence was as follows: age-group 40-50 years 0 of 127 patients (0%), 51-55 years 6 of 95 patients (6.3%), 55-60 years 1 of 56 patients (1.7%), and more than 60 years 6 of 52 patients (11.5%) (Table 3). Among them 7 (2.1%) had mitral valve involvement and underwent concomitant mitral valve procedure. Four (1.2%) had aortic involvement and underwent concomitant aortic valve replacement. And 3(0.9%) underwent concomitant double valve replacement (Table 1). Prevalence did not significantly differ between male and female population. The angiographic disease distribution of >50% Stenosis was found in 13(2.3%). Among them, 2(0.4%) had involvement of left main coronary artery, 4(0.7%) had single vessel disease, 6(1.1%) had double vessel disease, and 2(0.4%) had triple vessel disease (Table 2).

Demographics and Patients Characteristics	Number (Percent)
Age, yr (mean ± SD)	53.29 ± 7.9
Sex, male	155 (46%)
Isolated Mitral Valve Surgery	89 (26.4%)
MVR+ TV Repair	91 (27%)
Isolated Aortic Valve Replacement	50 (14.5%)
Double Valve Replacement	64 (19%)
DVR+TV Repair	26 (7.7%)
Redo MVR	2 (0.6%)
Prevalence of CAD(>50% Stenosis)	13 (2.3%)
MVR+CABG	7 (2.1%)
AVR+CABG	4 (1.2%)
DVR+CABG	3 (0.9%)

Table 1: Demographics and Patients Characteristics.

Angiographic Disease Distribution of >50% Stenosis	Number (Percent)
Left main coronary Disease	2 (0.4%)
Single vessel disease	4 (0.7%)
Double vessel disease Double Vessel	6 (1.1%)
Triple vessel disease e	2 (0.4%)

Table 2: Angiographic Disease Distribution of >50% Stenosis.

Age Group (years)	Number (Percent)
40-50	0 (0%)
51-55	6 of 95 (6.3%)
56-60	1 of 56 (1.7%)
> 60	6 of 52 (11.5%)

Table 3: Age-specific Prevalence.

Discussion

The main finding of the study was a low prevalence of coronary artery disease among the patients with rheumatic heart disease undergoing valve surgeries. At our centre, CAG is usually performed routinely in RHD patients prior to valve replacement surgery if there are symptoms, risk factors of CAD or in male patient >40 years and postmenopausal female. Assessment of CAD before valve replacement is important in patients who fulfill ACC/AHA criteria in order to determine need of concomitant surgical revascularization (Figures 1-4). Guidelines for CAG in patients with VHD are primarily based on studies wherein majority of the patients had degenerative etiology for VHD [1]. Data regarding the coexistence of CAD in patients with RHD is very scarce and there has been no large studies done in this context. The strength of this study is that we have evaluated patients only with rheumatic etiology, which is the most common form of valvular heart disease

in the developing countries.

Recommendations	COR	LOE
Coronary angiography is indicated before valve intervention in patients with symptoms of angina, objective evidence of ischemia, decreased LV systolic function, history of CAD, or coronary risk factors (including men age >40 years and postmenopausal women)	I	C
Coronary angiography should be performed as part of the evaluation of patients with chronic severe secondary MR	I	C

Figure 1: 2017 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease. (2014 guideline with 2017 focused update incorporated).

Recommendations	COR	LOE
Surgery without coronary angiography is reasonable for patients having emergency valve surgery for acute valve regurgitation, disease of the aortic sinuses or ascending aorta, or IE	IIa	C
CT coronary angiography is reasonable to exclude the presence of significant obstructive CAD in selected patients with a low/intermediate pretest probability of CAD. A positive coronary CT angiogram (the presence of any epicardial CAD) can be confirmed with invasive coronary angiography	IIa	B

Figure 2: 2017 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease. (2014 guideline with 2017 focused update incorporated).

Recommendations	COR	LOE
CABG or percutaneous coronary intervention is reasonable in patients undergoing valve repair or replacement with significant CAD (≥70% reduction in luminal diameter in major coronary arteries or ≥50% reduction in luminal diameter in the left main coronary artery.	IIa	C

Figure 3: 2017 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease. (2014 guideline with 2017 focused update incorporated).

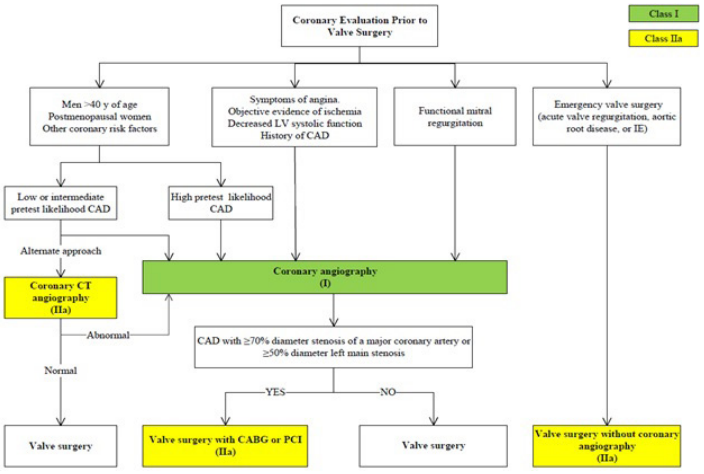

Figure 4: Evaluation of the Coronary Anatomy. 2017 AHA/ACC Guideline for the Management of Patients with Valvular Heart Disease (2014 guideline with 2017 focused update incorporated).

The previous studies have reported various prevalence rates for coronary artery disease in patients with valvular heart disease [1-14]. The overall prevalence of CAD in patients undergoing valve replacement has been shown to vary widely from 9% to 41%. In a study, led by Ganesh Narayana et.al. done in 372 patients, found that the incidence of CAD was 25% among study population Males were 2.93 times more at risk of CAD, compared to females [2]. Cholenahally et.al [3], conducted a study in 300 patients and found the overall prevalence of CAD in the rheumatic population to be 8.7% (total number). Studies by Jose et.al, Narang et al, Li et.al and Ayaz Hussain have reported prevalence of CAD to be 12.2%, 11% and 10.9% and 31.3% respectively in patients with RHD undergoing valve replacement [1,4,5,6]. DD Kruczan et al., [7] in his study of 294 patients with rheumatic and non-rheumatic VHD reported that patients with rheumatic VHD had lower prevalence of CAD (4%) when compared to those with non-rheumatic VHD (33.61%). A Turkish study [8] found that in patients undergoing valve replacement due to rheumatic involvement, 19% had concomitant significant CAD. Emren et al. [9] reported that CAD was detected in 26.4% of patients with mitral stenosis and 57.7% of patients with aortic stenosis. Of the patients with mitral insufficiency, 41.9% had CAD, and 44.4% of the patients with aortic insufficiency had CAD. Whereas, in our study, the prevalence did not significantly differ between the patients who underwent mitral and the aortic valve surgery. As in our context, where the major etiology of VHD is rheumatic, the prevalence of coexistent CAD is much lower as compared to western patients. This observational retrospective study identifies the overall prevalence of significant coronary Stenosis (> 50%) is only 13 (2.3%) which is very low compared to the studies that have been done so far. In general Nepalese population, the prevalence of CAD is estimated to be around 5% [15].

There was no positive CAD in patients in the age group of 40-50. There could be a multi-factorial etiology behind this result. However, these findings lead us to question whether we have been doing unnecessary intervention and exposing our patients to invasive procedure. And also, another question that we have raised is whether we need to revise the guidelines at least in the context of Nepalese population. The age factor, as we can see is that in the mean age of patients undergoing valve surgeries is very young in compared to the mean age of patients in the western studies. Also, the geographical factor that many patients who come for valve replacement in Nepal are from hilly and mountainous region could also affect the result. This study, however, only advocates the magnitude of the problem.

However, the unfavorable impact of untreated CAD on perioperative and long term postoperative outcome makes preoperative identification of CAD mandatory even in asymptomatic patients. In few studies, frequent association of RHD was seen with the occurrence of CAD with poor prognosis.

This brings us to the limitations of this study. The main limitation is the retrospective nature of the study. Our research did not study the prevalence of risk factors for CAD. Further prospective study should be planned with analysis of risk factors for CAD with a larger population and evaluation of symptoms of CAD. The deleterious effects of coronary angiogram and its effect on

perioperative morbidity and mortality should also be evaluated.

Conclusion

The prevalence of CAD in rheumatic patients requiring valve replacement seems to be lower compared to the available prevalence data of general Nepalese population. There were no cases of angiographically significant CAD in the age between 40-50 years. However, the results of this study should be inferred with caution and prospectively planned study with risk factor analysis is warranted.

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