Original Article

Coronary artery disease in patients undergoing valve replacement at a tertiary care cardiac centre

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Abstract

Objective: To determine the prevalence of coronary artery disease in patients undergoing valve surgery at a tertiary care cardiac centre.

Methods: The medical records of 144 consecutive patients who underwent mitral, aortic or dual (mitral and aortic) valve replacement surgery at the Tabba Heart Institue between January 2006 to December 2008 were retrospectively reviewed. All patients underwent coronary angiogram. Significant coronary artery disease (CAD) is defined as coronary stenosis of ≥ 50%.

Results: There were 74 (51.4%) males and 70 (48.6%) females in the study. The mean age was 51.64 ± 11 years. Of all, 73 (50.7%) underwent mitral valve replacement, 47 (32.6%) had aortic and 24 (16.7%) had dual valve replacement.

Out of 144 patients, 99 (68.8%) had <50% coronary stenosis and remaining 45 (31.3%) had ≥ 50% stenosis. In patients who had undergone mitral valve replacement (MVR), significant coronary disease was found in 32.9%, whereas in patients who had undergone aortic valve replacement (AVR) and dual valve replacement (DVR) the prevalence of coronary disease was 31.9% and 25% respectively.

Conclusions: Our results suggest that the overall prevalence of coronary artery disease in patients undergoing valve surgery in our population is comparable with prevalence reported in international data.

Keywords: Coronary artery disease, Prevalence, Rheumatic heart disease (JPMA 61:340; 2011).

Introduction

Valvular heart disease is a growing problem particularly in developing countries. It is important to consider that spectrum of valve disease in developing world is different from west as the predominant etiology for valve replacement in our part of the world is rheumatic valvular disease whereas degenerative valve diseases are at the top of list in the west. Rheumatic heart disease is a major health issue in developing countries with an incidence of over 1 per 1000.[1] In children and young adults it is the most common form of valvular disease requiring surgery.[2] In one local study conducted in Pakistan, the prevalence rate of echocardiographic rheumatic heart disease was estimated to be 5.7/1000.[3]

American College of Cardiology (ACC)/American Heart Association (AHA) recommends that coronary angiography should be performed before valve surgery in men aged ≥ 35 years, women aged ≥ 35 years with coronary risk factors and postmenopausal women.[4]

The prevalence of CAD in patients undergoing valve replacement is 20-40% in developed countries.[5] Study by Ottervanger and colleagues from Netherlands showed that CAD was found in upto 40% of patients who had undergone AVR, however this must be kept in mind that these are elderly patients with mean age of 65±11 years with multiple coronary risk factors and degenerative aortic valves.[6] In patients undergoing catheterization before MVR, CAD was found in 33% of patients.[7]

No study was found after robust literature search, addressing the prevalence of CAD in patients undergoing valve surgery in our population. The primary aim of our study was to determine an over all prevalence of CAD in patients undergoing valve replacement. Our secondary objective was to find CAD prevalence in rheumatic valvular disease patients as it is the most common underlying reason for valve surgery in our population.

Patients and Methods

Medical records of 144 consecutive patients undergoing valve replacement surgery at Tabba Heart Institute from January 2006 through December 2008 were reviewed retrospectively. All males ≥ 35 years , women ≥ 35 years with coronary risk factors and postmenopausal women who required pre-surgical angiogram for evaluation of CAD as per ACC/AHA guidelines were included in the study.[4]

Patients who needed emergent valve replacement, surgeries were not delayed for assessment of coronary

anatomy and were excluded from the study. Similarly patients with history of prior revascularization were also excluded.

All coronary angiograms were performed and reported by well trained and experienced staff cardiologists. Significant coronary disease was defined as ≥ 50% of luminal narrowing. Subsequent valve replacement surgery was performed and concomitant coronary artery bypass surgery (CABG) was also performed when required on the basis of coronary anatomy by qualified cardiothoracic surgeons.

A performa was designed to collect information including: age, gender, history of diabetes (defined as a fasting glucose ≥ 126 mg/dl or on treatment), hyperlipidaemia (fasting cholesterol ≥ 200 mg/dl or on treatment), hypertension (systolic blood pressure ≥ 140/90 mmHg or on treatment) and smoking. Left ventricular function was visually estimated by transthoracic echocardiogram. Etiology of valve disease was also recorded i.e. rheumatic heart disease, degenerative valve disease, infective endocarditis and valve prolapse. Angiographic data was collected including presence and absence of significant coronary stenosis (≥ 50% luminal narrowing) and number of coronaries involved.

The data was also collected on the type of valve replaced (mitral, aortic or dual valve replacement) and need of concomitant CABG.

The primary aim was to determine over all prevalence of CAD in patients undergoing valve replacement surgery. Secondary objective was to determine the prevalence of CAD in patients undergoing valve replacement for underlying rheumatic heart disease. Valvular lesions were defined as rheumatic on the basis of echocardiographic and surgical findings (diffuse fibrous thickening leading to leaflet rigidity, commissural fusion, thickened and shortened chordae tendinae, calcific deposits on leaflets) supported by the evidence of past group A streptococcal throat infection and/or history of acute rheumatic fever.[8]

All the variables were entered into the Statistical Package for Social Sciences software, version 14 (SPSS Inc) for data analysis. Descriptive statistics were computed and represented as mean and standard deviation for continuous variables like age.

Categorical variables were reported in percentages for the gender, diabetes, hypertension, dyslipidaemia, smoking, etiology of valve disease, valve replaced (MVR, AVR, DVR), angiographic disease (≥ 50% stenosis), number or coronaries involved, coronary artery disease in patient's rheumatic heart disease and need for concomitant CABG.

Results

Total of 144 patients were included in this study. (Table-1) shows the baseline demographic and clinical characteristics of the studied cohort. There were 74 (51.4%) males and 70 (48.6%) females in the study. The mean age was 51.64 ± 11 years. Seventy three (50.7%) patients underwent mitral, 47 (32.6%) aortic and 24 (16.7%) dual valve replacement.

The results depicted that 45 (31.2%) patients had ≥ 50% coronary stenosis while 99 (68.8%) had <50% coronary stenosis. Patients with single vessel disease (SVD) were 12 (26.6%), whereas those with double vessel disease (DVD) and triple vessel disease (TVD) were 14 (31.1%) and 19 (42.2%) respectively (Table-2). Eight (66.6%) patients with

Table-1: Baseline characteristics of patients (n=144).

Characteristic	Mean ± SD	
Age (year)	51.64 ± 11.0	
	n	**(%)**
Male	74	51.4
Female	70	48.6
Diabetes	35	24.3
Hypertension	67	45.8
Dyslipidaemia	49	34.0
Smoking	35	24.3
Etiology:		
Rheumatic	102	70.8
Degenerative	21	14.6
Valve prolapse	14	9.7
Infective endocarditis	7	4.9
Valve Replaced:		
MVR	73	50.7
AVR	47	32.6
DVR	24	16.7

MVR: Mitral Value Replacement. AVR: Atrial Valve Replacement. DVR: Dual Valve Replacement.

Table-2: Angiographic data (n=144).

Angiographic disease	n	(%)
< 50 % stenosis	99	68.8
≥ 50% stenosis	45	31.2
Distribution of ≥ 50% stenosis:		
SVD	12	26.6
DVD	14	31.1
TVD	19	42.2

SVD: Single Vessel Disease. DVD: Double Vessel Disease. TVD: Triple Vessel Disease.

Table-3: Coronary Artery disease in patients with rheumatic valve disease.

	Valve replaced			
	M VR	**AVR**	**DVR**	**Total**
≥ 50 % coronary stenosis	11 (23.0%)	10 (32.3%)	5 (21.2%)	26 (25.0%)

MVR: Mitral Valve Replacement. AVR: Atrial Valve Replacement. DVR: Dual Valve Replacement.

SVD, 12 (85.7%) with DVD and all patients with TVD underwent CABG. Significant CAD was identified in 32.9% of patients who underwent MVR whereas it was identified in 31.9% and 25% of patients who underwent AVR and DVR respectively.

The studied cohort suggested that 102 (70.8%) patients had valve replacement due to rheumatic valvular disease. Significant coronary stenosis was identified in 26 (25%) of these patients. In this subgroup of patients with rheumatic heart disease, CAD was found in 23%of patients who had MVR, 32.3% and 21.2% in patients with AVR and DVR respectively (Table-3).

Discussion

Assessment of CAD before valve replacement is important in patients who fulfill ACC/AHA criteria in order to determine need of concomitant surgical revascularization. In previous studies the incidence of angiographically proven CAD in acquired valvular diseases has been shown to vary widely, from 9-41%.[9] In aortic stenosis the incidence of CAD was reported to be as high as 37%.[10]

A prospective study evaluating angina, coronary risk factors and CAD in 387 patients with valvular heart disease, revealed that angina was present in 36.6% of the study population.[11] In patients undergoing catheterization before mitral valve replacement CAD was found in 33%.[7] Our data is consistent with this finding. We found significant coronary stenosis (≥ 50%) in 31.3% of patients undergoing valve replacement.

Considering the overall prevalence of rheumatic heart disease in our population it is important to identify presence of significant CAD in this subgroup of patients. However the data regarding the coexistence of CAD in patients with rheumatic valvular disease is limited. Marchant E et al[12] analyzed the coronary angiographic results of 100 patients with rheumatic valvular disease and reported the prevalence of significant CAD (≥ 50% stenosis) to be 14% in the study population, however it is important to mention that they performed coronary angiogram only in those patients who were >50 years of age and those having angina or electrocardiographic signs of ischaemia.

In a study including 82 mitral stenosis patients undergoing coronary angiography before valve surgery, CAD was documented in 26% patients.[13] A Turkish study found that in patients undergoing valve replacement due to rheumatic involvement, 19% had concomitant significant CAD.[14] In our study significant CAD in patients with underlying rheumatic heart disease was 25% which is consistent with international data.[14] We also found that in patients undergoing valve surgery for rheumatic valve disease, prevalence of CAD was 23% in patients undergoing MVR whereas it was 32.3% and 21.7% in patients undergoing AVR and DVR respectively.

Conclusion

Our study provides data on the prevalence of angiographically significant CAD in patients undergoing valve surgery and also identifies the prevalence of CAD in a subset of patients with rheumatic heart disease which is the most common cause of valve replacement in our population.

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