FREQUENCY OF ANGIOGRAPHICALLY SIGNIFICANT CORONARY ARTERY DISEASE IN PATIENTS UNDERGOING VALVE REPLACEMENT SURGERY WITH OR WITHOUT RISK FACTORS FOR ATHEROSCLEROSIS

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ABSTRACT

Objective: To determine the frequency of angiographically significant coronary artery disease in patients undergoing valve replacement surgery with or without risk factors for atherosclerosis.
Study Design: A single center, descriptive cross-sectional study.
Place and Duration of Study: Adult Cardiology department of AFIC & NIHD from 1st Jan 2017 to 30th Jun 2017.
Material and Methods: All consecutive patients who underwent coronary angiography before valve replacement /repair surgery were included in the study. Excluded Patients were those who had previous valve surgery, known CAD, post CABG and Post PCI patients, associated risk factors like diabetes, hypertension, dyslipidemia, family history of coronary artery disease, smoking and BMI of the patients were recorded. All the information was entered in an annexed pro-forma. All the collected data was entered and analyzed using the SPSS-23.
Results: A total of 136 patients underwent coronary angiography before valve replacement/repair surgery during study period and were recruited. Mean Age of the patients was 48.23 ± 5.2 years with minimum age 31 years and maximum 67 years. There were 80 (58.8%) male patients while 56 (41.2%) female patients. Smoking was found to be the most prevalent risk factor 98 (72.1%) followed by family history 67 (49.3%), hypertension 65 (48.0%), Obesity (BMI≥ 30) 63 (46.3%), diabetes mellitus 42 (30.9%) and dyslipidemia 35 (25.7%). Out of total patients, 63 (46.3%) patients had significant CAD. 33 (24.3%) had AVR, 89 (65.4%) patients had MVR while 14 (10.3%) patient had DVR.
Conclusion: Our study shows that significant proportion of patients above 40 years of age have asymptomatic underlying CAD (46%), this frequency of angiographically significant CAD in our patient population signifies pre valve replacement screening by coronary angiogram so that coronary bypass grafting can be offered to those patients concomitantly with valve replacement.

Keywords: Angiography, Atherosclerosis, Coronary artery disease.

INTRODUCTION

Coronary artery disease is the leading cause of death in Asian population 4.9%, compared to 7.0% of the total population and this prevalence is expected to increase globally[1]. Valvular heart disease is a growing problem particularly in developing countries like Pakistan but interestingly with a different spectrum of valvular disease than west, as we all know that most of valvular lesions are degenerative in western population while in developing countries the commonest etiology for valvular lesions is rheumatic valvular disease[2]. Among those patients with valvular heart disease many have concomitant coronary artery disease (CAD) as well, but considering our spectrum of valvular disease there are only limited data regarding optimal strategies for diagnosis and treatment of CAD in such patients[3]. The prevalence of CAD in patients undergoing valve replacement / repair is 30% in developed countries[4]. It is important to devise a screening strategy for coronary artery disease in patients with rheumatic valvular disease undergoing valve replacement surgery in our population subgroup considering more and more number of patients from that subgroup are presenting nowadays to tertiary care centers with CAD.

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However, the data regarding that subgroup of patients with concomitant CAD is limited. Marchant et al studied 100 patients with rheumatic valvular disease undergoing valve replacements and reported the prevalence of significant coronary artery disease (>50% stenosis) 14% in that subgroup of population[5], however, it is important to consider that coronary angiograms were only performed in patients with clinical evidence of ischemia (Angina, ECG changes suggestive of ischemia) or who were >50 years of age as incidence of CAD rises significantly after 50 years of age in general population studies. In another study by Bozbas et al, of 346 patients with rheumatic valvular disease who underwent surgery, 218 (63%) who were found eligible for coronary angiogram as per guidelines, 18.8% of them had significant coronary artery disease[6]. However, it was reported that out of them only seven patients were <50 years of age with the youngest being a 40 year old male with history of angina pectoris. They concluded that in patients less than 40 years of age if there was no history of angina or any coronary risk factors then coronary angiography can be omitted in such patients. Comparing patients with mitral stenosis CAD was found to be more common in patients with AS[9]. Among those patients with AS and history of angina the prevalence of coronary artery disease was reported from 40 to 80% in different studies[7,8]. Coronary artery disease often coexist with hemodynamically compromised aortic stenosis[8].

In another study of > 40 years of age patients with rheumatic heart disease, planned for valve replacement/repair and underwent coronary angiography. 46 (12.2%) patients out of total 376 were found to have significant CAD. Among those patients 13.5% had mitral valve disease, while 15.3% patients had aortic valve disease and 9% of them had combined mitral as well aortic valve disease[10]. In another study. Significant CAD was found in 7% of cases, and its prevalence was 3% in mitral, 10% in aortic, and 6% in combined mitral and aortic valve disease[11]. Patients with CAD are older than patients without significant CAD. In addition to that risk factors like smoking, hypertension, diabetes mellitus and dyslipidemia were more prevalent among patients with significant CAD[12]. A significant reduction in mortality is seen in such patients with aortic stenosis who had CAD and underwent concomitant valve replacement and CABG. Therefore, it is desirable to identify CAD in patients presenting for valve surgery[13,14].

American College of Cardiology (ACC)/ American Heart Association (AHA) recommendations for patients with planned valve replacement surgery is to undergo coronary angiography before surgery if they have history of angina or any objective evidence of coronary ischemia, impaired LV systolic function, risk factors for coronary artery disease including men >40 years age or postmenopausal women[15]. The purpose of this study is to determine the frequency of significant CAD in patients undergoing valve replacement surgery in our population considering our spectrum of valvular disease is different than western population so as to determine the need for concomitant CABG surgery or not.

MATERIAL AND METHODS

A descriptive cross-sectional study was carried out at department of Cardiology at Armed Forces Institute of Cardiology & National Institute of Heart Disease, Rawalpindi from 1st January 2017 to 30th June 2017 through consecutive non probability sampling. All patients of either gender who underwent coronary angiography before valve replacement surgery were included in the study. Excluded Patients were those who had prior valve surgery, known CAD patients, post CABG patients and Post PCI patients. All patients were assessed for eligibility and enrolled in study according to inclusion criteria after informed consent. Permission from the institutional ethical review board was taken before the commencement of study. Risk factors like diabetes, hypertension, dyslipidemia, family history of coronary artery disease, smoking and BMI of the patients were

recorded. All the patients planned for Valvular heart surgery meeting the inclusion criteria underwent coronary angiography before surgery and their significant findings were noted. All the information was entered in a annexed pro-forma. All the collected data was entered and analyzed using the SPSS version 23.

RESULTS

Continuous variable such as age was reported as mean ± standard deviation while categorical variables such as gender, diabetes, hypertension, family history of premature coronary artery disease, obesity, dyslipidemia, smoking and type of valve surgery were reported using frequency and percentages Frequency of angiographically significant CAD was also recorded as percentage. Confounding factors and interactions were addressed using stratified analysis for variables such as age, gender, family history of premature coronary artery disease, obesity, smoking and diabetes.

Total 136 patients were recruited in the study. Mean Age of the patients was 48.23 ± 5.2 years with minimum age 31 years and maximum 67 years. There were 80 (58.8%) male patients while 56 (41.2%) female patients. Out of total patients, 63 (46.3%) patients had significant CAD. 33 (24.3%) had AVR, 89 (65.4%) patients had MVR while 14 (10.3%) patient had DVR as shown in table-I, Smoking was found to be the most prevalent risk factor 98 (72.1%) followed by family history 67 (49.3%), hypertension 65 (48.0%), Obesity (BMI≥ 30) 63 (46.3%), diabetes mellitus 42 (30.9%) and dyslipidemia 35 (25.7%).

Chi-square test was applied to find out the association between Type of Valve Surgery and age groups. Association was found to be statistically significant with *p*-value<0.001 as shown in table-II.

Table-I: Showing baseline and risk factors profile.

Variables	n (%)
Age	(mean ± SD) 48.23.98 ± 5.2 years (Range) 31-67 years
Gender	
Male	80 (58.8%)
Female	56 (41.2%)
Family History of CAD	67 (49.3%)
Hypertension	65 (48.0%)
Obesity(BMI≥30)	63 (46.3%)
Smoking History	98 (72.1%)
Diabetes Mellitus	42 (30.9%)
Dyslipidemia	35 (25.7%)
Type of Valve Surgery	
AVR	33 (24.3%)
MVR	89 (65.4%)
DVR	14 (10.3%)
Significant CAD	63 (46.3%)

Table-II: Distribution of type of valve surgery with respect to age groups.

Type of Valve Surgery	Age Group <40 years	Age Group ≥ 40 years	*p*-value
AVR	-	33 (24.3%)	<0.001
MVR	52(38.2%)	37 (27.2%)	
DVR	-	14 (10.3%)	

DISCUSSION

Assessment of significant CAD is of utmost importance in patients undergoing for valve replacement surgeries beforehand who fulfill AHA criteria for prescreening by coronary angiogram in order to know if there is any need for concomitant coronary artery bypass grafting[4]. In our study we found that the frequency of CAD was 58.8% among study population Males were more at risk of CAD, compared to females. People with smoking history, diabetes mellitus, hypertension, Dyslipidemia and symptoms of angina also had increased risk of CAD in study population and this was similar to various studies across the globe[7,12,14]. In Sonmezetal study[10], out of 760 patients (357 males, 403 females; mean age 54.4 ± 18.1 years) planned for valve replacement surgeries and underwent coronary angiography between 1995 and 2000 were enrolled retrospectively. Significant CAD was reported in 46.3% of patient, the commonest valve lesion was aortic stenosis. Among them CAD was not seen commonly in patients <40 years of age. The highest correlation found was between CAD and smoking, family history of CAD, followed by hypertension, obesity, DM and hyperlipidemia. Li et al[9] studied consecutive 651 patients aged >40 who were scheduled for valve surgery underwent diagnostic coronary angiography. Seventy-one male patients and 17 females were detected as with CAD. The atheromatous lesion mostly involved the left descending branch (38.12%), and 38 patients (53.52%) showed lesions in 2 or more branches. The prevalence rates of diabetes mellitus and hypertension in the CAD group were 32.39% and 29.58% respectively, both significantly higher than those in the non-CAD[9].

In Jose et al[6] study out of 376 patients who underwent diagnostic angiograms before valve replacement surgery the prevalence of coronary artery disease in subgroup of patients with rheumatic heart disease was reported around 12.2%[11]. In another study by altar etal, of 1075 patients (658 females, 61.2%; mean age: 53.2 ± 9.9 years) the prevalence of CAD was found 11.1%[11]. Ayazetal showed in his retrospective study that, out of 144 patients, 99 (68.8%) found to have <50% coronary stenosis and remaining 45 (31.3%) had >50% stenosis. Among them 32.9% of patients were found to have significant CAD who underwent MVR, whereas 31.9% underwent AVR while 25% of patients with dual valve replacement were found to have coronary artery disease[9]. A prospective study of 387 patients with coronary evaluation for risk factors with valvular heart disease, revealed that 36.6% of the study population had angina[10]. Whereas, in our study only 6.5% of the subjects with CAD had reported angina in the study population.

CONCLUSION

Our study shows that significant proportion of patients above 40 years of age have asymptomatic underlying CAD (46%). This being of therapeutic as well as of prognostic importance, the frequency of angiographically significant CAD in our patient population signifies pre valve replacement screening by coronary angiogram so that coronary bypass grafting can be offered to those patients concomitantly with valve replacement.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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