Prevalence of Significant Coronary Artery Disease in Rheumatic Heart Disease Patients Undergoing Preoperative Coronary Angiography, Tanta University Hospital Experience

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Abstract

Background: *presence of significant coronary artery disease with rheumatic valvular heart disease patients requiring surgical valve intervention increases morbidity and mortality of such patients.*

Aim of the study: *to study the prevalence of significant coronary artery disease in patients undergoing preoperative coronary angiography in cardiology department, Tanta university hospital.*

Patients and Methods: *during the period from January 2015 to May 2016 all patients referred to our department to perform diagnostic coronary angiography before doing cardiac surgery for valvular rheumatic heart disease were included in the study. 96 patients were included. 51 patients were males and 45 patients were females.*

We did echocardiography and coronary angiography (CAG) for all of them.

Results: *of these 96 patients; 27 patients had severe aortic regurgitation, 23 patients had severe mitral regurgitation, 17 patients had severe aortic stenosis, 16 patients had combined lesions and 13 patients had severe mitral stenosis.*

10 male patients and 6 female patients showed significant coronary artery disease in coronary angiography. 8 patients showed single vessel disease, 5 patients showed two vessel disease, and 3 patients showed 3 vessel disease.

Conclusion: *our study showed that the prevalence of coronary artery disease in patients undergoing preoperative diagnostic coronary angiography was 16.66%. Such patients should be treated correctly to decrease their morbidity and mortality.*

Introduction

Rheumatic heart disease (RHD) is a common health problem in the developing world, as it causes morbidity and mortality for both children and adults [1]. With progression of the disease some patients with valvular heart disease are indicated for surgical intervention [2].

Many patients with valvular heart disease have concomitant significant coronary artery disease (CAD), but there is limited data about the strategy for diagnosis and treatment of such group of patients [3]. Untreated CAD has its unfavorable effect on both preoperative and postoperative outcome of patients with valvular heart disease

and this makes the diagnosis of CAD preoperatively is mandatory [4].

American College of Cardiology/American Heart Association (ACC/AHA) guidelines for coronary angiography (CAG) in valvular heart disease (VHD) patients, states that coronary angiogra-phyisa class one indication before valve intervention in presence of angina symptoms, depressed systolic function of the left ventricle (LV), objective evidence of ischemia, presence of CAD risk factors, or history of CAD including postmenopausal women and men above the age of 40 years [5]. The prevalence of significant CAD in such group of patients in our region is not known. So we performed this study to evaluate the prevalence of significant CAD in rheumatic heart disease patients undergoing preoperative coronary angiography.

Patients and Methods

During the period from January 2015 to May 2016 all patients with valvular heart disease who were referred to do preoperative coronary angiography in the department of cardiology Tanta university hospital were included in the study. All patients underwent full detailed history with special stress on the CAD risk factors; hypertension defined as patients having BP higher than 140/90 or on antihypertensive treatment, diabetes mellitus defined as fasting blood sugar $\geq$ 100mg/dl, postprandial glucose$\geq$ 140 mg/dl or on anti diabetic treatment, dyslipidemia defined as total cholesterol $\geq$ 200 mg/dl, or triglyceraides $\geq$ 150 mg/dl or on hypocholesterolemic medications, obesity defined as body mass index $\geq$ 30 and smoking.

Echocardiography was done using GE, Vingmed Vivid 7, Horten, Norway.

All patients performed coronary angiography using Philips, allura, Xper FD 10-10 to detect significant coronary artery disease which is defined as $\geq$ 50 reduction of the coronary artery lumen.

Inclusion Criteria

Patients with valvular heart disease who were referred for surgical intervention and have:

anginal symptoms, dpressed systolic function of the LV, objective evidence of ischemia, presence of CAD risk factors, or history of CAD including postmenopausal women and men above the age of 40 years.

Exclusion Criteria

Patients with creatinine $\geq$1.5 mg/dl.

Written informed consent was obtained from all patients. The study was approved by Local Ethics Committee at the University of Tanta, Egypt.

Statistical Analysis

Data analysis was performed using the SPSS 20.0 statistical package for Windows (SPSS Inc., Chicago). Continuous variables were presented as mean $\pm$ SD, whereas categorical variables were expressed as percentages.

Student t-test (2-tail distribution of unequal variance) was used for comparison of the results of the 2 groups

Pearson's correlation coefcient (r) was calculated to test the association between two variables. P value is considered significant if <0.05

Results

96 patients were included in the study, the mean age was 51.5±5.6 years. 51 (53%) patients were males and 45 (47%) patients were females. The characteristics of population study were shown in table one.

Table (1) Characteristics of the population of the study.

Item	Number±SD	Percentage
Height (cm)	168±11	Not applicable
Weight (kg)	76±8	Not applicable
BMI	24.96±7.31	Not applicable
BP systolic mmHg	135±12	Not applicable
BP diastolic mmHg	76±13	Not applicable
Total cholesterol(mg/dl)	203±30	Not applicable
TG (mg/dl)	156±19	Not applicable
FBS (mg/dl)	110±34	Not applicable
Smoking (+ve)	37	38.5%

SD=standard deviation, BMI= body mass index, BP= blood pressure, TG= triglycerides, FBS= fasting blood sugar.

The echocardiographic data of the patients: the results of the echocardiographic examination of the study population were as follows: 27 patients

(28.12%) had severe aortic regurgitation, 23 patients (23.9%) had severe mitral regurgitation, 17 patients (17.7%) had severe aortic stenosis,16 patients (16.66%) had combined valvular lesions and 13patients(13.54%) had severe mitral stenosis table (2).

Table (2) Anginal symptoms, echocardiographic and coronary angiographic results of the study population

Item	Number	percentage
Typical angina	25	26%
Atypical angina	33	34%
No angina	38	40%
Aortic regurgitation	27	28.12%
Mitral regurgitation	23	23.9%
Aortic stenosis	17	17.7%
Combined valvular letight	16	16.66%
Tight mitral stenosis	13	13.54%
Significant CAD	16	16.66%

The results of the coronary angiography of the patients showed

80 patients showed no significant CAD whereas 16 patients (16.66 %) showed significant CAD. 10 patients of them (10.4%) were male and 6 patients (6.25%) were females. The distribution of coronary artery disease lesions was as follows:

8 patients (8.3%) showed single vessel disease, 5 patients (5.2%) showed two vessel disease, and 3 patients (3.12%) showed 3 vessel disease. (figure one)
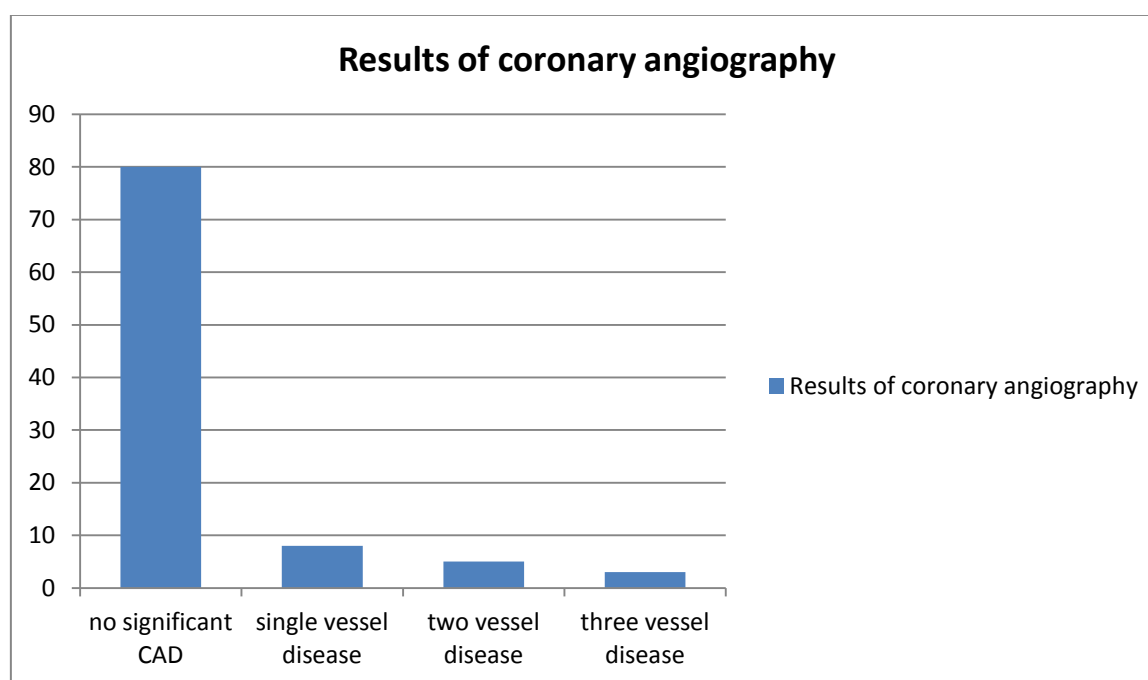

Figure one. Results of coronary angiography. CAD= coronary artery disease.

After doing coronary angiography patients were divided in two groups:

Group one comprised 80 patients with no significant CAD and group two comprised 16 patients with significant CAD (table 3)

Diabetes mellitus was found in 6 patients out of the 16 patients with significant CAD compared to 10 patients out of 80 patients without significant CAD (p value 0.02).

Hypertension was found in 7 out of the 16 patients with significant CAD compared to 12 patients out of the 80 patients without significant CAD (p value 0.003)

Dyslipidemia was found in 9 out of the 16 patients with significant CAD compared to 14 patients out of the 80 patients without significant CAD (p value 0.03)

Smoking was positive in 11 out of the 16 patients with significant CAD compared to 14 patients out of the 80 patients without significant CAD (p value 0.02)

Obesity was found in 9 out of the 16 patients with significant CAD compared to 13 patients out of the 80 patients without significant CAD (p value 0.04) (Table three).

Table (3) Distribution of the studied coronary artery disease risk factors in both groups

	Group one	Group two	P value	Significance
Diabetes mellitus	10/80 (12.5%)	6/16 (37.5%)	p value 0.02	S
HTN	12/80 (15%)	7/16 (43.75%)	p value 0.003	S
Dyslipidemia	14/80 (17.5 %)	9/16 (56%)	p value 0.03	S
Smoking	14/80 (17.5%)	11/16 (68.75%)	P value 0.02	S
Obesity	13/80 (16.25%)	9/16 (56%)	P value 0.04	S

Discussion

Although rheumatic fever as an etiology for valvular heart disease is declining and replaced by degenerative factors, cases of severe valvular rheumatic heart disease are still seen [6]. Together with change in the epidemiology of valvular heart disease, CAD has become frequently found in association with valvular heart disease especially in developed countries [7]. The prevalence of CAD associated with valvular heart disease requiring surgery varied widely from 9% to 41% [8-10]. In the developing countries prevalence of CAD in association with rheumatic valvular heart disease is much lower as compared to western countries [11,12]. Diagnosis of CAD must be done preoperatively as its presence has its bad effect on morbidity and mortality of the patients.

In the present study: we found the prevalence of significant CAD in rheumatic heart disease patients requiring surgery to be 16.66%.The prevalence is higher than the general population of Egypt as it was found to be 8.3% [13]. The higher prevalence of significant CAD in the present study may be attributed to the increased prevalence of CAD risk factors in group two. Manjunath CN et al conducted study in India in 2014 for prevalence of CAD in all patients referred for cardiac surgery. They included patients with rheumatic heart disease, degenerative valvular heart disease, congenital heart disease and others. They found the overall prevalence of CAD to be 8.7%. For the rheumatic heart disease group of patients they found the prevalence to be 4.9% only [3]. The difference between the results of theirstudy and

results of the present study may be attributed to the increased prevalence of CAD risk factors in group two of the present study. Marchant et al studied the prevalence of CAD in rheumatic heart disease patients in Chile. They found the prevalence of CAD to be 14% [14]. This in accordance with the results of the present study. Bozbas et al., found the incidence of CAD to be 18.8% in patients with valvular heart disease requiring surgery [6]. This is in accordance with the results of the present study.

Sonmez et al. found significant CAD prevalence to be 15.8% in patients who underwent valvular heart surgery. This is again in accordance with the results of the present study [8]

Conclusion: the present study found the prevalence of significant CAD in rheumatic valvular heart disease patients requiring surgical intervention to be 16.66%. These patients must be diagnosed and properly managed to decrease their postoperative morbidity and mortality.

Limitation of the Study

The study was conducted in one center which does not reflect the prevalence of the disease in the whole country. The size of the sample was small so another study with larger sample size is needed to validate the data.

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