



Original Research Article

Echocardiography Findings of Patients with Valvular Heart Disease: A Hospital Based Observational Study

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Abstract

Objectives: Objective of our study was to observe the echocardiography findings of patients with valvular heart disease.

Methodology: A complete assessment, physical examination was performed to all patients. Two-dimensional colour Doppler and M-mode Philips HD11XE and Aloka SSD 4000 ultrasound system were used to evaluate the valvular heart disease. The echocardiography was performed in accordance with American College of Cardiology/American Heart Association Guidelines.

Results: Data was analyzed by using simple statistical methods with the help of MS-Office software.

Conclusions: Female patients and Young age group (20-40 years) were more prone to valvular heart disease. Rheumatic Heart Disease was the most common etiological factors, mitral valve prolapse, isolated mitral regurgitation and mitral stenosis with mitral regurgitation were the more common presentation of patients with valvular heart disease. Echocardiography is important diagnostic tools for the evaluation of valvular heart disease.

Keywords: Valvular heart disease, Rheumatic heart disease, echocardiography.

Introduction

Diseases of the heart valves constitute a major cause of cardiovascular morbidity and mortality worldwide with an enormous burden on healthcare resources. Rheumatic heart disease (RHD) continues to be the dominant form of heart valve disease in developing nations.^[1]

Unfortunately, RHD presents at an advanced stage in many cases, when invasive treatments such as

surgery are needed.^[2] This has prompted the World Health Organization (WHO) to recommend active surveillance in endemic regions.^[3,4] Early detection is therefore paramount to efficient secondary prevention. In this context, echocardiography has emerged as a valuable tool to detect mild lesions, inaudible on clinical examination, thereby leading to the concept of subclinical RHD.^[5]

Echocardiography is a useful new technique that allows for the diagnosis and assessment of the severity of various forms of valvular heart disease. It is a safe and noninvasive procedure that can readily be used on the critically ill as well as the ambulatory patient. Since the examination can be easily repeated, echocardiography can be used to study a patient over an extended period of time to follow the severity of the disease.^[6]

Aims of our study were to observe the echocardiographic findings of valvular heart disease.

Materials and Methods

This observational study was conducted in department of Cardiology, Katihar Medical College, Katihar, Bihar, India. A total of 15434 cases were undergone echocardiography. Among them 488 cases were found valvular heart disease. Age group of cases were taken <20 years to > 60 years. Attendent of entire subjects/ subjects signed an inform consent approved by institutional ethical committee of Katihar Medical College, Katihar, Bihar India was sought. Inclusion criteria of this study was patients with lesions classified as isolated lesion and combined valvular lesions, and all the Rheumatic heart disease diagnosed according to World Heart Federation Echocardiography Criteria.

Exclusion Criteria of this study was the patients with a trivial, functional/unspecified mechanisms of MR, trivial-to-mild AR due to sclerotic valve or

unspecified causes and trivial or functional TR, complex congenital heart diseases with valvular involvement, congenital lesions, degenerative disease and other acquired causes for rheumatic heart disease.

Methods

Instruments: Two-dimensional colour Doppler and M-mode Philips HD11XE and Aloka SSD4000 ultrasound system were selected.

The echocardiography was performed in accordance with American College of Cardiology/ American Heart Association Guidelines.

Echocardiography was performed by consultant Cardiologist in department of Cardiology, Katihar Medical College, Katihar, Bihar.

Statistical Analysis

Data was analyzed by using simple statistical methods with the help of MS-Office software.

Observations

This study was conducted in department of Cardiology, Katihar Medical College, Katihar, Bihar during a period from april 2016 to december 2017.

Out of 15,434 consecutive cases were undergone to echocardiography, 488 valvular heart diseases were reported. Rheumatic heart diseases were the predominant type constituting 340 cases (69.67%), while non-rheumatic heart diseases constituted 148 cases (30.32%).

Table.1. Age wise distribution (N=488)

Ages(years)	BCAV(19)	AV CALCI(29)	MVP(100)	RHD(340)
<20	7(1.43%)	0	36(7.37%)	43(8.81%)
20-40	7(1.43%)	2(0.41%)	51(10.45%)	172(35.24%)
41-60	4(0.81%)	5(1.02%)	9(1.84%)	112(22.95%)
>60	1(0.20%)	22(4.50%)	4(0.81%)	13(2.66%)

Among non-rheumatic heart disease, mitral valve prolapse syndrome constitute 100 cases (20.49%) followed by degenerative calcified aortic valve disease 29 cases (5.94%) and bicuspid aortic valve disease 19 cases (3.89%). Only a very few cases of aortic aneurysm with AR, congenital

pulmonary valvular stenosis and ischaemic mitral regurgitation were also reported in our study.

The valvular heart disease was most commonly reported in females. The number of female patients were 332 constituting 68.03%, 156 male patients (31.96%). Rheumatic heart disease was

commonly reported in the age group of 21 - 40 years with female preponderance. Degenerative valvular heart disease was most commonly reported in old age (>60 years) with male preponderance (Figure 2).

Most commonly affected age group in Mitral valve prolapse was 20-40 years, whereas congenital bicuspid aortic valve disease were distributed equally in both groups of <20 years and 20 to 40 years.

In general among all multivalvular lesions combinations associated with MS were predominantly seen in females, whereas combination with AS were more common in males.

Table 2 Aetiology of valvular heart disease (N=488)

Aetiology	Percentage
MVP	100(20.49%)
CALCI AV	29(5.94%)
BCAV	19(3.89%)
RHD	340(69.67%)

In this study, major aetiology of valvular heart disease was Rheumatoid heart disease 340(69.67%), mitral valve prolapsed 100(20.49%). And least common aetiology was CALCI AV 29(5.94%) and BCAV 19(3.89%).

Table 3 Valvular heart disease (N=488)

Valvular heart disease	Total	Percentage	Male 156(31.96%)	Female 332(68.03%)
Isolated MS	63	12.90%	17(26.98%)	46(73.01%)
Isolated MR	186	38.11%	62(33.33%)	124(66.66%)
Isolated AR	20	4.09%	11(55%)	9(45%)
Isolated AS	20	4.09%	13(65%)	7(35%)
BCAV	19	3.89%	14(73.68%)	5(26.31%)
Multivalvular lesion	200	40.98%	50(25%)	150(75%)

In this study, out of 488 valvular heart disease, 200 (40.98%) cases had multivalvular lesion, among them female had 150(75%) and male 50(25%).

186(38.11%) cases were suffered with isolated MR, among them female 124 (66.66%) and male (62(33.33%).

63(12.90%) cases were suffered with isolated MS, among them 46 (73.01%) male and 17(26.98%) female. Out of total 488 cases, valvular heart disease was found in 156(31.96%) male and 332(68.03%) female.

Table 4 Multivalvular heart disease (N=200)

Multivalvular heart disease	Total: 200	Percentage	Male	Female
MS+MR	88	44%	18(20.45%)	70(79.54%)
MS+AR	6	3%	2(33.33%)	4(66.66%)
MS+MR+AR	53	26.5%	11(20.75%)	42(79.24%)
MS+AS	2	1%	1(50%)	1(50%)
MR+AR	17	8.5%	5(29.41%)	12(70.58%)
MS+AS+AR	2	1%	1(50%)	1(50%)
MR+AS+AR	3	1.5%	2(66.66%)	1(33.33%)
MS+MR+AS	3	1.5%	1(33.33%)	2(66.66%)
MS+MR+AS+AR	6	3%	2(33.33%)	4(66.66%)
AS+AR	20	10%	17(85%)	3(15%)

In this study, out of 200 cases with multivalvular heart disease, 88(44%) cases had mitral stenosis (MS) with mitral regurgitation (MR). Among them male were 18(20.45%) and female 70 (79.54%).

53(26.5%) cases had mitral stenosis (MS) with mitral regurgitation (MR) with aortic regurgitation, among them male 11(20.75%) and female 42(79.24%). 20 cases (10%) had aortic stenosis with aortic regurgitation, among them

male 17(85%) and female 3(15%). 17(8.5%) cases had mitral regurgitation with aortic regurgitation, among them male 5(29.41%) and female 12 (70.58%). And least number of cases were MS+MR+AS+AR 6(3%), MS+MR+AS 3(1.5%), and MS+AS+AR 2(1%).

Table.5. Incidence of aortic valve disease

Aortic valve disease	No of cases(N=40)
BCAV	15(37.5%)
CALCI AV	22(55%)
RHD	3(6%)

In this study, out 40 cases with aortic valve disease, 22(55%) cases had calcified aortic valve, 15(37.5%) bicuspid aortic valve disease (BCAV), and 3(6%) rheumatic heart disease (RHD). Major incidence of aortic valve disease was seen in patients with calcified aortic valve.

Discussion

Rheumatic heart disease (RHD), a sequela of rheumatic fever, is a major cardiovascular disease in children and young adults in most low/middle-income countries.^[7,8]

Echocardiography may prove to be a valuable tool in detecting RHD cases at an early stage, fundamental issues remain to be addressed.^[9,10]

In this present study, Rheumatic Heart Disease was the most common valvular heart disease 340(69.67%). Age group 20-40 years were commonly affected with RHD 172(35.24%), which is similar to the study of Manjunathan CN et al (64.3%)^[11] and Radhakrishnan D (68%).^[12]

In the present study, major aetiology of valvular heart disease was Rheumatic heart disease (69.67%) and mitral valve prolapsed 100 (20.49%) was the second major aetiology of valvular heart disease, calcified aortic valve was third one aetiological factor.

The most common cause of MS worldwide is rheumatic fever. Isolated MS is twice as common in women as in men.^[13] Other causes of MS are very rare and include congenital anomalies, prior exposure to chest radiation, mucopolysac-

charidosis, severe mitral annular calcification, and left atrial myxoma.

Rheumatic disease is associated with fibrosis, calcification and fusion of commissures, leaflet thickening, and chordal fusion resulting in MS. A normal MV area is 4.0 to 5.0 cm². Symptoms usually develop when the valve area decreases below 1.5 cm² and also below 2.5 cm², particularly when the heart rate is elevated, as during exercise.^[13] In some patients with chronic severe MS, pulmonary edema may not occur because of increased alveolar basement membrane thickening and decreased pulmonary microvascular permeability. The pulmonary arterioles may react with vasoconstriction, intimal hyperplasia, and medial hypertrophy, often resulting in pulmonary arterial hypertension. In some patients, a secondary obstruction may also develop at the level of the pulmonary veins.

In this present study, 75% female patients were affected with multivalvular lesion.

186(38.11%) cases were suffered with isolated MR, among them female 124 (66.66%) and male (62(33.33%).

63(12.90%) cases were suffered with isolated MS, among them 46(73.01%) male and 17(26.98%) female. Female patients were more affected with valvular lesion than male patients.

Mitral regurgitation may result from disorders of the valve leaflets themselves or from any of the surrounding structures that comprise the mitral apparatus. The leading cause of MR is rheumatic heart disease in developing areas of the world and degenerative forms of MV disease (myxomatous disease and fibroelastic deficiency) in the United States and other developed countries. Less common conditions include mitral annular calcification and congenital anomalies such as cleft MVs; other rare causes of MR are endomyocardial fibrosis, carcinoid disease with right-to-left shunting, ergotamine toxicity, radiation therapy, systemic lupus erythematosus, and diet-drug toxicity. The second leading cause of MR in developed countries is "functional" MR, which results from dilatation of the MV annulus

or from myocardial infarction. In particular, infarctions involving the inferolateral and the posteromedial papillary muscle produce tethering of the mitral leaflets that prohibits normal coaptation, leading to “functional” MR even though the valve leaflets themselves are normal.^[14]

In this present study, out of 200 cases with multivalvular heart disease, 88(44%) cases had mitral stenosis (MS) with mitral regurgitation (MR). Among them male were 18(20.45%) and female 70(79.54%). 53(26.5%) cases had mitral stenosis (MS) with mitral regurgitation (MR) with aortic regurgitation, among them male 11(20.75%) and female 42(79.24%). 20 cases(10%) had aortic stenosis with aortic regurgitation, among them male 17(85%) and female 3(15%).

Stewart BF, et al. (1997),^[15] and Wilson PWF, et al. (1998)^[16] were concluded that clinical factors associated with calcific aortic valve disease that was similar to atherosclerotic heart disease, with an increase in cardiovascular morbidity and mortality.

In our present study, out 40 cases with aortic valve disease, 22(55%) cases had calcified aortic valve, 15(37.5%) bicuspid aortic valve disease (BCAV), and 3(6%) rheumatic heart disease (RHD). Major incidence of aortic valve disease was seen in patients with calcified aortic valve.

Conclusions

Our study was concluded that the female patients were more prone to valvular heart disease. Young age group patients (20-40 years) were commonly affected. Rheumatic Heart Disease was the more common etiological factors of valvular heart disease. Mitral valve prolapsed, isolated mitral regurgitation and mitral stenosis with mitral regurgitation were the more common presentation. Calcified aortic valve was the common incidence of aortic valve disease. Echocardiography is the important diagnostic tools for the evaluation of valvular heart disease.

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