



CORRELATION OF CLINICAL FINDINGS WITH 2 D ECHO IN PATIENTS WITH VALVULAR HEART DISEASE AT TERTIARY CARE HOSPITAL OF CENTRAL INDIA.

Dr. Shalik Jadhav	Senior resident, Dept. of Medicine, NKPSIMS, Nagpur.
Dr. Anil Modak	Associate Professor, Dept. of Medicine, NKPSIMS, Nagpur.
Dr. Yogesh Gupta*	Assistant Professor, Dept. of Physiology, GMC, Bhopal. *Corresponding Author

ABSTRACT Rheumatic fever (RF) and Rheumatic heart disease (RHD) continue to be a major health hazard which also accounts for 30-40% of cardiac cases hospitalized and biggest cause of cardiac mortalities in India. Hence study was designed to get the clinical and 2 D echo correlation of the diseases for betterment of treatment modalities. Primarily after doing clinical examination of diagnosed cases of mitral stenosis (MS) 2D echo was performed and severity of the disease was assessed. The patients who were assessed clinically regarding severity of MS did not correlate with the severity assessed by 2D echocardiography because we found it is difficult to grade the patient's severity on the basis of symptoms and clinical examination as they were influence by many variables. Hence 2D Echocardiography evaluation is also needed which could help us in possible early detection, better management of the disease to reduce the complications providing better life expectancy.

KEYWORDS : 2D echo, Rheumatic heart disease, Rheumatic fever, cardiac mortality.

INTRODUCTION:

Rheumatic fever (RF) and Rheumatic heart disease (RHD) continue to be a major health hazard in most of the developing countries. RHD is a major cause of valvular heart disease in the world. Global studies estimated that up to 15.6 million people are affected by RHD worldwide of which nearly 70% are affected with some or other valvular heart disease.¹

Each year, there are approximately 470,000 new cases diagnosed and 233,000 deaths attributed to RHD with 30-40% of total cardiac cases hospitalized in India.²

A recent Indian Council of Medical Research (ICMR) study in 10 different, locations of the country found the prevalence to range from 0.2 to 1.1/1000 for RHD and 0.0007 to 0.2/1000 for RF.³

In India, Rheumatic fever is endemic accounting for nearly 25-45% of acquired heart disease with its annual incidence 100-200 times greater than that observed in developed countries.⁴

Narrowing of mitral valve orifice is known as mitral stenosis. Almost all cases of mitral stenosis are due to disease in the heart secondary to rheumatic fever and the consequent rheumatic heart disease.^{5,6}

Associated lesions are also important, in deciding the type of management for mitral stenosis. Until recently clinical, electrocardiographic and echocardiography were used for the diagnosis and assessment of severity of mitral stenosis.

2D echo with Doppler studies has revolutionized the diagnosis of mitral stenosis. Besides quantitative and qualitative evaluation, it provides excellent means for pre-operative evaluation for deciding the type of intervention required.⁷

Hence we have undertaken this study to get the clinical and 2 D echo correlation of the cases which could help us in possible early detection and better management of the disease which will reduce the complications in the patients providing them better life expectancy.

MATERIAL AND METHODS:

In present hospital based cross sectional study Consecutive type of non-probability sampling was followed. A total of 70 consecutive cases of Rheumatic mitral valve stenosis coming to Medicine Department of a Tertiary Care Hospital were considered for study purpose.

Institutional ethical acceptance was acquired after which written and informed consent of the participants were obtained. Patients were considered for study purpose fulfilling the following criteria:

Inclusion Criteria:-

- Patient who are above the age of 12 years of both sexes Males and

females.

- Diagnosed cases rheumatic of mitral stenosis.
- Patients who are willing to give informed written consent.

Exclusion Criteria:-

- Patient who are less than the age of 12 years.
- Patients who have undergone mitral valve replacement.
- Patients who are not willing to participate in the study.
- Voluntarily any patient can be withdraw from the study any time at their request.

After enrollment patients were tagged with their IPD numbers and demographic data like age, height and weight were recorded detailed history and examination of each patient was carried out.

In History taking patients history of present illness was detailed.

Past history: In past history patients were asked about adverse disease events if any occurred during past.

Personal history: In personal history of smoking, alcoholism and dietary habits were noted.

General examination: All patients were examined for the built, nourishment, Examination of the neck was carried out for any prominence of jugular veins, presence/absence of anemia, cyanosis, clubbing, and pedal edema etc.

Vital Data: All the patients were examined for the details of pulse, pulse deficit, blood pressure was recorded in right arm supine position. Examination of Cardiovascular System: Hepatojugular reflex was examined, abnormal pulsations were looked for. Precordium was examined for any precordial abnormality. Auscultation was carried out for S1, S2, OS (opening snap), and different murmurs.

Other systems were examined such as abdomen, central nervous system and respiratory system. Severity of mitral stenosis were assessed clinically by

- 1) Presence of orthopnea, paroxysmal nocturnal dyspnea and hemoptysis.
- 2) Presence of NYHA Class III or IV symptoms
- 3) Loud pulmonic component of 2nd heart sound (P2)
- 4) Long duration of mid diastolic rumbling murmur at apex
- 5) Graham-Steel murmur of functional pulmonary regurgitation at pulmonary area.
- 6) Pan systolic murmur of functional tricuspid regurgitation at left lower sternal border.

Echo Cardiograph:^{8,9}

All patients were subjected for echo cardiographic examination. A commercially available Toshiba diagnostic ultrasound system nemo XG SSA-580A model echocardiographic unit was used. (Machine registration No.MH/NG/0007). Annular phased array transducer with

3MHz frequency was used. One observer interpreted the 2D echocardiograms data which was used for analysis.

2-D Echocardiography:

2-D and M-mode echocardiography, and colour Doppler echocardiography was done in all included patients for the diagnosis of mitral stenosis, and also to assess the chamber size, valve pathology, valve movements, size of mitral valve orifice.

Cross sectional 2-D echocardiography was done from various conventional windows. In parasternal long axis view echogenicity, thickness and segmental mobility of leaflets were assessed. An increase in thickness (significant if ≥5 mm), of various segments, was considered abnormal. Both atrial and right and left ventricular sizes and movements were noted. The state of pulmonary artery, pulmonary, tricuspid and aortic valves were studied. Long-axis parasternal and apical views to enable assessment of the subvalvular apparatus. Wilkins score which grades each of the following components of mitral apparatus from 1 to 4: leaflet mobility, thickness, calcification, and impairment of subvalvular apparatus was used to assess mitral stenosis.

RESULTS:

Patients considered for present study were demographically in differentiable hence the data obtained from these patients can be statistically compared. Table 1 depicts the demographic value of the 70 patients considered for study purpose. In present study both males and females were considered with an average age of 41 years, when compared for their height and weight no statistical difference was found amongst the patients.

Table.1: Demographic distribution of study population:

	Male	Female	Total / p value
Gender distribution	32	38	70
Age	41 ± 6.7	39 ± 5.9	NS
Height	157 ± 5.3	153 ± 4.9	NS
Weight	62 ± 4.8	60 ± 4.1	NS

After enrolled for the study patients clinical examination was done for getting their clinical findings whose results are depicted in Table.2

Table2: Distribution of Rheumatic MS Subjects Based On Symptoms & Severity of MS

Symptoms	Severity of MS			Total	p value
	Mild	Mod	Severe		
Dyspnoea	22 (84.6%)	10 (83.3%)	27 (87.1%)	59 (84.3%)	0.87
Chest pain	17 (65.4%)	7 (58.3%)	20 (64.5%)	44 (62.9%)	0.73
Palpitation	12 (46.2%)	1 (8.3%)	20 (64.5%)	33 (47.1%)	< 0.05
Cough	6 (23.1%)	3 (25%)	10 (32.3%)	19 (27.1%)	0.47
Pedal oedema	11 (42.3%)	1 (8.3%)	10 (32.3%)	22 (31.4%)	< 0.05

Most common symptom observed in study subjects was Dyspnoea (84.3%), followed by Chest pain (62.9%), palpitation (47.1%), pedal oedema (31.4%) and cough (27.1%). The distributions were not significant according to severity of MS except for palpitations which was significantly associated with Severe MS. Diagrammatic representation shown in Dig.1

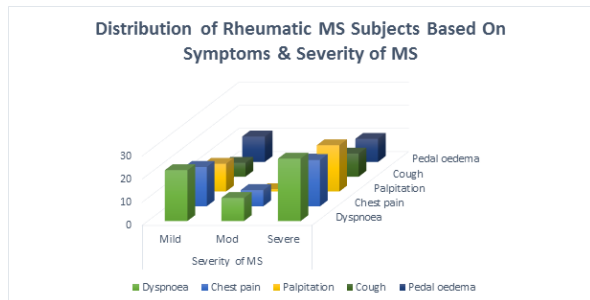


Fig. 1: Distribution of Rheumatic MS Subjects Based On Symptoms & Severity of MS

Finally 2D echo was performed in patients to access the severity of the mitral stenosis showing following outcomes as depicted in Table. 3

Table.3: Distribution of Rheumatic MS Subjects Based On 2D Echo cardiographic Findings & Severity of MS

Echo Findings	Severity of MS			Total (100%)	P value
	Mild	Moderate	Sever		
Thickened leaflets	26 (37.1%)	13 (18.6%)	31 (44.3%)	70	NS
Reduced EF slope	26 (37.1%)	13 (18.6%)	31 (44.3%)	70	NS
Calcification of Mitral valve	7 (22.6%)	6 (19.4%)	18 (58.1%)	31	S
Fibrosis of Mitral Valve	26 (37.1%)	13 (18.6%)	31 (44.3%)	70	NS
Reduced Mobility of AML	18 (30.5%)	10 (16.9%)	31 (52.5%)	59	S
Reduced Mobility of PML	26 (37.1%)	13 (18.6%)	31 (44.3%)	70	NS
Commisures – Fused	10 (29.4%)	6 (17.6)	18 (52.9%)	34	.33
Commisures – Open	16 (44.4%)	7 (19.4%)	13 (36.1%)	36	0.33
Papillary Muscles- Visualised	16 (55.2%)	5 (17.2%)	8 (27.6%)	29	S
Papillary Muscles- Non Visualised	10 (24.4%)	8 (19.5%)	23 (56.7%)	41	S
Mean leaf atrium size (in mm)	44.1	46.2	52.2		P < 0.05

Thickened leaflets and reduced EF slope was found in all cases. The mobility of Anterior and posterior mitral leaflets was restricted in 84.3% (p < 0.05) and 100% subjects respectively and restricted mobility was found mainly at tip of leaflets. Calcification and Fibrosis was observed in 44.3% (p < 0.05) and 100% subjects respectively and both calcification and fibrosis was found more at tip of leaflets. Commissures were fused in 48.6% subjects.

Papillary muscles were not visualised in 58.6% subjects (p value < 0.05). Most of the echo findings were more significant in Severe MS. Mean LA size significantly increased with severity of MS with mean LA size of 44.1 mm, 46.2 mm and 52.2 mm in mild, moderate and severe MS (p < 0.05). Graphical representation as shown in Dig.2.

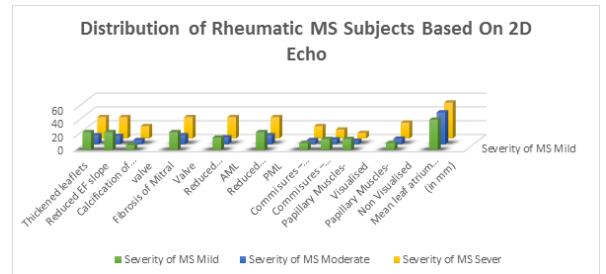


Fig.2: Distribution of Rheumatic MS Subjects Based On 2D Echo

Discussion:

A study by Mohammad-Reza Movahed et al. They retrospectively analysed mitral stenosis (MS) was significantly more prevalent in women (1.6% vs 0.4%, p < .001). Findings of our study correlate with this study.¹⁰

Sagie A et al study reviewed the studies of 205 consecutive patients with MS, in which a range of severity of MS was associated with at least mild mitral regurgitation in 78% of patients (160/205), and pure MS was correspondingly uncommon (22%) getting similar findings I present study.¹¹

The results of present study coincide with Mehrnoush Toufan et al who assessed fifty patients were assessed by echocardiography, and 32 (64%) were found to have mitral annular calcification. Nine patients (18%) had posterior mitral valve leaflet calcification, and both mitral valve leaflet and annular calcification were detected in nine (18%) cases all the patients with mitral stenosis showed mitral valve leaflet calcification with or without mitral annular calcification.¹²

According to Peter Probst et al study of 135 patients with mitral

valvular stenosis concluded that patients with smaller valve areas are, not unexpectedly, usually shown to have larger atria. However, over one third of the patients with valve areas of less than 1.0 cm² have normal or only minimally enlarged atria, and over one fourth of those with moderate mitral stenosis (valve area: 1.0-1.4 cm²) have marked atrial enlargement.¹³

Echo findings of our study Co-relates with study of Sagie A et al, Mehrnosh Toufan et al Peter Probst et al study. Distribution of Severity of MS based on clinical severity and 2-D. Planimetered by the standard method and was grouped into mild, moderate and severe mitral stenosis. The results were compared with clinical evaluation. An underestimation of severity of mitral stenosis was observed based on clinical findings. The difference between mitral valve area (MVA) determined by planimetry and pressure half time (PHT) method was very small and varied to the tune of 0-0.4cm² in 90% of the cases.

The patients who were assessed clinically regarding severity of MS did not correlate with the severity assessed by 2D echocardiography because we found it was difficult to grade the severity on the basis of symptoms and clinical examination as they were influence by many other variables like anemia, arrhythmia, infections similarly we found, it was difficult to assessed the severity on the basis of auscultation, again due to change in heart rate.

So we believe it's difficult to assess the severity of mitral stenosis only on clinical ground compared to 2D Echocardiography evaluation.

Loperfido F et al evaluated mitral valve area in 44 patients, derived from trans mitral pressure half time using 220/pressure half time formula, it was compared with that estimated by cross sectional echocardiography. They found good correlation between pressure half time and the cross sectional echocardiographic mitral valve area in patients with pure mitral stenosis and also in those with associated mitral or aortic regurgitation.¹⁴

Fredman CS et al calculated mitral valve area in 22 subjects, there was a good Correlation between the Doppler-derived mitral valve areas and the planimetered valve area. Findings of our study for estimation of mitral valve area by 2D planimetry and PHT method correlates with study of Loperfido F et al and Fredman CS et al.¹⁵

CONCLUSION:

The patients who were assessed clinically regarding severity of MS did not correlate with the severity assessed by 2D echocardiography because we found it is difficult to grade the patient's severity on the basis of signs and symptoms as they were influence by many other variables like anaemia, arrhythmia, and infections. Similarly we found difficult to assess the severity on the basis of auscultation, due to change in heart rate. So we believe it's difficult to assess the severity of mitral stenosis only on clinical ground. 2D Echocardiography evaluation is also needed which could help us in possible early detection and better management of the disease which will reduce the complications in the patients providing them better life expectancy.

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