

# Pattern of Valvular Involvement in Asymptomatic Chronic Rheumatic Heart Disease.

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## ABSTRACT

**Background:** Rheumatic Heart Disease (RHD) constitutes the most common form of Valvular heart disease in India. Rheumatic valvulitis most commonly affects the mitral valve (70% to 75%) followed by combined mitral and aortic involvement (20% to 25%), with isolated aortic disease being uncommon (5% to 8%). However no data is available regarding pattern of valvular involvement in asymptomatic chronic rheumatic heart disease. **Aims & Objective:** To study the pattern of valvular involvement in asymptomatic chronic rheumatic heart disease. **Methods:** Total no 12862 in the age group of 20 yrs to more than 90 yrs referred for perioperative evaluation, preemployment check up, preinsurance check up annual routine health check up for general health, evaluation of atrial fibrillation ante-natal check up were included in the present study conducted from April 2005 to January 2018. All were screened by standard routine echocardiography procedure. **Results:** Out of total no of 12862 persons screened Rheumatic valvular lesion was detected in 2057 persons with max prevalence in age group of 40 to 50 yrs. Mitral valve thickening with mild MR was detected in 42% cases followed by thick mitral valve mild MR mild AR in 14%, thick mitral valve with mild AR in 12%, thick mitral valve with mild MS mild MR mild AR in 8%, thick mitral valve with mod MR mild AR in 8%. Mild MS mild AR in 6% thick aortic valve with mild MR in 6%, moderate AR mild MR in 4% moderate MS mild MR in 4%, mod MS mild MR mild AR in 2% severe MR mild AR in 2%. Organic Tricuspid Valve disease was detected in 6% of cases. **Conclusion:** Routine screening study involving asymptomatic patient evaluated by routine echocardiography revealed high prevalence of regurgitation lesion. Mild to moderate MR along with thick valves is the dominant lesion and stenotic lesion are less prevalent among the asymptomatic persons.

**Keywords:** Asymptomatic RHD, Valvular Lesion, Echocardiography Study.

## INTRODUCTION

Rheumatic heart disease (RHD) constitutes the most common form of valvular heart disease in India. The reported prevalence of RHD is 1.0 to 5.4 per 1,000 school children in our country. The additions of Echocardiography in RHD surveys of normal children have introduced a new dimension to the assessment of disease burden. Most available Echocardiographic evaluation studies for the presence of RHD in school children suggest more than 10 to 20 times higher prevalence of clinically “silent” RHD. This may be attributed to subclinical carditis or the difficulty encountered in diagnosis and only 50% of patients with established RHD give a past history of rheumatic fever. The reliability or acceptability of the prevalence data based on clinical

evaluation alone is not known with certainty.<sup>[1]</sup> More recent studies on patients with acute RF utilizing echocardiography have brought out the shortcomings of auscultation in identifying valve disease which does not result in haemodynamic abnormalities consisting of regurgitant systolic (mitral) or diastolic (aortic) murmurs.<sup>[2]</sup> This has resulted in the identification of sub-clinical carditis (SC). Presence of subclinical carditis diagnosed using echocardiography in surveys of 5-14 yr old children when combined with the findings of the children suggests that RF is being missed more often than desirable. Some patients have only one clinical manifestation- fever with valvulitis during the episode of RF and the diagnosis of RF is being missed since the carditis is asymptomatic, mild and not associated with any murmurs (subclinical).<sup>[3]</sup> The information regarding the burden of disease comes from hospital data, population based studies and school surveys. Since the hospital-based data do not represent the population of the region, there is a bias towards the worst affected and those seeking admission for treatment. Hence hospital based data may not reflect the true prevalence of the disease. As

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more symptomatic patients are hospitalized there may be biased representation of different types of valvular lesion and it will not detect silent or asymptomatic RHD. There is a paucity of data and literature on asymptomatic rheumatic heart disease and no large scale study on adult because most of the study are based on school children 5 -15 yrs.

Now a day Echocardiography study has become routine procedure for peri-operative evaluation for non-cardiac surgery, preemployment, preinsurance, routine antenatal checkup and routine health checkup in adult patient. Hence we took advantage of such population to study the prevalence and pattern of asymptomatic rheumatic valve lesion. As it is routine evaluation it will remove the bias involving more symptomatic and sick patient when we use tertiary care hospital data. Aim of this present study was to evaluate the prevalence and pattern of Valvular lesion in asymptomatic chronic rheumatic heart disease.

## MATERIALS AND METHODS

This present study was done from April 2005 to January 2018 at VSSIMASR Burla, Samablpur, Odisha in collaborations with local diagnostic clinic where Echocardiography is done by competent cardiologist. All cases were reviewed by two cardiologist to remove any biases in reporting. All newcomers referred for perioperative evaluation, preemployment check up, preinsurance check up annual routine health check up for general health, routine antenatal check up evaluation of atrial fibrillation were included in the study. Total no 12862 in the age group of 20 yrs to more than 90 yrs were included in the present study. All were screened by standard routine echocardiography procedure.

As this was an observation study we took simple criteria to evaluate different valvular lesion. All Valvular lesion were defined by standard echocardiography criteria.<sup>[4-7]</sup> Mitral Stenosis MS was defined by presence thick mitral valve >5mm with doming and calculation of valve area was done with planimetry and/or pressure half-time method MS was Mild if Valve Area >1.5 cm<sup>2</sup> and Mean Pressure Gradient <5mmHg. Moderate if valve area <1.5 cm<sup>2</sup> with Mean Gradient <10 mmHg and Severe if valve area <1cm<sup>2</sup> and Mean gradient >10mmHg. Subvalvular thickening was measured from parasternal long axis view with chordal length measured at mid systole from tip of papillary muscle to mitral systolic closure line and thick chordal apparatus and thick papillary muscle was evaluated. Degree of subvalvular thickening was graded from grade 1 to 4. Severe subvalvular disease was defined by thick chordae with length <10 mm.<sup>[7]</sup> Chordal fusion was graded from 1+ to 4+. MR was evaluated in at least two views and was identified as central jet or posterior jet MR Post jet MR was identified as

more probably due to Rheumatic and severity was graded as mild if jet area 4 cm<sup>2</sup> moderate if jet area 4-10 cm<sup>2</sup> severe if jet area >10 cm<sup>2</sup>.<sup>[4,5]</sup> Presence of aortic valve involvement was evaluated by presence of thick valve with or without aortic regurgitation with central closure with increased gradient across aortic valve and graded as Mild if gradient < 25 mmHg, moderate > 25 but < 40 mmHg, severe > 40 mmHg or Vel <3cm/sec >3 but < 4 cm/sec > 4 cm/sec AR was diagnosed again by presence of thick valve with central jet and was graded as Mild if Jet Width / LVOT width <25% Moderate if >25-45 % & 45-65% Severe if > 65% Organic tricuspid valve disease was defined by the presence of thick and was diagnosed by presence of thick valve with doming with mean gradient of more than 2.5 mm and presence of Non hypertensive TR. Pulmonary valve involvement was identified by presence of thick valve with presence of non-hypertensive PR. TEE was done in few selected cases. LV dysfunction was defined as reduction in EF <45%. As the objective of the present study was to evaluate prevalence of different lesion we did not apply rigid criteria for quantification of valvular lesion.

## RESULTS

Total number of 12862 persons were included in the present study. Female predominated the group with around 58% and male patient constituted around 42%. Max no of patient around 44 % were in the age group of 40 to 50 yrs probably because in this age group max people go for routine health checkup pre-insurances checkup and max no surgery for female patients done in this age group. Followed by age group 50 to 60 around 21% 60-70 about 8% 20 to 30 about 12% dominated by pre-employment checkup and evaluation for AF around 8%.

Rheumatic valvular lesion was detected in 2057 persons with max prevalence in age group of 40 to 50 yrs. Mitral valve thickening with mild MR was detected in 42% cases followed by thick mitral valve mild MR mild AR 14%, thick mitral valve with mild AR 12%, thick mitral valve with mild MS mild MR mild AR 8%, thick mitral valve with mod MR mild AR 8%. mild MS mild AR 6% thick aortic valve with mild MR 6%, moderate AR mild MR 4% moderate MS mild MR 4%, mod MS mild MR mild AR 2% severe MR mild AR 2%. Organic Tricuspid Valve disease was detected in 6% of cases. Total no 5 cases of thick pulmonary valve with mild PR was observed. Dilated LA was observed in 18% of case but no LA clot observed or no evidence of healed vegetation. Asymptomatic small ASD II was observed in 6 cases asymptomatic PDA was observed in 2 cases. Situs Inversus dextrocardia was observed in cases with underlying mild MR mild AR No cases of pericardial effusion observed. Asymptomatic LV dysfunction with normal or

mildly dilated LV dimension was a surprise finding in 22 cases. No cases of severe MS was observed in the present study.

**Table 1: Patient subgroup.**

Patient subgroup	Total no and percentage
Peri-Operative evaluation	5201 (40.4 %)
General health check up	2112 (18%)
Pre employment check up	1286 (10 %)
Insurance healthcheckup	1028( 8%)
Evaluation of Atrial fibrillation	1028 (8%)
Routine Ante-Natal check up	2202(17.1%)

**Table 2: Pattern of Valvular Involvement.**

Pattern of Valvular Involvement	No of cases	Percentage(%)
Thick mitral valve with mild MR	861	42
Thick mitral valve mild MR mild AR	287	14
Thick mitral valve with mild AR	246	12
Thick mitral valve with mild MS mild MR mild AR	164	8
Thick mitral valve with mod MR mild AR	162	8
Mild MS mild AR	123	6
Thick aortic valve with mild MR	121	6
Moderate AR mild MR	82	4
Moderate MS mild MR	83	4
Mod MS mild MR mild AR	44	2
Severe MR Mild AR	41	2
Organic TV disease	121	6
Organic PV disease	9	0.4

## DISCUSSION

Rheumatic heart disease (RHD) constitutes the most common form of Valvular heart disease in India. Rheumatic valvulitis most commonly affects the mitral valve (70% to 75%) followed by combined mitral and aortic involvement (20% to 25%), with isolated aortic disease being uncommon (5% to 8%).<sup>[1]</sup> The mitral valve is most commonly affected in RHD with Severe MS observed in 25% of all RHD patients and about 40% have combined MS and Mitral regurgitation (MR). RHD is the commonest cause of mitral regurgitation (MR). Incidence of isolated rheumatic MR is 10%.<sup>[1]</sup> But data available was based on hospital based echocardiography or post-operative data and more severe lesion are detected and this may not reflect the true prevalence or pattern of valvular involvement. Between 1st January, 2009 and 31st December 2009 in an echocardiography study of 8,512 diagnosed RHD at Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, predominant MS constituted 55%, predominant MR 22% and combined MS and MR about 18%.<sup>[8,9]</sup> This hospital is one of the centre dealing with high volume of RHD cases in India but again patients attend this hospital for treatment hence severe

valvular lesion may dominate. Mild-to-moderate MR remain asymptomatic for several years.<sup>[1,14,15]</sup> Hence routine echocardiography done for routine evaluation may be able to detect several of these cases of asymptomatic regurgitation lesion. In the present study when we studied asymptomatic RHD in subset mentioned in table-1 mostly normal patient as far as cardiovascular disease is concerned and We detected high prevalence of different regurgitant lesion compared to stenotic lesion. Thick mitral valve with mild MR was the dominant lesion detected in around 42 % followed by thick mitral valve mild MR mild AR in around 14%, thick mitral valve with mild AR in around 12 % thick mitral valve with mild MS mild MR mild AR in around 8% thick mitral valve with mod MR mild AR in 8% of cases. Stenotic lesion with mild MS or mod MS was observed in 12% combined with Regurgitant lesion. This is in sharp contrast with dominant Stenotic lesion in hospital based symptomatic group. Mitral valve involvement was universal followed by combined aortic valve involvement in around 62% of cases in contrast to the observation around 33% in symptomatic group. Thus routine echocardiography is useful in more accurate detection of silent regurgitation lesion in chronic rheumatic heart disease. Saxena et. al. in a cross sectional echocardiographic screening study was carried out among 6270 randomly selected school children aged 5-15 years observed that the prevalence of RHD is several fold higher with Echocardiographic screening compared with clinical examination probably because of higher detection of regurgitation lesion with echocardiography.<sup>[10]</sup> RHD can occur only after a patient has had RF. Evaluation of data indicates that about 65 per cent patients get clinically recognizable RHD following RF. In the global estimate a conservative figure of 60 per cent aortitis has been used for calculating the burden of RHD.<sup>[11]</sup> This suggests that at least 40 per cent patients who have had RF could be potentially patients of subclinical aortitis. On the basis of Utah study, 27 per cent patients had subclinical aortitis.<sup>[12]</sup> Hence, the actual estimated burden could be much more than the actual burden. Secondly, most prevalence figures indicate that the prevalence of RF in surveys is about one tenth or even less than that of RHD (0.1/1000 vs 1/1000).<sup>[13]</sup> The inference could be that the diagnosis of RF is being missed more often than desirable or acceptable. Less than half of all RHD patients give history of past RF. Unfortunately, diagnosis of past RF is not possible unless patients give history of arthritis, arthralgia, and chorea or have established RHD. Hence, retrospective diagnosis or identification of past RF is missed or not available in almost 50 per cent patients with RHD. Hence unless routine evaluation with echocardiography is done large clinically unrecognised Rheumatic heart disease particularly mild to moderate regurgitation lesion will be missed.

This study was an unique study and such large scale study has not been reported in literature and is able to detect many asymptomatic lesion and was able to detect many lesion not detected if symptomatic group are only included. Our observation totally changes the pattern of valvular lesion in chronic rheumatic heart diseases o prevalent in our country. We are analysing data of another study going ion including all cases both symptomatic and asymptomatic to give true prevalence of valvular lesion in chronic rheumatic heart disease. Another unique finding is the detection of asymptomatic LV dysfunction observed in about 2.4% of cases along with presence of mild MR mild AR such LV dysfunction has not been reported in earlier study and in future more study is required to evaluate this aspect of chronic rheumatic heart disease.

## CONCLUSION

Hospital based study of involvement of different valves and pattern of valvular involvement does not reflect the true prevalence of the disease in the population as whole because of selection bias as more sick patient with severe lesion predominate the patient subgroup. Community based study involving both symptomatic and asymptomatic patient will reflect the true prevalence and pattern of valvular involvement. Routine screening study involving asymptomatic patient evaluated by routine echocardiography revealed high prevalence of regurgitation lesion. Mild to moderate MR along with thick vales is the dominant lesion and stenotic lesion are less prevalent among the asymptomatic persons Present study using echocardiography in the asymptomatic persons as routine evaluation detected high prevalence of asymptomatic regurgitation lesion in chronic rheumatic heart disease.

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