



## STUDY OF RHEUMATIC HEART DISEASE IN 30 GERIATRIC PATIENTS

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**ABSTRACT** **Background** It is considered as uncommon for Rheumatic Heart Disease (RHD) to present in the geriatric as a first symptom. In developing countries, rheumatic heart disease remains the primary cause of valvular heart disease whereas in industrialized countries there is an increase in the prevalence of degenerative valve disease. There are only a few studies on RHD in the elderly. **Materials and Methods Study design-** Cross sectional study. **Sample Size-** 30 (convenient sampling method) Geriatric patients with rheumatic heart disease attending Geriatrics OPD, ward and ICCU who fulfilled the eligibility criteria. **Results** 15(50%) patients presented for the first time after 60 years of age, out of 30 RHD patients studied. Hypertension (50%) was most common comorbidity followed by ischemic heart disease (46.6%). In our study, the most common valvular lesion was mitral stenosis in 19 patients (63%) and the most common isolated valvular lesion was also mitral stenosis (17%). Atrial fibrillation 70%(21) was the most common complication followed by pulmonary hypertension in 50 % (15). **Conclusion** Even today, rheumatic heart disease is a common etiology for valvular heart disease in developing countries. We should consider and evaluate for rheumatic heart disease when a patient presents with congestive cardiac failure or atrial fibrillation in our country, even in the geriatric age group (60 years and above).

**KEYWORDS :** Rheumatic heart disease(RHD), Geriatric, Mitral Stenosis, Atrial fibrillation, Congestive cardiac failure

## INTRODUCTION

Though a steady rise in life expectancy has been accompanied by a progressively increasing frequency of degenerative valve disease in developed countries<sup>(1)</sup>, Rheumatic heart disease still remains the main etiology in developing countries<sup>(2)</sup>. Acute Rheumatic Fever is caused by group A streptococcal infection of the tonsillo-pharynx, and leads to an inflammatory cascade that involves many organs including the heart, joints and central nervous system. RHD is the most serious complication of Rheumatic Fever (RF). Over the years, usually as a result of recurrent episodes, leaflet thickening, scarring, calcification, and valvular stenosis may develop<sup>(3)</sup>. Approximately 40%-60% of RF episodes result in RHD<sup>(4)</sup>, depending on the severity of carditis, recurrences of RF, and availability of and compliance with secondary prophylaxis. With chronic RHD, patients develop valve stenosis with varying degrees of regurgitation, atrial dilation, arrhythmias and ventricular dysfunction. Mitral valve stenosis appears to be one of the leading causes of chronic RHD requiring valve replacement in adults in the world<sup>(5)</sup>.

The surveys conducted by the Indian Council of Medical Research (ICMR), indicate a decline in the prevalence of RHD over decades.<sup>(6,7,8)</sup> The World Health Organization (WHO 2004) estimates that Acute Rheumatic Fever (ARF) and subsequent RHD affect about 15.6 million people worldwide<sup>(9)</sup>. According to recent studies prevalence per 1000 population in United States is 0.6, Japan 0.7, India 6.0-11.0, Asia 0.4-21.0, Africa 0.3-15.0, South America 1.0-17<sup>(5)</sup>. Acute Rheumatic Fever (ARF) is mainly a disease of children aged 5-14 years. 0.3% of cases of group A beta-hemolytic streptococcal pharyngitis in children<sup>(1)</sup>. Initial episodes are rare in persons aged >30 years. RHD peaks between 25 and 40 years<sup>(9)</sup>.

People with RHD are generally asymptomatic for many years. Moreover, particularly in resource-poor settings, the diagnosis of ARF is often not made. Children, adolescents, and young adults may have RHD but not know it. These cases can be diagnosed using echo cardiography. Diagnosis by auscultation depends on the expertise and experience of the clinician<sup>(9)</sup>. RHD is far more common in elderly patients than is typically thought and RHD is frequently missed or undiagnosed in elderly patients<sup>(10)</sup>.

Rheumatic fever<sup>(9)</sup>

Rheumatic fever arises as a result of an immune response to a recent Streptococcus pyogenes infection (2-6 weeks earlier).

Pathogenesis<sup>(9)</sup>

- Streptococcus pyogenes infection → activation of the innate immune system leading to antigen presentation to T cells.
- B and T cells produce IgG and IgM antibodies and CD4+ T cells are activated.
- A cross-reactive immune response (a sort of type II hyper sensitivity) is then elicited, which is assumed to be mediated by molecular mimicry.
- M protein, a highly antigenic virulence factor, is found in the cell wall of Streptococcus pyogenes. It is thought that the antibodies against M protein cross-react with myosin and the smooth muscle of arteries. This response leads to the clinical features of rheumatic fever.
- Aschoff bodies are granulomatous nodules found in rheumatic heart fever<sup>(9)</sup>.

Table 1- Modified Jones Criteria<sup>(9)</sup>

Major Criteria	
Low-risk populations	Moderate- and high-risk populations
Carditis (Clinical and/or subclinical)	Carditis (Clinical and/or subclinical)
Arthritis- Polyarthritis only	Arthritis- Monoarthritis or polyarthritis -Polyarthralgia
Chorea	Chorea
Erythema marginatum	Erythema marginatum
SC nodules	SC nodules
Minor Criteria	
Polyarthralgia	Monoarthralgia
Fever ( $\geq 38.5^{\circ}\text{C}$ )	Fever ( $\geq 38^{\circ}\text{C}$ )
ESR $\geq 60$ mm in the first hour and/ or CRP $\geq 3.0$ mg/dL	ESR $\geq 30$ mm/h and/or CRP $\geq 3.0$ mg/dL
Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)	Prolonged PR interval, after accounting for age variability (unless carditis is a major criterion)

**Diagnosis:**

Initial ARF- 2 major manifestations or 1 major plus 2 minor manifestations.

Recurrent ARF - 2 major or 1 major and 2 minor or 3 minor

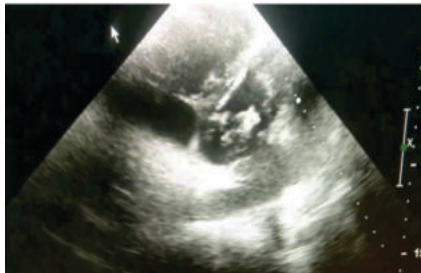
**Pathogenesis of rheumatic heart diseases in mitral stenosis**

The mechanism by which the stenosis of the mitral orifice, takes place is not known for certain<sup>(11)</sup>.

Rheumatic fever results, in four forms of fusion of the mitral valve apparatus leading to stenosis<sup>(22)</sup>.

- 1) Commissural
- 2) Cuspal
- 3) Chordal and
- 4) Combined.

The two cusps of the valve are greatly thickened and are fused at the point of attachment of the chordae tendinea, which are also thickened and shortened. The ultimate deformity is seen as greatly narrowed, oval or buttonhole orifice, which usually measures 1.0x0.5 sq cm. In a mild attack of rheumatic carditis the only damage is of the cusps, just proximal to their free margins, (where they receive the maximum natural trauma). Perhaps as the result of depositions of platelets and fibrins on the surface, of this damaged zone, stickiness develops, which encourages the two cusps to adhere to one another when they meet most firmly.



**Figure 1** – Severely narrowed and thickened mitral valve ( mitral stenosis) in parasternal short axis view.

The strong blood flow through the central pathway prevents fusion at the center, but there is less resistance to fusion at the critical areas of tendon insertion on each side of the central pathway, and this is where the two cusps stick together<sup>(12)</sup>. Gradual reduction in the size of the lumen between the two critical areas of tendon insertion may result from repeated deposits of fibrin at the edges. The excrescence become covered by endothelium and then fibrosed as described by (Magarcy 1951)<sup>(22)</sup>.

**MATERIALS AND METHODS**

**Study design-** Cross sectional study.

**Sample Size-** 30.

**Inclusion criteria:**

- Geriatric patients (age group 60 or more) with rheumatic heart disease (RHD).

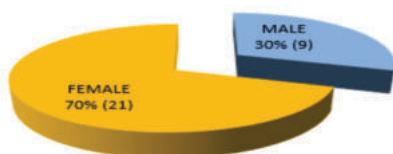
**Exclusion criteria:**

- Patients who did not give informed consent.

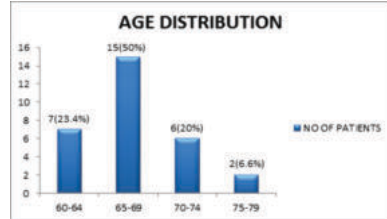
Geriatric patients with rheumatic heart disease attending Geriatrics OPD, ward and ICU who fulfilled the eligibility were included. The sample size is 30 cases. The study protocol has been followed in accordance with the approval of the institutional ethic committee and informed written consent has been taken from all the subjects.

**RESULTS**

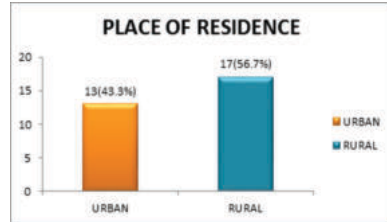
**SEX DISTRIBUTION**



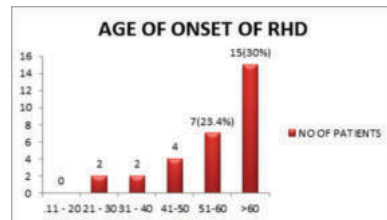
**Graph 1**-Sex Distribution Of Study Population



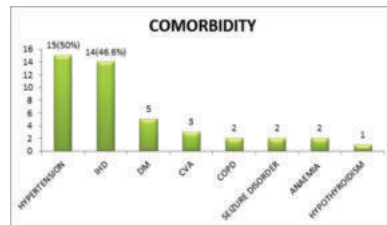
**Graph 2** -Age Distribution Of Study Population



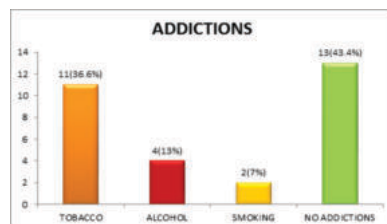
**Graph 3**-Place Of Residence



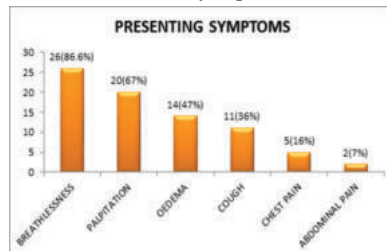
**Graph 4**-Age of Onset of Rhd



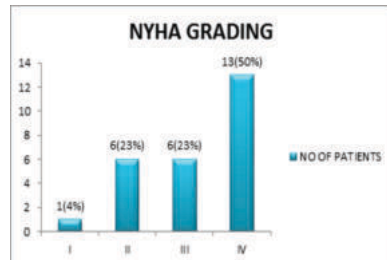
**Graph 5**-Comorbidity In The Study Population



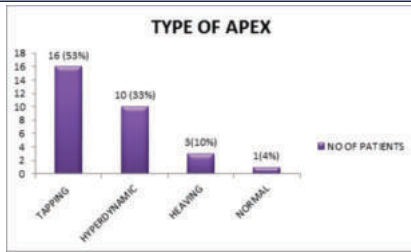
**Graph 6**-Addictions In The Study Population



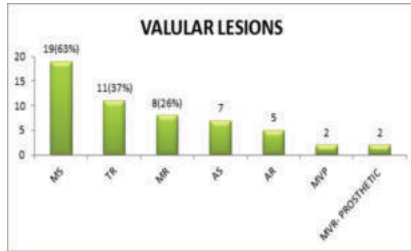
**Figure 7**-Presenting Symptoms



**Graph 8**- NYHA Grading

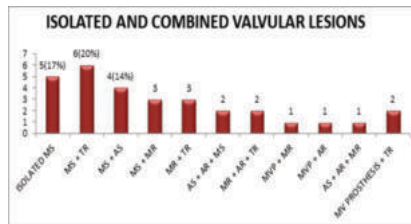


Graph 9- Type of Apex

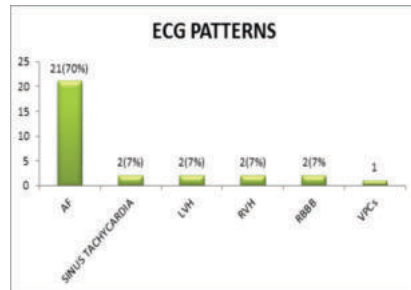


Graph 10- Types of Valvular Lesions In Rhd

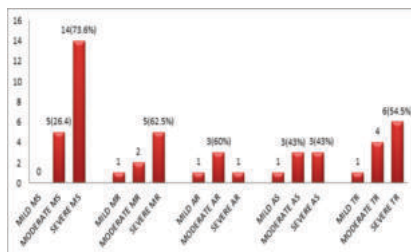
Mitral valve involvement (Mitral stenosis and mitral regurgitation)- 50%. Aortic valve involvement (Aortic stenosis and aortic regurgitation)- 22.2%. Tricuspid valve involvement (Tricuspid regurgitation)-20.3%.



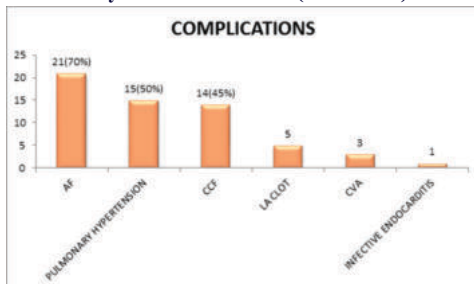
Graph 11- Isolated And Combined Valvular Lesions In Rhd



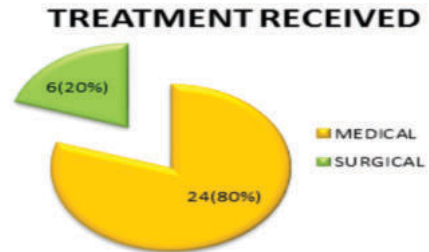
Graph 12- ECG Patterns



Graph 13- Severity of Valvular Lesions (on 2d Echo)



Graph 14- Complications



Graph 15- Treatment Received

Table 2- Various Surgical Procedures Undergone

SURGICAL PROCEDURE	NO OF PATIENTS
BALLOON MITRAL VALVULOPLASTY	3
MITRAL VALVE REPLACEMENT	3
CLOSED MITRAL COMMISSUROTOMY	2
TRICUSPID VALVE REPAIR	1

**DISCUSSION**

30 Geriatric patients with rheumatic heart diseases from Geriatrics OPD, ward & ICCU who had fulfilled the eligibility criteria were included in the study.

The age range of the patients in the study was from 60 years to 78 years with a mean age of 66.63 years. The maximum number of patients (15) belonged to the age group of 65-69 (50%). The late onset of RHD in the fifth or sixth decade is most likely due to milder types of the disease becoming symptomatic later in life. Many other factors could be responsible which need to be studied.

In this study, an overall female preponderance was observed. Out of 30 patients studied, there were 21 females (70%) and 9 males (30%). Female to male ratio is 2.3 : 1.

Out of 30 RHD patients studied, 15(50%) patients presented for the first time after 60 years of age.

**Comorbidity**

Name of study	Comorbidity	Percentage	Remarks
Present study	Hypertension	50%	Similar to OxVALVE Population Cohort Study (18)
	ischemic heart disease	46.6%	
OxVALVE Population Cohort Study (18)	Hypertension	55.8%	
	Ischemic heart disease	46.6%	

**Symptom at presentation**

Name of study	Symptoms	Percentage	Remarks
Present study	Breathlessness	86%	Similar to studies of Sliwa et al (15) and R.K. Kotokey et al(22)
	Palpitations	67%	
Sliwa et al (2009)(15)	Breathlessness	66%	
	Palpitations	66%	
R.K. Kotokey et al(22)	Breathlessness	57.15%	
	Palpitations	35.71%	

**Common valvular lesions in RHD**

Name of study	Valvular lesion	Percentage	Remarks
Present study	Mitral stenosis	63%	Similar to study by R.K. Kotokey et al(22)
R.K. Kotokey et al(22)	Mitral stenosis	71.4%	

In this study the most common isolated valvular lesion was – isolated mitral stenosis (17%). This was found to be similar to the Euro Heart Survey<sup>(20)</sup> on VHD where the most common cause for MS was RHD (84.2%). In this study, the most common combined valvular lesion was mitral stenosis with tricuspid regurgitation (MS + TR)- 20%.

Most common valve involved is mitral valve (50%). This was found similar to Waller et al (1994)<sup>(21)</sup> reported that approximately 25% of all

patients with RHD had pure mitral stenosis and an additional 40% had combined MS and mitral regurgitation.

Out of the 19 patients with mitral stenosis 5(26.4%) patients had moderate mitral stenosis and 14(73.6%) had severe mitral stenosis. In the study by Prakash R. Ghogale<sup>(19)</sup> et al, mild MS was seen in 17 (21.51%), moderate MS in 24 (30.38%), severe MS in 38 (48.1%).

#### Most common ECG findings

Name of study	ECG findings	Percentage	Remarks
Present study	atrial fibrillation	70%	Similar to studies of Prakash R. Ghogale(19) et al and R.K. Kotokey et al(22)
R.K. Kotokey et al(22)	atrial fibrillation	64.29%	
Prakash R. Ghogale(19) et al	atrial fibrillation	35%	

#### Complications of RHD

Name of study	complication	Percentage	Remarks
Present study	Atrial fibrillation	70%	Similar to study by R.K. Kotokey et al(22)
R.K. Kotokey et al(22)	Atrial fibrillation	64.29%	

Out of 30 patients, 24(80%) of patients were on medical treatment. 6(20%) patients had undergone surgical treatment. 3 patients had undergone balloon mitral valvuloplasty (BMV) and mitral valve replacement (MVR). 2 patients had undergone closed mitral commissurotomy and one had undergone tricuspid valve replacement.

#### CONCLUSION

In our country even in the geriatric age group, we should consider and evaluate for rheumatic heart disease when a patient presents with congestive cardiac failure or atrial fibrillation, as rheumatic heart disease is still a common etiology for valvular heart disease in developing countries. Also, at the time of diagnosis, most of the elderly patients presented with complications. Comorbidities, especially hypertension and ischemic heart disease can add to these complications.

#### Declaration

Funding details- NA

Conflict of interest - No

Ethics committee approval letter- taken

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