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ORIGINAL RESEARCH

Pattern of rheumatic heart disease in western Uttar Pradesh - An echocardiographic study: A single centre experience

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Abstract

Introduction: Rheumatic heart disease accounts for about 234,000–492,000 deaths each year. Echocardiographic detection of significant regurgitation of mitral and aortic valves can form the basis for the diagnosis of rheumatic carditis. Study was proposed to be conducted to study the pattern of rheumatic heart disease in Varun Arjun medical college & Rohailkhand hospital, department of medicine, Banthra, Shahjahanpur, Uttar Pradesh, India with the aid of echocardiographic evaluation.

Materials and Methodology: This present observational study was planned to be conducted between February 2016 and February 2019 in the Varun Arjun medical college & Rohailkhand hospital, department of medicine, Banthra, Shahjahanpur, Uttar Pradesh, India. This study incorporated all the echocardiograms of RHD patients that are needed to be performed during this period for analysis.

Results: Sex distribution of 520 echocardiograms of RHD patients were analysed, which composed of 201 males, and 319 females as given in Table 2. Mitral stenosis (MS) was seen in 362 (69.8%) cases, Mitral Regurgitation (MR) was diagnosed in 358 (68.8%) patients' Aortic stenosis (AS) was seen in 63 (12.2%) cases and Aortic regurgitation (AR) was found in 232 (44.62%) cases. The frequency of isolated and mixed valvular lesions in a total of 520 RHD patients were tabulated in Table 3.

Conclusion: The valvular involvement among females had a typically predominant MS, followed by MR, AR, AS, and organic TV disease. Whereas, in males MR leaded the valvular lesions followed by MS, AR, AS, and organic TV disease.

Keywords: Rheumatic heart disease, Echocardiography, Valvular heart disease

Introduction

Though there are various developments and technologies available in the recent world, certain developing countries usually deprive of adequate health care infrastructure in order to objectively investigate, diagnose and document each case of acute rheumatic fever (ARF). Consequently, secondary antibiotic prophylaxis is not offered globally to all the cases that are observed from RHD. Eventually, these undiagnosed cases become symptomatic at times in the later life of an individual.[1] Rheumatic heart disease (RHD) is estimated to affect 15.6–19.6 million people globally.

The progress of this disease was recorded to be observed slowly in the areas that are labeled as low prevalence areas compared to areas that were denoted as high prevalence areas due to lesser number of streptococcal infection recurrence and there are certain factors that can contribute in some seasonal variation or improvement in socioeconomic conditions.

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Therefore, the pace of progression of RHD might be cumbersome to predict and vary in different populations.[2] About 30–40% of adults having RHD are unlikely to think about an episode of ARF. Additionally, repeated episodes of ARF might be sometimes asymptomatic and even unnoticed.[3]

Echocardiographic detection of significant regurgitation of mitral and aortic valves can form the basis for the diagnosis of rheumatic carditis when a patient reported with signs and symptoms indicative of ARF even in the absence of clinically evident carditis. These cases could be noted as probable RHD and are started on secondary antibiotic prophylaxis.[4] In the earlier century, living conditions were less hygienic with lesser medical facilities as compare to today's era where living conditions are oriented towards more hygiene, better nutrition and access to better medical care, ARF and RHD have become rare in some developed countries. With the advent of antibiotics in managing this disease, the burden of treating the episodes has been greatly reduced.[5,6] ARF and RHD are now largely constrained only to developing countries and some poor or indigenous populations of certain wealthy countries.

It has to be proposed whether the morphological features of advanced valve deformity is easily detected by echocardiography, if it has been considered as the sole diagnostic criteria which would rather be sensitive enough to diagnose vast symptoms of the subclinical cases of RHD. There is reportedly no uniform set of echocardiographic criteria to diagnose a subclinical case of RHD particularly in the absence of advanced lesions that are characteristic of RHD. These advanced lesions, when present, are mostly detected by cardiac auscultation as well. This study was proposed to be conducted to study the pattern of rheumatic heart disease in Varun Arjun medical college & Rohailkhand hospital, department of medicine, Banthra, Shahjahanpur, Uttar Pradesh, India with the aid of echocardiographic evaluation.

Materials and methodology

After obtaining the prior permission from the institutional ethical committee, this present observational study was planned to be conducted between February 2016 and February 2019 in the Varun Arjun medical college & Rohailkhand hospital, department of medicine, Banthra, Shahjahanpur, Uttar Pradesh, India. This study incorporated all the echocardiograms of RHD patients that are needed to be performed during this period for analysis. There are some inclusion criteria that have been followed in the study which are those patients who were reported to the department within the stipulated study duration. And the exclusion criteria include those patients with non – rheumatic valvular involvement.

All the study subjects were brought to the department of cardiology. They were asked for the history of symptoms suggestive of rheumatic heart disease. Information that was obtained from the subjects like age, gender, referring physician, clinical signs and symptoms followed by echocardiographic findings were promptly recorded. Data were analysed using SPSS version 10.0 software.

The echocardiographic modalities mostly include M – mode, 2D and doppler studies. It was done with 3 – 5 MHz sector transducer. Total 2D echocardiographic examination was performed according to the protocols of the American Society of Echocardiography (ASE). Mitral stenosis was diagnosed on the presence of thickening, doming of diastole and leaflet motion restriction. In some severe cases, calcification, fibrosis, fusion of commissures and chordae tendinae were also recorded. Mitral regurgitation was identified as thickened valves, dilated mitral valve annuli and left atrial & ventricular dilatation. Doppler echocardiographic analysis recognised as the presence and severity of the regurgitation of aortic, mitral and tricuspid valves.

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Results

In this study, a total 520 echocardiograms of RHD patients of age ranging from 4 to 75 years with mean age of 35.6 ± 11.6 years were basically distributed into four groups as given in Table 1.

Sex distribution of 520 echocardiograms of RHD patients were analysed, which composed of 201 males, and 319 females as given in Table 2. Mitral stenosis (MS) was seen in 362 (69.8%) cases, Mitral Regurgitation (MR) was diagnosed in 358 (68.8%) patients. Aortic stenosis (AS) was seen in 63 (12.2%) cases and Aortic regurgitation (AR) was found in 232 (44.62%) cases. The frequency of isolated and mixed valvular lesions in a total of 520 RHD patients were tabulated in Table 3. Amongst combined valvular involvement- MS+MR was most frequently observed in 245 (47.2%) patients, followed by MR+AR in 178 (34.23%); MS+AR in 168 (32.36%); AS+AR in 65 (12.52%); MR+AS in 48 (9.33%) and MS+AS in 44 (8.52%) patients as seen in Table 4.

Table 1: Age distribution of 520 Echocardiograms of RHD patients.

Groups	Age in years	Total number of patients (n=520)			%
		Males	Females	Total	
Group – A	**0 – 20**	35	42	77	14.8
Group – B	**21 – 40**	97	159	256	49.2
Group – C	**41 – 60**	55	99	154	29.6
Group – D	**>60**	14	19	33	6.34

Table 2: Frequency of individual valve lesion according to sex distribution

Valve lesions	Males (n=201)	Females (n=319)
Mitral Regurgitation (MR)	80 (40%)	191 (60%)
Mitral stenosis (MS)	75 (37.4%)	199 (62.6%)
Aortic regurgitation (AR)	85 (42.5%)	183 (57.5%)
Aortic stenosis (AS)	106 (52.55%)	151 (47.45%)

Table 3: Frequency of isolated and mixed valvular lesions.

Valve lesions	Total	Isolated	Mixed
Mitral Regurgitation (MR)	362 (69.8%)	40 (7.8%)	316 (62%)
Mitral stenosis (MS)	358 (68.8%)	38 (7.3%)	324 (62.3%)
Aortic regurgitation (AR)	232 (44.62%)	8 (.6%)	225 (43.3%)
Aortic stenosis (AS)	63 (12.2%)	0 (0%)	63 (12.2%)

Table 4: Frequency of combined valvular involvement.

Combined valve lesions	Frequency (n=520)	Percentage
MS+MR	245	47.2%
MR+AR	178	34.23%
MS+AR	168	32.36%
AS+AR	65	12.52%
MR+AS	48	9.33%
MS+AS	44	8.52%

Discussion

There is earliest observable evidence that can predict the chronic nature of carditis if there might be negligible regurgitation of mitral and/or aortic valves. There could be echocardiographic detection of noticeable regurgitation of left-sided valves after ruling out non - rheumatic aetiologies of significant regurgitation that should eventually form an

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essential criterion to diagnose RHD.[7] The present study was intended to be carried out in a tertiary cardiac centre in Western Uttar Pradesh, India, with the prime goal of assessing efficiently the large volume of echocardiographic data on RHD patients which was observed in the echocardiographic laboratory. Echocardiography currently plays a more predominant role in the evaluation of the anatomic and hemodynamic consequences that are mostly caused by valvular lesions. Echocardiography is presently the absolute method of initial investigating and follow up of patients with valvular RHD. The benefits of echocardiogram over clinical investigations in distinguishing subclinical RHD that has been selectively proven by various school review-based researches that had been done across India.[8,9] It might lead to initiating the prophylaxis for rheumatic fever among many more youngsters thereby decreasing the burden of RHD. RHD was reportedly the most common in age group 21-40 years and the females were more commonly involved than males. These finding were in corroboration with the observations of *Manjunath* et al and *Kafle* et al.[10,11]

Manjunath et al reported that majority of patients of valvular heart disease (64.3%) were due to RHD.[10] The pattern of association of valve involvement in RHD was mitral followed by aortic, tricuspid, and pulmonary (mitral> tricuspid> pulmonary). Another study by *Chandrashekhar* et al substantiated that the pathologic involvement of the heart valves in ARF is similar to the findings observed in previous study where mitral valve is the most commonly involved and pulmonary valves reported to be the least.[12] In the current study, the pattern of valve lesions in RHD were identical to previous study as mitral, aortic, tricuspid and no pulmonary valve lesions were detected. In another survey that had been held at Cambodia and Mozambique among young children displayed that the cases of RHD as identified by echocardiography were many a times more than those achieved through routine clinical examinations.[13] Recurrences of rheumatic fever happen more in RHD patients and each spell of ARF might causes the deterioration of the valves.[14] The rheumatic heart disease is in association as depicted in the surgical series is observed in 99% of excised stenotic valves.[15] In a surgical series study, RHD was the most common cause of isolated AR, therefore in the recent series, is the aortic dilatation and degenerative changes that are implicated in more than half of the cases of AR.[16,17] In this present study, aortic valve was the second most affected valve (AR-44.62% and AS-12.15% patients). The study by *Manjunath* et al showcased that combined valvular involvement in RHD patients was following according to the order of involvement: MS + MR (46.2%) >MS+AR (26.5%) >MR+AR (23.3%) >MS+AS (2.4%) >MR+AS(0.9%) >AS+AR(0.3%).10 But, the present study concluded the pattern in the following order: MS+MR (47.2%) >MR+AR (34.23%) >MS+AR (32.36%) >AS+AR (12.52%) >MR+AS (9.33%) >MS+AS (8.52%).

Conclusion

The valvular involvement observed among the females had a typically predominant MS, followed by MR, AR, AS. In contrast, males reported with MR leaded the valvular lesions followed by MS, AR, AS. Moreover, amongst multi-valvular involvement the sequence was predominantly MS+MR followed by MR+AR, MS+AR, AS+AR, MR+AS, and MS+AS.

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