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Research Article

RHEUMATIC HEART DISEASE OUTCOME BETWEEN MITRAL VALVE REGURGITATION AND MITRAL VALVE PROLAPSE

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Abstract:

Objectives: To assess the most common valvular diseases presented in patients with RHD and associated complications.

Methodology: a cross sectional observational study was conducted from November 2019 to March 2020 at Lady Reading Hospital, Peshawar Pakistan for a duration of six months. All patients over the age of 18 years with diagnosed rheumatic heart disease who presented in the out patients' department were included in the study using consecutive sampling technique. Patients below the age of 15 years who had congenital malformations were excluded. All valvular disorders were observed and the frequency of each was noted. Associated complications were also noted. Data was collected on a preformed proforma. Analysis was performed using SPSS version 24.

Results: The mean age (SD) of patients was 36 (5.6) years with 67 (29.6%) male and 159 (70.3%) female patients. Mitral valve lesions were seen in 197 (86.7%) patients. 100 (44.2%) had mitral regurgitation and 97 (42.9%) had mitral stenosis. The frequency of Mitral valve lesions was higher in patients between the age group 26-35 years and 36-45 years. 19 (8.4%) patients had aortic lesions. Both mitral and aortic valve lesions were seen in 16 (7.0%) patients. The most common complication was pulmonary hypertension seen in 118 (52.21%) patients.

Conclusion: RHD and concomitant valvular disorders are a major concern in Pakistan. Further large scale cohorts should be conducted to evaluate the major risk factors associated with the severity of the valvular diseases.

Keywords: Aortic stenosis, mitral regurgitation, rheumatic heart disease, valvular disorder

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INTRODUCTION:

Rheumatic heart disease is caused by streptococcal pharyngitis (Group A) and a delayed immune response. Jones criteria is used to diagnose rheumatic fever (RF), which comprises minor and major clinical manifestations [1-3]. It also includes laboratory indications and signs of former streptococcal infection [4]. In the circumstances of a prior streptococcal infection, two major signs or a combination of one major and two minor signs, provide a reliable confirmation for the identification of Rheumatic Fever [5].

Patients with acute rheumatic fever may develop varying degrees of pancarditis with associated valve disease, heart failure, and pericarditis [6-7]. Worldwide, rheumatic heart disease remains a major health problem although its prevalence in the developed countries is much reduced. Involvement of the mitral valve results in mitral regurgitation and/or stenosis [8-9]

The previous studies have been inconsistent and the frequency of most common valvular diseases are still unknown and vague. Therefore, this current study was conducted to assess the most common valvular diseases presented in patients with RHD and associated complications.

METHODS AND MATERIALS:

A cross-sectional study was conducted from November 2019 to March 2020 at Lady Reading Hospital Peshawar in Pakistan. Patients were enrolled in this study by non-probability sampling method. 457 patients were selected in this research from the ward of cardiology of Lady Reading hospital (LRH). 231 of these patients were diagnosed with Chronic Rheumatic Heart Disease (CRHD) and 226 of these patients were selected from inpatient files and were undergoing surgical and medical treatment at the same time. Consent was obtained from each participant and their answers were answered anonymously. A health volunteer explained the forms to participants who were not literate through Arogyamithra. Patients were not asked any open-ended questions. Consent was also taken from these participants by taking a thumb print. Their anonymity was maintained. The study

was approved by the Ethics Committee of the Lady Reading hospital.

Inclusion Criteria:

1. Patients above the age of 18 years were given forms and added in the study
2. Patients only belonging to the cardiology ward were included

Exclusion criteria:

1. Patients below the age of 18 years who had congenital malformations were excluded.

Every patient was examined by experienced cardiologists who had been treating patients with rheumatic heart disease for many years. These patients were examined by an echocardiogram as well as by a clinical examination. Auscultation was done on the participants as they were placed on different positions; left lateral decubitus as well as supine. During clinical examination, those who were diagnosed with an organic murmur during auscultation had to go get an echocardiogram done so that we were sure they had rheumatic heart disease. Those patients who were not diagnosed by any murmur did not have to undergo an echocardiogram for confirmation of rheumatic heart disease. These results were then studied by two different cardiologists who had been dealing with these patients for years and then were analyzed by them.

Statistical analysis

The results were collected and then interpreted using SPSS (Statistical Package for the Social Sciences) version number 16, 2007. Tests were then used to compare each variable. The values were mentioned in percentages as well as mean standard deviation. The method that was used was direct age-standardisation method to combine factors such as age and population as a particular standard of compiling data. Chi square, mean, frequencies, references and various numeric values were used to form an authentic result.

RESULTS:

A total of 226 patients were enrolled in the study who fulfilled the eligibility criteria. The mean age (SD) of patients was 36 (5.6) years with 67 (29.6%) male patients and 159 (70.3%) female patients. Age and gender distribution of the study population are illustrated in Table 1.

Table 1. Age and gender distribution of the study population n=226

| Age Groups | Men | Women | Total |
|------------|-------------|-------------|-------------|
| 16-25 | 16 (7.08%) | 37 (16.37%) | 53 (23.45%) |
| 26-35 | 24 (10.62%) | 51 (22.57%) | 74 (32.74%) |
| 36-45 | 17 (7.52%) | 42 (18.58%) | 61 (26.99%) |
| 46-54 | 6 (2.65%) | 22 (9.73%) | 27 (11.95%) |
| 55 or more | 4 (1.77%) | 7 (3.10%) | 11 (4.87%) |

Table 2. Incidence of Mitral, Aortic, and Pulmonary valve disorders according to the age distributions (n=226)

| Age Groups | Mitral valve lesions | Aortic valve lesions | Pulmonary Stenosis | Mitral valve + aortic valve lesions |
|------------|----------------------|----------------------|--------------------|-------------------------------------|
| 16-25 | 48 (21.24%) | 3 (1.33%) | 0 (0.00%) | 3 (1.33%) |
| 26-35 | 64 (28.32%) | 6 (2.65%) | 1 (0.44%) | 6 (2.65%) |
| 36-45 | 55 (24.34%) | 4 (1.77%) | 0 (0.00%) | 2 (0.88%) |
| 46-54 | 21 (9.29%) | 4 (1.77%) | 0 (0.00%) | 3 (1.33%) |
| 55 or more | 9 (3.98%) | 2 (0.88%) | 1 (0.44%) | 2 (0.88%) |

Mitral valve lesions were the most frequently seen valvular disorder in the study population with a frequency of 197 (86.7%). Out of these, more than one-half had mitral regurgitation, while the rest of the 97 patients had mitral stenosis. The frequency of Mitral valve lesions was higher in patients between the age group 26-35 years and 36-45 years. See table 2.

A total of 19 (8.4%) patients had aortic lesions. Aortic stenosis was found in 10 (4.4%) patients, while Aortic regurgitation was seen in 9 (3.9%) patients. Both mitral and aortic valve lesions were seen in 16 (7.0%) patients and there were two patients with pulmonary valve lesions. (See table 2 and figure 1)

Table 3. The frequency of complications in patients with RHD (n=226)

| Complications | n(%) |
|------------------------------------|--------------|
| Atrial Fibrillation | 41 (18.14%) |
| Functional Tricuspid Regurgitation | 77 (34.07%) |
| Pulmonary Hypertension | 118 (52.21%) |
| Embolic Cerebro-vascular Events | 9 (3.98%) |
| Infective Endocarditis | 7 (3.10%) |
| Left Atrial Thrombus | 3 (1.33%) |
| Congestive Heart Failure | 71 (31.42%) |

The most common complications seen in patients with RHD with concomitant valvular heart disease were pulmonary hypertension, 118 (52.21%) followed by Functional Tricuspid Regurgitation in 77 (34.07%), congestive heart failure in 71 (31.42%), and atrial fibrillation in 41 (18.14%) patients. The minority of the patients suffered from Infective Endocarditis, Left Atrial Thrombus, and Embolic Cerebro-vascular events. See table 3.

DISCUSSION:

Even though recent data has shown a decline in the incidence of rheumatic heart diseases in Pakistan and other developing countries, it still poses a substantial burden on health-care and is associated with a high morbidity and mortality [10]. Furthermore, the current prevalence is remarked to have been an understatement to the actual prevalence as the majority of clinicians only use the clinical criteria to establish diagnosis. Therefore, the authors of the current study not only strictly abided

by the clinical criteria but also performed echocardiography to establish the diagnosis of rheumatic heart disease and presence of any structural abnormalities in heart valves.

In the present study, we found that the mean age of patients with RHD was 36 (5.6) years and there was a female predominance. Previous studies have shown a similar trend of indicating female predominance [11-12].

However, this trend was contradicted by Maken et al., who in 2016 revealed that the males were more frequently diagnosed with RHD with an average age of 29.4 years [13]. Additionally, the authors also reported the incidence of mitral regurgitation of 39.2% and 51.5% patients had mitral stenosis. In contradiction to our study where only 10 (4.4%) patients had aortic stenosis, Maken reported a strikingly higher prevalence of 67 percent [13]. Tricuspid regurgitation was the second most common complication observed in the study succeeded by the pulmonary hypertension and followed by congestive heart failure. A study by Ahmed et al., in 2016 revealed that there was a strong statistical correlation between incidence of tricuspid regurgitation and the severity of mitral stenosis. All the patients with severe mitral stenosis suffered from tricuspid regurgitation [14]. Another study in 2017 revealed that atrial fibrillation was significantly associated with tricuspid regurgitation as well as severe mitral stenosis [15]. If left untreated, atrial fibrillation may lead to heart failure and thromboembolic events. A local study published in 2020 by Arshad et al., pointed out that atrial fibrillation has indeed strong association with mitral stenosis, especially if left atrial volume is increasing [16]. The authors recommended routine echocardiography and assessment of left atrial volumes in patients with mitral stenosis.

In a recently published study by Beg et al, it was revealed that certain socio demographic characteristics like overcrowding, ill hygienic conditions, low socio-economic status, and low education level were the main risk factors for acquiring rheumatic heart disease and acute rheumatic fever in Pakistan. However, the specified age group between 5-12 years and a small sample size of the study limited the interpretation from the study findings [17].

In the present study, the majority of the patients with rheumatic heart disease belonged to rural areas in Pakistan. In low-income countries like Pakistan, certain factors such as illiteracy, low socio-economic status, poverty, maternal employment, rural residence, and inadequate access to standard healthcare significantly increases the risk for the development of rheumatic heart disease [18].

One apparent limitation of our study was that we did not sub stratified the patients according to the severity of the valvular diseases which would have given further insights into the pathogenesis of these valvular diseases. Further large scale studies would be helpful in determining the risk factors for developing severe valvular diseases in patients with rheumatic heart disease or acute rheumatic fever. In conclusion, the present study indicates that mitral regurgitation and mitral stenosis are most commonly

seen in patients with rheumatic heart disease. The most commonly seen complications from a long standing valvular disease were pulmonary hypertension, followed by tricuspid regurgitation, congestive heart failure, and atrial fibrillation. The majority of the study population belonged to rural areas in Pakistan. It is recommended to provide patients with diagnosed rheumatic heart disease, the optimum level of care and prompt treatment to prevent disease specific complications.

CONCLUSION:

The present study revealed that patients with rheumatic heart disease most commonly suffer from mitral regurgitation and mitral stenosis. Only a fraction of the patients had both mitral and aortic valvular dysfunction. Pulmonary hypertension, tricuspid regurgitation, congestive heart failure, and atrial fibrillation were the most common complications reported.

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