



RHEUMATIC HEART DISEASE AMONG PEDIATRIC AND ADOLESCENT PATIENTS: AN OBSERVATIONAL STUDY FROM PATNA MEDICAL COLLEGE AND HOSPITAL, BIHAR, INDIA

Pediatrics

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ABSTRACT

Rheumatic heart disease is the most serious complication of rheumatic fever. Acute rheumatic fever follows 0.3% of cases of group A beta-hemolytic streptococcal pharyngitis in children. **Methodology:** A cross-sectional observational study was planned and executed by Department of Pediatrics, Patna Medical College & Hospital. The study sample constituted of 88 children and adolescent patients who were selected randomly from patients attending RHD clinic and admitted in Department of cardiology and Department of Pediatric Medicine with various spectrum of manifestation due to RHD. The study was extended from February 2016 to July 2017 for a period of 18 months. **Results:** Near about one-third (35.7%) of the patients had positive history of rheumatic fever. Patients presented with a spectrum of clinical features most common of which being heart failure (Figure 1). Most common presenting symptom of the RHD study population was dyspnea among 86.27% patients. **Conclusions:** Demographic profile reveals that it is still prevalent in rural areas and low socio-economic class and non-compliance to penicillin prophylaxis is a major precipitating factor besides poor hygiene, overcrowding and poor nutritional status.

KEYWORDS

Rheumatic Heart Disease, Pediatric And Adolescent Patients

INTRODUCTION

In developed countries acute rheumatic fever and rheumatic heart disease were considered to be of decreasing significance until reports of recent outbreaks [1-8]. In developing countries most studies of these diseases have been hospital-based and have concentrated on children [9]. Techniques such as echocardiography for confirming the diagnosis and differentiating the initial attack of rheumatic fever from recurrences have only become available since the 1980s.

Rheumatic heart disease is the most serious complication of rheumatic fever. Acute rheumatic fever follows 0.3% of cases of group A beta-hemolytic streptococcal pharyngitis in children. As many as 39% of patients with acute rheumatic fever may develop varying degrees of pancarditis with associated valve insufficiency, heart failure, pericarditis and even death. With chronic rheumatic heart disease, patients develop valve stenosis with varying degrees of regurgitation, atrial dilation, arrhythmias and ventricular dysfunction. Chronic rheumatic heart disease remains the leading cause of mitral valve stenosis and valve replacement in adults [10, 11]. There have been many surveys in India regarding the prevalence of rheumatic heart disease in various parts of the country [12-15]. Even at the beginning of the 21st century [12], the problem of RHD in India has remained the same. ICMR's multi-centric 'Jai Vigyan Mission Mode Project on RF/RHD' was undertaken from 2000 to 2010 to estimate the prevalence of RF/RHD in 176904 school children in the age group of 5 to 14 years at various center in India. The prevalence of RHD ranged from 0.13 to 1.5 per 1000 in school children in the age group 5 to 9 years and 0.13 to 1.1 per 1000 in the age group of 10 to 14 years. There is an apparent decline in RHD prevalence in this study (2000 - 2010) from the earlier ICMR studies conducted in 1970s and 80s [13-15].

A study by Carpentis., et al. estimated that up to 15.6 million people are affected by RHD worldwide [16]. Each year, there are approximately 470,000 new cases diagnosed and 233,000 deaths attributed to RHD [10]. There have not been many studies on determining the clinical profile and prevalence of different types of RHD in India specially in this part of India. So, this study was undertaken to know the profile of various types of valvular involvement in patients with RHD and to determine the spectrum of complications of this condition in pediatric and adolescent age group.

METHODOLOGY

Study type & design: A cross-sectional observational study was planned and executed by Department of Pediatrics, Patna Medical College & Hospital.

Study sample: The study sample constituted of 88 children and adolescent patients who were selected randomly from patients attending RHD clinic and admitted in Department of cardiology and Department of Pediatric Medicine with various spectrum of manifestation due to RHD.

Study period: The study was extended from for a period of 18 months, February 2016 to July 2017

Ethical issues: An ethical clearance from the Institutional Ethics Committee, was obtained before starting the study. Written consent was obtained from parents of all patients before including them in the study.

INCLUSION CRITERIA: Clinical evidence of RHD confirmed with available record of echocardiographic diagnosis of RHD or those who had history of surgery or balloon valvotomy for RHD.

EXCLUSION CRITERIA: Those who did not give consent and patients of valvular heart disease of non RHD etiology.

Data collection: A predesigned proforma was used as study tool for documentation of clinical history, clinical examination and various investigations (Echo -doppler study, ECG, Chest Xray, Complete Hemogram, ASO titer, CRP, ESR, Throat swab culture) for Diagnosis and evaluation of RHD and its various complications. Echocardiography was done in our cardiology department by Siemens Acuson cv70 echocardiography machine.

STATISTICAL ANALYSIS:

All the accumulated data was analyzed by the help of Social Package for Social Sciences by IBM (ver 20).

RESULTS

A total of 88 patients were registered for the concerned study based on the inclusion and exclusion criteria during the stipulated period of time.

Socio-economic status

Among the 88 patients studied, 48 were males and 40 were females, male and female ratio being 1.2. Mean age of presentation among the male patients was 11.87 ± 3.76 while the mean age of presentation among the female patients was 10.91 ± 3.31 . It implies that females presented at younger age compared to the males. Most of the patients (82.9%) came from rural background. Per capita family income was calculated for each participant and the whole sample was divided into income quartiles. Median per capita income in INR was 2136. Approximately, one-third of the patients belonged to lowest quartile. Only 3.5% were in the highest quartile.

Clinical features

Near about one-third (35.7%) of the patients had positive history of rheumatic fever. Patients presented with a spectrum of clinical features most common of which being heart failure (Figure 1). Most common presenting symptom of the RHD study population was dyspnea among 86.27% patients. According to the NYHA functional grading of

dyspnea 50% had NYHA grade I, 27% had grade II, and 20% had grade III and 3% had grade IV symptoms. The grade III and IV cases received inpatient treatment. Second most common cardiac manifestation among the study population was palpitation among 93.4% patients. Fatigue was present in 37.2% and chest pain in 28.2% patients. Edema was present in 18.5% patients.

Among the major symptoms of acute or recurrent rheumatic fever; carditis was the most common one seen in 52.1% patients; arthritis was present in 45.2%. Subcutaneous nodule was present in one patient. And among the minor symptoms; there was a high incidence of a previous history of throat infection in 35.3% patients while 35.7% gave a history of fever.

Among the 88 patients included in the study, a variant of combination of valvular involvement was noted (Table 1). Among all, mitral valve was involved in 97.2% of the patients, either in combination or isolated. Most common type of mitral valve involvement was isolated mitral regurgitation. While the aortic valve was affected in 23.5% of the patients.

Complications

Among the various complications of the rheumatic heart disease, pulmonary hypertension was present in 13.6% of patients while 31.4% developed congestive cardiac failure, only single patient had infective endocarditis, two had atrial fibrillation and one patient had cardio-embolic stroke.

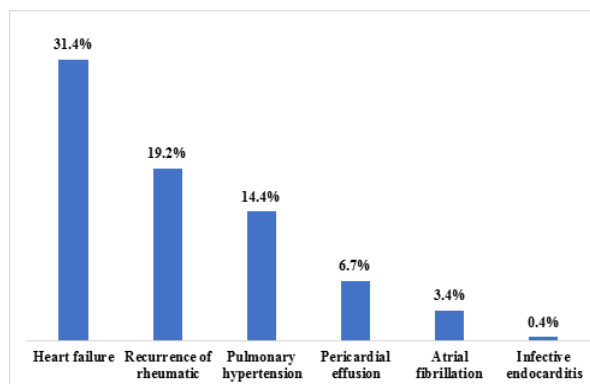


Figure 1: Bar diagram showing mode of presentation of RHD among the study participants

Table 1: Distribution of study participants based on their valvular involvement

Type of valvular involvement	%
Isolated MR	55.9
Isolated MS	7.8
MR with MS	12.7
Isolated AR	3.9
MR with AR	14.7
AR with MS	3.9
MR with MS with AR	0.98

DISCUSSION

Rheumatic heart disease (RHD) has virtually disappeared from the western world; however it continues to be a public health problem in India and several other developing countries. It is a disease of poverty and is associated with overcrowding, poor living conditions, poor sanitation and inadequate access to healthcare. The disease affects children and young adolescents causing progressive damage to cardiac valves. According to the World Health Organization (WHO), rheumatic fever (RF)/RHD affects about 15.6 million people worldwide, with 282,000 new cases and 233,000 deaths each year [10]. Deaths result from complication associated with disease such as heart failure, infective endocarditis, cardio-embolic stroke, atrial fibrillation, pulmonary hypertension.

Age of presentation of RHD patients and socio-economic factors:

In the present study mean age of the patients was 11.43 ± 3.58 , the mean age of patients in a study done in Turkey by Ozer OS., et al. [17] was 11.2 years which was similar to our findings. This can be explained high incidence of group A Streptococcal in schoolgoing children between age group of 5 year - 15 year and schools are often

overcrowded and badly ventilated increasing the spread of Streptococcal infection. In this study most of the patients belonged to lowest quartile of per capita income, which was similar to studies by Arora R., et al. [18] in New Delhi and Khatoun M., et al. [19] in Bangladesh. Our study also showed that most of patients, 85.29% were from rural areas, which is similar to work of Radwan A., et al. [20]. This can be explained by presence of most of risk factors in poor rural families such as overcrowding, intercurrent infection, protein energy malnutrition, and poor awareness about the disease.

Pattern of valvular involvement: Among the cardiac valvular lesions, mitral valve was found to be the most commonly affected, this was consistent with most other studies [20-22]. The most common valvular pattern was isolated mitral regurgitation, 55.88% (n= 57) the 2nd most common was mitral regurgitation with aortic regurgitation 14.7% (n = 15) followed by mitral regurgitation with mitral stenosis 12.74% (n = 13) these results were similar to study by Zhang W., et al. [23] showing pure mitral regurgitation was the commonest valvular disease (40.2%), followed by mitral regurgitation plus aortic regurgitation (29%). This higher incidence of isolated mitral regurgitation in the present may be explained by the fact that the study population here was patients upto 18 years.

Mode of presentation and complications of RHD: The most common mode of presentation was heart failure present in 31.4% patients which is similar to findings of Radwan A., et al. [20] showing 31.1% and 36.54% in the study by Ravisha MS., et al. [22]. 2nd most common presentation was recurrence of rheumatic fever present in 19.2% patients in this study, which varied among studies, 4.3% in study by Radwan A., et al. [20] 9.6% in study by Melka., et al. [24] and 40.7% in study by Ravisha MS., et al. [22]. In this study 14.4% patients had pulmonary arterial hypertension, which was lower than that found in other studies, study by Akinwusi OP., et al. [25] showing 36.4%, and Ogah OS., et al. [26] showing 54.2%. Infective endocarditis was present in 0.4% patients in present study, lower than other studies, 4.6%, 5.54% respectively in studies by Radwan A., et al. [20] and Akinwusi OP., et al. [25]. Atrial fibrillation was present in 3.4%, which was lower than the other studies, 15.9%, 22.2%, 27.3% atrial fibrillation in studies by Ogah OS., et al. [26], Radwan A., et al. [20] and Akinwusi OP., et al. [25] respectively. Pericardial effusion was present 6.7% in this study lower than that in studies by Bitar FF., et al. [27] finding 11% pericardial effusion.

Symptoms of RHD: Most common presenting symptom of the RHD patients in the present study was dyspnoea which was present in 86.27% this was similar to that shown by other studies, 75% of patients had dyspnoea in study by Zhang W., et al. [23] and 77.3% in study by Thakur JS., et al. [28], another study by Ogah OS., et al. [26] showing 100% patients having dyspnoea. NYHA (New York Heart Association) Grades of dyspnoea among total patients in this study as follows: class I = 40.19%, class II = 26.47% class III = 16.66%, class IV = 2.94% this was similar to findings of study by Thakur JS., et al. [28] showing: class I = 38.2%, class II = 38.2%, class III = 20.6%, class IV = 2.9%, but another study by Zhang W., et al. [23] showing more 43% having class III and class IV. All the patients in the present study with class III and class IV required admission. Next most common symptom was palpitation present in 73.4% of patients in this study. Whereas studies by Thakur JS., et al. [28] and Zhang W., et al. [23] showed 34.1% and 95.4% patients having palpitation respectively. Other symptoms like edema in 18.5% of patients similar to that shown by Zhang W., et al. [23] showing 14.6%, fatigue in 37.2% similar to that shown in study by Ogah OS., et al. [26] showing 50.4%, chest pain in 28.2% of patients much lesser than that shown by Zhang W., et al. [23] showing 76.4%.

Major features of rheumatic fever: Among the major features of rheumatic fever of rheumatic fever most common was carditis present in 52.1% which is similar to studies by Ravisha MS., et al. [22] showing 42% patients with carditis. Next most common feature was arthritis present in 45.2% patients, this was similar to that found in study by Ravisha MS., et al. [22] 42%.

CONCLUSION

Although complication of rheumatic heart disease is expected to be low in pediatric and adolescent (upto 18 years), but this study shows that a significant number of patients of RHD in this age group had to attend hospital for various reasons like Heart failure, recurrence of rheumatic fever, dyspnoea, palpitation, fatigue etc. Demographic

profile reveals that it is still prevalent in rural areas and low socio-economic class and non-compliance to penicillin prophylaxis is a major precipitating factor besides poor hygiene, overcrowding and poor nutritional status. Isolated mitral valve involvement specially isolated mitral regurgitation was the commonest valvular involvement in this study, while tricuspid and pulmonary valve involvement are rare and not found in this study. So, some relatively cheap measures like adherence to penicillin prophylaxis, improvement of hygiene and nutritional status, in all diagnosed cases of RHD and rheumatic fever will significantly reduce the morbidity and mortality in this condition.

Funding: No external support

Acknowledgement: None

Conflict of interest: None declared by any of the authors

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