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Spotlight on Current Clinical Profile of Rheumatic Heart Diseases and Rheumatic Fever in Sohag University Hospital, Egypt

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Keywords:

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Abstract

Background: Rheumatic heart disease (RHD) is still prevalent in the developing countries and poses major medical and cardio-thoracic surgery challenge in Egypt.

Aims: Our aim is to provide a description of the current clinical profile of RHD and Rheumatic Fever (RF).

Methods: This study was conducted on 112 patients with RF diagnosed according to the revised Jones criteria and 280 patients with RHD; their diagnosis was based on an Australian guideline.

Results: Rheumatic arthritis was detected in 50 patients (44.6%), followed by carditis in 34 patients (30.4%), Chorea in 8 patients (7.1%), arthritis and carditis in 8 patients (7.1%), arthritis and chorea in 6 patients (5.4%) while concomitant carditis, arthritis and chorea were detected in 3 patients (2.7%). *During the follow up period*, 63 patients (56.3%) improved, 46 (41.1%) were changed to chronic rheumatic valvulitis and 3 patients (2.7%) died.

In RHD patients, mitral valve affection was detected in 143 patients (51.1%), followed by the aortic valve in 88 patients (31.4%), Concomitant mitral and aortic valves involvement in 45 patients (16.1%) while the tricuspid valve affection was detected only in 4 patients (1.4%) and there was no affection of the pulmonary valve.

Conclusion: RF and RHD are still remaining a major health problem in our locality. Rapid increasing population without equal increasing in the level of socioeconomic status is one of the major predisposing factors.

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Rheumatic heart disease (RHD) remains a major public health problem in developing countries. RHD accounts for a major proportion of all cardiovascular disease in children and young adults in African countries and, by extension, in the world, because 80% of the world's population lives in developing countries where the disease is still rampant. The disease has the potential to undermine national productivity since it affects the most productive part of the population¹.

The major determinants of acute rheumatic fever (RF) and RHD are poverty, malnutrition, overcrowding, poor housing and a shortage of healthcare resources. Although cost-effective strategies for the prevention and control of these diseases are available, they remain under-utilized in most developing countries¹.

According to the World Health Organization (WHO), RF/RHD affects about 15.6 million people worldwide, with 282 000 new cases and 233 000 deaths each year. There are 2.4 million affected children between five and 14 years of age in developing countries².

Recurrent episodes of RF can lead to rheumatic heart disease with considerable disability and mortality in children. RF can recur in the absence of secondary prophylaxis³.

The incidence of RF and the prevalence of RHD have declined steadily in North America, Western Europe, and Japan over the past four decades⁴. However, recent outbreaks of RF in several areas of the United States have been reported^{5,7} re-emphasizing the importance of this disease. RF and RHD are largely restricted to developing countries and some poor, mainly indigenous populations of wealthy countries⁸.

The objective of the present study was to provide a detailed description of the current clinical profiles of RF and RHD in children at Sohag university hospital (Upper Egypt), and to compare our findings with those in neighboring and Western countries.

1. Subjects and methods:

The present work is a hospital-based study performed in the period between April 2008 to April 2010 at Pediatric and Rheumatology and Rehabilitation departments at Sohag University hospital (Upper Egypt). This study was conducted on 112 patients diagnosed as RF according to the revised Jones criteria⁹ and 280 patients diagnosed as RHD. The diagnosis of rheumatic valvular heart disease was based on previous clinical history of rheumatic fever, follow up cards, electrocardiography and echocardiography findings according to an Australian Guideline¹⁰. Children with congenital heart defects, cardiomyopathies and other non rheumatic cardiac lesions were excluded. An informed consent was taken from parents of patients participating in the study.

All patients were subjected to the following: (1) complete medical history with special interest to the age, sex, maternal parity, family history, possible risk factors, family income, housing, family size, consanguinity, history of repeated sore throat, tonsillitis, rheumatic fever and recurrent rheumatic activity, (2) complete physical examination which included pulse, blood pressure, general examination, cardiac examination, signs of heart failure, infective endocarditis and pulmonary hypertension, (3) laboratory investigations which included complete blood count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), throat swab and throat culture for streptococcal infections, (4) Plain chest X-ray was done to some patients which gave an idea about size, position and configuration of the heart, pulmonary vasculatures and others (5) Electrocardiography (ECG) was done to rule out ventricular hypertrophy, atrial enlargement, mitral and aortic valve hemodynamic effects, rate and rhythm of the heart, other conductive abnormalities, atrial fibrillation, pulmonary artery, and etc. (6) Echocardiography was performed according to an Australian Guideline by using two dimensional (2-D), M-mode and color Doppler echocardiography

with the following transducers, 5 MHZ and 3.5 MHZ).

Statistical analysis:

The results were analyzed by commercially available software package (Stat View, Abacus concepts, Inc., Berkley, CA, USA). The data were presented as mean and standard deviation (SD), or frequency and percentage (quantitative and qualitative data respectively). Student T test was used to assess the statistical significance of the difference between the two study group means. Pearson's correlation coefficient (*r*) was used to determine the relationship between different numerical variables. For all tests, a probability (*p*) of less than 0.05 was considered significant.

2. Results:

This study comprised 112 patients (65 girls and 47 boys) who fulfilled the revised Jones criteria for diagnosis of RF and 280 patients (166 girls and 114 boys) diagnosed as RHD. The ages of our patients at the time of the study ranged from 3.5-16 years, with a mean age of 10.7 ± 1.9 years. In general, female gender was predominant in all age groups and the female to male ratio was 1.4:1. The majority of RF patients were between 5-8 years while the majority of RHD patients were between 8-12 years. Ten patients (8.9%) with RF were below 5 years of age while eighteen patients with RHD (6.4%) were below five years of age (Table 1).

Overcrowded houses (> 4 person/room), Low socioeconomic level of family, illiteracy, and large family size represented the major predisposing factors for occurrence of RF & RHD in our study (Table 2).

As regard the current clinical profile of RF patients (*n*= 112), it was as follows: rheumatic arthritis represented the major detected sign of RF and was detected in 50 patients (44.6%), followed by carditis in 34 patients (30.4%), chorea in 8

patients (7.1%), arthritis and carditis in 8 patients (7.1%), arthritis and chorea in 6 patients (5.4%) while concomitant carditis, arthritis and chorea were detected in only 3 patients (2.7%). Erythema marginatum and subcutaneous nodules were not detected in our study. During the follow up period of patients with RF after acute attack, 63 patients (56.3%) improved while 46 (41.1%) were changed to chronic rheumatic valvulitis and 3 patients (2.7%) died; two died from severe carditis and one death was unrelated to RF (Table 3).

As regard the current clinical profile of RHD patients (*n*= 280), it was as follows: mitral valve was the commonest valve affected and was detected in 143 patients (51.1 %), followed by aortic valvulitis in 88 patients (31.4%). Concomitant affection of both mitral and aortic valves was detected in 45 patients (16.1%), while involvement of the tricuspid valve was found in only 4 patients (1.4%) and there was no affection of the pulmonary valve (Table 4).

As regard the complications that were encountered in both patients with RF and RHD, growth failure was found in 189 patients (48.2%), heart failure in 122 patients (31.1%), arrhythmia (atrial fibrillation and flutter) in 87 patients (22.2%) and infective endocarditis was found in 18 patients (4.6%) (Table 5).

Table 1 Age & sex distribution of the studied patients

Variable	RHD (n=280)			RF (n= 112)		
	Girls	Boys	Total	Girls	Boys	Total
≤ 5years.	11(3.9)	7(2.5)	18(6.4)	6(5.4)	4(3.6)	10(8.9)
5 years to ≤8 years	51(18.2)	41(14.6)	92(32.9)	26(23.2)	18(16.1)	44(39.3)
8 years to ≤12 years	82(29.3)	51(18.2)	133(47.5)	19(16.9)	15(13.4)	34(30.3)
>12 years to ≤16 years	22(7.9)	15(5.4)	37(13.2)	14(12.5)	10(8.9)	24(21.4)
Total	166(59.3)	114(40.7)	280(100)	65(58)	47(42)	112(100)

Table 2 Possible detected predisposing factors

Predisposing factors	RHD (n=280)	RF (n=112)
overcrowding (> 4 person / room)	186(66.4)	65 (58)
Low socioeconomic level	136(48.5)	63(56.3)
Illiteracy	123(43.9)	59(52.7)
Repeated tonsillitis & throat infections	121(43.2)	58(51.8)
Family size (>5 persons)	117(41.8)	48(42.9)
Consanguinity	114(40.7)	36(32.1)
Family history of RF	98(35.0)	28(25)

Table 3 Clinical profile of patients with RF

Parameters	Boys n=47	Girls n=65	Total n= 112
Age< 5 years	4(3.6%)	6(5.3%)	10(8.9%)
Age > 5 years	43(38.3%)	59(52.7%)	102(91.1%)
Arthritis alone	21(18.8%)	29(25.8%)	50 (44.6%)
Carditis alone	14(12.5%)	20(17.9%)	34(30.4%)
Chorea alone	3(2.7%)	5(4.5%)	8(7.1%)
Arthritis & Carditis	4 (3.6%)	4(3.6%)	8(7.1%)
Arthritis & Chorea	3(2.7%)	3(2.7%)	6 (5.4%)
Carditis ,arthritis and chorea	1(0.9)	2(1.9%)	3(2.7%)
Erythema marginatum	0(00)	0(00)	0 (000)
Subcutaneous nodules	0(00)	0(00)	0(000)
Deaths	1(0.9%)	2(1.9%)	3(2.7%)

Table 4 Pattern of RHD in the studied patients

Rheumatic heart diseases	n= 280	%
Mitral valve affection alone	<u>143</u>	<u>51.1</u>
MR	78	27.9
MS	45	16.1
MS & MR	20	7.1
Aortic valve affection alone	<u>88</u>	<u>31.4</u>
AR	48	17.1
AS	25	8.9
AS & AR	15	5.4
Concomitant mitral & aorta lesions	<u>45</u>	<u>16.1</u>
Tricuspid valve affection	4	1.4

Table 5 Complications encountered in the studied patients

Complications	n=392	%
Growth failure	189	48.2
Heart failure	122	31.1
Arrhythmias	87	22.2
Infective Endocarditis	18	4.6

3. Discussion:

Acute rheumatic fever (RF) is a common, preventable health problem in developing countries¹¹. RHD is the most serious sequelae of rheumatic fever occurring in approximately 30% of patients with rheumatic fever. Patients with RF may develop varying degrees of pancarditis with associated valve disease, heart failure, and pericarditis. Worldwide, RHD remains a major health problem although its prevalence in the developed countries is much reduced¹².

In this work series a total of 392 children (of them, 112 patients with RF and 280 patients with RHD) were included; their median age was 10.7 ± 1.9 years (ranged from 3.5 years to 16 years). Female gender was predominant in all age groups with a female to male ratio of 1.4:1. This female gender predominance in both RF and RHD was the same in many other studies¹³⁻¹⁷.

The majority of RF patients were older than 5 years of age, only 10 patients (8.9%), were younger than 5 years. Rheumatic arthritis represented the major sign of RF and was detected in 50 patients (44.6%). Our results agreed with other results published in different literatures in Egypt¹⁷, Pakistan¹³, Nigeria¹⁸ and USA¹⁹ in which rheumatic arthritis was the commonest finding in RF patients.

The incidence of carditis associated with rheumatic fever (65-98%) is variable in different countries²⁰. In our study; we found carditis in 34 patients (30.4%), while both carditis and arthritis were found in 8 patients (7.1%), and concomitant carditis, arthritis, and chorea were detected in only 3 patients (2.7%). In our study, we detected no patients with erythema marginatum or subcutaneous nodules. The infrequent occurrence of subcutaneous nodules and erythema marginatum has been reported in developing countries²¹ and in developed countries these features of rheumatic fever are also declining²².

A seasonal pattern was detected in our study, as the majority of RF cases had occurred during winter and spring months and this could be

explained by the highest rate of streptococcal infections among children during this period of the year due to closure of windows at houses and schools because of cold and dusty weather and lack of aeration. During the follow up period of patients with RF, 63 patients (56.3%) improved, 46 (41.1%) were changed to chronic rheumatic valvulitis and 3 patients (2.7%) died; two died from severe carditis and one death was unrelated to RF. Carditis leading to congestive heart failure is the commonest cause of death in patients with congestive heart failure. Recurrence of carditis, usually in the absence of prophylaxis, leads to further deterioration in cardiac status²². The follow up results in our study were similar to many other studies in Yemen¹⁴, India¹⁶, Sri Lanka²³ and England²⁴.

In patients with RHD, the age between 8-12 years is still carrying the highest risk for the disease, because at these ages, children are in schools which are overcrowded and badly ventilated, so that, spread of streptococcal infections is high.

Mitral valve was the commonest valve affected in patients with RHD as it was detected in 143 patients (51.1%), followed by aortic valvulitis in 88 patients (31.4%). Concomitant affection of both mitral and aortic valves was detected in 45 patients (16.1%) while involvement of the tricuspid valve was detected in only 4 patients (1.4%) and there was no affection of the pulmonary valve. Our study agreed with other studies^{3, 25, 26} that the mitral valve was the commonest valve affected followed by the aortic valve and rare affection of the tricuspid and pulmonary valves.

Many complications were detected in our patients with RF and RHD, among them growth failure that was found in 189 patients (48.2%), heart failure in 122 patients (31.1%), arrhythmia (atrial fibrillation and flutter) in 87 patients (22.2%) and infective endocarditis that was detected in 18 patients (4.6%). These complications were higher than those recorded in many other previous studies^{14, 15, 25, 27}. This could be explained by the lack of proper health programs instituted for early

picking up and efficient treatment of patients, poverty, lack of proper nutrition, re-infection due to exposure to the same environment, low family income, large family size and the inaccessibility of local health offices and specialized medical centers that deal with this kind of patients in our locality.

As regards the predisposing factors to both RF and RHD, Our study agreed with many other studies^{17, 19} that Overcrowded houses, Low socioeconomic status of family, illiteracy and large family size had represented the major predisposing factors for occurrence of RF and RHD.

In our locality, due to the presence of overcrowded poor ventilated houses and schools and the lack of primary health programs for prophylaxis against spread of streptococcal infections, the incidence of repeated tonsillitis and throat infections were high and found in 58 patients with RF (51.8%) and in 121 patients with RHD (43.2%). These results were in agreement with many literatures especially in developing countries^{17, 23, and 24}.

4. Conclusion

RHD and RF are still a major health problem in our locality (Sohag, Upper Egypt) in spite of increasing level of education, parents' awareness, and governmental efforts to increase the level of living standards, build new hospitals and to enhance the efforts for primary and secondary prophylaxis against RF. Great emphasis was needed to be put on the simple and cost-effective prevention and control measures needed to combat these disabling diseases.

5. Recommendations

The high frequency of RF and RHD in the developing world including Egypt necessitates aggressive prevention and control measures. The major interventions for prevention and control may include: (1) reduction of exposure to group A streptococci, (2) primary prophylaxis to prevent

initial episodes of RF, and (3) secondary prophylaxis to prevent recurrent episodes of RF. For some impoverished countries, secondary prophylaxis may be the only intervention that can realistically be implemented. In addition to this intervention, financial and human resources must be committed and integrated into the existing primary health care systems.

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