

**Echocardiographic Patterns of Rheumatic Heart Disease. A study from A Specialized Heart Clinic**

**أنماط تخطيط صدى القلب لأعراض القلب الروماتيزمية  
دراسة من عيادة القلب المتخصصة**

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## Echocardiographic Patterns of Rheumatic Heart Disease. A study from A Specialized Heart Clinic

### Abstract :

**Background:** Rheumatic heart disease (RHD) is an important contributor to cardiovascular disease in children and adults in Yemen. Rheumatic heart disease (RHD) continues to cause gross distortions of the heart and the associated complications of heart failure and thromboembolic phenomena in this age. Different valvular damages can cause real health problems for the affected persons by the disease.

**Aims:** To describe the presenting features of Rheumatic Heart Disease patients attended specialized heart clinic.

**Methods:** Echocardiographic data of patients attended this specialized clinic during the period of 3 years from January, 2009 to December, 2012 were analyzed. Two hundred and five patients who satisfied the inclusion criteria for RHD were found.

**Results:** Of the total 205 patients with RHD females were found to be more common than

males (63.4%, vs. 36.6%). The study shows that RHD was found more common in the age group 20-30 years. According to the valve lesions mitral valve is mostly affected(65.4%), followed by mixed valve lesions (22.9%).Mitral stenosis was found to be more common (47.8%).

**Conclusion:** A significant proportion of RHD patients present to hospital with severe disease associated with severe complications of advanced heart failure, pulmonary hypertension, infective endocarditis and atrial fibrillation. Valve replacement done for some patients. There is a need to improve awareness of the disease among the population, and clinical suspicion in primary health workers, so that early referral to specialist management can be done before severe damage to the heart ensues.

**Key words:** Rheumatic Heart Disease. Echocardiography.

## المخلص :

الروماتيزمية المترددين لعيادة القلب المتخصصة.  
نتائج البحث: تم العثور على مجموع ٢٠٥ من المرضى يعانون من أمراض القلب الروماتيزمي، معظمهم من الإناث مقارنة بالذكور (٦٣,٤٪ مقابل ٣٦,٦٪)، وتظهر الدراسة أن أمراض القلب الروماتيزم أكثر شيوعا في الفئة العمرية ٢٠ - ٣٠ سنة. وفقا لآفات الصمامات فإن الصمام التاجي الأكثر إصابة حيث يمثل حوالي (٦٥,٤٪)، يليها آفات الصمام المختلطة (٢٢,٩٪). ووجد أن تضيق الصمامات التاجية هو الأكثر شيوعا (٤٧,٨٪).  
الاستنتاج: إن نسبة كبيرة من المرضى المصابين بروماتيزم القلب يأتون إلى المستشفى وهم يعانون من أمراض شديدة مرتبطة بمضاعفات شديدة كفشل القلب المتقدم وارتفاع ضغط الدم الرئوي، والتهاب شغاف القلب الرجفان الأذيني. وتم استبدال صمام لبعض هؤلاء المرضى. وهنا كحاجة إلى تحسين الوعي لهذا المرض بين السكان ينبغي الإحالة المبكرة إلى عيادة متخصصة يمكن أن تفيد المريض قبل حدوث أضرار فادحة في القلب.

تعد أمراض القلب الروماتيزمية (RHD) من أهم الأسباب المؤدية إلى إصابة الأطفال والكبار بأمراض القلب والأوعية الدموية في اليمن.  
أمراض القلب الروماتيزمية (RHD) لاتزال تتسبب في تشوهات جسيمة في القلب، ومضاعفات مصاحبة كفشل القلب وانسداد الأوعية الدموية. إن أضرار الصمامات المختلفة قد تسبب مشاكل صحية حقيقية للأشخاص المتضررين من هذه الأمراض.  
هدف الدراسة: تهدف الدراسة لوصف العلامات والملاحح الظاهرة للمرضى أمراض القلب الروماتيزمية المترددين لعيادة القلب المتخصصة.  
منهجية البحث: تم استخراج بيانات الرسم الصدوي للقلب للمرضى المترددين لعيادة المتخصصة بالقلب خلال فترة ٣ سنوات من يناير ٢٠٠٩ إلى ديسمبر ٢٠١٢، وتم تحليلها، تم العثور على مائتين وخمسة مرضى استوفوا معايير التشخيص لمرض القلب الروماتيزمي.  
تهدف الدراسة لوصف العلامات والملاحح الظاهرة لمرض أمراض القلب

## Introduction :

Rheumatic Heart Disease is a condition when permanent damage of the heart valves occur as a result of previous rheumatic fever. The heart valves are damaged by disease process that generally begins with a strep throat caused by streptococcus A bacteria of beta hemolytic group, which may cause rheumatic fever. Rheumatic fever is an inflammatory disease, can affect many connective tissues, especially in the heart, joints, skin or the brain. 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<sup>1</sup>.

A study from Malawy reported that out of the 3908 new Malawian patients included in the 5-y period register, 34% had valvular heart disease ( mainly rheumatic heart disease – RHD )<sup>2</sup>, that reflects its high magnitude. In another study from Nigeria, five hundred and fifty eight (19.8%) of the 2875 medical admissions were patients with cardiovascular disease. And out these 6% were RHD patients<sup>3</sup>.

In a world health trial, a total of 1,433,710 school children were screened and 3135 cases of rheumatic fever/rheumatic heart disease were found, giving a prevalence of 2.2 per 1000 ( higher in the African and Eastern Mediterranean regions)<sup>4</sup>. Rheumatic Heart Disease remains one of the most prevalent diseases in Yemen. In a study done among school-children in Aden, the prevalence of RHD was 36.5/1000 school-children, which is one of the highest reported among school echocardiography surveys in the world<sup>5</sup>. Females are more prone to rheumatic heart disease than males. Socioeconomic status has a direct impact on the occurrence of rheumatic heart disease<sup>6</sup>.

Rheumatic heart disease remains one of the main health problems in Yemen. It is probably the most common CVD diseases among children and young adults.

Present study was designed to determine the frequency of rheumatic heart disease in a specialized heart clinic in Aden. Yemen.

## Methods :

This study was done in a specialized heart clinic in Aden city. Patients enrolled in the study are coming from different governorates of the southern part Yemen. All clinically suspected cases of RHD underwent Transthoracic Echocardiography examination was performed using color Doppler echo machine, with the different modalities for the B-mode, M-mode, and the Doppler studies for determination of valvular regurgitation, valvular stenosis<sup>7</sup>, assessment of the severity of these pathologic findings<sup>8</sup>. All the investigations were done in accordance to the criteria of World Heart Federation for the diagnosis of rheumatic heart disease<sup>9</sup>.

Echocardiography was used as a tool for diagnosis of different types of valvular lesions with the assessment of severity of the valve damage. It gives more accurate estimation for the severity of stenosis or regurgitation, and for the quantification of the degree of pulmonary hypertension<sup>10</sup>.

The collected data was downloaded to the computer for analysis. Patients were grouped to 4 groups ( according to their ages ). Patients with complications like atrial fibrillation were noted in their records and those who had done valve replacement also were recorded. Because of small number of the study cases, these were not grouped isolately.

Statistical analysis done using the Excel simple package. Age groups were expressed by percentages and averages ( mean+ standard deviation).

## Results :

The total number of patients was 205. These were grouped into four groups according the ages ( Group I from 10 to 20 years, Group II from 21 to 30y, Group III from 31 to 40 y, Group >40y.). The age group II represents the most affected group by RHD

(40.98%), followed by group III ( 31.7%). The younger age group and those above 40 years were less affected & found to be with similar prevalence (13.17% & 14.15% respectively).

**Table 1: Distribution of RHD cases according to age**

Age (Years)	10-20	21- 30	31- 40	40	Total
No of cases	27	84	65	29	205
%	13.17%	40.98	31.71%	14.15%	100%

In relation to the sex distribution of the RHD in our patients, we found that female patients are more prone to develop the disease 63% vs 37%.

To look for valve involvement we found that the prevalence of mitral valve disease is more prominent than other valves affected – 65.37% for mitral valve disease, followed by mixed valve affection 22.93% and the least affection was for aortic valve (11.27%).

**Table 2: Distribution of RHD cases according to valve type**

Valvular lesion	Mitral valve	Aortic valve	Mixed valve	Total
No of cases	134	24	47	205
%	65.37%	11.71%	22.73%	100%

Table 3: show the distribution of the cases in relation to mitral valve lesions. Mitral stenosis was found to be more common than other forms. 64 cases ( 47.8%) were found to have isolated mitral stenosis. Followed by mitral regurge which accounts for 31.3%. Mixed mitral disease was observed in 28 cases, which comprises 20.9%.

**Table 3: Distribution of RHD cases in relation to Mitral Valve Lesion**

Valvular lesions	Mitral Stenosis	Mitral Regurge	Mixed Mitral Disease	Total
No. of Cases	64	42	28	134
%	47.76%	31.34%	20.90%	100%

As seen in table 4 which demonstrates different forms of aortic valve affection in this study. As it is seen the total number of patients with aortic valve lesions were only 24 patients. Aortic regurg comprises 17 cases (70.83%) and cases with aortic stenosis were discovered in 7 patients ( 29.17%).

**Table 4: Distribution of RHD cases regarding Aortic Valve Lesion**

Valvular lesions	Aortic stenosis	Aortic regurg.	Total
No. of cases	7	17	24
%	29.17%	70.83%	100%

As seen in table 5 Frequency distribution of specific valvular lesions, of the total number of echocardiography records of our patients with RHD demonstrates, that mitral stenosis (MS) is most common type of the rheumatic valvular disease. It was detected in 64 cases ( 31.22%). Combined valve disease ( Mitral + Aortic ) was found in 47 cases, which comprises 22.93%, followed by mitral regurg (MR) 42 cases (20.49%).

**Table 5: Distribution of RHD cases according to Specific Valvular Lesion**

Valve lesions	MS	MR	Mixed MD	Combined valve D	AS	AR	Total
No.	64	42	28	47	7	17	205
%	31.22%	20.49%	13.66%	22.93%	3.41%	8.29%	100%

Table 6 shows that 78 cases (38%) of our patients had underwent intervention wether Balloon Valvotomy (BMVT), or others of them underwent open heart surgery. Of the 78 cases 34 cases (16.95%) had underwent Mitral valve replacement by metallic valve (MVR). 25 patients (12.20%) had been operated for double valve replacement (DVR). Balloon valvotomy was performed for 12 patients (5.85%). Aortic valve replacement was found only in 7 cases (3.41%).

**Table6: Distribution of RHD cases according to the type of Surgical intervention**

	Non Operated	BMVT	MVR	AVR	DVR	Total
No of Cases	127	12	34	7	25	205
%	61.95%	5.85%	16.95%	3.41%	12.20%	100%

Table 7 shows the distribution of the patients with RHD according to their area of residency. Majority of our patients came from Aden governorate 72 cases (35.12%). Patients from Abyan governorate takes the second place – 63 (30.73%). Where patients from Lahej governorate comprises 16.10% of the total number. Other governorates of southern parts of Yemen show less figures.

**Table 7: Distribution of RHD cases according to Residency**

Residency	Aden	Abyan	Lahej	Aldhalae	Shabwa	Others	Total
No.	72	63	33	11	16	10	205
%	35.12%	30.73%	16.10%	5.37%	7.8%	4.88%	100%

## Discussion :

Several studies had been about RHD in Yemen, whether hospital based data, or screening among school children<sup>5,12,13</sup>. To our knowledge this the first study from a private specialized heart clinic.

Rheumatic heart is still a prevailing disease among Yemeni population and it is surprisingly having higher prevalence among school children

Our results show that rheumatic heart disease affecting females than males (63.4% vs 36.6%), which is coincident with the findings of Essien IO<sup>13</sup> in the study done at Enugu, Nigeria, with Hamzullah Khan from Pakistan<sup>14</sup>. And it in contrast to the study done by H.K.Saleh<sup>12</sup> which showed almost equal frequency among both male & female. Our study show that mitral valve affection is the most common than other valves (65.37%) from the total number of studied group, which correlates with other studies<sup>5,14</sup>. We found that mitral stenosis is more common than mitral regurge which in

contradiction with other studies done by H.K.Saleh, may because our study included only adult patients. While those studies including children are more prevalent mitral regurge or equal in frequency. Some of the patients were found to be in advanced stage of rheumatic heart disease. And these patients had underwent surgical correction of the valves or done for them transcuteaneous balloon valvotomy( 38% of the cases). Of the studied group 12 patiens had done BMVT 2 of them during pregnancy. 34 cases underwent MVR.

Although nowadays some of these patients could get surgical correction, but still the problem of rheumatic heart disease is a great burden for Yemeni health situation. Further actions should be done among the children and young adult population to eradicate the cause of rheumatic fever, which consequently leads to rheumatic valvular disease.

## References :

1. Ralph A, Jacops S, McGough K, McDonald M, Currie BJ. The challenge of rheumatic fever diagnosis in high-incidence population: a prospective study and proposed guidelines for diagnosis in Austalia's Northern Territory. Heart Lung Circ 2006; 15(2): 113-8.
2. Suliman EZ, Juma H. Cardiac Diseases Patterns in Northern Malawi: Epidemiologic Transition Perspective. J. Epidemiol. 2008, August 28.
3. Ansa VO, Ekkot JU, Basseyy EO. Profile and outcomes of cardiovascular admissions at the University of Uyo Teaching Hospital, Uyo a-five year review. Nijer J. Clin. Practice 2008; 11(1):22-4.
4. World Health Organization. WHO programme for the prevention of rheumatic fever/rheumatic heart disease in 16 developing countries: report from phase I (1986-90). WHO Cardiovascular Diseases Unit and Principal Invistigators. Bull World Health Organization. 1992; 70(2): 213-8.

5. Ba-Saddik IA, Munibari AA, Al-Naqeeb MS, Parry CM, Hart CA, Ceuvas, LE, Coulter JB. Prevalence of rheumatic heart disease among school children in Aden, Yemen. *Ann Trop. Paediatr.* 2011;31(1):37-46.
6. Agarwal A. Karim, Yunus M, Ahmed J, Khan A. Rheumatic heart disease in India. *J.R.Soc Health* 1995,; 115: 303-304, 309.
7. Jaffe WM, Roche Ahmed, Coverdale HA, McAlister HF, Ormiston JA, Green ER. Clinical evaluation versus echocardiography in the quantitative assessment of valvular heart disease. *Circulation* 1988; 78: 267-275.
8. Helmke F, Nanda NC, Hsiung MC, Soto B, Adey CK, GoyalRG et al. color Doppler assessment of mitral regurgitation with orthogonal planes. *Circulation* 1987; 75: 175-183.
9. Reményi, B. et al. World Heart Federation criteria for Echocardiographic diagnosis of Rheumatic Heart Disease - an evidence-based guideline *Nat. Rev. Cardiol.* 9, 297–309 (2012); published online 28 February 2012.
10. Wang A, Riyan T, Kisslo KB, Bashore TM, Harrison JK. Assessing the severity of mitral stenosis: Variability between noninvasive and invasive in patients with symptomatic mitral valve stenosis. *Am Heart J* 1999; 138: 777-784.
11. Saleh H.K. Pattern of rheumatic heart disease in Southern Yemen. *Saudi Med J* 2007; vol 28 (1): 108-113.
12. Announu A, Al-Mutarreb A, Al-Kibsi M, Al-Zindani A, et al. Percutaneous Balloon Mitral Valvuloplasty during pregnancy: immediate and long term results in 81 Yemeni patients. Presentation to SHA23, Riyadh. February, 2013.
13. Essien IO, Onwubere BJ, Anisiuba BC, Ejim EC, Andy JJ, Ike SO. One year echocardiographic study of rheumatic heart disease at Enugu, Nigeria. *Niger Postgrad Med J.* 2008 sep; 15 (3): 175-8.
14. Khan H. Rheumatic Heart Diseases. *Professional Med J Mar* 2009; 16(1): 100-104.

