Rheumatic Valvular Heart Disease As Seen At Echocardiography In Ilorin, Nigeria

[1]P.M. Kolo, [2]P.O Adeoye [2], [1]A.B.O. Omotoso, [1]I.A.Katibi , [3]J.K. Afolabi,

1- Department of Medicine, University of Ilorin, PMB 1515, Ilorin Nigeria, 2- Department of Surgery, University of Ilorin, Ilorin, Nigeria, 3- Department of Pediatrics, University of Ilorin, Ilorin, Nigeria

Abstract

Rheumatic heart disease is one of the leading causes of cardiovascular morbidity and mortality among children and young adults in developing countries. The aim of our study was to determine the frequency and pattern of rheumatic heart disease among patients who had echocardiographic scans over a three-year period in the University of Ilorin Teaching Hospital, Nigeria. The data of patients who were examined in our echocardiography laboratory between May 2004 and April 2007 for various clinical conditions were reviewed. Patients who had echocardiographic diagnosis of rheumatic heart disease were selected for the study. Data obtained were analyzed for frequencies of cardiac lesions, male: female ratio and mean age at diagnosis for each lesion.

Sixty-five patients had rheumatic heart disease, accounting for 7.1% of 913 echocardiographic scans performed over the three year period. The mitral valve was involved either alone or in combination with other valves in 49 patients (75.4%), aortic valve in 26 patients (40%), tricuspid valve and pulmonary valve in 3 patients (4.6%) each. Pure mitral regurgitation (26.2%) was the most frequent valvular heart lesion followed by combined mitral and aortic valve disease. Only one of our patients had definitive surgical intervention. There is an urgent need for the establishment of well equipped cardiac centers in Nigeria with capability to perform open heart surgeries at subsidized rates. The Awareness, Surveillance, Advocacy and Prevention program for the control of rheumatic fever and rheumatic heart disease needs to be implemented fully in Nigeria.

Key words: Rheumatic heart disease; echocardiography; Middle Belt Nigeria

Correspondence to:

Dr P.M. Kolo
Department of Medicine,
University of Ilorin, P.M.B 1515,
Ilorin, Nigeria.
E-mail-etsumanma@yahoo.com

Introduction

Rheumatic fever/rheumatic heart disease (RF/RHD) are non-suppurative complications of infection with group A β-haemolytic streptococci due to delayed immune response[1]. It accounts for a major proportion of cardiovascular diseases in children and young adults in the world[2]. Although, the burden of RF/RHD has declined drastically in the industrialized world, epidemiological studies have shown that up to 1% of school children in Africa, Asia, Eastern Mediterranean region and Latin America show signs of RF/RHD[3]. There are 2.4 million affected children between the ages of 5 and 14 years in developing countries, 1 million of whom live in sub-Saharan Africa. Majority of those affected have no access to definitive treatment because of few centers that offer open heart surgeries[4].

In Nigeria, RHD still constitutes a major medical and surgical challenge because of poor development and implementation of RF/RHD intervention programs[5]. Many cases present late after complications such as congestive cardiac failure, pulmonary hypertension and thrombo-embolic phenomena have set in[6]. One of the major factors responsible for this delay is poor accessibility of facilities for accurate diagnosis of the cardiac lesions. However, the availability of echocardiography with real time imaging and Doppler facilities has improved detection and description of valvular heart lesions. The description of pattern of valvular involvement is important for management and the planning of health care systems. We present the distribution of rheumatic valvular cardiac lesions as seen at echocardiography in the University of Ilorin Teaching Hospital (UITH), Ilorin, located in the middle belt of Nigeria.

Materials and Methods

UITH, Ilorin is a tertiary health centre in the Middle Belt of Nigeria and serves many states in the region. Referrals were received for assessment of heart lesions from within Kwara state and the neighboring states of Oyo, Osun, Kogi, Niger, Ekiti and Kebbi. Studies were performed with Esaote Megas CVX machine which has 2-D, M-mode and Doppler facilities.

It was a retrospective study. Data of all patients who had echocardiographic scan in our laboratory for various clinical indications between May, 2004 and April, 2007 (3 years) were reviewed. Patients who were diagnosed of RHD were selected for the study. The information obtained from the records of these patients included age, sex, clinical indications and echocardiographic characterization of the valvular lesions. The nature of complications present in the patients was noted. Data obtained were analyzed using SPSS version 14 software for frequencies of each valvar affectation, clinical indications, male to female ratio and mean age at diagnosis of the patient. The involvement of various valves was analyzed in isolation and in combination.

Results

Sixty-five patients had rheumatic valvular heart disease accounting for 7.1% of 913 echocardiographic scans done over 3 years. There were 27 males (41.5%) and 38 females (58.5%), their ages ranged from 5 to 65 years with a mean of 29.5 years. Table 1 shows the age distribution of the study group. While 10 patients (15.4%) were diagnosed before the age of 15 years, 15 patients (23.1%) were between 15 and 24 years of age. Majority of the patients (61.5%) were 25 years and above. Table 2 shows pre-echocardiographic diagnosis by the referring physicians. The clinical suspicion of RHD was confirmed at echocardiography in 42 patients (64.6%). However, clinical diagnosis was congenital heart disease in 8 patients (12.3%), dilated cardiomyopathy in 6 patients (9.2%), hypertrophic cardiomyopathy in 4 patients (6.2%) and non-specific diagnosis in 5 patients (7.7%).

Figure 1: Upper panel (A) is a 2D guided m-Mode echocardiogram showing thickening, fusion and sclerosis of the aortic valve leaflets with aortic box reduced to a slit-like opening in a 45 year old Nigerian woman and lower panel (B) is a continuous wave Doppler from the same patient showing combined aortic regurgitation and stenosis (pressure gradient=64.8mmHg). Figure 2 (A, B, C) is a continuous wave Doppler from a 10 year patient showing regurgitation across mitral, aortic and tricuspid valves respectively with estimated pulmonary pressure of 38.mmHg. All the four cardiac valves were affected.

Table 3: shows echocardiographic features of the patients studied. The mean left ventricular posterior wall (10.2±2.7mm) and inter-ventricular septal (10.9±4.1mm) thickness were normal. The mean left ventricular ejection fraction (48.9±17.3%) was reduced. However, left ventricular mass index (163.6±82.2g/m^2) and left atrial diameter (41.7±11.9mm) were increased. Table 4 shows distribution of valvular lesions in the patients studied. Mitral valve was involved either alone or in combination with other cardiac valves in 49 patients (75.4%), aortic valve in 26 patients (40%), tricuspid in 3 patients (4.6%) and pulmonary valve in 3 patients (4.6%). Mitral regurgitation (MR) was the commonest echocardiographic diagnosis, present in17 patients (26.2%) with male: female ratio of 0.7:1. Their mean age at diagnosis was 25 years. Thirteen patients (20%) had mixed mitral and aortic valve disease. Of those with mixed mitral and aortic valve disease, 7 patients had a

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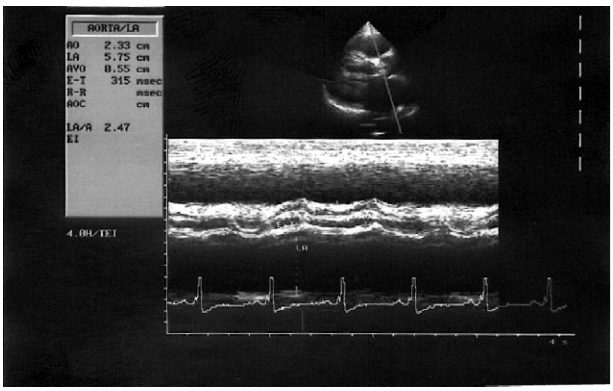

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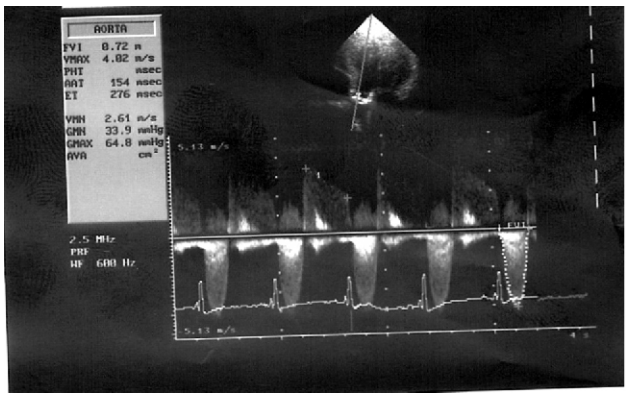

Figure 1: Upper panel (A) is a 2D guided m-Mode echocardiogram showing thickening, fusion and sclerosis of the aortic valve leaflets with aortic box reduced to a slit-like opening in a 45 year old Nigerian woman and lower panel (B) is a continuous wave Doppler from the same patient showing combined aortic regurgitation and stenosis (pressure gradient=64.8mmHg).

combination of mitral stenosis (MS) and aortic regurgitation (AR), while 4 patients had MR and AR. The remaining 2 patients had a combination of MS, MR and AR. Ten patients (15.4%) had mixed mitral valve disease with equal sex distribution. Eight patients (12.3%) had pure MS. Pure MS or MS in combination with AR occurred more in females than males. The mean age at diagnosis of patients with isolated MS was 29 years. While, 7 patients (10.8%) had pure AR, 5 patients (7.7%) had pure AS. Pure aortic valve disease (AR or AS) was commoner in males than females. Although two patients (3.1%) had isolated tricuspid regurgitation and 2 patients (3.1%) had pulmonary regurgitation, the morphologic evidence of rheumatic process was not apparent. One female patient (1.5%) had a combination of mitral, aortic, tricuspid and pulmonary valve disease. Only one of our patients has had definitive surgery (mitral and aortic valve replacement).

Complications of RHD noticed in our patients included; pulmonary hypertension (42.1%), left ventricular systolic dysfunction (39.3%), atrial fibrillation (17.1%), infective endocarditis (2.7%) and intra-cardiac thrombi (2.7%).

Discussion

The prevalence of RHD among patients who had echocardiographic examination during the period under review was 7.1%. Although the study was hospital based, the prevalence found may be a reflection of distribution of these cardiac lesions within the communities from which the patients were referred. In a similar retrospective study involving 600 patients in Zaria, Northern Nigeria, Danbauchi *et al*[7] found a prevalence of 7.7%. *Ike*[8] in a review of 2527 echocardiographic scans performed over 10 years in Enugu, Eastern Nigeria, found a prevalence of 34.4%. The higher prevalence observed by Ike[8] may not be unconnected with the active cardiac surgical unit at Enugu, thereby attracting more referrals for patients with RHD. However, a population-based study in India[9] found a prevalence of 4.54 per 1000. India is one the countries in the world with highest number of cases of RHD.

The mean age at diagnosis of our patients was 29.5 years. This is higher than mean age at diagnosis reported by previous studies in Nigeria[6-7]. The age at diagnosis of RHD is important for clinical outcome. Many of our patients with RHD had developed complications such as pulmonary hypertension, left ventricular systolic dysfunction and atrial fibrillation before they presented for diagnosis, making surgical intervention risky or contraindicated. There is also female preponderance in our study. This is in-keeping with findings of Sani *et al*[6] and results of some population-based studies in Asia[10-11].

The results of our study also showed reduced mean left ventricular ejection fraction (48.9±17.3%), increased mean left ventricular mass index (163.6±82.2kg/m^2) and increased left atrial diameter (41.7±11.9mm) of the patients. A combination of reduced ejection fraction, left ventricular hypertrophy and increased left atrial diameter is a risk for cardiac arrhythmias and sudden cardiac death[12].

Table1: Age distribution of the study group.

Age Group (Years)	Rheumatic heart Disease	
	Frequency	%
<1	–	
1-5	1	1.5
6-10	7	10.8
11-14	2	3.1
15-19	10	15.4
20-24	5	7.7
≥25	40	61.5
Total	65	100

Table 2: Shows clinical diagnoses by the referring physicians

	Clinical diagnosis by the requesting physicians	No	%
1	Rheumatic heart disease	37	56.9
2	Rheumatic heart disease with heart failure	5	7.7
3	Congenital heart disease	8	12.3
4	Dilated cardiomyopathy	6	9.2
5	Hypertrophic cardiomyopathy	4	6.2
6	Non-specific	5	7.7
	Total	65	100

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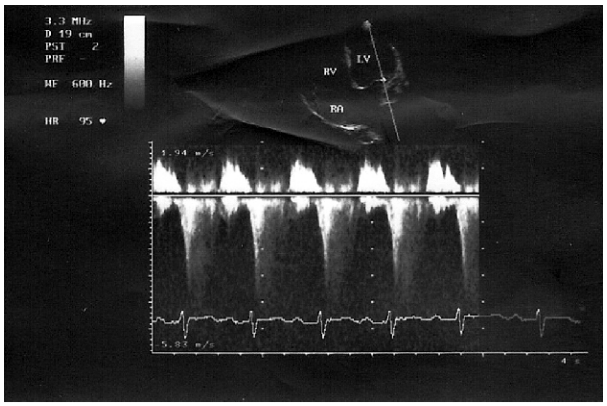

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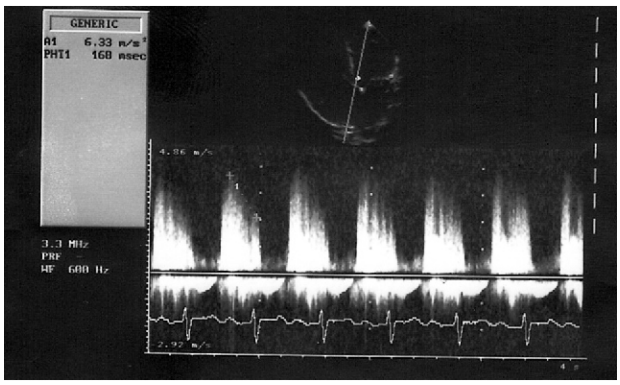

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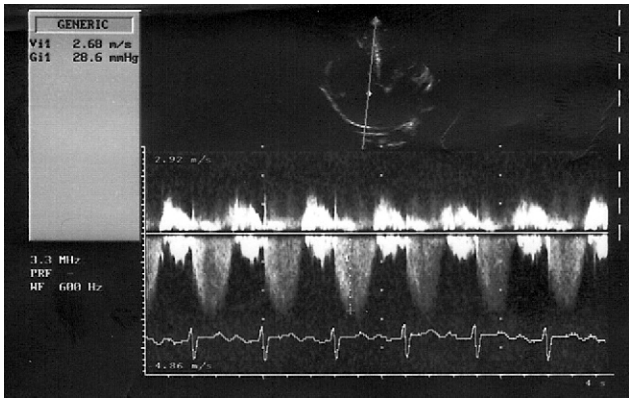

Figure 2 (A, B, C) is a continuous wave Doppler from a 10 year old patient showing regurgitations across mitral, aortic and tricuspid valves respectively with estimated pulmonary pressure of 38.6 mmHg. All the four cardiac valves were affected.

Table 3: Shows echocardiographic features of the patients

Features	Range	Mean±SD
LVDd	30-80.4	51.7±10.7
LVDs	15-61.8	36.4±11.8
IVSd	4.3-22.1	10.9±4.1
PWd	6-21	10.2±2.7
LVMI	31-313	163.6±82.2
Ejection fraction	15-79	48.9±17.3
Fractional shortening	7-47	25.7±10.9
Left atrial diameter	24-68.4	41.7±11.9
Aortic root diameter	16.2-39.4	34.3±11.3

Table 4: Distribution of types of valve lesion of RHD

Lesion	Number of patients (%)	Male: Female	Mean age at diagnosis (year)
MR	17 (26.2)	0.7:1	25
MR +MS	10 (15.4)	1:1	17
MS	8 (12.3)	0.3:1	29
AR	7 (10.8)	1:0.75	27
MS +AR	7 (10.8)	0.4:1	43
AS	5 (7.7)	1:0.67	31
MR +AR	4 (6.2)	1:1	23
MR +MS +AR	2 (3.1)	females	13
TR	2 (3.1)	1:1	35
PR	2 (3.1)	females	48
MR +AR +TR +PR	1 (1.5)	female	10
Total	65 (100)	0.71:1	29.8

Mitral valve was the commonest valve involved either alone or in combination with other valves (75.4%), followed by aortic valve disease (40%). These concur with results of previous studies in Nigeria[6-7] and the remaining parts of the world[13-16]. The commonest echocardiographic diagnosis in our patients was MR (26.2%). Pure MR was seen more than combined mitral valve disease or pure MS. Isolated mitral valve disease (MR or MS) was commoner in females than males. This pattern of mitral valve disease is largely in agreement with the available literature[6, 14,17-19]. However, two earlier studies[20-21] found combined MR and MS to be commoner than pure MS or MR. Our patients with pure MR presented earlier than those with pure MS. This observation is consistent with the reports of Reddy *et al*[18] and Marcus *et al*[20]. It has been suggested that in

developing countries MR develops after a recurrent or persistent rheumatic activity and is virtually never the result of a single episode of carditis[20]. This is probably responsible for rapid progression of the disease in patients with MR as compared with slowly progressive stenotic or mixed mitral valve lesions. Combined mitral and aortic valve disease is the second most common lesion in our study which is in agreement with the findings of Routray[22]. Isolated aortic valve disease (AS or AR) was commoner in males than females.

Only one of the people affected has had definitive surgery (Mitral and aortic valve replacement). Most of the patients do not have access to treatment because of poverty and lack of infrastructure for cardiac surgery. There is an urgent need for the establishment of well equipped cardiac centers to carry out open heart surgeries at subsidized rates in the six geo-political zones of Nigeria. There is a need for international collaboration and support to assist the sister centers in developing countries to establish cardio-thoracic units with full capacity to perform open heart surgeries. The assistance could be in-form of man power development or provision of necessary facilities. Primary and secondary prevention of RF should be strengthened at all levels of care by the use of penicillin as prophylaxis in the vulnerable groups. The Awareness, Surveillance, Advocacy, and Prevention (A.S.A.P.) program[23-24] for the control of RF/RHD needs to be implemented fully at the national level in Nigeria.

In conclusion, RHD is a major public health problem in Nigeria. Mitral valve is the commonest valve affected with MR being the most frequent lesion. There has been an improvement in diagnosis due to availability of echocardiographic imaging facility but this has not been matched with cardiac surgery. There is a need for international collaboration to assist developing countries to establish cardiac centers with full capacity to perform open heart surgeries.

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