A 32-year review of rheumatic fever and rheumatic heart disease records at university college hospital Ibadan, Nigeria

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Abstract

Introduction: Rheumatic fever (RhF) and rheumatic heart disease (RHD) are recognized causes of morbidity and mortality in Nigerians. They are also the most common causes of acquired heart disease in Nigeria. It was therefore necessary to document the features in patients with these conditions and the number of these patients who had surgical repair from available record sat our Centre in University College Hospital (UCH), Ibadan, southwest Nigeria over 32 years Methods: The study was a retrospective review of 121 patients seen in the University College Hospital Ibadan from 1976 - 2008 (32 years). Data on the symptoms, signs, and interventions in these patients were obtained. Data was analysed using SPSS 16. Results: There were 42 males and 79 females with a mean age of 41.87±16.02 years (range:3-85 years).The major symptoms in these patients were breathlessness (89.3%), tiredness (61.2%) and paroxysmal nocturnal dyspnoea (55.7%). One hundred and fifteen patients (95%) had carditis, 51% had fever and 18.2% had arthralgia. Only 3.3% of the patients had primary prevention. The majority of the patients (44.9%) had secondary prophylaxis in the form of intramuscular benzathine penicillin. One hundred and fifteen patients (95.04%) had rheumatic heart disease with single or multiple valvular involvements. The commonest valvular lesion was mitral regurgitation (86%) and the least common was aortic stenosis (5%). Only 12 (10.4%) of these patients had surgical intervention. Conclusion: Rheumatic fever and rheumatic heart disease are important causes of morbidity in Nigeria. The predominant clinical finding from the study was carditis (95%). Surgery was accessed by only 10.4% of the patients with valvular lesions that were amenable to surgery.

Keywords: Acquired heart disease, Benzathine penicillin prophylaxis, Open heart surgery, Rheumatic carditis.

Introduction

Rheumatic fever (RhF) is an inflammatory disease that occurs due to abnormal immunological response to pharyngitis caused by Lancefield group A β-hemolytic streptococci (GAS)[1,2] There is a complex interaction between the GAS, a susceptible host and the environment.[3] The inflammatory illness caused by this response commonly affects the joints, brain, heart, or skin. It may cause cardiac damage which may be severe and permanent. Rheumatic fever symptoms often occur 2-3 weeks after the pharyngitis[3] and it tends to recur.[1,3] The implicated serotypes of this organism are 1, 3, 5, 6,14,18,19 and 24.[1]

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Rheumatic fever is a major public health problem in developing countries where it is the most common cause of acquired heart disease.[1,4,5] The worldwide incidence of first attack of acute rheumatic fever is 5-51/per 100,000 population.[6,7] In developing countries it has an annual incidence of between 100- 200 per 100,000 school children.[2,6, 7] Acute Rheumatic Fever is rare in the United States and other developed countries.[6] It usually occurs between the ages of 5 and 15 years is rare before the age of 3 years[1,7] and is commoner in females.[1]

The revised (1992) T-Duckett Jones criteria are used to make the diagnosis of rheumatic fever.[8] It is intended for the initial diagnosis of RhF. There are 5 major criteria and 4 minor criteria and an absolute requirement of evidence of a recent GAS infection. Two major or 1 major and 2 minor criteria and

evidence of recent GAS infection are needed for diagnosis.[8,9] The exceptions to this rule are the presence of chorea, late-onset or insidious carditis or recurrence of Rheumatic Fever (RhF).[3,9]

Rheumatic heart disease (RHD) is a long-term complication of rheumatic fever. [10] Nearly 33 million people suffer from RHD worldwide and more than 319,400 individuals died in 2015 while about 471,000 new cases are diagnosed annually.[11] The highest prevalence of RHD is in sub-Saharan Africa with more than one million children between the ages of 5-14 years affected.[11] The prevalence of RHD in this age group is 5.7 cases per 1000 schoolchildren. [12]

The mitral valve is the most frequently affected. [2,12, 13] The aortic valve may also be affected. The heart lesions include mitral incompetence, mitral stenosis, aortic incompetence and aortic stenosis. Tricuspid valve and pulmonary valve involvement are rare. [2,12] This paper is aimed at documenting the features in patients with RhF and RHD and the accessibility to surgery in cases amenable to surgery from available records at our Centre in southwest Nigeria over a period of 32 years.

Materials and Methods

The study was a retrospective review of 121 patients seen in the University College Hospital Ibadan from 1976- 2008 (32 years).The case notes of all the patients seen in the adult and paediatric cardiology clinics, including hospitalised patients diagnosed with RhF and RHD, were recruited for the study. Several data including the age, sex, occupation, place of residence, symptoms, signs and interventions in these patients were obtained. Data was analysed using Software Package for Social Sciences 23 (SPSS 23).

Results

One hundred and twenty-one (121) cases were studied. Forty-two males and 79 females, with a ratio of 1:1.9 and the age range was 3-85 years, median age was 42 years. Table I shows the age distribution of the cases, with only 13 (10.7%) patients in the paediatric age group and 108(89.3%) patients in the adult range

Table I: Age distribution of cases

Age group (Years)	No of cases
<1	0
1-5	1
6-18	12
19-35	32
>35	76
Total	121

Table II shows the distribution of cases according to the year of presentation, while Tables III and IV show the clinical presentation using the Duckett-Jones criteria.

Table II: Cases according to the year of presentation

Year	Cases
1976-1980	6
1981-1990	63
1991-2000	24
2001-2008	28
Total	121

Table III: Distribution of Symptoms according to Jones Criteria

Major/ Minor criteria	Number of cases (%)
Migratory polyarthritis	4(3.3)
Carditis	117(96.7)
Chorea	0
Erythema marginatum	0
Subcutaneous nodules	0
Fever	62 (51.2)
Arthralgia	22 (18.1)
Prolonged PR interval	4 (3.3)
Raised ESR	38 (31.4)

Evidence of previous Group A β-hemolytic streptococcal (GABHS) infection was determined by ASO titre which was significant in only 6 (5%) of the cases. They had values >333 Todd units.

Eighteen (14.9%) cases presented with Rheumatic fever using the Duckett-Jones criteria. Four (3.3%) cases had oral penicillins for the treatment of sore throat (primary prevention) while 53 (43.8%) cases were on secondary prevention(monthly intramuscular benzathine penicillin).

Table V shows other symptoms in the cases and Table VI shows the valvar lesions in the cases. A total of 115 cases had valvular lesions.

Table IV: Distribution of other symptoms in cases

Symptoms	Number of cases (%)
Breathlessness	108 (89.3)
Tiredness	74 (61.2)
Weakness	59 (48.8)
Orthopnea	76 (62.8)
Paroxysmal nocturnal dyspnea	67 (55.4)

Table V: Distribution of Valvular lesions in the cases

Valvular lesions	Number of cases (%)
Mitral regurgitation(MR)	51 (44.4)
Mitral stenosis (MS)	6 (5.2)
Mitral regurgitation and MS	42 (36.5)
Aortic stenosis (AS)	2 (1.7)
Aortic regurgitation (AR) and AS	1 (0.9)
MS and AR	1 (0.9)
MR and AR	3 (2.6)
MR, MS and AR	6 (5.2)
MR, MS, AR and AS	3 (2.6)
Total	115 (100)

One hundred and nine (90.1%) cases were managed conservatively, and only 12 (9.9%) had surgery and these cases were with mitral regurgitation (1), mitral stenosis (6) and mitral regurgitation and stenosis (5).

Discussion

This study documented the features in patients with RhF and RHD from available records over the study period in UCH. It showed that more females were affected which is similar to reports from previous documentation[2, 3, 11,14] but the study by Animasahun *et al,* and Akpa *et al* showed that more males were affected than females.[12,14,15] This difference may be due to the variation in the age group of the subjects in the studies by Akpa and Animasahun and the fact that they studied patients with RHD only. A decrease in the number of cases over the years was not easily demonstrable in this study as reported in developing countries possibly because poverty and overcrowding, which are major predisposing factors, are still prevalent in Nigeria.[16]

Similar to previous studies, rheumatic fever and rheumatic heart disease were rare in cases less than 5 years of age.[1,7] The highest prevalence was in the age group > 35 years. This is contrary to ages 5-15 years in previous studies of RhF and RHD.[1,7,11,12] This maybe due to the fact that these patients(>35yrs) presented more with RHD than RhF. Rheumatic heart disease is the most important long-term sequel of RhF[10] and is a major cause of morbidity and mortality.[5,11,12] These morbidities would have caused the older cases to present in the hospital when alternative forms of management failed and as their last resort. It has also been documented that occasionally, acute RhF occurs in the older age group in epidemics in closed populations like military recruits, crowded living conditions and those in contact with school children.[17,18]

Only 18 (14.9%) cases had features suggestive of Rheumatic fever at presentation in the hospital. Poor health-seeking behaviour in Nigerians may account for the cases of RHD than RhF. Only 3.3% had migratory arthritis contrary to >75% reported in literature,[1,2,19] this may be due to the rampant use of non-steroidal anti-inflammatory drugs (NSAIDs) in Nigeria.

One hundred and seventeen patients (96.7%) had carditis. Previous authors had reported an incidence range of 40-75% of carditisin RhF.[1,2,19] The incidence is higher in this study possibly because patients with RhF, recurrence of RhF and RHD were included in this study. No cases in this study presented with chorea or erythema marginatum.

Evidence of previous Group β-hemolytic streptococcal (GABHS) infection was determined by ASO titre which was significant in only 6 (5%) of the cases. Tani[3] documented that about 80% of patients with acute RhF will have an elevated ASO titre which is >333 Todd units in children and >250 Todd units in adults. The six cases in this study had values >333 Todd units. The 5% incidence reported in this study may be because the cases were not all acute RhF cases and possibly because of the late presentation of the cases.

The major valvular lesion was mitral regurgitation (44.4%) as reported by other authors.[11,12] There were single andmultiple valvular lesions and altogether 115 valvular lesions. Forty-two patients (36.5%) had MR and MS, 5.2% had MS, 5.2% had MR, MS and AR, 1.7% had aortic stenosis, and 1% had AR and AS. No patient had AR alone, while 2.6 % had MR, MS, AR and AS. This is similar to the order of rheumatic valvular disease reported in the literature[3] but in contrast with the findings in the study in Kano by Abdullahi *et al.*[20] No tricuspid and pulmonary lesions were documented in this study. This is similar to the findings by Abdullahi *et al*.[20]

In the present study, 3.3% of the cases had primary prevention (oral penicillin) during the episodes of sore throat. Primary prevention has been shown in Cuba and Costa Rica to reduce the incidence of RhF and RHD.[21,22] Also in this study 43.8% had secondary prevention (intramuscular Benzathine penicillin), which is believed not to affect the natural history of RHD.[23]

Only 12 cases had access to surgical repair. This may be due to the unavailability of regular surgeries for cardiac lesions in UCH during the study period, the exorbitant cost of surgery in UCH and other centres in Nigeria and or the inability to pay for surgery abroad. The patients who had surgery all had mitral valve lesions. All the others were managed conservatively.

Conclusion

Rheumatic fever and rheumatic heart disease are important causes of morbidity in Nigeria. The predominant clinical finding from the study was carditis (95%). Surgery was accessed by only 10.4% of the patients with valvular lesions that were amenable to surgery.

References

1. Ogunkunle O, Ekure E. Acute Rheumatic Fever and Rheumatic Heart Disease. In Azubuike JC, Nkanginieme KEO eds. Paediatrics and Child Health in a tropical region. 3rdedition. Educational Printing and Publishing, Lagos, Nigeria; 2019:862-866
2. Tani LY. Rheumatic Fever and Rheumatic Heart Disease. https://thoracickey.com/rheumatic-fever-and-rheumatic-heart-disease/#R1-5 08/08/22 9.40 pm
3. Tani LY. Rheumatic fever and rheumatic heart disease. In: Allen HD, Driscoll MD, Shaddy RE, Feltes TF, (eds). Moss and Adams' Heart Disease in Infants, Children, and Adolescents. 8th ed. Philadelphia, PA: Lippincott Williams &Wilkins, 2013:1303-30.
4. Mayosi BM, Robertson K, Volmink J, Adebo W, Akinyore K, Amoah A, Bannerman C, Carapetis J, Biesman-Simons S, Cilliers A et al. The Drakensberg Declaration on the control of rheumatic fever and rheumatic heart disease in Africa. S Afr Med J 2006;96 (3):246https://www.ajol.info/index.php/samj/article/view/135443
5. Rheumatic fever and rheumatic heart disease. Report of WHO Experts consultation. WHO technical report series 923. WHO Study Group on Rheumatic Fever and Rheumatic Heart Disease (2001: Geneva, Switzerland) & World Health Organization. (2004). Rheumatic fever and rheumatic heart disease: report of a WHO expert consultation, Geneva, 20 October - 1 November 2001. World Health Organization. https://apps.who.int/iris/handle/10665/42898
6. Tibazawa KB, Volmink JA, Mayosi BM. Incidence of acute rheumatic fever in the world: a systematic review of population-based studies. Heart. 2008; 94(12):1534. Epub 2008 Jul 31.
7. Lahiri S, Sanyahumbi A. Acute Rheumatic Fever:Pediatr Rev 2021 Ma;42(5):221-232.Doi:10.1542/pir.2019-0288.PMID: 33931507
8. Gewitz MH, Baltimore RS, Tani LY, Sable CA, Shulman ST, Carapetis J. Remenyi B, Taubert KA, Bolger AF, Mayosi BM et al. Revision of Jones Criteria for the diagnosis of acute rheumatic fever in the era of Doppler echocardiography: a scientific statement from the American Heart Association. Circulation. 2015;131:1806-1818 https://doi.org/10.1161/CIR.0000000000000205
9. Smith MT, ZurinskyY, Lester-Smith D, Elliot E, Carapetis J. Rheumatic fever, Identification, management and secondary prevention. Aust Fam Physician. 2012 Jan-Feb; 41(1-2) 31-5 PMID:22276281
10. Rwebembera, J., Chang, A.Y., Kitooleko, S.M., Kaudha, G., de Loizaga, S., Nalule, M., Ahabwe, K., Zhang, W., Okello, E., Sinha, P., Mwambu, T., Sable, C., Beaton, A. and Longenecker, C.T., 2023. Clinical Profile and Outcomes of Rheumatic Heart Disease Patients Undergoing Surgical Valve Procedures in Uganda. Global Heart, 18(1), p.62.DOI: https://doi.org/10.5334/gh.1260
11. Ogah OS, Bode-Thomas F, Yilgwan C, Ogah F, Ogunkunle O, Okwuonu C, Sani M. Rheumatic heart disease in Nigeria: A review. Nig J Cardiol2020;17:27-36 :https//www.nigjcardiol.org/text.asp?2020/17/1/27/288651 DOI:10.4103/njc.njc_30_19
12. Animasahun BA, Madise Wobo AD, Itiola AY, Adekunle MO, Kusimo OY, Thomas FB. The burden of rheumatic heart disease among children in Lagos: how are we fairing? Pan Afr Med J. 2018 Mar 14;29:150. doi: 10.11604/pamj.2018.29.150.12603. PMID: 30050614; PMCID: PMC6057576.
13. Passos LSA, Nunes MCP, Aikawa E. Rheumatic Heart Valve Disease Pathophysiology and Underlying Mechanisms. Front Cardiovasc Med. 2021 Jan 18;7:612716. doi: 10.3389/fcvm.2020.612716. PMID: 33537348; PMCID: PMC7848031.
14. Danbauchi S, Alhassan A, David S. Spectrum of rheumatic heart disease in Zaria, Northern Nigeria. Annals of African Medicine Vol .3(1)2004: 17-21https://www.ajol.info/index.php/aam/article/view/8295
15. Akpa M, Dodiyi-Manuel S, Agada Z, Odia O. Rheumatic heart disease in Port Harcourt, Nigeria: clinical, demographic and echocardiographic features. Port Harcourt Medical Journal. Vol. 6 No. 3 (2012)https://www.ajol.info/index.php/phmedj/article/view/80736
16. Ucha C. Poverty in Nigeria: Some Dimensions and Contributing Factors. Global Majority E-Journal, Vol. 1, No. 1 (June 2010), pp. 46-56 S2CID: 31653499

17. Rullan, E., Sigal, L.H. Rheumatic fever. *Curr Rheumatol Rep* **3**, 445–452 (2001). https://doi.org/10.1007/s11926-996-0016-4
18. Okello E, Kakande B, Juergen F. Socioeconomic and Environmental Risk Factors among Rheumatic Heart Disease Patients in Uganda. PloS One. 2012; 7(8):e43917. Doi:10.1371/journal.pone.0043917
19. Carapetis, J., Beaton, A., Cunningham, M. *et al.* Acute rheumatic fever and rheumatic heart disease. *Nat Rev Dis Primers* **2**, 15084 (2016). https://doi.org/10.1038/nrdp.2015.84
20. Abdullahi U, Kana SA, Yakasai MM, Ishaq NA, Yau JA, Saidu H, *et al*. Update on rheumatic heart disease in Kano: Data from the Aminu Kano Teaching Hospital echocardiography registry. Niger J Basic Clin Sci 2017; 14:127-30. DOI: 10.4103/njbcs.njbcs_17_17
21. Nordet P, Lopez R, Duenas A, Sarmiento L. Prevention and control of rheumatic fever and rheumatic heart disease: the Cuban experience (1986–1996–2002). Cardiovasc J Afr. 2008May-Jun; 19(3): 135–40. PMID: 18568172
22. Arguedas A, Mohs E. Prevention of rheumatic fever in Costa Rica. J Pediatr. 1992 Oct; 121(4): 569–72. doi: 10.1016/s0022-3476(05)81146-1.
23. Karthikeyan G, Mayosi B. Is Primary Prevention of Rheumatic Fever the Missing Link in the Control of Rheumatic Heart Disease in Africa?Circulation. 2009 Aug 25; 120(8):709-13. doi:10.1161/CIRCULATIONAHA.108.836510.