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STUDY OF CLINICAL CHARACTERISTICS OF CHILDREN WITH ACUTE RHEUMATIC FEVER IN AL-ALWIYA PEDIATRICS HOSPITAL IN BAGHDAD

[1]*Dr. Sahar Awad Hassan, [2]Dr. Ahlam Mohammed Jawad Ibrahim and [3]Dr. Shatha Jaafer Naser

[1]M. B. Ch. B, D.C.H, Baghdad College of Medicine, Baghdad College of Medicine.
[2]M. B. Ch. B, D.C.H, Baghdad College of Medicine, College of Medicine AL Mustansiriya.
[3]M. B. Ch. B, D.C.H, College of Medicine -ALMustansiriya, Baghdad college of Medicine.
Department of Pediatrics – Al-Alwiya Pediatrics Hospital Baghdad /Iraq.

***Corresponding Author: Dr. Sahar Awad Hassan**
M. B. Ch. B, D.C.H, Baghdad College of Medicine, Baghdad College of Medicine, Department of Pediatrics – Al-Alwiya Pediatrics Hospital Baghdad /Iraq.

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ABSTRACT
Acute rheumatic fever (ARF) may have different clinical manifestations in different countries according to the genetic predisposition, prevalence of rheumatogenic strains, social and economic conditions. This study aimed to study was to determine the clinical characteristics of ARF in Al-Alwiya pediatrics hospital/Baghdad-Iraq and to improve the detection methods of the ARF cases. The current retrospective analysis included (60) clinical cases of inpatients aged (4-17) years and whose diagnosis with ARF was established according to Jones criteria and underwent treatment in Al-Alwiya pediatrics hospital during the period from 2009 to 2019. In this study, (63.3%) of patients showed fever and (65.0%) showed arthralgia which were the most common causes for admission to the medical care. The admission diagnosis was wrong in 24 (40.0%) children who underwent the treatment. The most frequent major Jones criteria of ARF were carditis (83.3%) and polyarthritis (55.0%). Chorea was significantly less common than carditis (P<0.001). The adequate treatment of the preceding streptococcal infection was administered in 17 children (51.5%). It can be concluded that the significant incidence of misdiagnoses in the ARF children during admission to the hospital, especially the interpretation of joint syndrome, indicates that physicians need an extra awareness. The lack of specific clinical signs of rheumatic carditis makes it a diagnostic challenge. The revised Jones criteria (2015) for the diagnosis of ARF can improve carditis detection. The adequate treatment of the preceding streptococcal infection may prevent ARF.

KEYWORDS: Acute rheumatic fever, children, Jones criteria.

INTRODUCTION
Acute rheumatic fever (ARF) was a major public health problem during the last century and a leading cause of cardiovascular morbidity among children and people aged over 40 years.[1] The appropriate treatment of streptococcal throat infection, primary and secondary prevention of ARF reduced its occurrence in the recent years.[2]

Poor socioeconomic status, under-nutrition and overcrowded homes are the most common risk factors among ARF cases.[3] Reduced crowding in homes and in schools, better hygiene and increased availability of children's health care are additional factors contributing to the decreased incidence of this disease.[4] A long-term study has also shown the decreased incidence of ARF in children from middle- to high-income families, with access to competent medical care.[5] However, ARF remains a major problem among children from the developing countries, especially those with tropical climate.[6] The highest documented rates in the world have been found in Maori and Pacific people in New Zealand, in Aboriginal Australians, and in the Pacific Islands nations.[6,7]

WHO experts claim that reliable data for ARF incidence is scarce. There are wide variations between countries, even between population groups in the same country (The World Health Report 2001). ARF has become a rare disease in high-income countries.[8]

ARF may have different clinical manifestations in different countries according to genetic predisposition, prevalence of rheumatogenic strains, social and economic conditions.[8] There are also differences in the prevalence of Jones criteria on different continents[2], which may be explained by epitopes of rheumatogenic streptococcal strains and genetics.[8] Studies of the course and features of this disease are especially important for the early diagnosis.

METHODS

The present retrospective study included (60) clinical cases of inpatients aged (4-17) years and whose diagnosis with ARF was established according to Jones criteria and underwent treatment in Al-Alwiya pediatrics hospital during the period from 2009 to 2019.

All the patients were examined according to the standardized protocol, which consisted of a detailed medical history recorded by a physician, general and special tests, including ECG, echocardiography, Doppler echocardiography (if applicable), anti-streptolysin-O titer (ASO) and throat culture for Group A beta-hemolytic streptococci.

Statistical analysis

Data were analyzed by using SPSS v.20 software package. The prevalence of variables was assessed by Chi-square test and the Fisher's exact test. The results were considered significant at P= 0.05 level.

RESULTS

The baseline characteristics of the patients are listed in table (1).

Table 1: Baseline characteristics of patients with ARF.

Parameter	ARF (No & % of the patients)
Males	35 (58.3)%
Females	25 (41.7)%

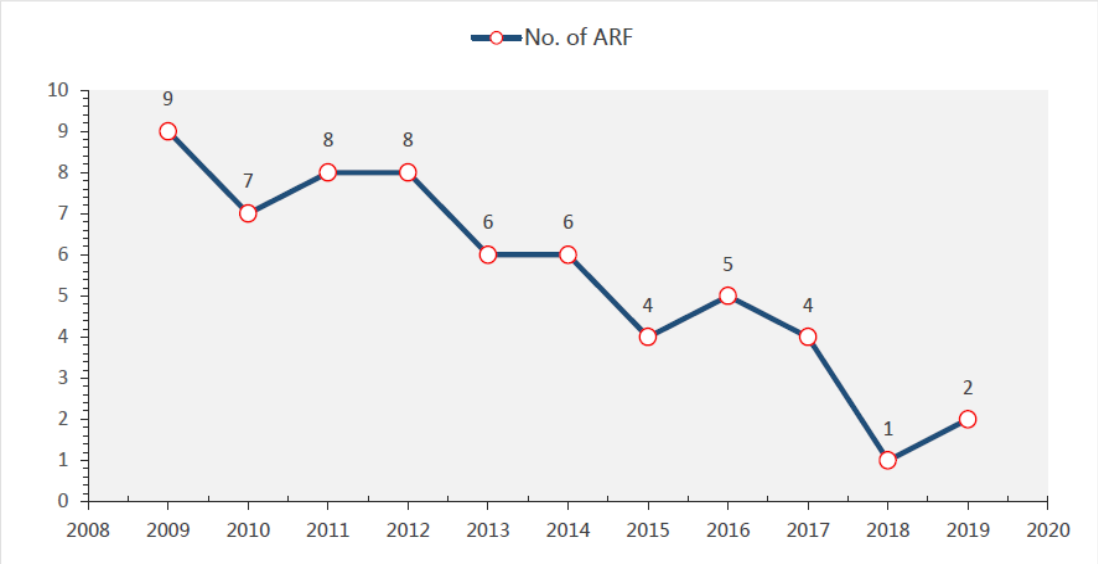

Figure (1): Distribution of ARF patients according to the cases per year.

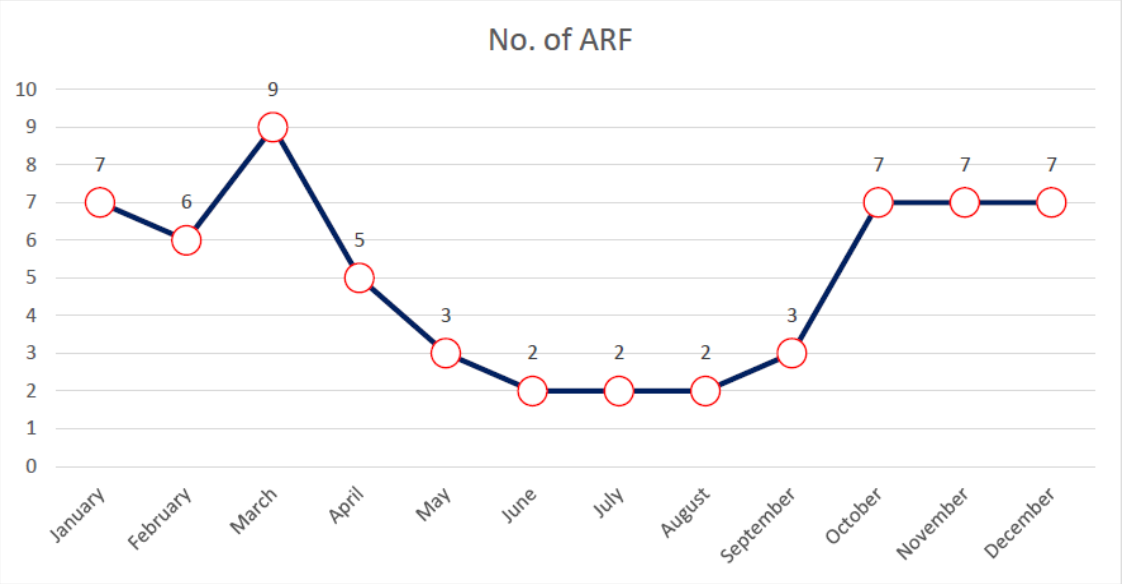

Figure (2): Distribution of ARF patients according to the months of the years (n).

The majority 43 (71.7%) of ARF patients were admitted to the hospital from October to March, with the peak admittance in March, while only 17 (28.3%) patients were admitted from April to September (p = 0.04).

Fever (63.3%) and joint syndrome (65.0%) were the most common causes for seeking medical care. The admission diagnosis was wrong in 24 (40.0%) children who underwent the treatment. The most common mistake was the incorrect interpretation of joint syndrome. The frequency of Jones criteria for ARF diagnosis is shown in table (2). Carditis (83.3%), followed by polyarthritis (55.0%) were the most frequent Jones criteria of ARF. Chorea occurred in significantly fewer cases than carditis (26.7%, P<0.001). Subcutaneous nodules and erythema marginatum were rarely observed (6.7% and 8.3% respectively). One major criterion was diagnosed in 16 (26.7%) of the patients, 10 (16.7%) in carditis and 6 (10.0%) isolated chorea. Two major criteria were found in 39 (65.0%) of patients which are 27 (45%) carditis and 7 (11.7%) polyarthritis and 7 (11.7%), while other combinations occurred more rarely. Three major criteria were found in 4 (6.7%) of patients. Some patients were presented with different combinations: carditis, polyarthritis, and chorea, while, in other cases, carditis and polyarthritis were combined with erythema marginatum or rheumatic nodules.

Table (2): Jones criteria in patients with acute rheumatic fever.

Criteria	All patients (No and % of the patients)
Major Jones criteria	
Carditis	50 (83.3)
Polyarthritis	33 (55.0)
Sydenham's Chorea	16 (26.7)
Isolated chorea	7 (11.7)
Subcutaneous nodules	4 (6.7)
Erythema marginatum	5 (8.3)
Minor Jones criteria	
Arthralgia	39 (65.0)
Fever	38 (63.3)
Raised ESR	38 (63.3)
Raised C reactive protein	6 (61.7)
Prolonged PR interval on ECG	7 (11.7)

The complaints of the patients with rheumatic carditis were not specific. On admission to the hospital, only 10 (16.7%) patients complained of chest pain. Intensive, blowing systolic murmur, typical for endocarditis was found in 24 (40.0%) children with signs of carditis. In other children, systolic murmur over the apex and/ or Erb's point was semi-intense, with irradiation to axilla. Tachycardia and decreased heart sounds were also observed. By the use of Doppler echocardiography, carditis was revealed in 50 (83.3%) patients with ARF. Arthritis affected the large joints, mostly the knee joints (60.6%), rarely elbow, hip, ankle joints and sometimes, shoulder, small joints of the wrist and foot. The majority of patients with arthritis 26 (78.8%) had migratory polyarthritis. Sydenham's chorea presented with hyperkinesis in all cases. Besides, hyperkinesis, 12 (75.0%) children with chorea had hypotonia, 8 (50.0%) children had static and coordination disorders, and 8 (50.0%) suffered from psychological and emotional disturbances (behavior changes, emotional lability). Erythema marginatum and rheumatic nodules were mostly observed in cases with high fever, intoxication, significantly increased inflammatory blood markers, and was usually associated with carditis.

Minor Jones criteria such as fever (63.3%), increased ESR (63.3%) and raised C-reactive protein (61.7%) and arthralgia (65.0%). Prolonged PR interval on ECG was identified in 7 (11.7%) patients. All the patients had evidence of a preceding streptococcal infection. Raised anti-streptolysin O titer was found in 42 (70.0%) of the patients, and recent streptococcal infection (tonsillopharyngitis, scarlet fever) was diagnosed in 33 (55.0%) of the children. The adequate treatment of preceding streptococcal infection was administered in 17 (51.5%) children, mostly in children with tonsillitis and scarlet fever. It is likely that manifestations of pharyngitis were interpreted as those of viral etiology and antibiotic therapy was not administered. A positive family history of ARF was determined in 8 (13.3%) patients. When diagnosed with ARF, the patients were receiving antimicrobial therapy for streptococcal infection. Penicillin was administered intramuscularly in 48 (80.0%) children. Oral macrolides (erythromycin, clarithromycin, azithromycin) were administered in 10 (16.7%) children. Other antibiotics were used in the remaining cases because of misdiagnosis on the admission to the hospital. The duration of antimicrobial therapy was 10 days. Nonsteroidal anti-inflammatory drugs were used in 54 (90.0%) ARF patients. The majority of them were treated with Diclofenac sodium 32 (53.3%), while acetyl salicylic acid was rarely used 11 (18.3%). Other nonsteroidal anti-inflammatory drugs (ibuprofen, nimesulide) were administered in the rest of the cases. Steroids were administered in 25 (41.7%) patients, particularly in those with severe carditis. Anticonvulsant drugs (phenobarbital, carbamazepine)

were given to patients with chorea. Fatal cases were not reported among the ARF patients.

DISCUSSION

The mean age of the patients with ARF in our investigation corresponds to the most commonly reported age of the patients with streptococcal pharyngitis and is in agreement with the recently published findings.[3] In most populations, ARF and rheumatic heart disease are more common among females, presumably because they are more sensitive to streptococcus A, or potentially, due to the genetic predisposition.[10] During the study period, we have seen an average of 5.5 new cases of ARF per year, with significant outbreaks between 2009 and 2012 (8.0 cases per year). The number of ARF cases per year has been reduced in the last 10 years. The publication from Montreal's Pediatric Tertiary Care Centers reported an increase in the number of cases per year, from 1995 to 2005, as compared with the previous year's.[8] The increased rate of admission of patients with ARF to hospitals from October to March, with the peak in March, is in agreement with the seasonal variability of pharyngitis, which is caused by group A beta-hemolytic streptococci and is most often diagnosed in the winter and spring[10] or in the fall and winter.[11,12] In contrast, pyoderma or skin infection occurs mostly in the summer and can be associated with acute glomerulonephritis.[13] The increased incidence of ARF in October may also be associated with the start of an academic year in September, which increases crowding and contact between school children. Low temperature and wet weather can also be determining factors for the seasonality of ARF. The role of other factors, such as levels of hormones (especially of melatonin and glucocorticoids), self-reactive autoantibodies, inflammatory factors and the activity of the immune response could contribute to the seasonality of rheumatic diseases and is discussed in some publications.[14] Our data showed the frequency of rheumatic carditis of 83.3%, which is similar to the other published data, in which it ranges from 45% to 95%.[15,16] The use of Doppler echocardiography helps improve the detection of carditis. The Jones criteria for the diagnosis of ARF were revised in 2015.[17] Echocardiography is now recommended in all the patients with suspected or confirmed ARF. Subclinical carditis can be used as a major criterion for ARF in all populations.[18] The reported frequency of arthritis in children with ARF ranges from 46 to 65%, depending on the region.[2] In our study, it was observed in 55.0% of the cases. Some authors[3] described arthritis as the most common criterion (up to 70% of the cases). We diagnosed Sydenham's chorea in 26.7% of the cases, although some authors reported the rates as low as 15-17%.[2] Some publications indicate rates of 6% to 31% and even 49%.[8] The difficulties in the ARF diagnosis were described in the cases of isolated rheumatic chorea, while other major criteria of ARF are absent.[6] The low rates of detected subcutaneous nodules and erythema marginatum in ARF children found in this study were likewise reported in literature.[2,3] The increased antibody titer to ASL-O ranges from 48.7% in Africa to 79.4% in the USA.[2] This is comparable with our results (70.0%).

The interpretation of the data was needed to confirm the streptococcal infection, frequently leading to difficulties in establishing the diagnosis and making the differential diagnostics of ARF. Negative throat culture does not exclude the beta-hemolytic streptococci infection, which was confirmed in the literature.[9,10] At the same time, the positive throat culture can be present in the asymptomatic carriers of group A beta-hemolytic streptococci. The increased levels of antistreptococcal antibodies are not specific only for beta-hemolytic streptococci group A, but can also be seen during infections caused by other types of streptococci, which do not lead to ARF. The high percentage of misdiagnoses at the time of admission indicates low level of ARF awareness by the family physicians and pediatricians, possibly because of the rarity of this disease. Atypical forms of the disease can also contribute to misdiagnosis. In our opinion, the fact that only 51.5% of the patients received an adequate treatment of the preceding streptococcal infection deserves special attention.

REFERENCES

1. Ayoub EM, Alsaeid K. Acute rheumatic fever and post-streptococcal reactive arthritis. In: Cassidy JT, Petty RE, Laxer RM, Lindsley CB, eds. Textbook of pediatric rheumatology. 2005, Philadelphia, WB Saunders, 614-629.
2. Seckeler MD, Hoke TR. The worldwide epidemiology of acute rheumatic fever and rheumatic heart disease. Clinical Epidemiology, 2011; 3: 67-84.
3. Joseph N, Madi D, Kumar GS, Nelliyanil M, Saralaya V, Rai S. Clinical Spectrum of Rheumatic Fever and Rheumatic Heart Disease: A 10 Year Experience in an Urban Area of South India. N Am J Med Sci., 2013; 5(11): 647–652.
4. Carapetis JR. Rheumatic heart disease in developing countries. N Engl J Med., 2007; 357: 439-441.
5. Veasy LG, Tani LY, Hill HR. Persistence of acute rheumatic fever in the intermountain area of the United States. J. Pediatr, 1994; 124(1): 9-16.
6. WHO Expert Consultation on Rheumatic Fever and Rheumatic Heart Disease. Rheumatic fever and rheumatic heart disease: report of a WHO Expert Consultation. 29 October – 1 November 2001: WHO technical report series. 2004, Geneva, 923.
7. Atatoa-Carr P, Lennon D, Wilson N. Rheumatic fever diagnosis, management, and secondary prevention: a New Zealand guideline. The New Zealand Medical Journal, 2008; 121(1271): 59-69.
8. Carceller A, Taoiero B, Rubin E, Miro J. Acute rheumatic fever: 27 year experience from the Montreal's pediatric tertiary care centers. An Pediatr (Barc)., 2007; 67(1): 510.

9. Guilherme L, Kalil J. Rheumatic fever: from innate to acquired immune response. Ann N Y Acad Sci., 2007; 1107: 426-433.
10. Hayes CS, Williamson H. Management of Group A Beta-Hemolytic Streptococcal Pharyngitis. American Family Physician, 2001; 63(8): 1557-1565.
11. Stollerman GH. Rheumatic fever. Lancet, 1997; 349: 935-942.
12. Cunningham MW. Pathogenesis of Group A Streptococcal infections. Clin Microbiol Rev., 2000; 3(13): 470-511.
13. Bisno AL. Non-suppurative poststreptococcal sequelae: rheumatic fever and glomerulonephritis. In Principles and practice of infectious diseases, eds. Mandell GL, Bennett JE, Dolin R. 1995, New York, N.Y., Churchill Livingstone, 2: 1799–1810.
14. Schlesinger N, Schlesinger M. Seasonal variation of rheumatic diseases. Discovery Medicine, 2005; 5(25): 64-69.
15. Ramakrishnan S. Echocardiography in acute rheumatic fever. Ann Pediatr Cardiol, 2009; 2(1): 61-64.
16. Rayamajhi A, Sharma D, Shakya U. Clinical, laboratory and echocardiographic profile of acute rheumatic fever in Nepali children. Ann Trop Pediatr, 2007; 27: 169177.
17. Gewitz MH, Baltimore RS, Tani LY, Sable CA, Shulman ST, Carapetis J, Remenyi B, Taubert KA, Bolqer AF, Beerman L, Mayosi BM, Beaton A, Pandian NG, Kaplan EL. American Heart Association Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease of the Council on Cardiovascular Disease in the Young. Revision of the 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.
18. Beaton A, Carapetis JR. The 2015 revision of the Jones criteria for the diagnosis of acute rheumatic fever: implications for practice in low-income and middle-income countries. Hea rt Asia., 2015; 7: 7-11.