

Rheumatic Heart Disease in Children: Epidemiological Aspects. Diagnostic and Evolutive at the Dakar Chu

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Abstract

Rheumatic heart disease is the ultimate consequence of acute articular rheumatism. It remains a public health problem in developing countries. It is a pathology found in all countries of the world, with a clear predominance in developing countries. In Senegal, the hospital prevalence of rheumatic heart disease is 30.5%. Its seriousness lies in the risk of valvular sequel responsible for cardiac dysfunction that can lead to death. The objective of this study was to describe the epidemiological, diagnostic and evolutionary aspects of rheumatic heart disease at the Albert Royer National Hospital Center of child (CHNEAR). We had carried out a retrospective, descriptive and analytical study lasting 3 years from January 1, 2017 to December 31, 2019. All children aged 4 to 17 hospitalized at CHNEAR for rheumatic heart disease were included. The hospital prevalence was 0.8%. The average age was 10.9 years with a sex ratio of 0.875 in favor of girls. 85.47% of cases came from parents who had a low economic level of life. The history of repeated angina and acute articular rheumatism (AAR) was found respectively in 22.69 and 15.13% of cases. The clinical symptomatology was dominated by heart failure with 58.3% of cases, arthralgia in 7.5% of cases. The biological inflammatory syndrome was found in 86.1%. 73% of the patients had a positive antistreptolysin O antibody (ASLO). Cardiomegaly was found in 89.7%. Heart doppler ultrasound found polyvalvular involvement in more than half of the cases. Mitral insufficiency was the predominant valve disease in 98.20% of cases. The evolution was favorable in the majority of cases but 9.32% of deaths were observed.

Keywords

Rheumatic Heart Disease, Child, CHNEAR

1. Introduction

Rheumatic heart disease represents all the clinical and paraclinical manifestations due to lesions of the heart valves caused by one or more episodes of the acute articular rheumatism (AAR), which is an autoimmune inflammatory reaction to an infection by group A beta hemolytic streptococcus. Its frequency and severity increases with relapses [1]. It is a pathology found in all countries of the world, with a clear predominance in developing countries where 9 to 15 per 1000 school-age children are affected [1]. In Senegal, the hospital prevalence of rheumatic heart disease is 30.5% [2]. In industrialized countries, the decrease in the AAR began before the appearance of antibiotics with the improvement of living conditions, to become more pronounced from the Second World War with the appearance of antibiotic therapy, which allowed the primary and secondary prevention of AAR [3] [4] [5]. On the other hand, in developing countries, AAR is still endemic and the current situation in these countries is that of Europe and industrialized countries before 1920 [1] [2]. In most of these countries, there are no precise statistics on the incidence of AAR, which varies greatly from country to country. The prevalence of AAR is probably underestimated in these countries [1] [2]. If group A beta-hemolytic streptococcus is the germ responsible for AAR, there are many arguments that plead in favor of an autoimmune origin of cardiac involvement [6]. On the anatomic-pathological level, the Aschoff nodule most often represents the only stigma of rheumatic myocardial involvement [7]. The clinico-radiological manifestations are diverse and varied and depend on the location of the lesion on the heart. The management is medico-surgical. Complications can be found, namely decompensation in heart failure, cardiogenic shock, thromboembolic complications as well as rhythm and conduction disorders. Its prevention is first primary with the treatment of streptococcal angina and the improvement of living conditions, then secondary using antibiotics to prevent the recurrence of this angina.

Clinicians in endemic areas report a high frequency of hospitalizations for rheumatic heart disease, hence our work on rheumatic heart disease in the Albert Royer National Hospital Center of child (CHNEAR) cardiology pavilion.

The objective of our study was to report cases of rheumatic heart disease and to study their reasons for hospitalization for better management and adequate prevention.

2. Methodology

We had carried out a retrospective, descriptive and analytical study carried out at the Albert Royer National Hospital Center of child (CHNEAR) over a period of 3 years (from January 1, 2017 to December 31, 2019).

The study concerned all children aged 4 to 17, hospitalized in Pavilion O of the CHNEAR during the study period.

All children aged 4 to 17 hospitalized in Pavilion O who presented with rheumatic heart disease.

Children with rheumatic heart disease but whose records were unusable or untraceable were not included.

Data were collected from registers and hospitalization records using a pre-established survey form (see appendix).

For each case, we collected the following parameters:

- Socio-demographic: age, sex, geographical origin.
- History: polyarthralgia, angina and scarlet fever; parents' profession, socio-economic level and position among siblings.
- Clinical: functional signs and physical signs.
- Paraclinical: the results of biology, chest X-ray, cardiac Doppler ultrasound, ECG and brain scan.
- The reasons for hospitalizations.
- Evolution: healing, transfer, death.

3. Results

3.1. Epidemiological

Our study involved 120 individuals.

3.1.1. Prevalence

Hospital prevalence was 0.8%.

3.1.2. Age

The mean age of the patients was 10.9 years with a standard deviation of 2.82. The median age was 11 years, with extremes of 17 years and 4 years.

3.1.3. Sex

The sex ratio was 0.875 in favor of girls.

3.1.4. The Socioeconomic Level

Our results showed that 84.9% of these children hospitalized for rheumatic heart disease had a low socioeconomic level.

3.1.5. Geographic Origin

The majority of children came from the suburbs of Dakar with a proportion of 42.5%, followed by other regions (30%) (**Table 1**).

3.2. Clinic

3.2.1. Antecedents

The most frequent antecedents were angina with a proportion of 22.69% and polyarthralgia with a proportion of 15.13%, and scarlet fever with a proportion of 0.84% (**Figure 1**).

3.2.2. Reasons for Hospitalization

The reasons for consultation were dominated dyspnea found in 68.97% of patients (**Table 2**).

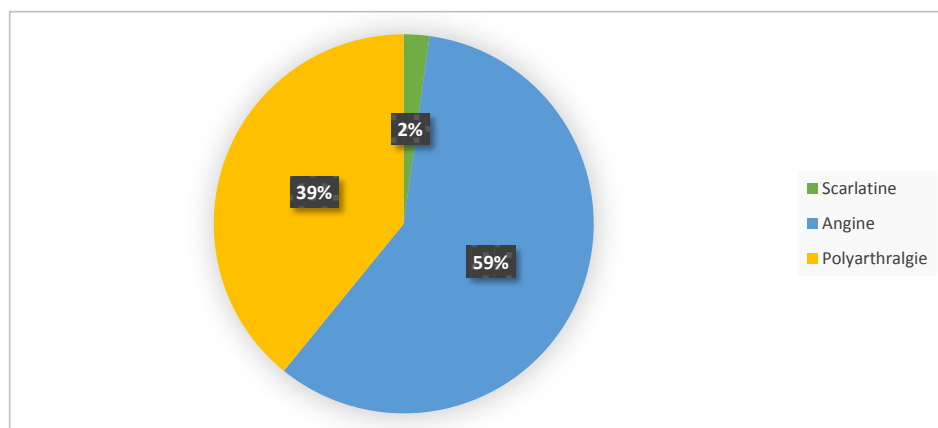


Figure 1. Population distribution by background.

Table 1. Breakdown of workforce by geographical origin.

Geographic origin	Number (N)	Percentage (%)
Dakar suburbs	51	42.5
Other regions	36	30
Dakar City Center	30	25
Foreign	3	2.5
TOTAL	120	100

Table 2. Breakdown by reason for consultation.

Reasons for hospitalization:	Number	Percentage (%)
Dyspnea	80	68.97
Cough	52	43.7
Palpitations	30	25.21
Fever	39	32.77
Chest Pain	17	14.29

3.2.3. Physical Examination

An alteration of the general state was objectified in 33.05% of the children, a state of shock in 6.84%. 20.59% of the children had a fever. Heart failure syndrome was revealing in 58.3% of cases, followed by pulmonary condensation syndrome (12.5%) and joint signs (7.5%). Cyanosis was found in 6.84% of children. No cutaneous manifestations were found in our patients.

3.2.4. Paraclinical

The normochromic normocytia anemia, the positivity of the C reactive protein (CRP), the Hyperleukocytosis and the positivity of the antistreptolysin O antibodies (ASLO) were the most found biological signs with respectively.

Cardiomegaly was present in 89.7% of patients.

On Doppler echocardiography, the mitral valve was the most affected (98%),

polyvalvular involvement was found in half of the cases. OSLER endocarditis was particular in 9 patients (7.56%), only one case of pericarditis was found.

3.2.5. Reasons for Hospitalization

Rheumatic progression was the main reason (84%) for hospitalization. Other reasons for hospitalization were found such as OSLER endocarditis, heart failure and intercurrent infections.

3.2.6. Evolution

Over the years, 80.5% of patients have evolved favorably against 5.95% who have called for a transfer to a cardiovascular surgical structure.

Of the 11 deceased patients (9.32%), 81% had a low socioeconomic status; all carriers of MI and rheumatic polyvalvulopathies; 81% progressive flare-ups; 1 case of OSLER endocarditis and 18% of cases of bronchopulmonary infection. All benefited from medical treatment and only 1 case of therapeutic rupture was noted. Morbid associations have been found with anemia, sickle cell disease and acute malnutrition (Figure 2).

4. Discussion

The exploitation of patient files enabled us to recruit 120 rheumatic heart disease files out of 13,789 children hospitalized at the Albert Royer children's hospital (CHNEAR) during our study period, *i.e.* a hospital prevalence of 0.8%. In Senegal Diao found in 2005 a prevalence 30.5% higher than ours, which can be linked to reinforced screening and early treatment of children with rheumatic heart disease [2]. Faasalele's studies in Australia in 2017 found a much lower prevalence (0.01%) [8]. This would be due to the primary and secondary prevention established in industrialized countries, namely the improvement of the living conditions of the populations and penicillin treatment.

In our study the average age was 10.9 years. These results are similar to those of Arehhal and Hammani in Morocco in 2009 who had highlighted an average age close to ours of respectively 10 years and 9.91 years [9].

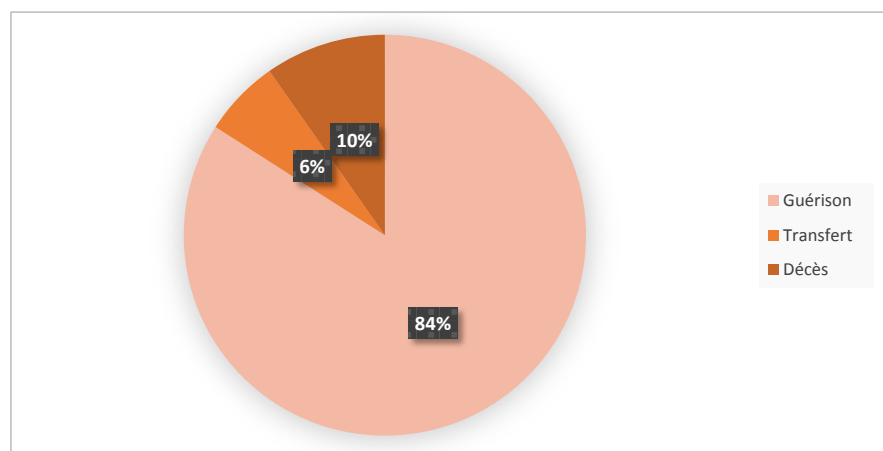


Figure 2. Population distribution according to evolution.

The sex ratio was 0.875. The same observation was made in other studies in developed countries such as that of Faasalele in Australia in 2017, and that carried out in Africa with Kingué in 2016 and in Senegal by Diao in 2005 [2]. However, other series report the male predominance in India with the study by Mehta in 2016 and that by Ben Meriem in 2016 which finds a male predominance [10] [11]. This could be explained by the difficult access of girls to health structures in these countries due to social inequalities between boys and girls.

In our study 42.5% of the children came from the suburbs of Dakar, this is in agreement with several studies such as that of Marijon in France in 2007 and that of Ngaide in Senegal in 2015 [12] [13]. This seems to be linked to the unfavorable socio-economic conditions and difficult access to health care in these areas.

Our study found 84.9% of children with rheumatic heart disease having a low socioeconomic level. The low socio-economic level, often described as a factor contributing to the development of rheumatic heart disease, was also found by Toure of Guinea Conakry in 1992 [14]. In Senegal, a recent study by Ngaide described low socio-economic status as a risk factor for developing acute articular rheumatism (AAR) with a p less than 0.04 [13]. It is an established fact that poverty, promiscuity and poor hygienic conditions promote the outbreak of AAR and therefore its cardiac sequelae, rheumatic heart disease.

A history of repeated angina was found in 22.69% of patients or polyarthralgia in 15.13% or both associated. This is comparable to the study by Goeh A [15] where angina represented 31, 5% and the AAR 34.21% but different from the 82.3% AAR and 13% angina of the Diao [2] study in Senegal in 2005. This is explained by the fact that the rheumatic attack is part of the post-streptococcal syndromes with an initial damage otolaryngological and/or cutaneous involvement as well as cross-antigenicity with resemblance between foreign streptococcal antigens and self-antigens.

Heart failure syndrome, progressive attack and intercurrent infections represented the main reasons for consultation with 16.7% respectively; 84% and 16.7%. Diao *et al.* found lower results [2]: heart failure was 76.4%.

Nearly 3/4 of the patients presented with a non-specific biological inflammatory syndrome (Hyper leukocytosis: 73.6% and positive C proteine reactive (CRP): 86.1%. These figures are close to those of Kramoh [16] which revolve around 80.2% positive CRP. In our study, 73% of patients had a positive ASLO. What is close to 98.7% found by Ben Meriem however Maiga had positive ASLO in 27.5% of patients [10]. Normochromic normocytic anemia was found in the majority of patients, *i.e.* 88%, as in the Diao study [2].

In our series we found chest X-rays which show cardiomegaly in 89.7% with an average ICT of 0.65. This is comparable to the results of the study by Diao [2] from Senegal 2005.

In our study, mitral valve involvement is the most frequent, it was observed in 109 patients (98.2%), which is in agreement with the literature [2]. Diao [2] found a much higher percentage (64.7%). We found no cases of isolated MM

and RM contrary to some authors [17].

More than half of the children (59.8%) had polyvalvular disease. This rate is higher than that found by Chkili (41%) and Mirabelle (56.6%) [18] [19].

Pericarditis was found in our study in 1 patient, it was isolated as in other studies [20] [21].

Rheumatic endocarditis in our study was found in the majority of our patients (98.20%) in association with the diagnosis of scalability. Osler's endocarditis was found in 9 patients. Maiga [22] noted 4 cases (3.3%) of Osler endocarditis during the follow-up of his patients.

The evolution was favorable after medical treatment with stabilization of 95 patients (80.5%) following their hospitalization.

In our series, 7 patients (5.93%) were transferred to the CUOMO (Cardiovascular Surgery Department for children at the Fann hospital in DAKAR) for surgical management.

The evolution was unfavorable in 11 patients who died (9.32%) during the study period.

This is comparable to the results of Diarra in Mali with stabilization in 64% of patients and worsening in 29.33% but different from those of Ndiaye [21] from Senegal where 34.97% stabilization and 39.87% of aggravation.

The 11 cases of death detected during this study were associated with some morbidity, namely 6 cases of anemia, 3 cases of sickle cell disease, 1 case associated with severe acute malnutrition. The association with comorbidities is sometimes a factor of poor prognosis and explains the high number of deaths.

5. Conclusion

Rheumatic heart disease remains a formidable condition in developing countries and particularly in Senegal. The fight against the contributing factors is the improvement of socio-economic conditions, vaccination and treatment of associated angina prophylactic penicillotherapy are the effective pillars to reduce the incidence of rheumatic heart disease.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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