Original Research Article

EPIDEMIOLOGY OF RHEUMATIC HEART DISEASE IN EMERGENCY DEPARTMENT IN DAKAR: A DESCRIPTIVE STUDY OF 37 CASES.

UNDER PEER REVIEW

ABSTRACT

Background : Acute rheumaticfever (ARF), alsoknown as "Bouillaud'sdisease", is a post-streptococcal non-suppurative inflammatorydiseasecomplicating an upperairway infection with group A β-hemolytic*streptococcus*. Although ARF has almostdisappeared in developed countries, itisstill a major public healthproblem in low- and middle-income countries, as itremains the mostfrequent cause of cardiovascularmortality and morbidity in children. The objective was to describe the epidemiological and evolutionary aspects of rheumaticheartdiseaseadmitted to the emergency room of the Albert Royer National Children's Hospital in Dakar.**Methods :** weconducted a retrospective, descriptive study over a 12-month period (January 1 to December 31, 2021) of childrenaged 3 to 18 yearshospitalized for rheumaticheartdisease in the emergency departmentduring the studyperiod.**Results :** The prevalencewas 3.73% (37/993) with a meanage of 11.35 +/- 3 years and a majoritybetween 10 and 15 years. Males predominated - sex ratio 1.3. The majority came fromdisadvantaged areas (91.9%) withlowincomes for the most part (83.8%). The reasons for consultation weredominated by dyspnea (86.5%), fever (75.7%) and poly-arthralgia (35.1%). General and physicalsignsweretachycardia (86.5%), orthopnea (24.3%), hypoxia (40.5%), congestive heartfailure (83.7%). Cardiacinvolvementwasdominated by mitral and aorticpolyvalvulardisease in more thanhalf (57%). Management includeddiuretics (97.3%),

oxygentherapy(90%), corticosteroids (31%) and antibiotics (81%). Three cases of deathwerenoted.**Conclusion :** ARFisstillfrequent in our countries with an oftenpoorprognosis due to delayed management. Prevention policies are necessary to eradicatethisscourge.

Keywords: Rheumaticheartdisease, polyvalvulardisease, children.

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1. INTRODUCTION :

Rheumaticfever (RF), alsoknown as Bouillaud'sdisease, is a post-streptococcal non-suppurative inflammatorydiseasecomplicating an upperairway infection with group A β-hemolytic streptococcus. Although AAR has virtuallydisappeared in developed countries, itremains a major public healthproblem in low- and middle-income countries, whereitisstill the mostfrequent cause of cardiovascularmortality and morbidity in children [1,2,3]. Rheumaticheartdiseaseis the leading cause of acquiredheartdisease in children and adolescents in the Third World [4,5].nAfrica, the high prevalence of rheumaticheartdisease in schoolchildrenis a worrying public healthproblem. AAR is a complication of post-streptococcalangina, favored by poorhygiene and a lack of effective management of streptococcal infections [6-9].Diagnosisisbased on the presence of the modified Jones criteria, combinedwith proof of streptococcal infection, notably anti-streptolysin O antibody (ASLO) positivity. Management depends on the clinicalform of the disease, withpreventionbased on a clearimprovement in people's living conditions, as well as effective diagnosis and treatment of strepthroat.There is a lack of recent data on the prevalence of AAR in Senegal. Withthis in mind, weconductedthisretrospectivestudy over a 12-month period (January to December 2021) in the emergency department of the Centre Hospitalier National D'Enfant Albert Royer, with the overallaim of describing the epidemiological and evolutionary aspects of RAA in hospitalizedchildren.

2. MATERIAL AND METHODS

2.1. Study site

The studytook place in the emergency department(ED) of the Albert Royer National Children's Hospital in Dakar. All childrenaged 0 - 18 years are admitted to thisdepartment for consultation for anyreason. It includes a triage unit, an emergency room where vital emergencies are treated, a short-termhospitalization room and ambulatory follow-up boxes.

2.2. Type and duration of study

Weconducted a retrospective, descriptive study over a 12-month periodfromJanuary 1 to December 31, 2021, in the emergency department of the Albert Royer Children's Hospital in Dakar.

2.3. STUDY POPULATION

2.3.1 Inclusion criteria

All childrenaged 3 to 18 yearshospitalized in the emergency department for rheumaticheartdiseaseconfirmed by cardiac Doppler ultrasoundwithevidence of streptococcal infection (ASLO positive) wereincluded.

2.3.2 Non-inclusion criteria

- Patients withincomplete or unusable records**.**

- Outpatient care

2.4. DATA COLLECTION AND ANALYSIS

- **Diagnosis confirmation**

The diagnosis of RAA wasbased on the Jones criteria and on ASLO positivity (levelsgreaterthan or equal to 200 IU).

- **Collection tools**

- A pre-established data collection form;
- Collection of information frommedical files

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- **Parametersstudied**

The followingparameterswerestudied for all included cases:

- Epidemiological : children'sage, gender,socio-demographic data

- Clinical andparaclinical : history, reasons for admission, generalsigns, signs of clinicalexamination, Doppler echocardiography, biology and ASLO.

- Therapeuticand outcome data

2.5. Statisticalanalysis

Data wereenteredinto Excel 2010 afterdesigning a data entry mask. Analysiswascarried out using Excel 2010 and Epi info 7.2. Duringanalysis, qualitative variables weredescribed by frequency tables, histograms, camembert and bar charts. Quantitative variables weredescribed by theirpositionalparameters ((mean, median and mode).

The bivariateanalysisconcernedriskfactors for death. The differencewasstatisticallysignificantwhen the p-value wasstrictlylessthan 0.05.

2.6. Ethicalconsiderations

As the studywas descriptive, based on patients' files, approvalfrom the national ethicscommitteewas not required.

3. RESULTS AND DISCUSSION

3.1 RESULTS

Over the studyperiod, a total of 37 patients wereincluded out of 993 childrenhospitalized in emergency departments, representing a frequency of 3.73% (37/993). The meanage of the patients was 11.35 +/- 3.0 years. The extremeswere 3.00 and 17.00 years (Table 1). The sex ratio was 1.31.Among the children, 54.05% hadregular follow-up by a cardiopediatrician, 30.56% hadrecurrenttonsillitis and 18.92% (n=7) had a comorbidity.Antibioticprophylaxiswasprescribed for 35.14% of patients. School absence concerned 13.51% of children. The majority of patients came from the periphery of the city center (91.89%).Of these, 87.78% had a lowsocio-economicstatus. The

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mostfrequentreasons for consultation weredyspnea, fever and astheniain 86.49%, 75.68% and 54.05% of cases respectively (figure 1). Physical signsweremainlyheartmurmur (94.59%), congestive heartfailure syndrome (83.78%) and respiratorydistress (75.68%) (figure 2).A biologicalinflammatory syndrome wasnoted in most patients, withhyperleukocytosis (50%), inflammatoryanemia (83.33%) and positive C-reactiveprotein (>6mg/l) in 91.67%. The ion disordersnotedwerehyponatremia (32.43%) and hypokalemia (27.03%) (table 2).Cardiomegalywasnotedin 22 patients (59.46%), pleural effusion in 4 (16.66%) and pulmonarysuperinfectionin 32.43%. Cardiac Doppler ultrasonographyrevealedvalvular damage in over half (57%), and endocarditisin 16.22% of cases (figure 3).Mitral insufficiencywas the mostfrequentvalvularinvolvement (30.10%). Management wasmainlymedical, withdiuretics (100%), oxygentherapy (78.38%), conversion enzyme inhibitors (Captopril) (83.78%) and antibiotics (81.08%).No patient had a surgical cure. The majorityhad a favorable outcome. Wehadrecordedthree cases of death in the context of cardiorespiratoryarrest.

3.2. DISCUSSION

The prevalence of rheumaticheartdisease in Dakar emergency departmentsremains high (3.73%). A higherprevalencewasfound in Dakar in a schoolsurvey: 4.96% (95% CI 2.4 - 9.1) [9]. This difference can beexplained by the factthat the study population consistedexclusively of patients hospitalized in emergency departments. Despitepreventivemeasures and early management of strepangina, acute rheumatoidarthritis(ARA) remains high in Senegal. Policy to eradicateARA must focus on the availability of rapid tests for streptococcaltonsillitis in healthcarefacilities in general, and emergency departments in particular, as well as on training healthcare staff to diagnose and treat all bacterialtonsillitis in childreneffectively.Educating parents and makingthemaware of the need to seek care in the event of feverisalso an important pillar of thispolicy. ARAis a disease of youngchildren, and is rare in infants under 3 years of age. In thisstudy, the averageage of the childrenwas 11.35 +/- 3.0 years (3.00-17.00 years). A slightlyloweragewasfound in Senegal and Congo, at 9.7 +/- 3.3 and 9.6 yearsrespectively [9, 10]. The population waspredominantlymale, with a sex

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ratio of 1.31. A femalepredominancewasfound in otherstudies [9,10]. ARA has virtuallydisappeared in industrialized countries, where the socio-economiclevelisrelativelyhigher, althoughotherfactorsexplainthisrarity of ARA. Low socio-economicstatus has been described as a factor favoring the onset of ARA. This is due, amongotherthings, to late recourse to treatment for lack of financialmeans. More thanhalf (56.49%, n=87) of patients had a lowsocio-economiclevel. Theseresults are in line with data fromstudiescarried out in Africa [11].It's an establishedfactthatpoverty, promiscuity and poorhygienepromote the outbreak of ARA. The decline in these rates is due to a slightimprovement in people's standard of living. Recurrenttonsillitisincreases the risk of ARA, affecting 30.56% of patients. Similar data have been noted in Togo [4]. Indeed, it has been shownthatthereis a cross-antigenicitywith a similaritybetweenmicrobial Ag and human Ag, leading to the production of antibodies, affectingsomeorganssuch as the heart, joints and skin. Preventingrheumaticheartdiseaserequiresimproving the socio-economic conditions of populations and combatingprecariousness in underprivilegedenvironments. The severity of ARA lies in the cardiac damage, particularlyvalvular damage, whichdetermines the vital and functionalprognosis of the disease. In ourstudy, just over half the patients (56.76%, n=21) wereaffected by valvulardisease. The mitral valve wasmostaffected, in the form of mitral insufficiency (38.10%). The samefindingwasfound in the schoolsurveyconducted in Senegal, with a proportion of 80% [9]. Polyvalvular damage affected 30.10% of patients.Aorticvalvulopathywaslessfrequentthan mitral damage, as noted in otherstudies [9]. All theseresults show that damage to variouscardiac tissues isverycommon in rheumaticfever. The frequency of mitral damage can beexplained by the factthatleft-sided pressures are higherthan right-sidedintracardiac pressures, althoughthishypothesisis not fixed in the literature [11, 12]. Management wasmainlymedical in ourseries, the studybeingcarried out in the medical emergency department. Management includedprevention of rheumatic progression with long-termpenicillintherapy, and prevention of cardiacfailurewithdigitalis-diuretics. None of our patients receivedsurgicaltreatment in our case series, in contrast to otherstudies [13]. This can beexplained by the factthatsurgeryis

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out of the patient'sreach. The outcomewas favorable aftermedicaltreatment, withstabilizationfollowinghospitalization. Werecordedthree cases of death in congestive heartfailurewith hypotension and hypoxiarefractory to medicaltreatment. The factorsassociatedwiththesedeathswere the child'sage over 14, lowsocio-economicstatus and femalegender ($p<0.003$).

CONCLUSION :

Rheumaticheartdiseaseiscommon in low-income countries. Prevention involves effective management of angina and improvingpeople's standard of living.

CONSENT

As per international standard, parental written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard writtenethicalapproval has been collected and preserved by the author(s).

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Table1 : Distribution of patients by age group

age group (years)	Effectif	Percentage %
3 – 10	8	21.62%
10 – 15	25	67.57%
15 – 18	4	10.81%

Table 2 : Distribution of patients by biologicalsigns

Biologicalsigns	Number	Percentage %
Hyperleukocytosis	18	50,00
Inflammatoryanemia	30	83,33
Positive CRP	33	91,67
Positive ASLO (> 200)	25	67,57
Hyponatremia	12	32,43
Hypokalemia	10	27,03

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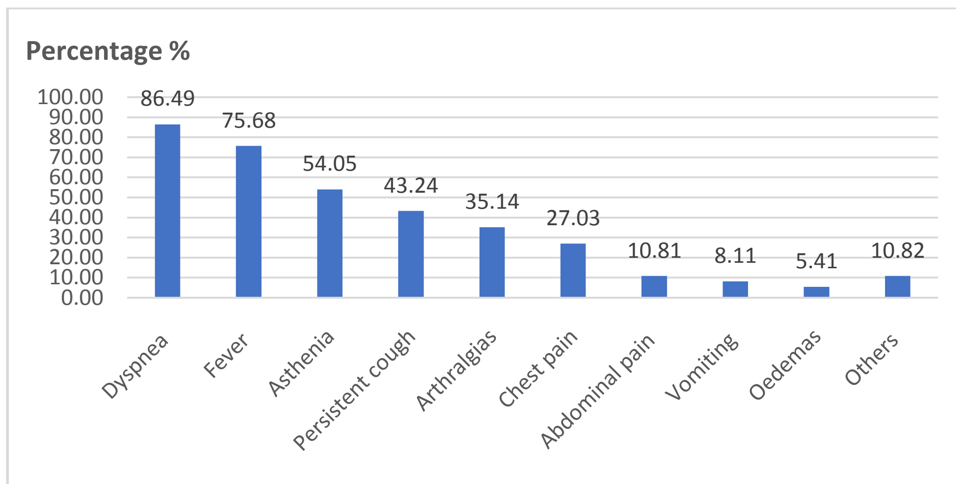

Figure 1 : Distribution of patients by reasons for hospital admission

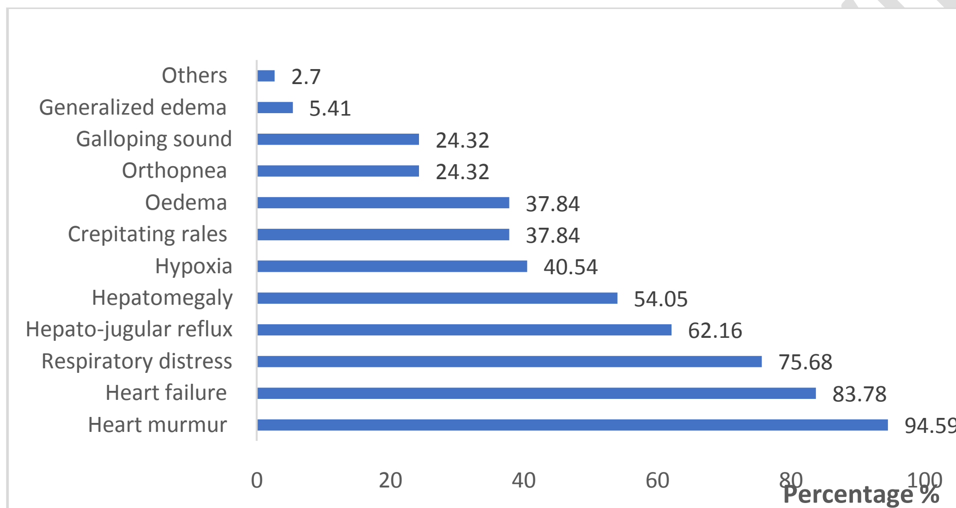

Figure 2 : Distribution of patients by physicalsigns

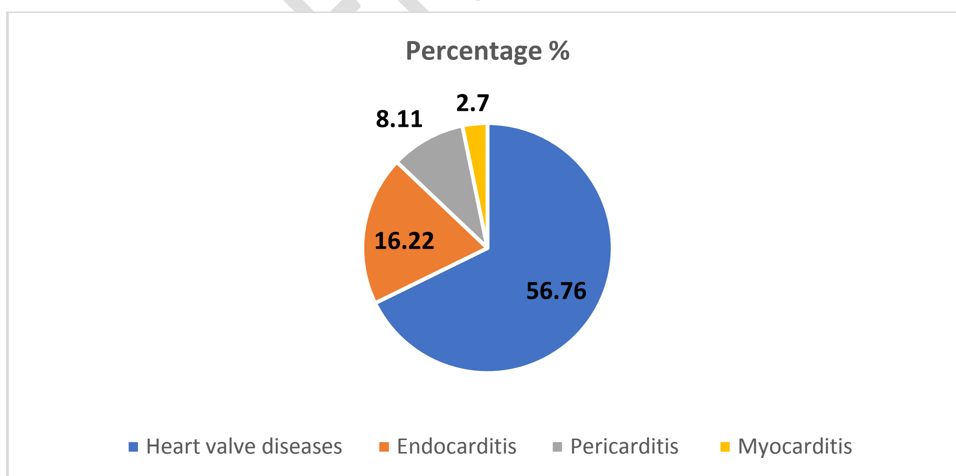

Figure 3 : Distribution of patients by cardiac damage

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