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Importance of Electrocardiogram for Detection of Preclinical Abnormalities in Patients with Rheumatoid Arthritis without Cardiovascular Events

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Abstract

Introduction: In patients with rheumatoid arthritis, cardiovascular involvement is common, may have serious consequences, and can contribute to worsening of patient's outcome. The realization of systematic electrocardiogram can help to detect earlier cardiac abnormalities and place in a logical secondary prevention.

Our purpose of this study was to investigate the electrocardiographic abnormalities in a population of Senegalese patients with rheumatoid arthritis without clinically evident cardiovascular manifestations.

Patients and methods: The study was performed as a cross-sectional study, which included prospectively 73 patients of both sexes aged at least 18 years in the internal medicine department of University Hospital Center Aristide Le Dantec in Dakar, Senegal, fulfilling the criteria for definite or classical rheumatoid arthritis according to the criteria of the American Rheumatism Association. It focused on a sample of following clinical examination, we conducted laboratory tests (CRP, fibrinogen, ESR, Rheumatoid factors: Latex and Waaler Rose, Anti-CCP, antinuclear factors and antibodies anti-ENA), a standard ECG. Data were analyzed using a descriptive study of the different variables with the calculation of proportions for categorical variables, and the positional parameters and dispersion for quantitative variables.

Results: All patients had normal ECG and no cardiac symptoms or dyspnoea on effort. The study included 73 patients (68 females and 5males) with rheumatoid arthritis without obvious cardiac events meet the criteria of definition of the ACR 1987. The mean age was 44.17 ± 14.43 years with extremes of 18 and 75 years. The mean duration of RA was 5.93 ± 4.78 years. The concept of family inflammatory arthritis was reported in 35.60% of cases and almost one in six patients had at least a factor of cardiovascular risk (16.96%). Electrocardiographic abnormalities found were dominated by left ventricular hypertrophy encountered in 34 patients (46.57%), left atrial enlargement in 32.90% of cases, 16.44% of patients had left axis deviation. The myocardial hyper excitability was present in 8 patients (11.19%), including 6 (8.45%) ventricular premature beats found in patients with active RA. Twenty-six patients had signs consistent with an ischemia and/or myocardial injury is a rate of 35.61%.

Conclusion: The realization of the electrocardiogram in patients with rheumatoid arthritis without clinically evident cardiovascular manifestations allows highlighting cardiovascular abnormalities related to the natural course of the disease.

Keywords: Electrocardiogram; Rheumatoid arthritis; Myocardial hyperexcitability

Introduction

Besides articular symptoms, rheumatoid arthritis (RA) can be associated with extra-articular features. Among those extra-articular features, cardiovascular diseases are common, including pericarditis, cardiomyopathy, cardiac amyloidosis, coronary vasculitis, arrhythmia, valve diseases, congestive heart failure, and ischemic heart disease [1]. It is a chronic inflammatory disease affecting 1% of the population [2,3]. Apart from the extra-articular manifestations, it is associated with an increased risk of cardiovascular events [4]. The mechanisms that explain the rise in cardiovascular morbidity and mortality have not yet been elucidated. However, it seems that traditional cardiovascular risk factors contribute but elements specific to RA, including the existence of a chronic inflammation of the endothelium exposed to accelerated atherosclerosis [5]. Mark cardiovascular abnormalities based on the ECG, which is a non-invasive, relatively acceptable cost. It is in this light that we conducted this study whose objective was to investigate electrocardiographic abnormalities in rheumatoid arthritis, in a population of Senegalese patients, asymptomatic cardiovascular plan.

Patients and Methods

This is a descriptive cross-sectional study, including outpatients in the internal medicine department of Hospital-University Centre Aristide Le Dantec in Dakar, Senegal, with a diagnosis of rheumatoid

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arthritis in asymptomatic cardiovascular plan. It covered a sample of 73 patients of both sexes aged at least 18 years old, collected between April 2009 and May 2010. Patients with rheumatoid arthritis that meet the criteria of the American College of Rheumatology [6] and asymptomatic cardiovascular level, wishing to participate in the study were included. For each patient, the following data were systematically collected: age, sex, duration of disease progression, clinical manifestations, successive treatments (especially steroids), the disease activity score (DAS 28), the presence of atherosclerotic risk factors (hypertension, diabetes, dyslipidemia, and smoking), as recommended by the Afssaps [7]. Have been excluded from the study all patients with known cardiac disease outside the blood pressure, symptoms suggestive of cardiovascular disease or treatment referred cardiology (excluding high blood pressure). The results of laboratory tests was collected sedimentation rate (ESR), C-reactive protein (CRP), rheumatoid factor (FR) (Latex and Waaler Rose), anti-nuclear antibodies (ANA), anti-dsDNA antibodies and antipeptides citric citrullinated (anti-CCP). Patients selected for the study had a resting ECG (standard, 12-lead). Were analyzed PR interval, QRS duration and QT interval, cardiac electrical axis; the presence or absence of ectopic beat, rhythm disorder, disorder atrioventricular or interventricular conduction, a microvolt age and anomalies which could towards myocardial ischemia (modification of repolarization, Q waves of necrosis or equivalent). Abnormalities of the QT interval (lengthening or shortening calculated using Bazett's formula) were consistently mentioned.

Data Processing

The analysis plan was made according to a descriptive study of the different variables with the calculation of proportions for categorical variables, and the position and dispersion parameters for quantitative variables using the SPSS17 program.

Results

Seventy-three patients with asymptomatic cardiovascular RA, meeting the definition of ACR criteria 1987 were enrolled including 65 women. The mean age was 44.17 ± 14.43 years (18-75 years). Clinical and laboratory characteristics of patients are summarized in Tables 1 and 2. Main electrocardiographic data are reported in Table 3. There is a significant number of left ventricular hypertrophy (46.57%) and left atrial (32.90%). From the analysis, it appeared that the existence of these abnormalities was correlated with age. In bivariate analysis, our study showed that left ventricular hypertrophy was associated with increased left ventricular mass in 21 patients (28.76%). Left axis deviation was found in 16.44% of patients. Myocardial hyperexcitability was present in 8 patients (11.19%) of which 6 (8.45%) premature ventricular found in patients with active RA. Twenty-six patients had signs consistent with ischemia and/or myocardial injury or a rate of 35.61%.

Discussion

Studies have highlighted the importance of cardiovascular risk [8] and the value of routine electrocardiography in RA [9]. To our knowledge, this is one of the first African studies who studied electrical abnormalities in RA in asymptomatic patients at heart level. Analysis of the results of CV event risk factors in our study puts forward instead of conventional risk factors where the overall prevalence was 16.33%, and especially hypertension 20.55%. Hypertension was known in 60% and unknown in 40% and suggests the importance of screening and systematic support for it in the PR. The concept of family inflammatory rheumatism was reported in 35.60% of cases. Our results are consistent with those in the literature who see a risk of occurrence of a PR 2-3 times higher in the offspring of a patient with the disease, however, although it is not a genetically transmitted disease [10,11]. In Senegal, a case of PR in four part of an inflammatory arthritis family [12]. Electrocardiographic abnormalities during the observed RA are different. In our study, they are essentially dominated by left ventricular hypertrophy (46.57%), where nearly one in two patients presented this anomaly.

The fact is that just as the left atrial hypertrophy, the left ventricular hypertrophy were observed especially after the after the age of 50 years. The explanation could be related to the natural history of arthritis which is considered our day as a cardiovascular risk factor [4] but mainly from the combination of other comorbidities including diabetes, hypertension and age [13]. The disorder association of the minor conduction (1st degree AV block) is rarely encountered in our study, as pointed out by Goulenok [9]. Abnormalities PQ segment (offset) found in 10 patients (13.70%) could be related to the inflammation of the pericardium induced by RA. Myocardial hyperexcitability is found in our patients in the form of premature beat is related to disease

	n	Percentage
Age(years): Average ± SD	44,17 ± 14,43	
Male	8	10,96
Female	65	84,04
Sex ratio : M/F	8/65	0,12
Hypertension	15	20,55
Diabetes	4	5,48
Dyslipidemia	2	2,74
smoking	5	6,8

Table 1: Demographic characteristics and risk factors for Rheumatoid Arthritis.

Characteristics of rheumatoid arthritis	n=73
Mean disease duration (year) ± SD	5,93 ± 4,78
Nodule(%)	3 (4,11%)
DAS 28 (mean score)	5,5
FR(UI/ml) : % (taux moyen)	76,4 (88,1)
Ac anti-CCP(UI/ml): (taux moyen)	52,05 (205,95)
PRC(mg/l) : moyenne	41,32
ESR(mm/first hour) : mean	38,96 ± 23
Family history of rheumatoid arthritis: n(%)	26 (355,60%)

Table 2: Characteristics of Rheumatoid Arthritis.

Parameters ECG	n=73
Average heart rate ± SD	82,80 ± 16,22
PR interval (ms) mean ± SD	150,50 ± 20,82
QRS duration (ms)	83,00 ± 15,00
QT Interval (ms)	40,32 ± 3,66
Anomaly of heart's axis	15(20,54%)
Presence of atrial premature beat	2 (2,74%)
Presence of ventricular premature	6 (8,45%)
AVB : Atrioventricular block	
I	2(2,74%)
II	0
III	0
CLBBB ou ILBBB	2 (2,75%)
CRBBB ou IRBBB	3 (4,11%)
myocardicischemia*	27 (36,98%)

Note: AVB: atrioventricular block type I, II, III; CLBBB: Complete left bundle branch block.
ILBBB: Incomplete left bundle branch block; CRBBB: Complete right bundle branch block; IRBBB: Incomplete right bundle branch block; *signs compatible with myocardial ischemia (presence of a Q wave necrosis, T wave changes or ST segment).

Table 3: Main Electrocardiopgraphic abnormalities.

activity imposed by inflammation. Wislowska [14] showed that the cardiovascular risk is all the more important that the inflammatory balance is disturbed. Similarly Seferovic [15], in a study of arrhythmias and conduction disorders in rheumatic autoimmune diseases origins, noted that the presence of these abnormalities were more frequent in patients with active RA. Abnormalities intraventricular conduction was 6.86%. Villeco [16] in the series, found a different result with a high frequency of branch block particular rights (35%). In our study a BBD association and rheumatoid nodule was more met as described by Lutalo Zimbabwe [17]. This type of anomaly is a common phenomenon in rheumatoid arthritis and may be due to infiltration of the conduction tissue induced by the inflammatory process.

The average length of measured and calculated QT intervals were respectively 388 and 403 ms ± 27 ms ± 36 ms. Goulenok et al. [8] in their series, found themselves an average duration of the QT interval calculated from 367 ± 26 ms, lower than in our study. The calculated QT interval was normal in 71.23% of cases in our study. The prevalence of QTc interval was 28.77%. This could among others be explained by the effect of antimalarials on the duration of the QT interval abnormalities most frequently found depolarization, were those of the negative T wave (35.61%), different from that observed by Barry (14.3%) [18].

In the French study on the value of routine electrocardiography in the detection of cardiac involvement in rheumatoid arthritis, abnormalities most frequently found repolarization were also negative T waves (21%) [9].

Conclusion

This study highlights the need for systematic electrocardiogram in patients with rheumatoid arthritis, even in the early stages of the disease when cardiovascular involvement is clinically silent because electrocardiographic abnormalities are real and should alarm the physician and lead to the initiation of appropriate therapy that may help reduce the incidence of cardiovascular death in RA patients. However, considering the small number of cases enrolled in this study, further work is necessary to confirm our data.

Conflict of Interest

The author did not report a conflict of interest in relation to this article.

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