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Cardiac Diseases During Systemic Inflammatory Diseases in the Internal Medicine and Medical Oncology Department of NTHC-HKM of Cotonou

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Abstract: Systemic inflammatory diseases are characterized by multivisceral involvement at some point in their evolution. This involvement can concern almost all organs, including the heart. Each systemic condition has a unique cardiac expression. The target of this study is to determine the frequency of cardiac involvement in systemic inflammatory diseases. This study is a cross-sectional, descriptive, and analytical study that was conducted within 07 months. The aim was to screen 23 patients followed for systemic inflammatory diseases for cardiac involvement. The mean age was 44 (±12) years old with a minimum of 24 and a maximum 64 years. Most of patients were women with a sex ratio (M/F) of 0.09. An echocardiographic abnormality was found in 26.1% of patients and 73.1% had an ECG abnormality. They included left atrial hypertrophy (43.4%), left ventricular hypertrophy (30.4%), right axial deviation (26.1%), low voltage (21.7%), right atrial hypertrophy (8.6%), S1Q3 appearance (8, 6%), pulmonary hypertension (8.6%), repolarization disorders (8.6%), sinus tachycardia (8.6%), middle tricuspid insufficiency (4.3%), middle pulmonary insufficiency (4.3%), and pericarditis (4.3%). Patients with systemic inflammatory diseases had cardiac disorders with rare clinical manifestations but with an incidental discovery either on ECG or on cardiac echodoppler. Hence, a systematic cardiac exploration in these patients was essential.

Keywords: Systemic Inflammatory Disease, Heart Disease, Cotonou

1. Introduction

Systemic inflammatory diseases (SIDs) are rare and difficult to diagnose. Among these diseases there are: rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), scleroderma (SSc), mixed connective tissue disease, Sjogren's syndrome, inflammatory myopathies, Behcet's disease, and sarcoidosis. Cardiac involvement, which is frequent in these diseases, is sometimes a diagnostic and often a prognostic element [1, 2]. Each systemic disease has a somewhat specific cardiac expression. In lupus, the pericardium and endocardium are most often affected, whereas the antiphospholipid syndrome mainly affects the valves [3]. In scleroderma, the pericardium and myocardium are predominantly affected [4]. Dermatopolymyositis and polymyositis are

mainly complicated by rhythm and conduction disorders. Myocardial involvement is a serious factor in periarteritis nodosa and Churg and Strauss vasculitis [5]. In Sharp's syndrome, pericardial involvement is predominant. Atrophying polychondritis is characterized by valvular lesions, whereas polyangiitis granulomatosis affects the coronary arteries and the pericardium. Gougerot-Sjögren's syndrome has little cardiac involvement [1].

In Africa, few studies have been devoted to cardiac manifestations during non-organ specific inflammatory diseases. The interest of this study could be to diagnose early cardiac pathologies during these diseases. The objective of this work was therefore to detect cardiac damage during systemic inflammatory diseases in patients followed in the internal medicine department of the CNHU-HKM of Cotonou.

2. Methods

This work is a cross-sectional, descriptive, and analytical study that was conducted from March 30 to October 30, 2018, i.e., 07 months, and involved patients followed in the internal medicine department of the CNHU-HKM of Cotonou for systemic inflammatory diseases and who gave their informed consent. The patients were either hospitalized or followed as outpatients.

Patients with poor echogenicity were excluded from this study. An exhaustive recruitment was performed of all patients seen in the study period who met the inclusion criteria.

The collection technique consisted in a selection of patients meeting the inclusion criteria with the help of the hospitalization register and the consultation files of the internal medicine department.

We then proceeded with the analysis of the files of the patients selected to fill in the survey form. The analysis consisted in collecting socio-demographic data, history, and data related to the inflammatory disease. Patients were then called by telephone for a physical examination and systematically scheduled for a cardiac echodoppler and electrocardiogram (ECG) examination. Each patient was first interviewed to update sociodemographic data, history, and clinical data.

Then the clinical examination was performed with the taking of blood pressure, the calculation of the BMI from weight and height and finally the research of the cardiovascular clinical signs.

Patients underwent clinical, electrocardiographic (ECG), and cardiac echocardiography (Doppler) testing for cardiovascular disease.

The interpretation of the echocardiographic images was done according to the recommendations of the American Society of Echocardiography by the same operator, who is a cardiologist with a degree in echocardiography and 07 years of experience. The echographic parameters studied were: right ventricular dimensions, LV systolic and diastolic function, IVS, pulmonary artery, left ventricle, search for tricuspid insufficiency, pulmonary insufficiency, systolic pulmonary artery pressure, and pericardium.

Data entry and analysis were carried out using SPSS (Statistical Package of Social Science) 16.0 software. A significance level of 5% was used and the results were expressed as mean, standard deviation, frequency, and percentage. The comparison between the proportions was analyzed using the Chi-square test with simulated p-value because of the small frequencies in the current work. The graphs and tables were prepared using Microsoft Word and Microsoft Excel 2010.

3. Results

3.1. Frequency

During the period from March 30 to October 30, 2018, i.e. 07 months, 699 patients had consulted the internal medicine department CNHU-HKM of Cotonou. There were 23 patients included in this study, i.e. a frequency of 3.3%.

3.2. Socio-demographic Characteristics

The most represented age group was 55-64 years at 26.1% (Figure 1) with an average age of 44 years (± 12) and extremes of 24 and 64 years. Females predominated at 91.3% (21 cases) with a sex ratio (male/female) of 0.09.

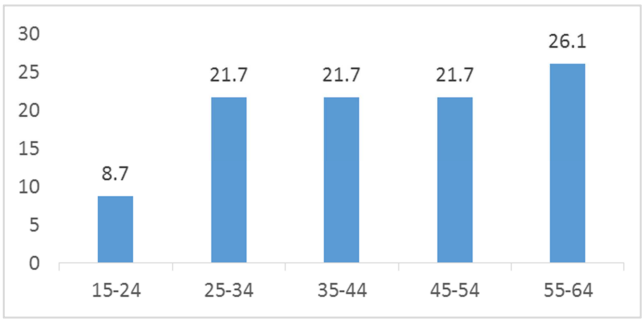
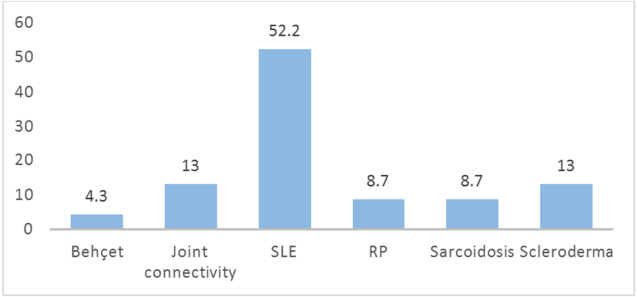


Figure 1. *Distribution of patients by age group.*

3.3. Profile of Systemic Inflammatory Diseases

Systemic lupus erythematosus (SLE) was the most represented disease (52.2%).



RP: Rheumatoid Polyarthritis

Figure 2. *Distribution of patients per systemic inflammatory disease.*

3.4. Blood Pressure

AH was found in one of the 2 patients with sarcoidosis (50%), whereas it represented 1/3 of those with scleroderma. There was no statistically significant relationship (Chi2=14.4; p=0.4).

Table 1. *Distribution of Patients by SIDs and Blood Pressure.*

	Normal (%)	HBP (%)	Total (%)
Behçet	1 (100)	0 (0)	1
SLE	10 (83.4)	2 (16.6)	12
RP	2 (100)	0 (0)	2
Joint connectivity	2 (66.7)	0 (0)	3
Sarcoidosis	1 (50)	1 (50)	2
Scleroderma	2 (66.7)	1 (33.3)	3

3.5. Appearance on Cardiac Echodoppler

We found that 6 (26.1%) of patients had at least one ultrasound abnormality. The basal end-diastolic diameter was increased in 17.4% (4 cases) of patients. It was 100% for Behçet's disease, 50% for sarcoidosis, 33% for joint connectivitis, 8.3% for systemic lupus, and 0% for rheumatoid arthritis and scleroderma. There was no statistically significant relationship (Chi2=13.1; p=0.06).

The only patient with Behçet's disease had a 100% dilated basal mid-diastolic diameter, followed, respectively by sarcoidosis at 50% (1 case), joint connectivites at 33.3% (1 case) and SLE at 8.3% (1 case); on the other hand, the 2 patients with RA had no abnormality. There was no statistically significant relationship (Chi2=13.1; p=0.06).

Right medioventricular diameter was increased in 17.4% (4 cases). Right atrial area was increased in 8.7% (2 cases) of respondents. Right ventricular systolic function was normal in all our patients. Septal curvature was normal in all our patients. Pulmonary artery trunk diameter was increased in 66.7% of cases of joint connectivity, in 50% of cases of sarcoidosis, 50% of cases of RA, and finally in 8.3% during SLE. There was no statistically significant relationship (Chi2=6.7; p=0.7).

Inferior vena cava (IVC) diameter was increased only in one patient with SLE with no statistically significant relationship (Chi2=2; p=0.9). The ratio of diastolic DVD to diastolic LV was elevated in 26.6% of our patients (6 cases). Elevated PAPS was found in 8.7% (2 cases).

Table 2. *Distribution of patients according to echographic parameters of the left ventricle.*

	Normal (%)	High (%)
FE VG Simpson biplan	22 (95.7)	1 (4.3)
LV filling pressure	22 (95.7)	1 (4.3)
E/A	23 (100)	0 (0)
Diastolic DVD/DVG	17 (73.9)	6 (26.1)
PAPS	21 (91.3)	2 (8.7)

Diastolic LVSD was normal in all of respondents. The left atrial area was dilated in 50% of sarcoidosis patients and in 8.3% of patients with SLE. There was no statistically significant relationship (Chi2=5.1; p=0.3).

We found 13 cases of tricuspidial insufficiency, i.e. 56.5% of patients, including one (4.3%) of moderate insufficiency. Patients also had pulmonary insufficiency in 8 cases (34.8%) and in all of them, small insufficiency.

Table 3. *Distribution of patients according to tricuspid and pulmonary insufficiency.*

	Small (%)	Moderate (%)	No (%)	Total (%)
Tricuspid insufficiency	12 (52.2)	1 (4.3)	10 (43.5)	23
Pulmonary insufficiency	8 (34.8)	0 (0)	15 (65.2)	23

The only case of pericardial effusion (1 case) occurred in a patient with scleroderma (33.3%) without a statistically significant relationship (Chi2=17.9; p=0.06).

3.6. ECG Abnormality

The ECG showed at least one abnormality in 17 (73.9%) of our patients. The most common abnormality was left atrial hypertrophy in 43.5% (10 cases). Patients had an inferior and anteroseptal repolarization disorder in equal parts at 4.3%. Only 8.7% (2 cases) of patients had a tachycardia-type rhythm disorder.

Table 4. *Distribution of Patients by All ECG Abnormalities.*

	n (%)
Right axial deviation	6 (26.1)
S1Q3 appearance	2 (43.5)
Right bundle branch block	0 (0)
Low voltage	5 (21.7)
Right atrial hypertrophy	2 (8.7)
Left atrial hypertrophy	10 (43.5)
Right ventricular hypertrophy	0 (0)
Left ventricular hypertrophy	7 (30.4)

An ECG abnormality was found in all pathologies, ranging from 50 to 100% depending on the case (Table 4). There was no statistically significant relationship (Chi2=3.1; p=0.6).

Table 5. *Distribution of Patients by SIDs and ECG Status.*

	Anormal (%)	Normal	Total (%)
Behçet	1 (100)	0 (0)	1
LES	8 (66.7)	4 (33,3)	12
PR	1 (50)	1 (50)	2
Joint connectivity	3 (100)	0 (0)	3
Sarcoidosis	2 (100)	0 (0)	2
Sclerodermia	2 (66.70)	1 (33.30)	3

4. Discussion

This study focused on cardiac involvement during systemic inflammatory diseases in the Department of Internal Medicine.

Among the 699 patients registered during the study period, 23 (3.3%) patients were recruited selection criteria. Systemic inflammatory diseases are little known and often difficult to diagnose in sub-Saharan Africa. In a study conducted in

Cotonou in 2017, 91.4% of general practitioners were unaware of systemic lupus [6]. In this series, the mean age was 44 + 12 years with extremes from 24 to 64 years. This mean age was comparable to that found by Kane et al [7] in Dakar (43.76 years). A clear female predominance with a male to female sex ratio of 0.09 was found. This female predominance was also found by several other authors [5-9].

Blood pressure was elevated in 21.8% of patients. SLE was the most common pathology (52.2%). Agbodande in Benin also found a predominance of systemic lupus [10]. On the other hand, Kane in Senegal found a predominance of rheumatoid arthritis [7]. In this study population, the basal end-diastolic diameter was increased in 17.4% of the cases and the right mid-ventricular diameter in 17.4% of the patients. This could be explained by the fact that the majority of patients were routinely on corticosteroid therapy and this could bias the results. In 26.1% of the patients, dilatation of the pulmonary artery trunk was recorded, distributed as follows: 66.7% in joint connectivities, 50% in RA, 50% in sarcoidosis, 33.3% in scleroderma and 8.3% in SLE. In view of this dilatation, one could hypothesize that there is a risk of PAH occurring in the years to come. Therefore, the ideal would be to monitor PAPS to look for PAH in all black African subjects with systemic inflammatory disease. Tricuspid insufficiency was found in 56.5% of patients in this cohort of which 4.3% were moderate and 52.2% were small.

Pulmonary insufficiency was found in 34.8% of cases. This pulmonary insufficiency was small. In this cohort, pericardial effusion was recorded in only one (4.3%) patient. Pericarditis represents the most common cardiac involvement in rheumatoid arthritis. This result is superior to that of Kapkovi et al [11] in Togo who had noted it in 1.1% of patients and is inferior to that of Ngaïdé et al [8] in Senegal who had found 38% of pericarditis during lupus pathology. This could be explained by the fact that the majority of patients were already under specific treatment, which would have already improved the pericardial effusion.

Sarcoidosis was found in 4.3% of patients. Paule et al [12] found, during sarcoidosis, left cardiac disorders such as disturbance of systolic function, segmental kinetics of the left ventricle, diastolic function, valvulopathy, abnormal echogenicity of the myocardium or pericardial derailment. In the literature, PAH is a classic complication of sarcoidosis. It occurs at a terminal stage of the respiratory disease and is attributed to the destruction of the distal capillary bed by the fibrotic process and/or chronic hypoxia [13].

PAH is a severe complication of systemic scleroderma, its actual prevalence is difficult to establish because the methods and diagnostic criteria vary according to the series. Depending on the study, it is present in 30 to 60% of patients [14, 15].

In this cohort, the different electrocardiographic disturbances recorded were:

a. 2 cases of atrial or right atrial hypertrophy (8.7%).
b. 2 cases of S1Q3 aspect (8.7%).
c. 6 cases of right axial deviation (26.1%).
d. 5 cases of low voltage (21.7%).
e. 10 cases of left atrial hypertrophy (43.5%).
f. 7 cases of left ventricular hypertrophy (30.4%).

The electrical abnormalities found were superior to those of B'NYAT et al [16] in Benin who found AGH and LVH at 17.3% each, subepicardial ischemia, lateral and inferior subendocardial lesions and right bundle branch block respectively at 19% each.

The cross-tabulation of systemic inflammatory diseases with different cardiac abnormalities did not find any statistically significant association, certainly because of the small size of our sample.

5. Conclusion

Patients with systemic inflammatory diseases had cardiac disorders with rare clinical manifestations but of incidental discovery either on ECG or cardiac echodoppler. An electrocardiographic abnormality was found in all the pathologies, ranging from 50 to 100% depending on the case. In 26.1%, the patients had at least one echographic abnormality. Hence the importance of a systematic cardiac exploration in these patients. The small size of this sample did not allow a contributory analytical study.

Conflicts of Interest

The authors declare that they have no competing interests.

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