

Heart Failure with Preserved Ejection Fraction: A Report about 64 Cases Followed at the Heart Institute of Abidjan

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How to cite this paper: Traore, F., Bamba, K.D., Koffi, F., Ngoran, Y.N.K., Mottoh, M.P., Esaie, S. and Coulibaly, I. (2017) Heart Failure with Preserved Ejection Fraction: A Report about 64 Cases Followed at the Heart Institute of Abidjan. *World Journal of Cardiovascular Diseases*, 7, 285-291. <https://doi.org/10.4236/wjcd.2017.79026>

Received: August 9, 2017

Accepted: September 19, 2017

Published: September 22, 2017

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Abstract

Objective: To describe the epidemiological and etiological features of heart failure with preserved ejection fraction in our context. **Materials and Methods:** This is a retrospective study that was carried out over a 12-month period, from 1 January 2015 to 31 December 2015, in the hospitalization department of the Heart Institute of Abidjan. It was about patients hospitalized for heart failure who had received a dose of NT-proBNP and who had had an electrocardiogram, and a Doppler echocardiography. Heart failure with preserved ejection fraction (HFPEF) was defined from the symptoms and signs of heart failure, the level of NT-proBNP and from echocardiography data based on the left ventricular ejection fraction (LVEF) > 50%, the dilatation of the left atrium. The diastolic dysfunction of the left ventricle was assessed by the ratio E/E' > 13. We defined as heart failure with decreased ejection fraction (HFDEF) symptoms and signs of heart failure and left ventricular dysfunction LVEF < 40%. A computer file was completed. It included epidemiological and etiological data. **Results:** The study involved sixty-four patients with heart failure with preserved ejection fraction out of 257 patients with heart failure that is a prevalence of 25%. The mean age was 57.3 ± 16 years. There was a male predominance that is 52% of cases. Congestive heart failure was predominant in 67%. NT-proBNP levels were 365 pg/ml on average. The average length of stay was 5.5 ± 3.1 . Intra-hospital deaths were 4.6%. The etiologies are dominated by high blood pressure in 85.9%, followed by obesity in 28.1%, then by ischemic heart disease in 4.6%. There were no diabetic patients in this group. **Conclusion:** Heart failure with preserved ejection fraction is characterized in our regions by its occurrence in young male subjects. Congestive heart failure prevailed. The dominant etiology was high blood pressure.

Keywords

Epidemiology, Etiology, Heart Failure

1. Introduction

The concept of heart failure with preserved ejection fraction is relatively new. Historically, the diagnosis of heart failure was based primarily on clinical criteria, and patients described in the studies were likely to be a mixture of heart failure with altered ejection fraction and heart failure with preserved ejection fraction. The generalization of echocardiography in the 1980s and the need for standardization of diagnosis for inclusion in large therapeutic trials led to the exclusion from studies patients with preserved left ventricular ejection fraction. Studies have systematically focused on this population over the past 15 years, with a number of publications indexed in PubMed, from 13 in 2001 to 336 in 2014.

The profile of heart failure with preserved ejection fraction is known woman, in atrial fibrillation [1] [2] [3] [4]. However, in Africa, little work has been done on this type of heart failure and we do not have local data for this clinical entity. It is therefore appropriate to describe the epidemiological and etiological features of this condition in our context.

2. Materials and Methods

It is a comparative and descriptive retrospective study of records of patients hospitalized for heart failure in the medical department of the Heart Institute of Abidjan over a 12 month-period, from 1 January 2015 to 31 December 2015.

Heart failure with preserved ejection fraction (HFPEF) has been defined by the presence of symptoms and/or signs of heart failure (HF), elevation of NT proBNP, demonstration of left ventricular ejection fraction (LVEF) > 50% at the Simpson Biplane, dilation of the left atrium assessed at the Simpson biplane (4 cavities or 2 cavities) when the volume of the left atrium is >32 ml/m², left ventricular hypertrophy (LVH) assessed by the left ventricular mass index (LVMI) and the Relative parietal thickness (RPT) of the left ventricle, values systematically given by the ultrasound system, threshold values 110 g/m² in man and 95 g/m² in women. Thus, left ventricular hypertrophy (LVH) is said to be concentric when LVMI is high and the relative parietal thickness (RPT) > 0.45. Left ventricular hypertrophy (LVH) is said eccentric when LVMI is high and relative parietal thickness (RPT) < 0.45. We refer to concentric remodeling when LVMI is normal and RPT > 0.45). Diastolic dysfunction was assessed by the ratio between the E wave at the pulsed Doppler of the mitral flow (synchronous with the protodiastolic rapid filling of the left ventricle) and the E' Wave at the tissue Doppler recording the spectral pulsed Doppler signal in the myocardial wall > (E/E' > 13).

Heart failure with altered ejection fraction was defined by the presence of symptoms and/or signs of HF and LVEF <40%.

A computerized file was filled and the parameters studied were: epidemiological (age, gender, length of hospital stay, intra-hospital death), clinical (type of HF, NT-proBNP level and etiologies) and echocardiographic (size of left atrium (LA), LVH, E/E'13).

All patients with clinical, biological heart failure and with LVEF between 40 and 49% were not selected in our study.

The echocardiographic parameters were obtained using a VIVID 3 brand ultrasound system with a 2.5 MHZ adult probe.

LVEF was measured by Teicholz or Simpson biplane (4 cavities, 2 cavities). The measurement of LVEF by Teicholz was used in the absence of segmental kinetic disorder.

Heart failure with preserved ejection fraction and heart failure with altered ejection fraction accounted for 64 (25%)... and 193 (75%), respectively [5] [6] [7] [8] [9].

High blood pressure was accepted when systolic blood pressure (SBP) was ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg.

Dilated cardiomyopathy was accepted according to the following criteria: dilation of the left ventricle (LV), overall kinetic disorder, homogeneous.

Valvular heart disease was accepted when there was an organ involvement.

Ischemic cardiopathy was accepted in case of a history of myocardial infarction that had benefited from coronary angiography or not, segmental contractility disorder in echocardiography.

Obesity was defined from the body mass index with a BMI > 30 kg/m².

Diabetes was defined from fasting blood glucose with a level > 1.26 g/l and hbA1C > 7 .

All patients with clinical, biological heart failure with LVEF between 40% and 49% were not selected in our study.

The results are presented by standard averages and deviations or by percentages. Differences between patient groups according to LVEF were tested with the chi square test for categorical variables. The significance threshold was 0.05.

3. Results

The study involved Sixty-four patients with heart failure with preserved ejection fraction out of 257 patients with heart failure that is a prevalence of 25%. The mean age was 57.3 ± 16 years. There was a male predominance that is 52% of cases. Congestive heart failure was predominant in 67%. NT-proBNP levels were 365 pg/ml on average. The average length of stay was 5.5 ± 3.1 . Intra-hospital deaths were 4.6% (**Table 1**). Echocardiographic features of HFPEF were left ventricular ejection fraction ($52.6\% \pm 8\%$), left ventricular mass (114.5 ± 31.3 g/m²), left atrial volume (45 ± 3.5 ml/m²), E/E' (19 ± 4.2) (**Table 2**). The etiologies are dominated by high blood pressure in 85.9%; Followed by obesity in

28.1% then by ischemic heart disease in 4.6%. There were no diabetic patients in this group (**Table 3**).

Table 1. Epidemiological and clinical features of heart failures with preserved ejection fraction (HFPEF) and heart failures with altered ejection fraction (HFAEF).

	IC-FEP (64)	IC-FEA (193)
Age	57.3 ± 16	53.2 ± 16.7
Sexe		
M	33	98
F	31	95
Ancienneté de l'IC	17	77
Type d'IC		
OAP	3	7
ICG	12	12
ICD	6	12
ICGLOBALE	43	164
PAS	144 ± 24.3	119 ± 20.6
PAD	100 ± 16.4	84 ± 18.7
DMS	5.5 ± 3.1	15.6 ± 9.2
DECES INTRAHOSP	3	16

Table 2. Echocardiographic features of HFPEF.

	Mensurations (moyenne)
DTDVG	49.3 ± 1.51
DTSVG	31.04 ± 1.54
FEVG	52.6 ± 8
MVG	114.5 ± 31.3
VOG	45.5 ± 3.53
E/E'	19.4 ± 4.2

Table 3. Etiologic features of HFPEF.

	IC-FEP	IC-FEA	P
HTA	85.9	2	<0.01
OBESITE	28.1	1.9	<0.01
C ISCHEMI	4.6	13.4	>0.05
CMD	0	74	>0.05
VALVULOP	0	9	<0.05
DIABET	0	0	
AUTRES	0	2	

4. Discussion

Heart failure is an increasingly common condition in our context. In our work, 25% of patients hospitalized for heart failure had heart failure with preserved ejection fraction (HFPEF). This prevalence is close to that found in the American studies, 24% to 55% [10] [11] and in African studies in particular that of Mouhamed Chérif in SENEGAL which found 28% and that of Addeji in NIGERIA which found 39.5% [12] [13]. This prevalence may be higher in our context because some parameters of diastolic dysfunction such as the E/E' ratio between 8 and 13 had not been assessed, which would mean an increase in filling pressures when the left atrial volume is >40 ml/m² and/or associated with the difference between the pulsed Doppler of the pulmonary venous flow and the pulsed Doppler of the mitral flow > 30 ms and/or associated with systolic pulmonary arterial pressure (SPAP) > 35 mmhg.

The average age of patients with heart failure with preserved ejection fraction (HFPEF) was 53 ± 16 years. This is super imposable to that found by Mouhamed Chérif in Senegal $65.7\% \pm 9.1\%$ and Addeji in NIGERIA 52.3 ± 16 [12] [13]. Indeed, the mean age represents the average age of patients with heart failure in Africa which is proved by a study in Togo that found an average age of 52 ± 16.7 years and a Djiboutian study that found 55 ± 12 years [14] [15]. However, this average age is significantly lower than that found In the American and European series. In these studies, the average age was 79 ± 7.6 years and 71 ± 12 years respectively in the UNITED STATES and EUROPE [16] [17]. This difference could be related to life expectancy that is lower in our context but especially to the inaccessibility of the majority of the population to health structures. These cardiovascular risk factors are dominated by high blood pressure. In our study, high blood pressure is the most common etiology in patients with HFPEF that is 85.6%. Masoudi in the United States and Lenzen in Europe found similar proportions 65% and 59% respectively in their studies [16] [17]. In AFRICA, in particular in SENEGAL and NIGERIA, the studies found larger proportions of 96.1% and 82.9% respectively [12] [13]. This could be explained by the high prevalence of high blood pressure in our context and also the pathophysiological consequences of this disease on the left ventricular diastole. These consequences are disorders of the left ventricular relaxation and the ventricular and arterial rigidity. Obesity was found in patients with HFPEF in 28.1% in our study. This has been found in several studies. This may be explained by the fact that obesity is frequently associated with high blood pressure and thus with left ventricular hypertrophy, which is the cause of abnormal relaxation or even diastolic dysfunction of the left ventricle [18] [19].

Ischemic heart disease was found in 4.6% of patients with HFPEF in our study. Our figures are much lower than those of the literature. A Chinese study found 29.3% [20] and an American study found 21% [16]. This could be explained by the inadequacy of the technical platform and the medical staff for the systematic performance of coronary angiography.

We did not find diabetics in our study, whereas in the work of Nurcan [21] and Mouhamed Cherif [12], the prevalence of diabetes was 42.3% and 45%, respectively. And in the study of Tribouilly, diabetes was a poor prognostic factor in patients with HFPEF. Its presence was associated with a 5-year survival of 32% and an increase in mortality of 60% compared with the group of non-diabetic patients [22].

5. Limitations of the Study

The limitation of our study is mainly the unavailability of certain parameters of echocardiographies, namely the duration of the A wave at the pulsed Doppler of the pulmonary venous flow and the duration of the A wave at the pulsed Doppler of the mitral flow because they have not been set by our ultrasound system and because of the lack of experienced echocardiographers.

The current definition of heart failure with preserved ejection fraction (HFPEF) has limited the number of patients.

6. Conclusion

Heart failure with preserved ejection fraction is characterized in our regions by its frequent occurrence in the congestive mode, in young hypertensive men. Complications of high blood pressure occur early and severe in the African black subject. We will insist on prevention which must be based on early screening and efficient management of this main cardiovascular risk factor in Africa.

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