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Focale: Study of systolic and diastolic heart failure in a French elderly population

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Abstract

Context: The epidemic of heart failure (HF) in France has not been fully investigated and data on both the systolic and diastolic forms are limited.
Objectives: To determine the prevalence, aetiology and treatments of both forms in French patients over 65 with HF (NYHA grade II–IV).
Participants: Cross-sectional study of 446 patients with HF recruited by 273 randomly selected cardiologists in France, with echocardiography and ECG available for central reading.
Main measurements: Prevalence of diastolic (DHF) and systolic (SHF) HF using the left ventricular ejection fraction (LVEF).
Results: DHF, with a mean LVEF of 57.6±8.0%, was reported for 245 (54.9%) patients and SHF, with a mean LVEF of 33.33±8.0% was reported for 201 (45.1%) patients. Men were more prone to suffer SHF than DHF whereas for women the reverse was true. As compared to SHF, DHF endsystolic and enddiastolic volumes were smaller, the thickness/radius ratio was greater, with a longer E-wave deceleration time and a shorter peak filling rate. Aetiology and treatments were similar in both types of HF, except for ACE inhibitors and aldosterone antagonists, which were more frequently prescribed in SHF.
Conclusion: This observational study provides further knowledge of SHF and DHF in outpatients.

Keywords: Cross-sectional study; Heart failure; Prevalence; Diastolic heart failure

1. Introduction

Despite substantial progress in clinical understanding and treatment regimen, heart failure (HF) remains the single most important cardiovascular public-health burden for contemporary medicine [1]. Of importance, the incidence and the prevalence of HF have not decreased in more than 2 decades [2] and an ageing population as well as progress in cardiovascular disease treatments favours an increase of these figures. Survival after onset of HF has increased overall, with less improvement in women and elderly persons [3]. In France, HF affects 500,000 persons, and is responsible for 30,000 deaths per year [4]. It also accounts for 1% of health expenses. These data are global, based on symptomatic patients without distinction between diastolic and systolic heart failure. About one-third of all patients presenting with congestive heart failure have a normal left ventricular function [5]. Diastolic heart failure is the paradoxical condition where the patient has the symptoms and signs of HF with preserved left ventricular ejection fraction (LVEF) and

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Table 1
Population characteristics

		DHF (N=245)	SHF (N=201)	All (N=446)
Sex	n	245	201	446
	Male	142 (58.0%)	136 (67.7%)	278 (62.3%)
	Female	103 (42.0%)	65 (32.3%)	168 (37.7%)
	Test	Chi^2 p=0.035		
Age (years)	n	245	200	445
	Mean (SD)	76.0 (7.9)	75.4 (7.5)	75.7 (7.7)
	Test	Wilcoxon p=0.340		
HF duration (years)	n	239	198	437
	Mean (SD)	3.4 (4.3)	4.5 (5.6)	3.9 (4.9)
	Test	Wilcoxon p=0.108		
NYHA stage	n	244	198	442
	Moderate (stage II)	134 (54.9%)	87 (43.9%)	221 (50.0%)
	Severe (stage III–IV)	110 (45.1%)	111 (56.1%)	221 (50.0%)
	Test	Chi^2 p=0.022		
SBP (mm Hg)	n	243	201	444
	Mean (SD)	133.2 (20.8)	125.2 (20.3)	129.6 (20.9)
	Test	Wilcoxon p<0.001		
DBP (mm Hg)	n	242	199	441
	Mean (SD)	76.7 (11.1)	74.1 (11.0)	75.5 (11.1)
	Test	Wilcoxon p=0.021		

DHF, Diastolic heart failure; SHF, systolic heart failure.

diastolic dysfunction [5]. Its mortality is 8–9% per year, which is about the half of systolic heart failure; however its morbidity, hospitalisation rates and health-care costs per patient are very similar to systolic heart failure [6]. Distinction between DHF and SHF are recommended [3], but difficult to realise in practice [7], especially in elderly patients for whom less tests are performed. Non-invasive methods are ideal to investigate heart failure, but not systematically performed [8].

The main objective of this observatory was to obtain a precise estimation of diastolic (DHF) and systolic (SHF) heart failure prevalence in patients aged over 65 years, diagnosed with a heart failure and seen by a liberal cardiologist. The aetiology and treatment description of both forms were secondary objectives.

2. Patients and methods

This was a population-based transverse, observational study. Five hundred private practice cardiologists, equipped with an integrated-recorder Doppler echocardiograph, were selected through the French College of Cardiology directory, using a randomisation scheme with equal probabilities without throw-in and geographical stratification. The cardiologists were to include, within a 4-month recruitment period, the two first patients for whom an echo-Doppler and an ECG were to be performed, who met the following criteria: at least 65 years old, with a NYHA stage II to IV heart failure, consenting to participate in the study, good quality echo-Doppler and ECG available for central reading, no severe concomitant disease. A total of 1000 patients were foreseen in the observatory, as a sample size of 500 patients was estimated necessary to obtain a precise estimation of SHF and DHF prevalence. The echocardiography, Doppler and ECG techniques were standardised, to allow for comparable central reading by a committee of specialists.

Besides the echocardiography, Doppler and ECG data, assessed by central reading, data concerning the medical history, risk factors assessments, on-going treatments and treatment modifications were collected. The systolic or diastolic form of heart failure was determined after central reading of the echocardiogram. All patients for whom a case report form, an ECG and an LVEF were available were included in the study. The rate of patients presenting with SHF or DHF was determined according to the left ventricle ejection fraction (LVEF): SHF if LVEF was <45%, DHF otherwise. All data were described and compared between the two forms of HF. Continuous variables were expressed as means ± SD, qualitative variables as the number and percent of subjects in each class. Qualitative variables were compared using the chi-square test or the Fisher's exact test, quantitative variable using the Student's t-test or the Wilcoxon according to the distribution characteristics. A p value ≤0.05 was considered significant.

3. Results

A total of 531 patients were included by 273 cardiologists out of the 477 who consented to participate to the study. The case report form and the LVEF were available for 446 patients, who constitute the basis of the study.

Diastolic heart failure, with an LVEF of 57.6 ± 8.0%, was reported for 245 patients, leading to a prevalence of 54.9% (95% confidence intervals [CI]: 50.3%–59.5%). With 201 patients having a mean LVEF of 33.3 ± 8.0%, the prevalence of SHF was of 45.1% (95%CI: 40.5%–49.7%).

Baseline characteristics of the patients are presented in Table 1. Male patients were globally more numerous than female; the prevalence of SHF was significantly higher in male than in female, whereas male and female patients were

Table 2
Previous cardiac history and risk factors

	DHF (N=245)	SHF (N=201)	All (N=446)
At least one risk factor	225 (91.8%)	180 (89.6%)	405 (90.8%)
	Chi^2 p=0.406		
Diabetes	60 (24.6%)	53 (26.4%)	113 (25.4%)
	Chi^2 p=0.668		
Hypertension	150 (61.2%)	113 (56.2%)	263 (59.0%)
	Chi^2 p=0.285		
Coronary disease	115 (47.1%)	95 (47.7%)	210 (47.4%)
	Chi^2 p=0.899		
Smoking	6 (2.4%)	5 (2.5%)	11 (2.5%)
	Fisher's exact test p=1.000		

DHF, Diastolic heart failure; SHF, systolic heart failure.