

The New York Heart Failure registry

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The Heart Failure Club of New York was established over 14 years ago to serve as a forum for interaction among heart failure (HF) physicians and nurses in the Metropolitan New York area. The club has met annually to address areas of interest selected by the participants. Our consortium has also served as the center of collaborative research studies with the largest project thus far being a prospective multicenter registry. This study characterized the clinical profile, hospital course, and treatment of patients hospitalized for congestive HF with a normal left ventricular (LV) ejection fraction (EF) and was published in the *J Am Coll Cardiol*, 2004; 43:1432-1438.

The cause of HF in these patients is thought to be related to LV diastolic dysfunction. Therapeutic guidelines are available for the treatment of patients with low-EF HF, but no evidence-based guidelines have been developed for the management of patients with HF normal EF.

METHODS: Patients hospitalized for HF at 24 medical centers in the New York metropolitan area and found to have a LV EF of $\geq 50\%$ within seven days of admission were included in this registry. Patient demographics, signs and symptoms of HF, coexisting and exacerbating cardiovascular and medical conditions, treatment, laboratory tests, procedures, and hospital outcomes data were collected.

RESULTS: A total of 619 patients (mean age 71.7 ± 14.1 years, range 22 to 106 years) were enrolled. Four hundred forty-nine patients (72.5%) were women and 170 (27.5%) were men. Women were on average four years older than men: 72.8 ± 14.1 years versus 68.6 ± 13.8 years ($p < 0.001$). Before hospitalization, 75% of patients had chronic symptoms compatible with New York Heart Association functional class II or III, 14% of patients had chronic symptoms compatible with functional class I, and 11% had chronic symptoms with functional class IV.

Patients had multiple co-morbid conditions (Table). Hypertension was the most common with a mean duration of 14 years (median 10.5 years; interquartile range 7 to 20 years). The blood pressure (BP) upon presentation and prevalence of hypertension were similar in

women and men. The second most common co-morbid conditions were diabetes and obesity, with a similar prevalence in the total population (46%) and between women and men. Eighty-eight percent of diabetics were treated with oral hypoglycemic agents and/or insulin and 10% were treated with diet alone. Their mean hemoglobin A1C was $8.2 \pm 2.4\%$. Forty-three percent of patients had coronary artery disease. Atrial fibrillation was present in nearly one-quarter of patients.

Table Clinical Characteristics and Co-Morbid Conditions

	Total 619 (100%)	Women 449 (72.5%)	Men 170 (27.5%)
Age (yrs)*	71.7 ± 14.1	72.8 ± 14.1	68.6 ± 13.8
History of hypertension	78.2%	78.8%	76.3%
Systolic BP (mm Hg, on presentation)	159.7 ± 35.5	158.8 ± 34.3	162.2 ± 38.5
Diastolic BP (mm Hg, on presentation)	83.9 ± 20.4	82.9 ± 19.7	86.3 ± 22.1
Diabetes mellitus	45.9%	44.9%	48.5%
Coronary artery disease	43.1%	42.3%	45.1%
History of COPD or asthma	24.5%	25.1%	22.9%
Atrial fibrillation	23.4%	22.7%	25.3%
Atrial flutter	2.1%	1.3%	4.1%
Supraventricular tachycardia	0.8%	0.5%	1.8%
Hypothyroidism	9.7%	11.3%	5.1%
Hemoglobin (mg/dl)	11.8 ± 2.2	11.7 ± 2.0	12.2 ± 2.4
Glomerular filtration rate [†] (ml/min)	50.8 ± 28.5	50.1 ± 22.7 [†]	52.7 ± 22.8 [†]
Dialysis	4.5%	3.6%	7.1%
Body mass index (n = 509)	30.6 ± 8.8	30.8 ± 8.9	30.2 ± 8.3
Body mass index >30 (n = 509)	46.2%	46.9%	44.4%

Quantitative values are mean ± SD.

* Age was the only statistically significant difference between women and men ($p < 0.001$).

[†] Excluding patients on dialysis, n = 483.

Eighty-three percent of women and 81% of men had increased LV mass by echocardiogram with a similar median LV mass index: 66.9 versus 65.7 g/m^{2.7} (p = 0.92).

Symptomatic deterioration precipitating hospitalization was related to exacerbation or poor control of coexisting conditions in 51% of patients (primarily severe hypertension) and to new events in 2%.

Eighty-five percent of our patients had chronic overt symptoms of HF that antedated their hospitalization. Functional intolerance and moderate pulmonary hypertension most likely result from chronic elevation of LV filling pressures. The marginal status of our patients at baseline renders the identification of precipitating factors for hospitalization difficult, as these factors are likely to be modest in nature. The present experience is similar to that in patients with HF due to LV systolic dysfunction, where precipitating factors are often not identified but generally thought to be related to medical and dietary non-compliance .

Therapy. Despite conflicting views regarding the use of angiotensin-converting enzyme inhibitors (ACEI) in patients with diastolic HF, they were, after diuretics, the medications most often prescribed to our patients. The CHARM preserved trial is the only prospective trial to evaluate any therapy in this patient population. The investigators utilized candesartan, an Angiotensin II receptor blocker (ARB), and found a trend (statistically non-significant) towards reducing the combined endpoint of death and HF hospitalizations. (Yusuf S, Pfeffer MA, Swedberg K, et al. Effects of candesartan in patients with chronic heart failure and preserved left-ventricular ejection fraction: the CHARM preserved trial. *Lancet* 2003;362:777-81). Thus, current therapy for diastolic HF is a combination of diuretics to control volume and an agent to control BP. Whether the preferred agent should be an ACEI, an ARB, a beta blocker or a calcium channel blocker is unknown.

In summary, patients hospitalized in the New York metropolitan area for HF normal EF are preponderantly elderly women with a history of hypertension and increased LV mass. The chronic disability of these patients and the frequent inability to identify a factor precipitating hospitalization points to an absence of functional reserve and the need to develop aggressive treatment strategies.