

Systolic and Nonsystolic Heart Failure Equally Serious Threats

Per Hildebrandt, MD, DMSc

HEART FAILURE IS A COMMON DISEASE WITH INCREASING prevalence, accounting for an estimated 1.1 million hospitalizations annually in the United States.¹ Despite development of effective treatments, including β -blockers, angiotensin-converting enzyme inhibitors, spironolactone, defibrillators, and cardiac resynchronization, heart failure remains a serious disease and is associated with a poor prognosis.²

Clinical heart failure can occur with reduced systolic function, typically defined as a left ventricular ejection fraction (LVEF) of less than 40% and not more than 55% or with preserved LVEF (or nonsystolic heart failure). With modern imaging techniques, LVEF is relatively easy to measure but clinical heart failure is much more difficult to define precisely. This is an important issue because use of an imprecise definition of clinical heart failure may result in many patients with preserved LVEF being incorrectly diagnosed with heart failure.³ Although heart failure with preserved LVEF is generally considered to be primarily due to diastolic dysfunction, heart failure with reduced systolic function also can include a component of diastolic dysfunction.⁴

The term diastolic dysfunction implies clinically important impairment of the left ventricular filling. Classic descriptions of this disorder derive from invasive hemodynamic measures with high-fidelity catheters.^{4,5} A widely accepted noninvasive gold standard for assessing left ventricular diastolic function does not exist. Doppler echocardiography has emerged as a potentially valuable tool for identifying left ventricular diastolic dysfunction with a variety of measures and patterns described as markers of delayed myocardial relaxation and impaired filling. For example, in a community-based study, Redfield et al⁶ defined diastolic dysfunction according to velocities of blood flow across the mitral valve and pulmonary vein ostia during different phases of diastole. While these measures have been shown to have prognostic value,⁶ the absence of a widely accepted noninvasive gold standard has confused the discussions.

One problem is that the general perception of heart failure most often is based on the vast literature about heart

failure with reduced LVEF and about systolic dysfunction. In contrast, less is known about the prevalence, prognosis, and treatment of heart failure with preserved LVEF and of diastolic heart failure. Studies on the prevalence of heart failure with preserved LVEF report proportions ranging from 20% to more than 60%, primarily due to differences in the populations studied and the definition of preserved LVEF (ranging from $\geq 55\%$ to $\geq 40\%$). The data on prognosis also vary. For instance, in the Framingham study with a rather small cohort of patients with heart failure, the reported annual mortality rate was 8.7%; this rate is higher than that for persons without heart failure (3%-4%) but lower than that for patients with heart failure and reduced LVEF (18.9% per year).⁷

Unlike heart failure with reduced LVEF, there is not a database of large randomized trials supporting clear evidence-based therapeutic strategies. Most agree that patients with reduced LVEF should be candidates for angiotensin-converting enzyme inhibitors and β -blocker treatment but no such consensus exists for treatment of diastolic dysfunction among patients with preserved LVEF. At this point, perhaps the best one can argue is that angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers should be part of the treatment regimen for patients with heart failure and preserved LVEF,^{4,8} which is reasonable considering that the majority of these patients also have hypertension.⁸

The study by Bursi and colleagues⁹ in this issue of *JAMA* provides substantial new evidence about the prevalence and prognosis of heart failure with reduced and preserved LVEF and diastolic heart failure in the community. The authors used Framingham criteria for diagnosing clinical heart failure, used established population-based methods for identifying patients with heart failure in Olmsted County, and used some of the best available echocardiographic methods for evaluating left ventricular systolic and diastolic function. The validity of the methods used for diastolic dysfunction is strengthened by the previous use of these methods in the general population study in Olmsted County,⁶ which showed substantially fewer persons with diastolic dysfunction.

Author Affiliation: Departments of Medicine and Cardiology, Roskilde University Hospital, Roskilde, Denmark.

Corresponding Author: Per Hildebrandt, MD, DMSc, Departments of Medicine and Cardiology, Roskilde University Hospital, Roskilde, Denmark DK-4000 (rspehi@ra.dk).

See also pp 2209 and 2217.