

Epidemiology of Heart Failure with Preserved Ejection Fraction



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KEYWORDS

• Epidemiology • Heart failure • Preserved ejection fraction • Mortality • Prognosis

KEY POINTS

- Heart failure with preserved ejection fraction (HFPEF) is a common disease, especially among the elderly and in women.
- With an increasing prevalence of hypertension, obesity, atrial fibrillation, and diabetes, and the growing elderly segment of the general population, the prevalence of HFPEF is projected to increase in the future.
- HFPEF presents a diagnostic challenge and studies differ widely in the reported incidence and mortality associated with this condition.
- There is agreement that between a third and one-half of patients with heart failure have HFPEF.
- Prognosis is overall poor. Patients with HFPEF have substantial comorbidity, high rates of repeated hospitalizations, and a high mortality.

INTRODUCTION

Heart failure with preserved ejection fraction (HFPEF) can be defined as a clinical syndrome in which the heart is unable to deliver the requisite amount of oxygen to the tissues commensurate with their metabolic needs, or does so but only at the expense of increased left ventricular (LV) filling pressures, despite a normal ejection fraction. Other terms used for this condition include backward heart failure and diastolic heart failure. The reported prevalence of HFPEF is increasing,

in part because of a greater awareness of the diagnosis, refined echocardiographic techniques, and also because of changes in demographics (such as aging of the population) and higher burden of lifestyle-related risk factors (such as obesity and diabetes). For many years, HFPEF has remained a clinically illusive concept with lack of both national and international consensus on criteria for its diagnosis.^{1,2} There are no clinical symptoms or signs that have a high sensitivity or specificity for the diagnosis of HFPEF, and the pathophysiologic mechanisms underlying the

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condition are not well established. Moreover, patients with HFPEF often have concomitant comorbidities that may either mask or confound the diagnosis.

The current American Heart Association/American College of Cardiology and European Society of Cardiology guidelines both recommend that a diagnosis of HFPEF should be based on the presence of the following features: (1) signs and symptoms consistent with a diagnosis of heart failure; (2) absence of depressed ejection fraction (ie, an LV ejection fraction [LVEF] $\geq 50\%$); and (3) objective measures showing an impaired LV diastolic function.^{3,4} Furthermore, the clinical findings should not be explainable by other conditions, such as a primary volume overload state or chronic pulmonary disease. The diagnostic criteria are still subject to variability between hospitals and across studies. No single noninvasive measure of LV diastolic function is optimally accurate and sensitive for establishing a diagnosis of LV diastolic dysfunction (the third criterion). Therefore, the guidelines concur that LV diastolic function should be measured by more than one technique in these patients, if feasible. In addition, guidelines are not specific regarding the combination of symptoms and signs that adequately and accurately establishes a clinical diagnosis of heart failure.

Most symptoms and clinical findings, especially those that are present in milder states of HFPEF (such as reduced exercise capability or mild ankle edema) are inherently nondiscriminatory and may be caused by a variety of clinical conditions, including chronic pulmonary disease, physical deconditioning, obesity, and/or renal disease. Symptoms and signs of more severe heart failure (like paroxysmal nocturnal dyspnea and pulmonary edema) are more specific, but have a lower sensitivity. The Framingham Heart Study heart failure criteria are among the most commonly used and are widely accepted for an initial evaluation of suspected heart failure. They are based on an algorithm that combines different objective signs for diagnosing heart failure (**Box 1**) and are intended for epidemiologic settings. Because there is no gold standard for the clinical diagnosis, validation of different algorithms and measures to diagnose HFPEF is challenging. As an illustrative example, in the recent placebo-controlled randomized trial of spironolactone (the Aldo-DHF trial) only 1 of 422 patients died during 12 months of follow-up, which is lower than the mortality expected in patients with HFPEF based on prior reports from other observational and clinical trials. The observed low mortality of these patients in some series has led some investigators to

Box 1
Framingham criteria for congestive heart failure (2 major, or 1 major plus 2 minor criteria are required)

Major:

Paroxysmal nocturnal dyspnea
 Neck vein distension
 Rales
 Radiographic cardiomegaly
 Acute pulmonary edema
 Third sound gallop
 Increased central venous pressure
 Increased circulation time (≥ 25 seconds)
 Hepatojugular reflux
 Pulmonary edema, visceral congestion, or cardiomegaly on autopsy
 Weight loss greater than or equal to 4.5 kg in 5 days in response to treatment of heart failure

Minor:

Bilateral ankle edema
 Nocturnal cough
 Dyspnea on ordinary exertion
 Hepatomegaly
 Pleural effusion
 Decrease in vital capacity by 33% of maximal value recorded
 Tachycardia (≥ 120 beats per minute)

question the diagnosis of HFPEF with the added speculation that some of these patients may not have heart failure.^{1,5} The most common heart failure symptoms for inclusion in the Aldo-DHF trial were fatigue (59%) and nocturia (80%), which are not specific enough for a diagnosis of heart failure (compared with the more exhaustive Framingham criteria).⁶ Supporting the notion that HFPEF may be overdiagnosed, Caruana and colleagues⁵ reported that, in a sample of consecutively referred patients with suspected heart failure and normal systolic function but without atrial fibrillation or valve disease, an alternative diagnosis (such as obesity, reduced pulmonary capacity, or coronary artery disease) was present in most patients even though they had demonstrable LV diastolic dysfunction. The investigators therefore concluded that few if any patients satisfied the criteria for a diagnosis of pure diastolic heart failure.⁵ The echocardiographic findings suggestive of heart failure were recently compared with clinical findings based on the

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