

Advanced Heart Failure Prevalence, Natural History, and Prognosis



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KEYWORDS

• Heart failure • Cardiomyopathy • Prognosis • Risk assessment • Clinical decision making

KEY POINTS

- Advanced heart failure is defined by the presence of progressive and/or persistent severe symptoms despite optimized medical, surgical, and device therapy.
- Overlapping classification schemes—New York Heart Association class, ACC (American College of Cardiology)/American Heart Association stages, and Interagency Registry for Mechanically Assisted Circulatory Support profiles—provide complementary descriptive information for patients with advanced heart disease.
- In select patients, early recognition of advanced heart failure facilitates the timely deployment of surgical heart failure therapies in the context of patient-centered shared decision making.
- Risk stratification in advanced heart failure can be informed by clinical history, physical examination, routine blood tests, assessment of functional capacity, and cardiac imaging.

INTRODUCTION

Heart failure is a complex clinical syndrome resulting from impairment of ventricular filling or ejection of blood associated with symptoms of dyspnea, fatigue, and peripheral and/or pulmonary edema.¹ Although there have been dramatic innovations in medical and device treatments for heart failure in recent decades, the incidence of heart failure is increasing. The heart failure syndrome affects an estimated 5.7 million Americans and more than 23 million people worldwide.^{2,3} The heart failure epidemic has a staggering impact on quality of life, functioning, and longevity, while imposing heavy costs on the health care system. The identification of the syndrome of advanced heart failure requires an iterative clinical assessment integrating routinely available clinical risk markers. Recognizing that a patient suffers from advanced

heart failure promotes timely triage to surgical cardiac therapies, such as mechanical support or transplant, and allows clinicians to initiate the development of end-of-life care plans consistent with patient values, preferences, and goals.

The syndrome of heart failure is commonly divided into 2 categories: heart failure with reduced ejection fraction (HFrEF) and heart failure with preserved ejection fraction (HFpEF). Although past literature and guidelines have proposed varying definitions of HFrEF,^{1,4,5} the American College of Cardiology Foundation/American Heart Association (ACCF/AHA) Task Force currently defines it as heart failure with an ejection fraction (EF) of no more than 40%. Patients with an EF of at least 50% make up the group of patients definitively characterized with HFpEF, while the group of patients with EF between 41% and

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49% has been variably classified in clinical trials as either HFpEF or HFrEF. Although advanced disease exists in patients with HFpEF, its prevalence and prognosis remain poorly understood. Current understanding of the epidemiology and natural history of advanced heart failure has been largely derived from the systolic heart failure literature.

Multiple classification systems have been devised to characterize the severity of heart failure beyond EF alone. The earliest and most commonly used classification system is from the New York Heart Association (NYHA), which divides patients into 1 of 4 classes based on their exercise capacity and symptom burden. Within this system, patients with persistent NYHA class 4 symptoms are deemed to have advanced heart failure.⁶ In 2001, the ACCF/AHA released a new system that placed emphasis on antecedent risk factors and progressive stages of disease similar to the approach commonly used in cancer staging. In this system, stage D patients were considered as advanced heart failure and were defined as having refractory heart failure despite optimal medical therapy (Fig. 1).

Most recently, in 2009 the Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) classification system was developed to stratify the advanced heart failure patients undergoing consideration of mechanical circulatory support⁷ (Table 1). The INTERMACS patient profiles are important for framing discussion surrounding the appropriateness and timing of mechanical support. In the end, the classification systems are complementary to one another, describing current symptoms (NYHA), stepwise disease progression (ACCF/AHA stages), and integrated assessment of advanced disease trajectory (INTERMACS profile). As might be expected given these evolving classification schemes and heterogenous population at risk, the major

cardiovascular societies have varying definitions of advanced heart failure (Table 2).⁸

PREVALENCE

Over the last 3 decades, there has been a change in the definition and prevalence of advanced heart failure as treatment options have evolved. Prior to the routine use of neurohormonal antagonists, medical therapy for advanced systolic heart failure consisted of digoxin and diuretics, with advanced heart failure defined as patients with persistent NYHA class 4 symptoms.⁹ With the advent of renin-angiotensin-aldosterone antagonists and beta-blockers, as well as widespread use of implantable cardioverter-defibrillators for the primary prevention of sudden death, advanced heart failure patients today are often older at presentation and have accumulated more comorbid medical conditions. Most recently, the Heart Failure Society of America (HFSA) has defined advanced heart failure as the presence of progressive and/or persistent severe symptoms of heart failure despite optimized medical, surgical, and device therapy.¹⁰

Given the shifting definitions of advanced heart failure and the fact that many signs of advanced disease may be nonspecific, the true prevalence is elusive. A population-based, cross-sectional, random sample of the Olmstead County database estimated the prevalence of stage D heart failure to be only 0.2%.¹¹ Experts have estimated the prevalence to range widely from 6% to 25% among patients with established heart failure, with estimates influenced by the definition used and population studied.⁸ Findings from the Acute Decompensated Heart Failure national registry (ADHERE) suggest that 5% of all heart failure patients have end-stage disease with refractory symptoms despite optimal medical therapy.¹² At the current time, advanced heart failure in the

AHA/ACC Stages

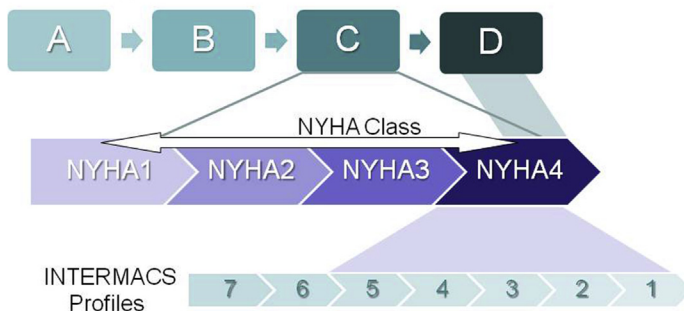


Fig. 1. Classification schemes for heart failure severity. Overlapping classification systems provide complementary descriptive and prognostic information for patients with advanced heart disease. NYHA classifies dynamic functional limitation, the American Heart Association/American College of Cardiology- Stages of Heart Failure highlight antecedent risk factors and disease progression, while the INTERMACS patient profiles integrate symptom burden and ongoing measures used to treat evolving shock.

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