Fast Fact and Concept #143: Prognostication in Heart Failure

Authors: Gary M. Reisfield, MD and George R. Wilson, MD

This Fast Fact reviews prognostication data in Heart Failure (HF). Although the Framingham Heart Study (1990-1999) showed a 5-year mortality rate of 50% for newly identified cases, providing accurate prognostic data for 6-12 month mortality is nearly impossible. Reasons cited include: 1) an unpredictable disease trajectory with high incidence (25-50%) of sudden death; 2) disparities in the application of evidence-based treatment guidelines; 3) inter-observer differences in New York Heart Association (NYHA) classification; and 4) heterogeneous study populations in the HF literature. The NYHA classification remains the major gauge of disease severity. Based on data from SUPPORT, Framingham, IMPROVEMENT, and other studies, 1-year mortality estimates are as follows:

- Class II (mild symptoms) ............... 5-10%
- Class III (moderate symptoms) ......... 10-15%
- Class IV (severe symptoms) .......... 30-40%

The following indicators have been independently associated with a limited prognosis in HF:

- Recent cardiac hospitalization (triples 1-year mortality)
- Elevated BUN (defined by upper limit of normal) and/or creatinine ≥1.4 mg/dl (120 •mol/l)
- Systolic blood pressure <100 mm Hg and/or pulse >100 bpm (each doubles 1-year mortality)
- Decreased left ventricular ejection fraction (linearly correlated with survival at LVEF ≤ 45%.)
- Ventricular dysrhythmias, treatment resistant
- Anemia (each 1/ g/dl reduction in Hb is associated with a 16% increase in mortality)
- Hyponatremia (Na + ≤135-137 mEq/l).
- Cachexia
- Reduced functional capacity
- Co-morbidities: diabetes, depression, COPD, cirrhosis, cerebrovascular disease, cancer, and HIV-associated cardiomyopathy.

Medicare Hospice Benefit

The National Hospice and Palliative Care Organization’s 1996 guidelines for Heart Disease admission criteria include: 1. Symptoms of recurrent HF at rest NYHA class IV AND 2. Optimal treatment with ACE inhibitors, diuretics, and vasodilators (note: optimal treatment now includes β-blockers,
aldosterone and device therapies). The NHPCO guide indicates that an ejection fraction < 20% is “helpful supplemental objective evidence”, but not required. The NHPCO guidelines also list “one or more of the following are supporting evidence for hospice eligibility”: treatment resistant ventricular or supraventricular arrhythmias, history of cardiac arrest in any setting, history of unexplained syncope, cardiogenic brain embolism, concomitant HIV disease. **Note:** Based on the current literature, the NHPCO guidelines are not predictive of six or twelve month prognosis with 50% accuracy.

Since publication of the NHPCO’s guidelines, several models have been developed for predicting short- and/or long-term mortality among HF patients. Two recent models purport to predict mortality among patients hospitalized with acutely decompensated HF. Fonarow (2005), using a model based on admission BUN (≥ 43 mg/dl), creatinine (≥ 2.75 mg/dl), SBP (< 115 mmHg), identified in-hospital mortality rates ranging from about 2% (0/3 risk factors) to 20% (3/3 risk factors). Lee (2003), using a model based on admission physiologic variables and co-morbidities (almost all from above list of indicators) identified 30-day mortality and 1-year mortality rates ranging from <1% and <10%, respectively (for the lowest risk patients) to >50% and >75%, respectively (for the highest risk patients). While both models are applicable to bedside use, neither have been applied prospectively or in independent patient samples, nor do they address HF treatments as predictive variables.

**Bottom Line:** Meticulous application of medication and device therapies can and will continue to change HF prognostic data. HF follows an unpredictable disease trajectory, one which is highly modifiable by application of evidence-based therapies, yet still associated with a high incidence of sudden death. The 1996 NHPCO criteria are not predictors of 6-month mortality. Several models have recently been developed to aid in determining short- and long-term mortality in hospitalized, decompensated HF patients. These models await prospective testing and will need to address the dynamic of optimizing medical therapy. Future models should address prognostication in unselected ambulatory HF patients. Finally, models will need periodic updating to control for continually evolving standards of HF care. At present, accurate prognostication remains problematic.

**References**

5. Horwich TB, Fonarow GC, Hamilton MA, et al. Anemia is associated with worse symptoms,


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Fast Facts are edited by David E. Weissman, MD; Palliative Care Center, Medical College of Wisconsin. For comments/questions write to: dweissma@mail.mcw.edu. The complete set of Fast Facts are available at EPERC: www.eperc.mcw.edu


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Purpose: Self-Study Guide, Teaching

Audience(s)

Training: Fellows, 3rd/4th Year Medical Students, PGY1 (Interns), PGY2-6, Physicians in Practice
**Specialty:** Anesthesiology, Emergency Medicine, Family Medicine, General Internal Medicine, Geriatrics, Hematology/Oncology, Neurology, OB/GYN, Ophthalmology, Pulmonary/Critical Care, Pediatrics, Psychiatry, Surgery

**Non-Physician:** Nurses

**ACGME Competencies:** Medical Knowledge and Patient Care

**Keyword(s):** Terminal Care