

Challenges in the Management of Acutely Decompensated Congestive Heart Failure: Disposition Decisions in the Emergency Department

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The vast majority of patients who present to the Emergency Department (ED) with decompensated heart failure are admitted to the hospital, despite increasing pressure to contain cost.¹ Appropriate decision making in the ED is paramount, obviously very important for diagnostic and therapeutic maneuvers but also true for patient disposition. One could argue that patient disposition, not management, is the most daunting task an emergency physician faces. Historically, ED physicians were forced to make disposition decisions with only two options: discharge home after a relatively short ED stay or admit to the hospital. To make things more difficult, these decisions were often made with the pressure of time and usually on limited data. This strategy frequently led to inappropriate admissions and premature ED discharges with resultant increased cost and morbidity, respectively.^{2,3} The American College of Cardiology (ACC)/American Heart Association (AHA) guidelines on the management of heart failure suggest that patients with mild to moderate symptoms generally do not require admission.⁴ However, clinicians often have difficulty judging the prognosis of such patients and while these guidelines may assist in decision making, clinical judgment remains important.⁵ Recently, ED based observation units, clinical decision units or diagnosis driven critical pathways/protocols have been developed to aid in the management of selected patients.⁶ Their use has been best described with chest pain suspicious for acute coronary syndrome, but the principle of a

successful observation strategy holds true for any clinical diagnosis associated with high volume, high cost and a significant clinical penalty for mismanagement. Acute decompensated heart failure clearly falls into this category and a number of institutions have applied what has worked with chest pain to the management of heart failure.^{3,7}

The following strategy incorporates disposition recommendations for an ED with a more traditional setting (i.e. no clinical decision unit) as well as one with the ability to provide observation services. Vital to any disposition strategy is a well conceived and designed management protocol with specific emphasis on patient selection, diagnosis, therapy and targets for successful outcome. Without these, it will be more difficult to consistently identify patients who are appropriate for ED discharge, observation in a clinical decision unit or hospital admission.

Patient selection is a key component to any ED based strategy. After initial ED evaluation, it is usually obvious that critically ill patients will require hospital admission while patients with mild symptoms may be able to be discharged relatively quickly. Unfortunately, this represents the minority of decompensated heart failure patients. The majority will require more complex disposition decision making, and it is this larger group that warrants more attention. Appropriately selected patients from this group have the most potential to benefit from an ED management protocol or admission to an observation unit. First and foremost, only patients with heart failure should be included. A management protocol aimed specifically at heart failure will largely be unsuccessful if applied to patients with disorders that mimic heart failure (COPD, pneumonia, etc.). The history, physical examination, chest radiography, echocardiography and newer technologies to estimate hemodynamics (bioimpedance)⁸ or left ventricular distention (B-type natriuretic peptide)⁹ are the cornerstones of diagnosis. Nearly as important is excluding patients who will not likely benefit from an ED protocol or observation unit management of decompensated heart failure. These patients should be admitted to the hospital for more definitive care. Exclusion criteria include:^{1,3,10}

- 1) Unstable vital signs
 - a. SBP ≤ 90 or ≥ 220 after initial therapy
 - b. Heart rate ≥ 130
 - c. Temperature ≥ 38.5 C°
- 2) Persistent hypoxemia (O₂ saturation $\leq 90\%$)
- 3) Evidence of myocardial ischemia/infarction
- 4) Unstable angina
- 5) Any evidence of active concomitant disease
- 6) Any requirement for non-invasive ventilation

Therapy for patients who meet the eligibility requirements should be goal oriented, protocol driven with treatment to include supplemental oxygen, diuretics and vasodilators.^{10,11} The crux of any disposition decision is the response to these therapies and identification of any complications or other barriers to successful discharge. It is most important to identify a priori targets of clinical improvement and use these to determine which patients may be discharged from the ED or observation unit. Failure to adhere to these clinical predictors will likely lead to repeat ED visits, hospital admission (often with prolonged length of stay), patient morbidity and increased overall cost.^{2,3} The following are criteria that should be considered when determining disposition:^{1,3,10}

- 1) Improvement in dyspnea, no orthopnea
- 2) Ambulatory without dizziness or dyspnea on exertion
- 3) Stable vital signs (HR < 100, SBP > 90 and < 200)
- 4) Urine output > 1 liter
- 5) Normal electrolyte panel (Na⁺ > 130 Mmol/L, K⁺ 4.0-5.0 Mmol/L)
- 6) Normal cardiac injury markers
- 7) Achievement of dry weight (if known)
- 8) Stable or improving renal function
- 9) No evidence of other active cause of dyspnea (COPD, pneumonia)
- 10) Decreasing BNP level
- 11) Improved hemodynamics by bioimpedance if available
- 12) Improvement in jugular venous distension and edema
- 13) 12-24 hours of stability on current medical regimen

Failure to reach these clinical improvement goals or occurrence of any complications should trigger a hospital admission from either the ED or observation unit. Further attempts to "force" the issue after this initial protocol based period of observation may lead to increased morbidity and overall cost.

Making a disposition decision is difficult, and critical to its success is providing suitable aftercare. Availability of prompt follow-up often determines the appropriateness of the decision to discharge a patient. The initial improvements gained in the ED or observation unit can be quickly negated if the patient is discharged with a poor outpatient management. Important components of outpatient heart failure disease management include:^{11,12}

- 1) Nursing case management
- 2) Physician follow-up (Primary care coordinated with cardiology)
- 3) Optimization of medication regimen
- 4) Patient education
- 5) Social support (Home health assessment)

Hospital readmission is a very common problem after initial management of decompensated heart failure, approaching 50 percent at three months.¹³ Factors associated with hospital readmission include:¹³⁻¹⁵

- 1) Age > 65 years
- 2) Male gender
- 3) Heart failure admission within 6 months
- 4) Initial length of hospital stay > 1 week
- 5) Elevated BUN
- 6) Diabetes mellitus
- 7) Inadequate social support and follow-up
- 8) Dietary and medication noncompliance

Readmission often results from inadequacies of the previous disease management plans. A comprehensive strategy which incorporates an observation unit protocol and appropriate aftercare has the opportunity to positively impact readmissions and overall cost.

Outpatient heart failure disease management provides consistent benefits, with a 25-75% reduction in hospitalization.^{13,16} There are multiple variations on the theme of outpatient case management but most have the common thread of a specialized heart failure nurse who provides education and preemptive telephone contact to identify problems and field questions.¹¹ Close monitoring of patient weight and response to changing volume status is the most important aspect of ongoing care for heart failure.⁴ Because non-compliance is estimated to cause up to half of all heart failure admissions, patient education is critical.¹⁵ This includes review of a sliding scale diuretic dose based on daily weights and information on sodium and fluid restriction.¹⁷ Social services can arrange a home health assessment to determine if there are other psychosocial, cultural or economic barriers preventing therapeutic compliance.

Optimizing the medical regimen is probably the most complex portion of outpatient disease management, as it requires coordination between many providers, including the ED physician, primary care physician and heart failure physician-nurse case management team. Although beyond the purview of this discussion, medication considerations would include a loop diuretic, spironolactone, angiotensin converting enzyme inhibitor, B-blocker and nitrates.^{10,11}

Determining the disposition of patients with acutely decompensated heart failure after a stint in the ED or observation unit is a difficult task. Although not well studied, there are predictors of successful discharge after an accelerated treatment protocol has been instituted. The keys are appropriate patient selection, adherence to clinical outcome targets and goal oriented outpatient case management. Utilization of such a comprehensive strategy is imperative to achieve safe and accurate disposition.

REFERENCES

1. Kosowsky J, Abraham WT, Storrow A. Evaluation and management of acutely decompensated chronic heart failure in the emergency department. *Congestive Heart Failure*. 2001;7: 124-136.

2. Kosecoff J, Kahn KL, Rogers WH et al. Prospective payment system and the impairment at discharge: The "quicker and sicker" story revisited. *JAMA*. 1990;264:1980-1983.

3. Peacock WF IV, Remer ER, Aponte J et al. Effective observation unit treatment of decompensated heart failure. *Congestive Heart Failure*. 2002;8:68-73.

4. Hunt SA, Baker DW, Chin MH, Cinquegrani MP et al. ACC/AHA Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult. *J Am Coll Cardiol*. 2001;38:2101-2113

5. Poses RM, Smith WR, McClish DK et al. Physicians' survival predictions for patients with acute congestive heart failure. *Arch Intern Med*. 1997;157:1001-1007.

6. Graff LG. Principles of observation medicine. In: Graff LG, ed. *Observation Medicine*. Newton, MA: Butterworth-Heinemann; 1993.

7. Graff LG, Krivenko C, Maag R et al. Emergency Department Evaluation of Congestive Heart Failure: The Appropriate Evaluation and Treatment of DRG 127. Farmington, CT: VHA of Southern New England; 1995.

8. Summers RL, Kolb JC, Woodward LH et al. Differentiating systolic from diastolic heart failure using impedance cardiography. *Acad Emerg Med*. 1999; 6: 693-699.

9. Cheng V, Kazanagra R, Garcia A et al. A rapid bedside test for B-type peptide predicts treatment outcomes in patients admitted for decompensated heart failure: a pilot study. *J Am Coll Cardiol*. 2001;37:386-391.

10. Peacock WF 4th, Albert NM. Observation unit management of heart failure. *Emerg Med Clin North Am*. 2001;19:209-232.

11. Nohria A, Lewis E, Stevenson LW. Medical management of heart failure. *JAMA*. 2002; 287:628-640.

12. Peacock WF 4th. Rapid Optimization: Strategies for optimal care of decompensated congestive heart failure patients in the emergency department. *Rev Cardiovasc Med.* 2002;3(Suppl 4): S41-S48.

13. Rich MW, Beckham V, Wittenberg C, Leven CL, Freedland KE, Carney RM. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *N Engl J Med.* 1995;333:1190-1195.

14. Krumholz HM, Parent EM, Tu N et al. Readmission after hospitalization for congestive heart failure among Medicare beneficiaries. *Arch Intern Med.* 157:99-104, 1997.

15. Vinson JM, Rich MW, Sperry JC et al. Early readmission of elderly patients with congestive heart failure. *Journal of the American Geriatric Society.* 1990; 38:1290-1295.

16. Hanumanthu S, Butler J, Chomsky D, Davis S, Wilson JR. Effect of a heart failure program on hospitalization frequency and exercise tolerance. *Circulation.* 1997; 96:2842-2848.

17. Grady KL, Dracup K, Kennedy G et al. Team management of patients with heart failure: a statement for healthcare professionals from the Cardiovascular Nursing Council of the American Heart Association. *Circulation.* 2000; 102:2443-2456.

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