Decompensated Heart Failure Revisited

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Hospitalization for decompensated heart failure, which represents the largest expenditure for Medicare, has tripled in the past decade, reaching 1 million hospital discharges in 2000 (1,2). A thorough understanding of factors leading to decompensation, and a meticulous evaluation of potential contributors to decompensation, are needed to address this growing public health problem.

Decompensation of heart failure can be divided into two categories: decompensation resulting from treatable or preventable factors, such as noncompliance, inadequate medical management, infection, and arrhythmias; and decompensation due to disease progression. The latter category may explain why optimally treated patients may eventually have decompensated heart failure, even in the absence of any identifiable precipitating factors.

The percentage of patients hospitalized for decompensation without identifiable precipitating factors has been shown to vary among studies according to the characteristics of the study sample and the criteria adopted to define precipitating factors (3-6). Indeed, the clinical course and prognosis would be expected to differ between patients whose decompensation is precipitated by noncompliance, infection, or arrhythmia, and those optimally treated patients in whom decompensation is due to unrelenting progression of the disease—with patients in the former group more likely to stabilize and return to a "steady state" and those in the latter group representing a greater management challenge. This also suggests that postdischarge course would differ between these two groups. Those whose decompensation is precipitated by treatable or preventable factors would be expected to have fewer rehospitalizations and lower mortality. Patients whose deterioration is due to disease progression would more likely require eventual implantation of a device or heart transplantation and have high mortality.

Although the spectrum of precipitating factors varies widely, all these factors impose hemodynamic stress on the left ventricle, leading to decompensation. Episodes of decompensation are characterized by hemodynamic derangement, activation of the neurohormonal systems, and mechanical overload. Thus, it is highly likely that each episode of decompensation leads to an incremental damage to the left ventricle (Figure).

The documentation of the release of markers of necrosis, such as troponin I and T, during decompensation, and their correlation with severity of heart failure (7,8), support the hypothesis that decompensation represents not simply a deterioration of hemodynamic status that could be alleviated by a temporary intensification of management without long-term consequence, but also a far more serious event that could lead to further damage to the left ventricle. If this is true, then the overall prognosis for all patients hospitalized for heart failure would be poor, regardless of the cause of decompensation. The high rehospitalization rate for heart failure (9), the poor prognosis of hospitalized patients (4), and the recent demonstration of improved survival and reduced hospitalization by instituting a home-based multidisciplinary intervention (10) lend further support to this hypothesis.

Although a simple measurement of markers of necrosis and relating their levels to hospital course and postdischarge outcome are helpful, a more thorough evaluation of neurohormonal activation may be more useful. Many randomized trials with multiple hospitalizations for heart failure did not prospectively identify patients in whom precipitating factors of decompensation could be identified, including trials in which serial measurements of anatomical, physiological, and neurohormonal parameters were done. Serious consideration should be given to identifying precipitating factors leading to hospitalization—or lack of them—in future heart failure trials. Thus, an approach that identifies the precipitating factors and implements interventions that prevent readmission would not only lead to an improvement in quality of life and substantial financial savings, but also help to prevent or slow down progression of the disease and potentially improve survival.

In this issue of the *Journal*, Schiff et al. (11) report their findings on delays in seeking treatment and precipitating factors leading to hospitalization for heart failure. The cohort was relatively young (mean age, 56 years) and comprised more men (64%). The authors found noncompliance to be the major precipitating factor in almost two thirds of patients. The duration of symptoms was somewhat longer than expected, and the authors speculated that timely intervention could have prevented hospital admission.

To guide a collaborative disease management program, a more comprehensive assessment of precipitating

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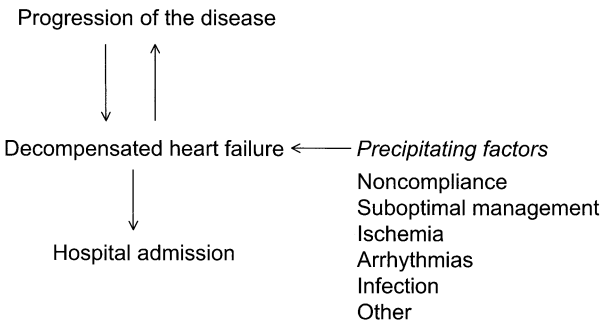

Figure. Potential interaction of precipitating factors leading to decompensation and progression of the disease in heart failure.

factors needs to be performed. For instance, the high prevalence (89%) of hypertension in the study suggests that the role of uncontrolled hypertension and adequacy of medical treatment need to be evaluated. Patients with heart failure and impaired left ventricular ejection fraction should have a systolic blood pressure of about 100 mg Hg. Was this goal achieved in the outpatient clinic? Similarly, 16% of the patients were seen by their physicians and 6% in the emergency department during the 2 weeks before admission; a careful review of their management is necessary to identify any deficiencies in medical management that could have prevented hospitalization.

Another pertinent issue is the administration of noncardiac medications, such as nonsteroidal anti-inflammatory drugs, which could lead to fluid retention and considering the high prevalence (39%) of self-reported diabetes, the role of insulin sensitizers and thiazolidinediones (e.g., pioglitazone and rosiglitazone) needs to be investigated. Likewise, the utilization of calcium antagonists (with the exception of amlodipine and felodipine) needs to be ascertained.

Identifying factors that lead to delays in seeking treatment and hospitalization is important. Considering the low level of patients' understanding of their disease, a practical educational program needs to be established that provides information about the illness, compliance with medications and dietary instructions, and recognition of symptoms of heart failure and appropriate responses to them. Implementing changes in policies that facilitate timely outpatient contact and medication refills is needed. Optimal management of patients with decompensated heart failure should include proper selection of medications, adequate blood pressure control, and continuous reinforcement of compliance with medications and dietary instruction. Such a systematic approach has been documented to be cost-effective (10) and to reduce hospitalization (10,12). Further research efforts are needed to verify whether these measures would also halt disease progression and prolong survival.

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