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Early Vasoactive Drugs Improve Heart Failure Outcomes

Hospitalization for acute decompensated heart failure (ADHF) is common in the United States.¹ In 2003, 1,093,000 hospital discharges with a diagnosis of heart failure were reported. Hospitalizations for ADHF are associated with significant mortality and morbidity. The total 2003 mortality due to heart failure is estimated at 57,218.¹ Large observational registry data suggest that the in-hospital and short-term (60–90 days) mortality rates after a heart failure hospitalization are approximately 4% and 13%, respectively.^{2,3} These data underscore the need to identify factors that may influence the clinical outcomes of patients hospitalized for ADHF.

Elevated left ventricular filling pressures may contribute to the pathophysiology and progression of heart failure through several potential mechanisms.⁴ Studies of implanted hemodynamic monitoring systems reveal that patients with ADHF experience increases in filling pressures days before presentation with acute symptoms.^{5,6} Thus, pathophysiologic processes that can result in adverse outcomes or heart failure progression are fully activated in most ADHF patients at or before the time of presentation. Based on these concepts, we hypothesized that early vasoactive therapy administration may be more effective at reducing symptoms and improving outcomes as compared with late administration. However, this concept has not been adequately studied.² This study's objective was to determine the association between clinical outcomes and the time to vasoactive therapy initiation in patients hospitalized for ADHF.

Methods

The Acute Decompensated Heart Failure (ADHERE) National Registry database was analyzed for this study. The

*Vasoactive therapy is often used to treat acute decompensated heart failure (ADHF). The authors sought to determine whether clinical outcomes are temporally associated with time to vasoactive therapy (vasoactive time) in ADHF. Using the Acute Decompensated Heart Failure (ADHERE) Registry, the authors examined the relationship between vasoactive time and inpatient mortality within 48 hours of hospitalization. Vasoactive agents were used early (defined as <6 hours) in 22,788 (63.8%) patients and late in 12,912 (36.2%). Median vasoactive time was 1.7 and 14.7 hours in the early and late groups, respectively. In-hospital mortality was significantly lower in the early group (odds ratio, 0.87; 95% confidence interval, 0.79–0.96; P=.006), and the adjusted odds of death increased 6.8% for every 6 hours of treatment delay (95% confidence interval, 4.2–9.6; P<.0001). Early vasoactive initiation is associated with improved outcomes in patients hospitalized for ADHF. **Congest Heart Fail.** 2009;15:256–264. © 2009 Wiley Periodicals, Inc.*

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design, methods, and initial ADHERE results have been published.^{3,7–9} ADHERE is a large, national, multicenter registry designed to collect data on the clinical characteristics, treatment patterns, and outcomes of patients hospitalized for ADHF.³ Data were collected from participating hospitals across the United States. Hospitals of various sizes from all regions of the country were represented. All hospitals obtained institutional review board or ethics board approval for participation. The data collection system was designed such that patient informed consent was not necessary.³

Patient episodes were included if they received an intravenous (IV) vasoactive agent (nesiritide, nitroglycerin, nitroprusside, dobutamine, dopamine, or milrinone) within the first 48 hours of

the hospitalization. The 48 hours limitation time point was established arbitrarily for this analysis in an attempt to differentiate between patients who received vasoactive agents as part of the initial management strategy for ADHF and those who might have received vasoactive therapy for other reasons. Delayed therapy may be appropriately used for indications or complications not present at the time of admission (eg, post-admission myocardial infarction) or for failure to respond to initial therapy. Our goal was to focus on a homogenous group of patients with a similar diagnosis and indication for vasoactive therapy. To eliminate competing needs for vasoactive treatment among patients hospitalized with both ADHF and acute coronary syndromes, patients with an admitting or discharge (either primary