Use and Predictors of Heart Failure Disease Management Referral in Patients Hospitalized With Heart Failure: Insights From the Get With the Guidelines Program

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ABSTRACT

Background: Heart failure disease management (HFDM) may be beneficial in heart failure (HF) patients at risk for readmission or post-discharge mortality. However, characteristics of hospitalized HF patients referred to HFDM are not known.

Methods and Results: Get With the Guidelines (GWTG) program data was used to analyze 57,969 patients hospitalized with HF from January 2005 through January 2010 from 235 sites. Factors associated with referral to HFDM and rates of HF quality measures by referral status were studied. Mean age of patients was 69.7 ± 14.5 years, 52% were men, and 65% were white. HFDM referral occurred in 11,150 (19.2%) patients. The median rate of HFDM referral among all hospitals was 3.5% (25th−75th percentiles 0%−16.7%) and 8.7% (2.8%−27.7%) among hospitals with at least one previous HFDM referral. Quality and performance measures were higher in patients referred to HFDM. HFDM referral was associated with atrial fibrillation, implanted cardiac device, depression, and treatment at larger hospitals. Patients at higher 90-day mortality risk were paradoxically less likely to receive HFDM referral.

Conclusions: HFDM referral occurred in less than one-fifth of hospitalized HF patients and was more frequently recommended to lower-risk patients. Increasing use and optimizing selection of patients for HFDM referral is a potential target for quality improvement. (*J Cardiac Fail 2011;17:431−439*)

Key Words: Heart failure disease management, referral, predictors.

The clinical and economic burden of heart failure (HF) has been well documented. HF afflicts close to 6 million U.S. adults and 10 per 1,000 in the U.S. population after 65 years of age.[1,2] Studies suggest that costs are similar in HF patients regardless of left ventricular ejection fraction (LVEF)[3] and that >20% of discharged HF patients are rehospitalized within 30 days.[1,4] HF-related morbidity is reflected in the 12 million ambulatory care visits yearly[5] and highlights the chronic nature of the illness. In an effort to improve transitions of care and optimize the management of patients with HF who are at high risk for clinical decline, specialized HF disease management (HFDM) programs have been recommended in the practice guidelines of the American College of Cardiology/American Heart Association (AHA)[6] and the Heart Failure Society of America[7] as an adjunctive strategy to improve outcomes. These programs are intended to target unhealthful behaviors, improve patient self-care, and implement practice guidelines, building on themes that may have been addressed at the time of discharge planning. Studies suggest that HFDM programs are associated with reduced hospitalizations and improved outcomes,[8−10] and HFDM may be especially beneficial to high-risk patients, including those who are older, have a history of HF

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hospitalization or comorbid conditions, or have behavioral or psychosocial barriers to HF care.

Despite the demonstrated benefits of HFDM programs in patients at risk for hospitalization, little is known regarding contemporary referral patterns and the characteristics of patients who receive referral to HFDM programs at hospital discharge or factors at the hospital-level that are associated with HFDM referral. The objective of the present study was to describe patient and hospital characteristics associated with referral to HFDM among patients hospitalized for HF in the Get With the Guidelines—Heart Failure (GWTG-HF) program.

Methods

Data were collected through the AHA's GWTG-HF program, a voluntary, national, observational data collection and quality improvement program that started in 2005 under the auspices of the AHA. Details of the GWTG-HF program have been previously described.[11–13] Participating hospitals submitted clinical information regarding in-hospital care and outcomes of patients hospitalized for HF using a point-of-service, internet-based patient management tool (PMT; Outcome Sciences, Cambridge, MA). Hospitals were instructed to submit information on consecutive eligible patients to the database. All participating institutions were required to comply with local regulatory and privacy guidelines and, if required, to secure Institutional Review Board approval. Because data were used primarily at the local site for quality improvement, sites were granted a waiver of informed consent under the common rule. Outcome Sciences served as the data collection (through their PMT) and coordination center for GWTG. The Duke Clinical Research Institute (DCRI) served as the data analysis center and has an agreement to analyze the aggregate deidentified data for research purposes.

Patients hospitalized with new or worsening HF or patients that developed significant HF symptoms such that HF was the primary discharge diagnosis were included in the registry beginning January 1, 2005. Data was abstracted by trained personnel using standardized definitions for data elements and entered using an electronic case report form. Variables collected included race/ethnicity (as defined by the case report form), insurance status, demographic and clinical characteristics, medical history, presentation characteristics, admission laboratory data, LVEF, previous HF admissions, exacerbating conditions related to the HF event, in-hospital procedures, HF performance and quality measures, and referral to HFDM.

HFDM referral was defined as referral to an outpatient HF management program and collected as such on the case report form. Patients were considered referred to HFDM if they were participants in HFDM at the time of hospitalization with plans to continue on an outpatient basis after discharge or if they received HFDM referral during the course of hospitalization or at discharge. Patients for whom HFDM was considered to be not applicable (eg, palliative care) were excluded from the denominator of patients eligible for HFDM referral. Specific categorization of the HFDM program the patient was referred to was collected beginning in 2008 and consisted of clinic-based, telephone-based, or home visit management or any combinations of the above. Hospital-level variables were determined using the American Hospital Association database. Data quality is monitored and data edit checks were performed to verify the validity of collected data.

Study Population

We identified 111,498 patients with HF-related diagnoses discharged from 257 GWTG-HF fully participating hospitals between January 1, 2005, and January 5, 2010. We excluded patients not discharged home (n = 29,413), which included patients discharged to skilled nursing facilities (n = 17,343), in-hospital deaths (n = 3,245), transfers to acute care (n = 2,613), hospice (n = 2,126), and inpatient rehabilitation (n = 1,902), left against medical advice (n = 946), and other or unknown discharge location (n = 1,238). We also excluded those with missing data for HFDM referral (n = 24,116), leaving a final study population of 57,969 patients from 235 hospitals. The primary analysis was performed on these 235 GWTG sites. In addition, a sensitivity analysis was performed in 164 sites demonstrating prior HFDM referral after excluding sites with no prior HFDM referral (n = 71). Sites with no prior HFDM referral were smaller, were located predominately in the midwestern and southern U.S., and had less availability for cardiac surgery (25%) compared with hospitals with prior HFDM referrals.

Statistical Analysis

The primary outcome variable was referral to outpatient HFDM. For baseline characteristics, we calculated medians and interquartile ranges (IQRs) for continuous variables and percentages for categoric variables and compared them using Wilcoxan rank sum tests and chi-square tests, respectively. We used chi-square tests to evaluate whether referral to HFDM was associated with compliance to HF performance and quality measures.[14]

Multivariable logistic regression analysis with generalized estimating equations to adjust for within-hospital clustering was used to identify factors associated with receipt of referral to HFDM at hospital discharge.[15] Candidate variable selection included important baseline demographics and covariates used in prior GWTG analyses.[16,17] Variables initially assessed using univariate tests were age, gender, race, insurance type, systolic blood pressure (SBP), heart rate, and comorbidities, including anemia, atrial fibrillation, atrial flutter, HF etiology (ischemic vs nonischemic), chronic obstructive pulmonary disease, asthma, smoking status, cerebrovascular disease (stroke or transient ischemic attack), depression, diabetes, renal insufficiency, chronic dialysis, hypertension, and peripheral vascular disease, LVEF, presence of device (implantable cardioverter defibrillator [ICD], cardiac resynchronization therapy [CRT], or device combination [CRT-D]), number of HF hospitalizations in preceding 6 months, and conditions contributing to HF exacerbations (arrhythmias, ischemia/acute coronary syndrome, pneumonia/respiratory process, uncontrolled hypertension, worsening renal failure, and dietary and/or medication noncompliance). Hospital-level variables included in the initial model included number of beds, region, academic affiliation (vs no academic affiliation), and cardiac surgery capability (vs no cardiac surgery capability). A variable was considered to be a candidate for the multivariable model if it was missing in $<10\%$ of the sample and if the P value was $<.10$ in the univariate test; variables with multiple levels were included in the model if ≥ 1 level versus reference group resulted in $P < .10$. Continuous predictors (eg, age, SBP, etc) were evaluated in their continuous form for linearity of relationship to the outcome, and truncations were made as