

Angiotensin-converting Enzyme Inhibitor or Angiotensin Receptor Blocker Adherence in Patients With Primary Versus Secondary Diagnosis of Heart Failure

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Context: It is unknown whether hospitalization for a secondary diagnosis of heart failure (HF) impacts adherence to current HF guidelines. National HF databases that benchmark quality of care currently do not report on adherence based on whether HF is the primary or secondary diagnosis.

Objective: To describe angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) utilization at time of discharge in hospitalized patients with a primary or secondary diagnosis of systolic HF.

Study Design: Six-month observational chart review.

Methods: Patients were included if they were hospitalized with a primary or secondary diagnosis of HF, had an ejection fraction of $\leq 40\%$, and were more than 18 years of age. Guideline adherence was defined as appropriate if an ACEI or ARB was prescribed at discharge or if there was a documented contraindication.

Results: Of 204 patients in the study, 170 and 34 patients had a primary or secondary diagnosis of HF, respectively. Eighty-six percent of patients with a primary diagnosis of HF were discharged with an ACEI or ARB, whereas 71% of patients with a secondary diagnosis of HF were discharged with an ACEI or ARB ($P = .029$).

Conclusion: Patients with a primary diagnosis of HF are more likely to be discharged on an ACEI or ARB (if indicated) than those with a secondary diagnosis. Identifying and evaluating the need for an ACEI or ARB in hospitalized patients with a secondary diagnosis of HF offers practitioners an opportunity for improved patient care through better adherence to national guidelines.

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Current American College of Cardiology (ACC)/American Heart Association (AHA) guidelines recommend that all patients with a reduced left ventricular ejection fraction (EF) and previous or existing symptoms of heart failure (HF) undergo treatment with an angiotensin-converting enzyme inhibitor (ACEI) or an angiotensin receptor blocker (ARB), unless contraindicated.¹ Research has demonstrated that prescription of an ACEI or ARB at discharge has a profound effect on clinical outcomes. In a recent article examining performance measures and clinical outcomes in HF, only appropriate ACEI or ARB utilization at discharge affected mortality and readmissions.²

The Acute Decompensated Heart Failure National Registry (ADHERE) compiles information from more than 275 US hospitals from different geographic areas regarding the medical management of patients with congestive HF. The registry reports statistics to participating hospitals on patient medications, demographics, and course of acute hospitalization.³ The ADHERE registry found that only 72% of participating hospitals followed the ACC/AHA recommendations.⁴

When analyzing data regarding adherence to HF guidelines at our institution, we found a disparity in the standard of care for patients with a primary versus a secondary diagnosis of HF. It appeared that patients with a secondary diagnosis of HF were less likely to receive an ACEI or ARB when indicated. Upon review of published literature, we found no publications that investigated varying standards of care based on primary versus secondary diagnosis of HF. Our purpose was to evaluate the difference in ACEI or ARB utilization at time of discharge in hospitalized patients with a primary versus a secondary diagnosis of HF.

METHODS

We performed a single-center, observational chart review at a 400-bed regional medical center with a comprehensive heart program. The medical center's investigational review board approved the protocol for this study on July 5, 2006.

Study patients were identified by a computer-generated report listing patients admitted to the hospital between January 1, 2006, and June 30, 2006, with a primary or secondary diagnosis of HF (*International Classification of Disease, Ninth Revision,*

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Clinical Modification code 428). Patients were included in the study if they had HF with a documented EF of $\leq 40\%$ and were more than 18 years of age. The most recently documented EF found in the patient medical record was used for the study. Patients were excluded if they had a diagnosis of diastolic dysfunction, died during hospitalization, or were discharged to hospice.

Data collected included demographic information, primary versus secondary diagnosis of HF, physician specialty, and inpatient and discharge medications. Data were collected for each patient and entered (excluding patient identifiers) into a computerized database (Excel, Microsoft Corp, Redmond, Wash). The standard of care given to patients in the hospital was classified as adherent or nonadherent. The ACC/AHA recommends patients with reduced left ventricular EF ($\leq 40\%$) receive an ACEI or ARB unless contraindicated.¹ In our study, patient care was classified as adherent if ACC/AHA recommendations regarding ACEI or ARB utilization were followed. The care was classified as nonadherent if contraindications were not clearly documented in the medical record. Clear reasons for withholding recommended therapies, including medications, are required by registries.

Statistical tests were performed using SPSS 14.0 (SPSS Inc, Chicago, Ill). Demographic data were analyzed by using the χ^2 test, the Fisher exact test, and independent *t* tests where appropriate. Clinical outcomes were compared using independent *t* tests and χ^2 tests. Sample size was determined by the number of patients admitted during the 6-month observation period. A value of $P < .05$ was considered significant.

RESULTS

Of the 360 hospitalized patients with a primary or secondary diagnosis of HF during the 6-month study period, 204 patients met inclusion criteria. One hundred fifty-six patients were excluded. The most common reason for study exclusion was a documented EF of $>40\%$.

Of the 204 study patients, 170 (83%) and 34 (17%) were discharged with a primary or secondary diagnosis of HF, respectively. Baseline demographics for the study population are presented in **Table 1**.

Adherence to current ACC/AHA guidelines for ACEI or ARB use based on level of diagnosis is presented in **Table 2**.

■ **Table 1.** Demographics of the Study Patients

Variable	Primary Diagnosis of Heart Failure (n = 170)	Secondary Diagnosis of Heart Failure (n = 34)	P
Sex, No. (%)			
Male	86 (51)	14 (41)	.316
Female	84 (49)	20 (59)	
Mean age, y	71.3 \pm 14.4	73.5 \pm 14.8	.419
Mean ejection fraction, %	28.2 \pm 8.2	28.8 \pm 9.9	.694
Mean number of previous hospitalizations for HF as a primary diagnosis	1.4 \pm 1.0	1.6 \pm 1.1	.192

HF indicates heart failure.

■ **Table 2.** Clinical Outcomes of the Study Patients

Outcome	Primary Diagnosis of Heart Failure (n = 170)	Secondary Diagnosis of Heart Failure (n = 34)	P
Adherence to HF guidelines specific to ACEI or ARB utilization, No. (%)	146 (86)	24 (71)	.029
Type of medication prescribed at discharge, No. (%)			.288
ACEI	88 (52)	15 (44)	
ARB	29 (17)	4 (12)	
Combination ACEI and ARB	1 (0.5)	1 (3)	

HF indicates heart failure; ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker.

Take-away Points

Addressing heart failure (HF) in hospitalized patients presenting with other acute illnesses can improve functional status and prevent costly readmissions.

- Current HF guidelines advise that an angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB) be prescribed to all HF patients, unless contraindicated.
- Chart review indicated that 86% of hospitalized patients with a primary diagnosis of HF were discharged on an ACEI or ARB, whereas only 71% of hospitalized patients with a secondary diagnosis of HF were discharged on an ACEI or ARB.
- Prescribing an ACEI or ARB when indicated to hospitalized patients with a secondary diagnosis of HF offers practitioners an opportunity for improved patient care through better adherence to national guidelines.

The overall adherence rate was 83% when all patients were considered together. Approximately 19% of those patients categorized as adherent had a documented contraindication in the medical record.

DISCUSSION

Use of the term “secondary diagnosis” for HF may imply that less importance is attached to this illness than is attached when HF is a primary diagnosis. In the study population, the prioritization of the diagnosis is the only difference. Baseline demographics, documented EFs, and number of previous hospitalizations for HF were similar for the 2 groups, indicating that each study arm would potentially benefit from ACEI or ARB therapy.

Secondary or comorbid conditions are frequently the reasons for complicating care and extending hospital stays. In the administrative world, these complications translate quickly into increased costs and problematic bed utilization. Maximizing treatment for comorbidities is crucial for optimizing patient outcomes. National guidelines have been established to direct evidence-based care for all HF patients regardless of setting: hospital, physician office, or home. Healthcare providers have an obligation to meet or exceed these guidelines.

In the hospital setting, there is a unique opportunity to implement guideline-driven practice. In addition to the immediate effects on quality of care, readmissions may be decreased. Heart failure readmissions are costly both emotionally and financially to patients, families, and the providers of healthcare. When the opportunity to start an ACEI or ARB is missed in the inpatient setting, patients who may have the most to gain are being deprived of therapies proven to decrease morbidity and mortality.

There are several limitations to this study. The study was small and only represented HF patients at a single hospital over a 6-month period. The research was observational in nature, and the accuracy of the information was dependent

on the completeness of the medical record. Information on comorbid conditions was not collected. Healthcare providers may not have initiated therapy with an ACEI or ARB in the inpatient setting for reasons related to clinical status (eg, hypotension) that were not documented in the medical record. No follow-up data were collected, which limits the ability to identify patients who may have been started on an ACEI or ARB in the outpatient setting. Further research may include a larger trial with other therapies important for the treatment of HF such as beta-blockers.

CONCLUSION

Hospitalized patients with a secondary diagnosis of HF are less likely to be discharged with an ACEI or ARB than are those with HF as a primary diagnosis. Patients with a secondary diagnosis of HF, even if a minority, are still included in some databases that benchmark adherence to nationally recognized guidelines. Closer attention to patients with a secondary diagnosis of HF may increase adherence to HF guidelines. More important, such adherence will improve quality of care and perhaps quality of life for *all* HF patients.

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