JACC: HEART FAILURE
VOL. ■, NO. ■, 2017

ISSN 2213-1779/$36.00
PUBLISHED BY ELSEVIER
http://dx.doi.org/10.1016/j.jchf.2016.12.014

STATE-OF-THE-ART PAPER

Acute Heart Failure

Alternatives to Hospitalization

Reka Zsilinszka, MD,[a] Robert J. Mentz, MD,[b] Adam D. DeVore, MD, MHS,[b] Zubin J. Eapen, MD,[b] Peter S. Pang, MD,[c] Adrian F. Hernandez, MD, MHS[b]

ABSTRACT

Acute heart failure (HF) is a major public health problem with substantial associated economic costs. Because most patients who present to hospitals are admitted irrespective of their level of risk, novel approaches to manage acute HF are needed, such as the use of same-day access clinics for outpatient diuresis and observation units from the emergency department. Current published data lacks a comprehensive overview of the present state of acute HF management in various clinical settings. This review summarizes the strengths and limitations of acute HF care in the outpatient and emergency department settings. Finally, a variety of innovative technologies that have the potential to improve acute HF management are discussed. (J Am Coll Cardiol HF 2017;■:■–■) © 2017 by the American College of Cardiology Foundation.

Acute heart failure (HF) is a major public health problem, resulting in more than 1 million annual hospitalizations in the United States alone (1). These hospitalizations are associated with a significant economic burden that is expected to rise, with annual costs approaching $70 billion by the year 2030 (2). Recent health policy changes mandate the public reporting of hospitals' HF readmission rates. Furthermore, these policy changes impose reductions in Medicare reimbursements for hospitals with higher-than-predicted readmission rates. As a result, there is a growing interest in novel approaches to deliver treatment for acute HF, such as the use of same-day access clinics (SDACs) for outpatient diuresis, observation units from the emergency department (ED), and transition strategies to safely reduce hospitalization and rehospitalization rates in appropriate patients with HF. In this article, we review the current state of acute HF triage and management in various clinical settings. We focus on the strengths and limitations of acute HF care, and alternative approaches to care, to inform contemporary clinical practice and trial design.

CURRENT STATE OF HF CARE

OUTPATIENT MANAGEMENT OF ACUTE HF. Patients hospitalized for acute HF remain at significant risk for readmission and mortality. Integrated outpatient care with physicians, nurses, dieticians, and pharmacists

From the [a]Duke University School of Medicine, Durham, North Carolina; [b]Division of Cardiology, Duke University Medical Center and Duke Clinical Research Institute, Durham, North Carolina; and the [c]Department of Emergency Medicine and the Regenstrief Institute, Indiana University School of Medicine, Indianapolis, Indiana. Dr. Hernandez was supported, in part, by funding from the Agency for Healthcare Research and Quality (U19HS021092). The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality. Dr. Mentz has received research funding from the National Institutes of Health, Amgen, AstraZeneca, Bristol-Myers Squibb, GlaxoSmithKline, Gilead, Novartis, Otsuka, Medtronic, and ResMed; and honoraria from Thoratec and Heartware. Dr. DeVore has received research support from Amgen, Novartis, and the American Heart Association; and has consulted for Maquet. Dr. Eapen has served on advisory boards for Novartis, Medtronic, and Cytokinetics; consulted for Novartis, Myokardia, SHL Telemedicine, and Janssen; and received honoraria from Janssen. Dr. Pang has consulted for BMS, Intersection Medical Janssen, Medtronic, Novartis, Trevena, scPharmaceuticals, Cardioxyl, Roche Diagnostics, and Relypsa; received research support from Roche, Novartis, PCORI, IUSM, and Indianapolis EMS; and received honoraria from Palatin Technologies. Dr. Hernandez has received research funding from Amgen, AstraZeneca, GlaxoSmithKline, Merck, and Novartis; and consulted for AstraZeneca, Merck, and Novartis. Dr. Zsilinszka has reported no relationships relevant to the contents of this paper to disclose. John R. Teerlink, MD, served as Guest Editor for this paper.

Manuscript received June 28, 2016; revised manuscript received November 11, 2016, accepted December 15, 2016.

ABBREVIATIONS AND ACRONYMS

ED = emergency department

HF = heart failure

IV = intravenous

SDAC = same-day access clinic

is crucial to avoid preventable readmissions. Patients with earlier follow-up after discharge for HF hospitalization have a lower risk of 30-day readmissions (3), yet this suggests that the outpatient setting is reserved for patients already stabilized after a hospital or ED visit. Historically, clinics were mainly for stable patients with chronic HF, with telephone "visits" taking the place of a clinic visit if acute symptom exacerbations occurred. The efficacy of early follow-up to reduce readmission and improve patient self-care is well supported; however, many patients who are readmitted after discharge are never seen in an outpatient setting (3–7).

As a result of these gaps in follow-up, the concept of SDAC was introduced as an intermediate step in acute HF care (**Central Illustration**). SDACs facilitate close post-hospitalization follow-up in an outpatient setting. Patients who are either too ill for oral diuretic agents or fail escalation oral therapy can receive intravenous (IV) diuresis in an SDAC setting. Outpatient IV diuresis has been shown to be a safe and potentially cost-effective way to reduce hospital admissions (8–11). Data on outpatient diuresis programs implemented within a hospital HF disease management plan remain limited, because few institutions to date have initiated such interventions (12).

Given the chronic nature of HF, an important part of any transitional outpatient HF program should include a multidisciplinary approach to assess psychological needs, patient support, palliative care, and medication reconciliation, all as a model of patient-centered care (13–15). As SDACs expand, they also should be integrated into the overall health care system with the ability to provide referrals to social workers, nutritionists, pharmacists, and mental health providers to manage patients' comorbidities and complex social situations. Multiple studies have shown the importance of social and information support in the management of HF (16–18). One previous study investigated the effectiveness of a post-discharge transitional care program for patients with HF, and found that 30-day readmission rates were reduced; an important part of this program included advanced practice registered nurses providing comprehensive support for patients (19).

EVIDENCE BASE. Given the relatively recent development of the SDAC model, limited data are available regarding its effectiveness at reducing hospitalization and improving patient outcomes; however, several studies have assessed the use of specialty clinics and outpatient diuresis to reduce rehospitalizations.

In 2008, Ryder et al. (8) demonstrated the efficacy of implementing an outpatient diuresis program in the setting of a hospital-based disease management program. Another pilot study by Banerjee et al. (9) investigated the efficacy of administering IV diuresis on a cardiology day ward for symptomatic improvement in acute HF. The study showed that outpatient IV diuresis was effective at symptom improvement and avoiding hospital admission, concluding that IV diuresis in an SDAC-type setting may represent a safe and effective way to reduce hospital admissions. Other recent studies have also shown the efficacy of adopting an outpatient IV diuresis model as a part of a transitional care program for patients with HF and frequent exacerbations (10,11). More recently, Buckley et al. (20) demonstrated the efficacy of outpatient IV diuresis in a cohort of 60 patients with chronic HF and evidence of worsening congestion, all of whom received a bolus and 3-h infusion of furosemide; the study suggested that outpatient diuresis was safe and effective, and may reduce the need for hospitalization for a proportion of patients included in the study. These studies highlight the importance of establishing open lines of communication between patients and the outpatient clinic, which allows for close post-hospitalization monitoring and timely symptom management as issues arise (11).

Although previous analyses support the benefits of specialized HF and outpatient IV diuresis clinics, these earlier studies were limited by small sample sizes, heterogeneous interventions, varying follow-up assessment times, and limited descriptions of patient populations. Randomized controlled trials comparing the SDAC model with standard of care for acute HF (ED to hospital to outpatient follow-up) have not been conducted, nor is there sufficient published data about single-site experiences with this treatment model. Implementing the SDAC into the HF management paradigm may substantially reduce admissions, and has emerged as a growing clinical setting for patient-centered care.

IN THE EMERGENCY DEPARTMENT

IDENTIFICATION OF LOWER RISK. Of the 670,000 annual ED presentations for acute HF, approximately 20% of these patients are discharged directly to home, whereas the remaining 80% are either admitted or (more rarely) managed in the ED observation unit (21). These admission statistics have been largely unchanged over the past 5 years (21). Because HF SDACs are not widespread and may require capital investments, most patients with acute HF begin their clinical course in the ED, where the decision