Specialty Healthcare Benefits Council
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Redesigning Heart Failure Management to Optimize Patient and System Outcomes

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Heart failure (HF) management involves drug therapies familiar to all, such as angiotensin-converting enzyme inhibitors (ACEIs)/angiotensin receptor blockers (ARBs), beta-blockers (BBs), and hypertension and statin therapies. However, on critical chart review, one typically finds lapses in care continuity and monitoring. Recently, Medicare and JCAHO in the United States and the National Health Service and NICE (National Institute for Health and Care Excellence) in the United Kingdom have focused on whether these therapies are linked into an orderly care process to optimize physical function and quality of life (QOL) for patients, and to decrease avoidable readmissions.

Readmissions are common, with 20% of hospitalized patients readmitted within 30 days and 56% within a year.[1] For HF, 90-day readmission rates can range from 30% to 50%.[2] High rates of hospitalization reflect patients with HF that are not cured during hospitalization, but stabilized where their care can be managed in an outpatient setting.

In 2003, the Centers for Medicare & Medicaid Services (CMS) reported that 14% of its beneficiaries carried a diagnosis of HF, yet this population accounted for 43% of the total Medicare spending.[3] As CMS has moved toward paying for results rather than process, the healthcare industry has had to adapt to earn full reimbursement. Thus, pressure on system managers is intensifying as payers incorporate financial and regulatory penalties for organizations which do not provide connected and consistent care processes.

This article reviews current evidence-based drug therapies for HF, and best practices that integrate these recommendations into a patient care framework, improve patient adherence and QOL, and minimize risk of unmonitored deterioration and readmission to acute care—or death.

Treatment Optimization for Progressing HF

HF has historically been divided into 2 distinct classes: those with preserved ejection fraction (HF*p*EF), and those with reduced ejection fraction (HF*r*EF). The 2013 American College of Cardiology Foundation/American Heart Association HF Guidelines add 2 subgroups to the HF*p*EF category: those with borderline ejection fractions (EF 41-49%), and those with improved EF (patients with previously reduced EF, but now with an EF ≥40%).[4] Several effective therapies have been proved to reduce morbidity and mortality in patients with HF*r*EF. However, so far, effective medication management has been limited to treating risk factors for patients with HF*p*EF.

Medication therapies shown to significantly reduce mortality in HF*r*EF include ACEIs or ARBs, BBs, and aldosterone antagonists. In addition, in the IMPROVE-HF analysis, the authors found significant reductions in mortality were additive with each successive therapy, plateauing at 4 to 5 treatments.[5] Interestingly, they did not find that aldosterone antagonists provided additional mortality reduction when combined with BBs/ACEIs. This finding is contradictory to the EPHESUS trial which showed an additional relative risk reduction of 15% for all-cause mortality when eplerenone was added to ACEI/BB treatment.[6]

For all patients with congestion related to HF, managing volume status is essential to controlling symptoms and improving QOL. Loop diuretics are the first-line agent for diuresis because of their powerful effects in the ascending loop of Henle. While proved to reduce symptoms, these medications have shown no benefit on mortality reduction.

For patients classified as A or B (Table), treatments should be aimed at treating comorbidities, reducing risk factors (like hypertension, coronary artery disease, obesity),

PRACTICAL IMPLICATIONS

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- Readmissions for HF are common, with 20% of hospitalized patients readmitted within 30 days and 56% within a year.
- 90-day readmission rates can range from 30% to 50%.
- High readmission rates for HF can result in loss of CMS payment for hospitals.
- For HF, and many other conditions, we now have effective therapies, and information technology allowing us to track multiple issues across many services and providers.
- Driving patient-centered care using a multidisciplinary approach with defined care guidelines is a societal and economic mandate to bring more tangible benefit to patients and financial incentives for hospitals.

and introducing lifestyle modifications. Where appropriate, it is reasonable to initiate an ACEI/ARB and/or a BB.

As patients progress to stage C, therapies proved to reduce morbidity and mortality should be optimized. One of the challenges in HF management is achieving doses which have been proved effective in clinical trials. Initiation of therapy with a low dose, followed by slow upward titration until maximum benefit is achieved, is ideal for reducing adverse effects and improving tolerability. This requires a collaborative effort between inpatient and outpatient practitioners, as well as early follow-up upon hospital discharge.

The newest HF guidelines specifically recommend an outpatient practitioner visit within 7 to 14 days of release from the hospital.[4] Follow-up is also important for discussions between patients and healthcare practitioners regarding progression to stage D and goals of therapy. HF education is thus crucial to the success of this population.

Once a patient transitions to stage D, medications which were optimized during stage C should be continued, but treatment options need to turn toward advanced heart care programs or palliation/hospice. At this point, medication therapy often becomes challenging due to the significant weakening of the heart resulting in low blood pressures and worsening cardiac output.

Electrolyte management may also pose a problem due to renal insufficiency from poor kidney perfusion. Intravenous inotropes may provide benefit for symptom management, but this is a relatively short-term solution. Established relationships between hospitals, outpatient practitioners, advanced heart care centers, and hospice providers help transition patients once they have reached stage D.

Managing HF Through the Continuum

Having an Evidence-Based Formulary—Most patients are newly diagnosed with significant HF while in the hospital. Thus, the starting point for improving an HF patient's QOL is having an evidence-based formulary that only includes HF drugs that have been proved to be better (more effective and safer) than other HF drugs.[7]

Providing Evidence-Based Therapy—The next step is to provide the evidence-based therapy according to the latest clinical guidelines.[4] The evidence showing that providing evidence-based therapy in HF patients is robust. The number needed to treat (NNT)—the number of people needed to be treated, on average, to prevent 1 more event—is often used to judge the effectiveness of therapy. For example, a systematic review of the impact of BBs on the secondary prevention of HF discovered the numbers needed to treat to prevent death or hospitalization and death after 1 year were 17 and 12, respectively.[8] When using ACE inhibitors, the NNT was 20 for death and 3 for hospitalization after 3 years of therapy.[9]

The use of HF-targeted order sets can provide a standardized framework to therapy optimization. For optimal effectiveness, these plans would be designed to be addressed upon admission and again at discharge and focus on medication selection, laboratory follow-up, and interdisciplinary counseling/discharge planning.

Approximately 20% of patients experience adverse events within 3 weeks of discharge[10]; nearly 1 in 3 HF patients is readmitted within a month after hospital discharge[11]; and 3 out of 4 post discharge follow-up visits occur without the benefit of a discharge summary.[12] A 2011 study revealed the types of issues that "fall through the cracks": in a study of 564 patients discharged from a large academic medical center to a sub-acute care facility, 181 (32%) had pending laboratory tests.[13] Of these, only 20 (11%) of the discharge summaries provided documentation of these pending tests. How can we organize ourselves to be more effective in connecting all components of care so fewer treatment failures occur, and patients can optimize their QOL?

Multimodal Discharge Education

An understanding of the condition of HF and its progression is important for reducing hospital admissions

Table. Drug Therapy Options for Treating Heart Failure

STAGE	TREATMENT GOALS	MEDICATION SELECTION
A	• Prevent progression of disease • Manage risk factors • Encourage lifestyle modifications	• Therapy targeted at comorbidities
B	Same as Stage A, plus: • Prevent symptoms of heart failure • Revascularize appropriate candidates	• Continue to select medications with morbidity/mortality benefit in comorbid conditions • Where therapeutically appropriate, discontinue any medications that are known to induce/worsen heart failure
C	• Slow progression • Prevent/reduce hospitalizations • Prevent mortality	HF*p*EF: • Diuretics for symptom relief • Medications for comorbidities HF*r*EF: • Diuretics ACEIs/ARBs: • BBs • Aldosterone antagonist *In select patients it may be appropriate to consider:* • Hydralazine/isosorbide • Digoxin
D	• Improve quality of life • Prevent/reduce hospitalizations • Prevent mortality • Address advanced heart care options • Determine end-of-life desires	• Optimize medications (as above) • When necessary, add diuretics with an alternative mechanism of action to those that the patient is receiving • Consider comfort measures

ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta-blocker; HF*p*EF, heart failure with preserved ejection fraction; HF*r*EF, heart failure with reduced ejection fraction.

and improving compliance. Various studies have tested the hypothesis that HF education at hospital discharge will reduce readmission rates and improve self-care. One study showed that patients who received all 6 points of discharge education, as required by CMS (weight monitoring, diet, activity level, discharge medications, follow-up appointment, and course of action if symptoms worsen), were less likely to be readmitted.[14] Another study found that patients who received 1 hour of HF education before hospital discharge were less likely to readmit, and had a lower mortality rate at 180 days.[15]

Patient education should include a multidisciplinary team of healthcare professionals, and ideally be directed at the patient, as well as family members. Co-development of comprehensive education programs by medical staff, pharmacy, nursing, physical therapy, nutrition support, and care management can reinforce and elaborate on the information which has been given by the discharging physician. It is recommended that these groups work together to develop a standard written document which can be used in all subsequent teaching sessions.

A phone call within 3 days of hospital discharge is also recommended in the current HF guidelines. The purpose of these phone calls should be to ensure medication compliance and adherence to a follow-up appointment, and to answer any questions the patient may have related to their condition. It is also important that the patient be clear on the appropriate points of contact who should be alerted to any issues the patient may have.

An early follow-up office visit after hospital discharge should occur within 7 to 14 days. A recent study of 30,136 patients in 225 hospitals shows the importance of outpatient follow-up for HF patients.[16] Patients with outpatient follow-up within 7 days of discharge for an HF hospitalization were less likely to be readmitted within 30 days in the "Get with the Guidelines (GWTG)-HF Registry of Patients."[17]

Home healthcare is a complementary strategy to delay or prevent hospital readmissions. A study examined the relationship between home care nursing services and hospital readmissions after 1176 patients were discharged from the hospital with a primary diagnosis of HF.[18] Findings indicate that patients receiving home care nursing services were readmitted to the hospital significantly less often within 90 days after hospital discharge.

Telemonitoring, a system where a communication device is placed in a patient's home to transmit various data points such as blood pressure, weight, and oxygen saturation on a daily or frequent basis, has proved beneficial in some organizations. Home-based care and disease management programs have also had successes, although the definitions of these programs are not yet well established.

Optimizing Patient Adherence

Perhaps the most difficult challenge is getting patients more interested in understanding and taking an active interest in their care. Patients vary in terms of having information, motivation, and behavioral skills necessary to self-manage their chronic disease, collaborate with healthcare providers, preserve functioning, and access appropriate care. Identifying the patient's degree of activation toward self-management provides the key to interventions that lead to better medication adherence and lifestyle changes that improve a patient's QOL.

Communicating Within a Patient-Centered Framework

A 10-question validated instrument, Patient Activation Management (PAM), can be used to assess the patient's ability to self-manage their disease and medications. PAM assessment and patient coaching and counseling skills have been shown to be effective in managing HF patients, with a 28% drop in emergency department (ED) visits and a 12% drop in hospitalizations in the PAM group versus a control group.[19]

This instrument underscores the importance of communicating with patients in a manner which is effective for them. Historically, communications have been instinctively based on each provider's area of emphasis: doctors talk doctor issues, pharmacists focus on pharmacy issues, and so forth. The move toward patient-centered care involves organizing a simple but comprehensive educational package, which is framed in a way the patient can understand it.

Cost and Availability of Medication

For chronic HF, 1 study found the overall monthly cost of medication was $438, and this was back in 2002. Patients in class II and III had the highest costs, at $541 and $514 respectively.[20] Also, in a study of a cohort (n = 192) nested within a randomized trial at a university-affiliated ambulatory practice, Murray et al demonstrated that refill adherence of <40% was associated with 3 times as many hospitalizations.[21] These findings underscore the need for refill adherence of ~80% (P = .002). Programs which attempt to blend the distinct lines between hospital pharmacy and retail programs may provide a smooth transition from inpatient to home.

In addition to cost, a common concern of patients is not wishing to wait at a retail pharmacy on hospital discharge. This often leads to days of missed medications and the potential for readmissions. Through hospital-based retail pharmacies and merged data systems, the ability to discharge a patient from the hospital with medications in hand is an opportunity which is improving as communities increasingly integrate inpatient and outpatient care and information.

Improving the Patient's QOL

Studying and understanding health-related QOL can be complex and difficult. It is easy to get caught up in trying to improve the patient's medication therapy and seeing laboratory tests and biomarkers improve; however, the real challenge is improving the patient's longevity and QOL.

Those who study this activity have developed a potpourri of definitions, tools, and measurements (like the SF-12 or SF-36) that are often conflicting. Because of the enormity of options, many clinicians ignore the issue. However, for HF, understanding QOL can be made simple—is the patient better, the same, or worse because of what you do? Here we are speaking of outcome measures, rather than process measures (interventions and clinical measures like laboratory results) or healthcare utilization measures (eg, hospital, physician, ED visits).

QOL measure what is most important to the patient—Will I live longer? Will I have less symptoms or exacerbation of my disease? Will I have more energy? When will I be able to climb more stairs or walk further without getting shortness of breath? Most patients measure their QOL by what they can do versus what they could do before they were ill.

SUMMARY

Previously, we as professionals have been judged (and paid) according to whether we ordered or advised proper tests or therapies in our institution or office—patient understanding about their disease or therapies, motivation, accomplishment of recommended follow-up, monitoring, or self-care was beyond our required responsibilities.

Now, however, healthcare is rapidly transitioning from a "sick-care" model that emphasizes urgent interventions to maximizing patient benefit from coordinated and systematic "healthcare." In our grandparents' time, there

were few supportive therapies, and treatment complexity exemplified by HF did not exist.

For HF, and many other conditions, we now have effective therapies, and information technology allowing us to track multiple issues across many services and providers. Driving patient-centered care is a societal and economic mandate to bring more tangible benefit to patients, such as emancipating an NYHA Class III patient who is short of breath moving across a room, constantly feeling the dread of knowing they are at the edge of decompensation, readmission, or possibly death, and transforming him or her into a person who can maintain reasonable activity, visit family, enjoy a beautiful day outside, or simply do routine daily tasks.

To accomplish this improvement consistently involves a transition from each of us having our own professional, siloed "guidelines" to participating in best practice processes to develop a smoothly running framework that coordinates all the professionals touching that patient.

Trying to coordinate without care process standards is as ineffective as fielding a football team of all-stars who have no coordinated "plays," where every movement by each team member has to be discussed anew after each down. Given a core play, or process, customization for individual variables needs would be analogous to calling for a "DRG 127 (HF) flare, hold the BB for bradycardia and bifascicular block, cardiology consult regarding possible pacemaker, routine monitoring, education, and guideline therapies—GO!", providing multiple physicians, pharmacists, respiratory therapists, physical therapists, discharge planners, and others with clear directions for coordinating "best practice" care both during and after acute hospitalization.

Times of dramatic change, such as now, are threatening to those who cannot imagine the benefits for patients of this transition to "patient-centered care," or do not acquire new skill sets to leverage medical and information technologies and move out of our traditional silos toward a "collaborative care" model. Indeed, we are long overdue for the organizational transformation discussed in this paper, and are in fact the last major complex industry to adopt integrated logistics to improve the tangible value of our services to society.

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