

CME ARTICLE

Disease Management of Congestive Heart Failure

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AUDIENCE

This article is designed for primary care physicians, cardiovascular specialists, medical directors, and other managed care administrators responsible for heart failure patients.

GOAL

To provide the reader with a basic understanding of heart failure epidemiology, heart failure management, and different strategies for the management of this particular patient population.

OBJECTIVES

1. To describe the impact of heart failure on the healthcare system in the United States.
2. To briefly describe the current practice for managing heart failure.
3. To describe the evidence for care by cardiologists of heart failure patients.
4. To describe the different disease management strategies being utilized in heart failure management.

Impact of Heart Failure

The management of chronic conditions has come to the forefront of healthcare policy and research as we begin to understand its clinical and financial impacts. Using the 1987 National Medical Expenditure Survey, Hoffman et al found 46% (90 million) of Americans had one or more chronic conditions.¹ Although they comprise just 46% of patients, sufferers of chronic conditions represented 76% (\$272.2 billion) of healthcare expenditures. The same study found a \$73 billion cost in lost productivity secondary to chronic conditions. The percentage of the American population over 65 years of age is projected to increase² and this subpopulation represents 42% of the chronic care expenditures; therefore, the study by Hoffman et al projected that by the year 2030, total direct costs of caring for patients with chronic conditions will rise to \$798 billion.¹

As a chronic condition, congestive heart failure (CHF) has a significant impact on the nation's healthcare system. The prevalence of heart failure in the United States is estimated at 4.7 million Americans and the overall 5-year mortality for CHF is 50%.^{3,4} Yet, as more patients survive myocardial infarctions and as treatments for acute coronary syndrome continue to improve, the number of patients suffering from heart failure is expected to grow.⁵ Heart failure is both a chronic and a progressive illness. After the diagnosis is made, the syndrome of heart failure progresses and the prognosis of the patient is generally poor, culminating in either cardiac transplantation or death. Concomitant with the increased prevalence of CHF, the number of deaths attributed to congestive heart failure increased 115.7% from 1979 to 1995.⁶ Presently, the one-year survival of New York Heart Association (NYHA) class II-IV patients with ejection fractions near 20% is about 65%; and one-year survival of class II and III patients is 80%.⁷⁻¹⁰ The

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overall 5-year survival for CHF is 50%, irrespective of severity.^{3,6} Although new medications have improved survival, overall mortality among this patient population remains high.

As the prevalence of CHF and its mortality increase, a parallel rise in morbidity, particularly hospitalization, has been noted. From 1983 to 1993, CHF hospitalizations increased by 70% to 875,000, resulting in 6.5 million hospital days.¹¹ The total direct cost of CHF has been estimated to be \$10 billion.⁵

The impact of CHF is magnified in the elderly. Five percent of the population between 70 to 79 years of age have been diagnosed with CHF.¹² As reported by the Centers for Disease Control and Prevention, the overall death rate increases significantly for each decade over 65. For example, the death rate for patients between the ages of 65 and 74 is 31.6 deaths per 100,000 persons. Whereas the death rate for patients over the age of 85 is 559.1 deaths per 100,000 persons – an 18-fold increase.¹³ Between 1984 to 1991, 15.1% in a national sample of elderly patients were hospitalized for CHF.¹⁴ CHF

hospitalizations increase more than 27 times in patients older than 74 years of age versus those under the age of 65, making CHF the highest volume Medicare Diagnosis Related Group (DRG) at 600,000 discharges.¹⁵ In 1994, O'Connell et al reported that CHF admissions represented 4.8% of the total DRG budget (\$5.45 billion) for the Health Care Financing Administration (HCFA). In other words, the money spent treating CHF was greater than the expenditures for all types of cancer (\$2.24 billion) and for myocardial infarction (\$3.18 billion).¹⁶

Hospitalizations represent not only a significant morbidity to patients with CHF, but also the most significant portion of the cost for caring for this patient group, up to 80%.¹⁷ Readmission rates for heart failure patients within the first three months after discharge range between 36%-57%.¹⁷⁻¹⁹ Risk factors for readmission include medical non-compliance, age, gender, presence of coronary artery disease or diabetes mellitus, and poor inpatient care.^{9,13,20,21} Noncompliance with medications and diet causes between 33% to 64% of readmissions and inadequate discharge planning or follow-up causes up to 35% of readmissions.^{12,13,16,22}

Care of Heart Failure Patients

For the patient presenting with symptoms consistent with CHF, the American College of Cardiology, the American Heart Association, and the Agency for Health Care Policy and Research developed a series of guidelines outlining interventions that should be followed. These guidelines, as summarized in Table 1, describe the importance of proper diagnosis and evaluation for other causes of symptoms, identification of reversible causes of CHF— most importantly myocardial ischemia, and appropriate management, including patient counseling and drug therapies. Although many consider these guidelines to be outdated due to significant advances made in heart failure therapeutics, the recommendations in the guidelines are still pertinent. In addition, new guidelines may be forthcoming

Table 1. Guideline Recommendations from the AHCPR³

<ul style="list-style-type: none"> ■ Asymptomatic patients with ejection fractions <35-40% should be treated with an ACE inhibitor. ■ All patients with symptoms suggestive of heart failure should undergo an evaluation including measurement of left ventricular function unless another disease is clearly evident. ■ Presence or suspicion of heart failure and/or any of the following findings usually indicates a need for hospitalization: evidence of acute myocardial infarction, respiratory distress, pulmonary edema, severe complicating medical illness, anasarca, symptomatic hypotension, heart failure refractory to outpatient management. ■ Diuretics should be used for patients with heart failure and/or signs of significant volume overload. ■ After a diagnosis of heart failure is established, all patients should receive counseling on the disease, the prognosis, the symptoms to watch for, and the different therapies available. ■ All patients with heart failure should be given a trial of ACE inhibitors unless specific contraindications exist. ■ Patients with ischemic cardiomyopathy should be advised of the possibility of revascularization unless they have a specific contraindication.
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Source: Reference 3.

that will incorporate the more recent clinical research findings (Table 2).

Guidelines must continue to be based on clinical research. A number of medical therapies to significantly improve clinical outcomes for heart failure patients have been proven in large, randomized, controlled trials. Angiotensin-converting enzyme (ACE) inhibitors are the cornerstone of heart failure therapy. This class of medication is recognized as an essential therapy based on a number of studies that showed improved survival and reduced morbidity, even in patients with asymptomatic left ventricular dysfunction.²⁴⁻²⁷ In addition, recent evidence suggests that higher ACE inhibitor doses are more efficacious than lower doses in preventing hospitalizations (Milton Packer, MD, American College of Cardiology, 1998). Recently, the evidence for β -blocker therapy has been so supportive that this class of medication is accepted by heart failure specialists as the standard of care.²⁸⁻³⁰

Alternative therapy for ACE inhibitor intolerant patients that improves survival (but not to the same degree as ACE inhibitors) is the combination of hydralazine and isosorbide dinitrate.^{27,31} This combination should be considered for patients who have an absolute contraindication (or a significant relative contraindication, making them a poor candidate for ACE inhibitor therapy) and have achieved target dosing of a β -blocker approved for use in CHF patients. Angiotensin receptor blockers are a new class of drugs which are currently being studied in heart failure patients but have not conclusively been shown to improve clinical outcomes. The results of a randomized trial conducted to evaluate the effect of spironolactone on mortality (the Randomized Aldactone Evaluation of Survival Study) were presented at the American Heart Association Scientific Sessions in Dallas, TX in November 1998. Investigators reported a 27% reduction in mortality ($P=0.0001$) for patients treated with spironolactone (Bertram Pitt, MD, unpublished data, 1998). Thus, spironolactone may be an important component of the heart failure regimen in patients with advanced heart failure.

Although digoxin has a neutral effect on mortality survival,³² it does reduce admissions and improve symptoms; discontinuing digoxin exacerbates symptoms, adversely affects quality-of-life, and increases admissions.³²⁻³⁴ Although the strength of evidence for diuretic therapy is weak in terms of improving clinical outcomes, it has become ingrained over time as part of the standard care of patients with heart failure for symptomatic relief.³

The Argument for Disease Management

Although the guidelines set the standard, physicians have fallen short of the mark. As stated above, ACE inhibitors have been proven to improve survival and morbidity of heart failure patients; however, when prescribing the first drug for therapy of heart failure, less than 20% of physicians prescribed an ACE inhibitor.³⁵ Using the Study of Left Ventricular Dysfunction registry, Bourassa et al found that only 30% of CHF patients were receiving ACE inhibitors at the end of their first year in the registry.³⁶ The use of ACE inhibitors increased to 55% in patients with an ejection fraction less than 20%. In another study, only 51% of patients with known left ventricular dysfunction were discharged from the hospital on an ACE inhibitor.¹⁶ Certainly, a continued lag between clinical research and physician practice patterns is expected, but these numbers will improve as physicians become more comfortable with using ACE inhibitors.

The care CHF patients receive during a hospitalization has an impact on mortality and morbidity. Using standards determined by a review committee, Kahn et al found that 12% of hospitalized CHF patients received poor to very poor quality of care.³⁷ Patients receiving inferior care had higher 30-day post-discharge mortality compared with patients receiving proper care. In a retrospective analysis by Krumholz et al, 86% of discharged elderly CHF patients received ACE inhibitors. Only 14% received the target dose of the ACE inhibitor,³⁸ but this may be explained by the need to increase dosage over time. In the same study, however, CHF patients received limited counseling. Only 6% of patients received instruction regarding weight monitoring whereas 70% of patients were counseled on sodium restriction in their diet. Furthermore, only 11% of

Table 2. Potential New Guideline Recommendations

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| <ol style="list-style-type: none"> 1. Initiation and titration of β-blockers. 2. Titration of ACE inhibitors to high target dose. 3. Addition of spironolactone in patients with NYHA class III or IV. 4. Maintenance of digoxin concentration at lower end of therapeutic range (0.6 – 1.0 ng/ml). |
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smokers were advised on smoking cessation. Ashton et al found that patient's lack of readiness for discharge in terms of medications and counseling increased the risk for unplanned early readmission.²¹ After taking into account other covariates, the authors found that the poor quality of care CHF patients receive as inpatients caused 18.5% of the unplanned readmission.²¹

The quality of care CHF patients receive may not only depend on where they receive their care, but may also depend on who is providing it. Cardiologists deal with the concepts of heart failure on a more consistent basis during their training and in their practice than internists or family physicians. Using national guidelines as benchmarks, there is evidence that cardiologists provide better quality of care than primary care physicians.^{26,39-42} A survey of family practitioners/generalists, internists, cardiologists, and other caregivers found a significant difference between cardiologists and primary care physicians with regard to diagnostic evaluation and treatment of CHF patients.³⁹ Ninety-two percent of cardiologists assessed left ventricular function compared with 69% of internists and 61% of family physicians/general practitioners. A more thorough evaluation of CHF by cardiologists has been noted in other studies.⁴⁰ In addition, cardiologists are more likely to rule out reversible ischemia using stress tests and cardiac catheterization.^{39,41} When admitted to the hospital, a heart failure patient cared for by a cardiologist is more likely to be in an intensive care unit and be treated with intravenous inotropes.⁴⁰ Studies have shown that cardiologists are more likely to use ACE inhibitors as first line therapy compared with primary care physicians.^{26,40,41} A study of patients referred to a heart transplant program found that 18% of those not taking an ACE inhibitor (for reasons unknown) were started on this medication; for those receiving ACE inhibitors, the mean daily dose was increased by 98%.⁴² One possible explanation for the differences in the quality of care CHF patients receive is that the patients cared for by primary care physicians tend to be older, have more comorbid diseases, and have more diastolic dysfunction as the cause of their symptoms.

The differences in the quality of care appear to translate into improved outcomes for patients cared for by cardiologists. Cardiology patients are less likely to be hospitalized and have increased functional status.^{40,42-44} In the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment (SUPPORT), hospitalized patients cared

for by cardiologists had significantly higher adjusted survival rates than the patients cared for by general internists (relative hazard 0.80, 95% CI 0.66,0.96).⁴¹ Treatment of coronary artery disease by cardiologists compared with generalists has also demonstrated improved outcomes at higher costs.^{45,46} Improved outcomes in patients treated by cardiologists come at a greater upfront cost to the healthcare system, but improved survival and reduced morbidity may translate into cost savings.^{41,47} It is important to note that these studies evaluated the cost of care in the inpatient, not the outpatient, setting. The evidence for improved care by cardiologists versus primary care physicians needs to be emphasized in light of the fact that the majority of CHF patients receive their care from primary care physicians without additional cardiology input.⁴⁸

Even when physicians and the healthcare system provide optimal care, patients may not achieve optimal health due to poor compliance with the prescribed medications and lifestyle changes. Elderly patients are at particular risk for noncompliance because of the increased number medications they are prescribed.⁵⁰ Compliance with medications among a patient cohort can be as low as 40 to 50%.⁵¹⁻⁵³ Targeting therapies to improve compliance should have an impact on hospitalizations and reduce resource utilization.

New Paradigms of Care

A number of new models for the care of heart failure patients are being developed to replace the traditional strategies. The underlying concept of each new system is removing certain responsibilities for patient care from the physician and reassigning them to the patient, the patient's family, or another person in the healthcare team. By shifting responsibilities away from the physician, the physician's time is freed up to see more patients. In addition, as responsibilities are shifted to other members of the healthcare team, utilization of protocols are required that allow for a more systematic approach to the care of heart failure patients.

Heart failure clinics were the first attempt to change the system for patients with CHF. As an offshoot of the transplant programs, heart failure clinics are an efficient and effective means to improve patient care. Heart failure clinics improve medical regimens, reduce hospitalizations, and increase functional capacity.^{42,44} Significant increases in the doses of ACE inhibitors (95 ± 120 mg to 183 ± 143 mg, $P=0.001$) and diuretics (48 ± 76 mg to 90 ± 79 mg of furosemide, $P=0.01$) occurred after patients were

followed in a heart failure clinic.⁴² Over a 6-month period, hospitalizations for the diagnosis of heart failure decreased from 429 admissions to 63 ($P=0.0001$).⁴² In a second study, hospital admissions for all causes one year before and after enrollment decreased from 219 to 116 ($P<0.01$).⁴⁴

In the heart failure clinic model, patients interact with physicians, nurses, and pharmacists who have experience and training in caring for patients with heart failure. The patients receive intensive evaluations (usually as inpatients), have easy access to the specialist team, and receive regular follow-up phone calls. A recent study showed that a clinical pharmacist specializing in heart failure who works with cardiologists could have a significant beneficial impact on CHF patients' outcomes, including reduced hospitalizations.⁵⁴

Other programs have been designed to target patients at risk for hospitalization during an index heart failure admission. Rich et al developed a multidisciplinary team approach to treat CHF patients identified as high risk for rehospitalization.⁴³ In this randomized, controlled study, patients admitted with the primary diagnosis of CHF received either usual care as an inpatient that could include any consultation that the attending physician wanted, or received care from a heart failure team composed of a cardiologist, a heart failure nurse specialist, a dietitian, and a social worker. The patients in the intervention arm were provided intensive predischARGE management including medication review by the cardiologist and patient education on weight surveillance and sodium restriction. After patients were discharged, they received intensive follow up including telephone calls and home visits. This approach increased rates of event free survival (53.6% in the usual care patients vs 64.1% in the intervention patients, $P=0.09$) and prevented readmission within 90 days of discharge (42.1% in the usual care arm vs. 28.9%, $P=0.03$). In addition, quality of life, measured with the Chronic Heart Failure Questionnaire, was significantly improved in the patients cared for by the multidisciplinary team (22.1 ± 20.8 vs 11.3 ± 16.4 , $P=0.001$). After accounting for the cost of readmissions and the program, cost of care for patients in the program was reduced \$490 per patient.

The Multifit program, developed by West et al, is a third model for heart failure patient care. It utilizes nurse managers as the primary healthcare provider.⁵⁵ During a predischARGE visit with hospitalized heart failure patients, nurse managers review diet therapy, warning symptoms, medication usage,

and techniques for improved adherence to medications. This intensive training is followed-up with postdischarge telephone calls to assess compliance and symptom exacerbation. Using this system, significant functional status, measured as the percent of patients with NYHA class I or II, significantly increased at 3 months (74%, $P=0.001$) and at 6 months (76%, $P=0.007$) compared to baseline (60%). In addition, ACE inhibitor usage improved with significant increases from baseline doses of lisinopril (17 ± 12 mg vs 23 ± 12 mg, $P=0.0004$) and of captopril (67 ± 22 vs 100 ± 56 mg, $P=0.04$). Furthermore, reductions in heart failure and all cause admissions (87% and 74%, $P=0.0001$) were observed.

Although the program was designed with input from cardiologists, there were no visits with cardiologists. When the patient called the program with a symptom exacerbation, off-site nurses contacted the primary care physicians to respond. However, Shah et al found problems in the responsiveness of primary care physicians in a similar telemanagement program.⁵⁶ In this study, 52 physician notifications for 65 specific problems were generated by a system patients called into to report problems. Seventy-five percent of the calls came from patients with NYHA class III or IV. Only 19 (37%) interventions were made by physicians once notified, suggesting that programs need to be designed with appropriate response mechanisms.

Self-Management for CHF Patients

One of the key components that impact the ultimate success of these new programs in managing CHF patients is the concept of self management. Not only are the responsibilities of the physician shifted to other healthcare providers, but the patients themselves are also asked to participate more in their care. These new models in patient care recognize that patients and their families take on many of the primary care giver's responsibilities in managing these chronic conditions.^{57,58} Patients' new responsibilities include reporting the onset of symptoms to the nurse coordinator instead of going to the emergency room, educating themselves about diet and medications, monitoring their weight, and recording their dietary intake. It is important to remember that, as Clark et al found, self management has less to do with learning specific facts and more to do with setting goals, organizing resources, and implementing problem-solving strategies.⁵⁷ In addition, each heart failure patient has specific needs. For example, investigators found that elderly patients have different self-management needs compared

with younger patients (eg, differences in the number of medical conditions, the social circumstances, and patient goals for their management).⁵⁷

The medical profession needs to see self-management as more than just a mechanism to change behavior.⁵⁹ Although behavior modification has an impact on risk reduction and outcomes, the correlation between health behavior adjustments and improving health status in chronic conditions is not as strong.⁵⁹ Additional modifications in terms of psychosocial parameters also have an impact on patient outcomes. In patients with rheumatoid arthritis, improving psychosocial well being has been accomplished through simple seminars aimed at educating patients about their disease and nonmedical means for self-care.^{60,61}

Challenges for the New Disease Management Programs

Researchers at Duke University Medical Center have developed a heart failure disease management program that incorporates a number of the previously described concepts. The program is a cooperative endeavor between primary care physicians and heart failure cardiologists and is designed to improve the care of patients with severe heart failure. A nurse practitioner coordinates the program for patients, assists the patient in his/her interaction with the healthcare system, and promotes communication between all participants in the program.

The Duke Heart Failure Program uses evidence-based medicine as the foundation for its management of heart failure. Protocols for evaluation of patients, medication initiation and titration, and symptom exacerbation were developed using national guidelines, results of clinical trials, and (when no evidence was available) the consensus of the program's heart failure cardiologists. As further studies related to the care of heart failure patients are completed, new protocols will be developed.

Based on our experience in initiating and maintaining the program, we have identified some specific challenges that a new program might face.

Integrating the Primary Care Physician and the Cardiologist. Defining the proper balance between specialist and generalist care remains a critical component of any heart failure disease management program. Much depends on the practice environment that exists within the service area of the program. In keeping with the concepts of evidence-based medicine, the incorporation of cardiologists into the program is justified based on the evidence that cardiologists achieve better out-

comes for heart failure patients. Although these improved outcomes may come at a cost higher than that of a primary care physician, when the cardiologists' services are provided within a disease management framework extra costs can be minimized.

Once the decision is made to include specialty care as part of a disease management program, the program needs to recognize specific concerns of the primary care physicians who will refer their patients. The program should be designed as a service intended to support the primary care physician, not as a substitute for that physician.

Primary care physicians, for example, may see a new disease management program as an economic threat. In the Duke Healthcare System, managed care provides coverage for approximately 20% of the system's total population. Primary care physicians are evaluated based on the number of patients they see and on the number of referrals they make. A program that eliminates visits to their office and increases visits to a specialist may not be welcomed. In order to overcome this legitimate concern, a disease management program needs to be supported by the healthcare system, since the entity as a whole will benefit from the improved quality of care. That is the case with the Duke Heart Failure Program, which is funded by the Duke Healthcare System. In addition, the program is seeking approval by insurers to be part of the normal primary care practice so that referrals will not be considered as specialty care.

The need to focus on primary care physician reimbursement issues is dependent on the type of system into which a disease management program is implemented. The Multifit program developed by West et al, for example, has been implemented in the Kaiser Permanente system, which is a staff model health maintenance organization based on the west coast. Since primary care physicians have a set salary, they do not see the program as a threat to their practice or income.

Beyond economics, a disease management program may have difficulty in gaining the trust of generalist physicians due to patterns of referrals by the program. A common complaint regarding the referral of patients to a large tertiary care center is what we have defined as "steerage." This occurs when a patient referred to one specialist is then referred to a second specialist without the input of the primary care physician making the initial referral. Physicians will not refer patients to a program that steers patients away from their care. However, as the

role of the cardiologist develops, it is crucial to remember that the primary care physician remains the main caregiver for the patients. A disease management program needs to play the role of a consult and support service by providing management of heart failure together with the primary care physician. Responsibility for final decisions regarding a patient's care must remain with the primary care provider, or be given to the heart failure team by the primary care physician. The Duke Heart Failure Program has attempted to decrease generalists' anxiety regarding steering through intensive peer communication, so that decisions regarding other referrals are made with the input of the primary care physician.

Patients with Diastolic Dysfunction. In addition to caring for patients with systolic dysfunction, the Duke Heart Failure Program has taken on the challenge of caring for patients with diastolic dysfunction. The cardiology community is beginning to recognize the importance of this difficult-to-manage subgroup of heart failure patients. The prevalence of diastolic dysfunction has been estimated between 13% and 74% and it has been predicted this number will grow as the average age of the population increases.^{12,62} In the study by Rich et al, diastolic dysfunction was found as the cause of heart failure in 33% of the patients included in the study.⁴³ Although there are no large randomized-control trials to guide the program in terms of management, we feel that these patients can benefit from a disease management program. These patients do benefit from therapies that improve compliance, reduce salt intake, and improve fluid management, which are aspects of a disease management program. In addition, the inclusion of these patients in the program will offer a great opportunity to better understand this population in terms of risk factors and management strategies.

Proving the Program Works. In order to demonstrate that a program is making a positive impact on patient care, specific demographic, clinical, and economic data need to be collected and followed over time. In the end, a program will be accountable for what it has achieved. At Duke, we have combined results from our clinical database with the Duke University Medical Center administrative database in order to develop outcomes regarding medication usage, hospitalization, and death. As the number of patients cared for by the clinic increases, we hope to develop specific models to predict risk of hospitalization and death.

An important aspect of proving the effectiveness of any program is identifying appropriate bench-

marks against which accomplishments can be compared. One set of benchmarks recommended by the committee that developed the AHCPR guidelines proposed a set of 8 standards of quality that any program should achieve.⁶³ These included timely assessment of left ventricular function, appropriate counseling, assessment and treatment of volume overload, and use of an ACE inhibitor. As new therapies are shown to be effective, new benchmarks will need to be developed for the program.

Results must be targeted for the organization funding the program. Although any organization will promote improved quality of patient care, the evaluation of cost savings will certainly depend on the outlook of the provider. For example, a reduction in hospitalizations decreases the overall cost to society and improves the patient's quality of life. From a societal perspective, the program has two benefits: improved care and lowered costs. However, if the market in which the program has been initiated is predominantly fee for service and payment for hospitalizations is per service rendered, a reduction in hospitalizations could be viewed as improved care but a loss in income. By shifting the outcome to a reduced length of stay, a hospital paid at specific diagnostic related group levels per hospitalization will view the program as potentially cost reducing. The hospital will be paid roughly the same amount, but the savings of an earlier discharge will be seen by the hospital. In addition, if the program attracts more patients to the hospital, the total number of hospitalizations may not decrease, even as the rate of hospitalization declines.

Conclusions

Congestive heart failure has become more prevalent and places a tremendous burden on the health-care system. Although the medical community continues to make advances in the treatment of left ventricular systolic dysfunction, there continues to be controversy regarding the best means of delivering proven therapies to the patient. Investigators have shown that the best approach is a team approach that includes the primary care physician, a cardiologist specializing in heart failure, and other health-care providers including nurses, pharmacists, physical therapists, dietitians, and social workers. Close follow up appears to be required for successful heart failure care. Future research is needed in order to address the questions of which type of heart failure patient benefits from a disease management approach, who should make up the heart failure team, and how a team should be organized.

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CME QUESTIONS: TEST #059904

Johns Hopkins University School of Medicine is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education for physicians. Johns Hopkins University School of Medicine designates this continuing medical education activity for 1.0 credit hour in Category 1 of the Physician's Recognition Award of the American Medical Association. This CME activity was planned and produced in accordance with the ACCME Essentials and Standards for Commercial Support.

Instructions

After reading the article "Disease Management of Congestive Heart Failure," select the best answer to each of the following questions. In order to receive 1 CME credit, at least 7 of the 10 answers must be correct. Estimated time for this activity is 1 hour. CME credits are distributed on a yearly basis.

1. Regarding the impact of congestive heart failure in the United States, each of the following statements is true *except*:

- a) more than 4 million people suffer from congestive heart failure
- b) the overall 5 year mortality is 20%
- c) the estimated cost of caring for patients with congestive heart failure is more than \$10 billion
- d) hospitalizations for CHF have increased by 70% over 10 years, resulting in 6.5 million hospital days by 1993
- e) HCFA spent more on CHF than on cancer and myocardial infarction

2. All of the following medications have been shown to improve survival in patients with heart failure *except*:

- a) hydralazine and isosorbide dinitrate
- b) β -blockers
- c) digoxin
- d) angiotensin converting enzyme (ACE) inhibitors

3. Regarding CHF hospitalization, which of the following statements is true:

- a) 85% received ACE inhibitors
- b) 40% received target doses of ACE inhibitors
- c) 80% received instructions regarding weight monitoring
- d) 30% of smokers were advised on smoking cessation
- e) 90% were counseled on sodium restriction in their diet

4. Compared to primary care providers (family physicians, general practitioners, and internists), cardiologists are less likely to do which of the following:

- a) evaluate the underlying etiology of heart failure patients
- b) assess left ventricular function
- c) use intravenous inotropes for admitted patients
- d) use an ACE inhibitor
- e) provide care at a lower cost

5. Which of the following means of quality of care improvement for heart failure patients is the only one studied by a randomized control method?

- a) telephone follow-up by a nurse
- b) pharmacist with experience in heart failure
- c) heart failure clinic
- d) multidisciplinary care prior to discharge with follow-up
- e) specialized home care

(CME QUESTIONS CONTINUED ON FOLLOWING PAGE)

CME TEST FORM

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Disease
Management of
Congestive Heart
Failure

(Test valid through
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Please circle your answers:

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On the whole, how do you rate the information presented in the article?

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(CME QUESTIONS CONTINUED FROM PREVIOUS PAGE)

6. When promoting self management, which of the following should receive the least emphasis:

- a) goal setting
- b) resource identification
- c) learning specific facts
- d) problem-solving

7) When developing a disease management program, all of the following concerns must be addressed, except:

- a) type of healthcare reimbursement system in area
- b) protocols for drug initiation and titration should be based on only published national guidelines
- c) composition of heart failure team
- d) degree of self-management expected of patients

8) All of the following factors may contribute to increased cost of care except:

- a) medical noncompliance
- b) presence of ischemic heart disease
- c) discontinuing digoxin therapy
- d) care by a primary care or generalist physician
- e) type of healthcare reimbursement system

9) In which disease management paradigm did cardiologists play a limited role:

- a) telephone follow-up by a nurse
- b) pharmacist with experience in heart failure
- c) heart failure clinic
- d) multidisciplinary care prior to discharge with follow-up

10. New treatment strategies for improving survival that have recently been recommended include:

- a) high dose digoxin therapy
- b) outpatient administration of intermittent inotropes
- c) β -blockers in patients with mild to moderate heart failure
- d) use of angiotensin receptor blockers instead of ACE inhibitors