

Failing the Failing Heart: A Review of Palliative Care in Heart Failure

Ankit B. Shah, MD, MPH,¹ Ryan P. Morrissey, MD,¹ Afshan Baraghoush, MD,¹ Parag Bharadwaj, MD,² Anita Phan, MD,¹ Michele Hamilton, MD,¹ Jon Kobashigawa, MD,¹ Ernst R. Schwarz, MD, PhD¹

¹Cedars-Sinai Heart Institute and ²Palliative Care Services, Cedars-Sinai Medical Center, Los Angeles, CA

Heart failure (HF) is the most common reason for hospital admission for patients older than 65 years. With an aging population and improving survival in heart failure patients, the number of people living with HF continues to grow. As this population increases, the importance of treating symptoms of fatigue, dyspnea, pain, and depression that diminish the quality of life in HF patients becomes increasingly important. Palliative care has been shown to help alleviate these symptoms and improve patients' satisfaction with the care they receive. Despite this growing body of evidence, palliative care consultation remains underutilized and is not standard practice in the management of HF. With an emphasis on communication, symptom management, and coordinated care, palliative care provides an integrated approach to support patients and families with chronic illnesses. Early communication with patients and families regarding the unpredictable nature of HF and the increased risk of sudden cardiac death enables discussions around advanced care directives, health care proxies, and deactivation of permanent pacemakers or implantable cardioverter defibrillators. Cardiologists and primary care physicians who are comfortable initiating these discussions are encouraged to do so; however, many fear destroying hope and are uncertain how to discuss end-of-life issues. Thus, in order to facilitate these discussions and establish an appropriate relationship, we recommend that patients and families be introduced to a palliative care team at the earliest appropriate time after diagnosis.

[*Rev Cardiovasc Med.* 2013;14(1):41-48 doi: 10.3909/ricm0635]

© 2013 MedReviews®, LLC

KEY WORDS

Heart failure • Palliative care • Myocardial dysfunction • Therapy • Quality of life

With a prevalence of over 5.5 million patients and an annual incidence of at least 670,000 newly diagnosed patients in the United States alone, heart failure (HF) continues to be a major public health burden and is the most common reason for hospital admission in patients older than 65 years.¹ With the population of patients in this age group expected to increase from 40 million in 2009 to 72 million by 2030,² there will be a significant increase in the number of patients living with HF. HF accounted for 1.2 million hospitalizations in 2004³ and approximately 300,000 deaths in 2006.¹ The median survival after hospitalization for HF symptoms is 2.4 years,⁴ with 1-month mortality estimated at 12% and 6-month HF exacerbation readmission rates estimated as high as 18% to 23%.^{5,6}

Despite significant improvement in morbidity and mortality over time,⁷⁻⁹ HF remains a chronic disease characterized by recurrent decompensations, often culminating in the need for advanced therapies such as cardiac transplantation or ventricular assist devices (VADs). With an emphasis placed on communication, symptom management, and coordinated care, palliative care offers an integrated approach to supporting patients and families with serious chronic illnesses in which prognosis cannot be reliably predicted and, with optimal care, can often be measured in years.¹⁰ Originally reserved for patients with malignancy, integration of palliative care has expanded to many serious and chronic illnesses, including HF. In contrast to palliative care, hospice care targets a narrower scope of patients: those who decide to forego life-prolonging medical treatments and whose prognosis is measured in months.

Published reviews of palliative care in HF have initiated discourse regarding its role and justification.¹¹⁻¹⁴ These reviews include detailed analysis of the pathophysiology of HF symptoms and available treatment options in addition to stressing the importance of end-of-life communication with patients and families. Our aim

for HF patients. A national survey of HF specialists in 2004 found that 67% had not referred a single patient to palliative care in the 6 months prior to the survey.¹⁸ Multiple studies have described HF patients' unmet needs for palliative care.¹⁹⁻²⁴ Family members of HF patients have reported minimal communication from

Palliative care continues to be the exception rather than the norm for HF patients. A national survey of HF specialists in 2004 found that 67% had not referred a single patient to palliative care in the 6 months prior to the survey.

is to provide an update on the role of palliative care in HF patients, including the current state of palliative care involvement in HF, potential impact on quality of care, palliative care models, and symptom management. In addition, we discuss guidelines regarding device deactivation and the role of palliative care in facilitating these discussions. This should be of interest to any practitioner who treats HF patients as palliative care involvement in those with life-limiting illnesses has been shown to improve quality of life, reduce symptoms, and increase patient and family satisfaction with the care they receive.¹⁵⁻¹⁷

To identify studies of palliative care in HF, we searched the Medline database for literature with the subject headings "heart failure" and "palliative care" from 1996 to current, which led to 220 results. After limiting it to English language only, we were left with 209 results; 44 were nonrelated, 2 were based on costs, 4 on prognostication, 37 on management of HF, and 122 on palliative care/hospice in HF.

Current State of Palliative Care Involvement

Palliative care continues to be the exception rather than the norm

physicians about the natural course of HF and what to expect from the disease.²² In a study of 600 patients who died from heart disease, 47% of family members said they did not receive adequate information about the disease and its progression, and 63% were unaware of the poor prognosis.²⁵ Patients and families also have a limited understanding of the increased risk of sudden cardiac death.²⁵ A recent review of end-of-life discussions with HF patients suggested that the topic was rarely discussed.²⁴ The authors found that factors contributing to this lapse in communication include that the majority of patients do not realize the severity of their disease, and in addition to being focused on aggressive medical care, clinicians fear destroying hope and are unsure how to discuss end-of-life issues. This demonstrates a clear indication for a more comprehensive approach to HF management that involves palliative care to help with open communication and understanding of the disease for patients and families.²⁶ Palliative care can facilitate communication regarding the course, progression, prognosis, and risk of HF, enabling patients and families to make informed and timely decisions (eg, advanced care planning, advanced directives

[prior to the implantation of medical devices], and health care proxy). Palliative medicines' role in HF treatment is beginning to gain recognition by national entities, which may improve its utilization going forward—the American College of Cardiology/American Heart Association (AHA) HF guidelines included palliative care referral as a class I recommendation (Level of Evidence C) for patients with HF at the end of life for the first time in their 2005 guideline update.²⁷

Potential Impact on Quality of Care

Evidence of the impact of palliative care on quality of care is growing and spans from subjective metrics such as patient satisfaction to objective metrics such as length of stay. In a study of patients with multiple organ failure, palliative care involvement was associated with fewer invasive procedures and interventions at the end of life, decreased length of stay, and shorter admissions to intensive care units.²⁸ A recent retrospective telephone survey with family members of veterans who received palliative care demonstrated higher scores for emotional and spiritual support, access to home care services, access to benefits after a patient's death, and adequacy of communication.¹⁵

Studies in cancer patients and those with life-limiting illnesses suggest that the involvement of palliative medicine improves patient and family satisfaction with care and symptom management.¹⁵⁻¹⁷ In a recent cross-sectional study comparing symptomatic HF and cancer patients, the authors suggest that HF patients may benefit from palliative care as much as cancer patients.²⁹ The study shows that end-stage HF patients had higher symptom burden (eg, fatigue, pain,

dyspnea), depression scores, and lower spiritual well-being than cancer patients. Another study comparing HF and cancer patients suggests similar quality of life and emotional well-being; however, a lower satisfaction with information and communication among HF patients. These authors propose that there is a palliative transition point at which HF patients would benefit from palliative care.³⁰

Palliative Care Model

The traditional palliative care model is based on patients with illnesses that have predictable trajectories, where patients have steady declines followed by a short terminal phase. This type of model allows for the initiation of palliative care at a planned time for all patients. The traditional model cannot be applied to HF due to the risk of sudden death and the natural history of disease, which is characterized by acute decompensations followed by periods of stability.³¹

Despite many prognostic models, we still cannot reliably predict who is at risk for sudden death or the terminal phase of HF. Many prognostic models and markers for survival are valuable at the population level but not at the individual level. The Seattle Heart Failure Model predicts 1-, 2-, and 5-year survival based on clinical, laboratory, and medication data without assessing hemodynamics or cardiac capacity.³² This model also allows one to predict effects on survival by adding or removing interventions such as a β -blocker or implantable cardioverter defibrillators (ICD) (online calculator available at: <http://www.SeattleHeartFailureModel.org>). Other prognostic measures range from single-item predictors, such as the 6-minute walk test,³³ B-type

natriuretic peptide,³⁴ peak cardiac power,³⁵ and maximal oxygen consumption,³⁶ to multivariable models.^{37,38} The Heart Failure Survival Score³⁸ is used for risk stratification in the evaluation for cardiac transplantation and has been shown to be effective for patients with or without β -blockade.^{39,40}

Given the inability to predict prognosis at the individual level and the natural history of HF, patients and their families should be introduced to the palliative care team at the earliest appropriate time after diagnosis. Although the involvement of palliative care specialists will not likely be required at the onset of diagnosis, establishing a relationship can be beneficial for future interactions. When the disease course progresses, the palliative care team initiates the appropriate care and assistance in collaboration with the life-prolonging treatments offered by cardiologists. This departure from the traditional model—initiating discourse with patients and families regarding the natural course, prognosis, and inevitable end-of-life issues as early as at the time of diagnosis⁴¹—is reinforced by the World Health Organization (WHO). The WHO states that palliative care should be used “early in the course of illness, in conjunction with other therapies that are intended to prolong life,” as it “improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering.”⁴²

In addition to the timing of consultation, there is the question as to who should be providing palliative care. Palliative care describes a multidisciplinary approach that addresses both the symptomatic and psychosocial aspects of HF therapy with the assistance of physicians, nurses, and social workers

specifically trained in palliative medicine. The multidisciplinary team can be expansive, including chaplains, massage therapists, pharmacists, and nutritionists. Although likely most effective, this model may not be practical in many care settings. In the long term, cardiologists may have to learn aspects of the palliative care skill set to ensure optimal treatment of HF patients, relying on the multidisciplinary teams for more intensive interventions.

through their anxiolytic properties. In addition, actions on opioid receptors in the brain can change patients' perception of dyspnea.¹² Benzodiazepines may also be useful in patients with panic attacks associated with breathlessness. For those patients who develop resistance to diuretics or suffer from acute decompensations with fluid overload, ultrafiltration may be a safe and effective alternative.^{50,51} The use of angiotensin-converting enzyme inhibitors has been shown

muscle strength, and peak oxygen consumption in men and women with NYHA functional class II or III HF.⁵⁶⁻⁵⁸ Other options to treat fatigue include stimulants and aerobic exercise.⁵⁹

Like many chronic illnesses, pain is common and undertreated in end-stage HF.^{60,61} Opioids have been suggested for use as first-line agents for treatment of moderate to severe pain.⁶² Therapy should be initiated with a short-acting agent to determine total daily requirements and then transitioned to long-acting agents. Opioids are traditionally avoided or used sparingly for risk of addiction; however, studies demonstrate that the risk of addiction in terminally ill patients is low.⁶² Other treatment methods, including acupuncture, music, and exercise, may be beneficial, but have not been validated in HF patients. Nonsteroidal anti-inflammatory agents should be avoided due to potential precipitation of acute renal failure, fluid retention, and the risk of gastrointestinal bleeding.

It is estimated that approximately 30% of patients with HF have depression. These patients have also been shown to have poorer HF outcomes.^{63,64} Recent guidelines from the AHA Science Advisory Committee⁶⁵ advocate screening patients with coronary heart disease for depression with the two-question Patient Health Questionnaire (PHQ-2).⁶⁶ Studies have suggested that a score ≥ 3 in the PHQ-2 is 83% sensitive and 92% specific for major depression; thus, those with a score ≥ 3 should then be given the nine-item PHQ.⁶⁷ Patients with a score < 10 on PHQ-9 can be offered support and follow-up within 1 month; those with a score ≥ 10 should be referred to a mental health specialist.^{65,68} In general, nonpharmacologic treatments for depression, such as psychotherapy,

HF patients have a myriad of symptoms, including dyspnea, fatigue, pain, and depression, that lead to a diminished quality of life. Multiple therapies have proven to be effective in alleviating these symptoms.

Role in HF Symptomatology

HF patients have a myriad of symptoms, including dyspnea, fatigue, pain, and depression, that lead to a diminished quality of life.⁴³⁻⁴⁵ Multiple therapies have proven to be effective in alleviating these symptoms. With a focus on improving patient satisfaction and quality of life, palliative care involvement can assure that HF patients receive the appropriate available palliative treatments to minimize symptoms.

A recent review by West and colleagues recommends that the Likert scale and Visual Analog Scale be used to measure dyspnea in acute HF syndromes as they have been established as being the best combination of valid, reliable, and easy-to-use instruments.⁴⁶ Loop diuretics given for volume overload improve exertional capacity and decrease dyspnea.⁴⁷ Oral opioids have been shown to improve dyspnea both acutely and chronically in patients who are New York Heart Association (NYHA) class II to IV.^{48,49} Opioids can improve ventilatory response to exercise,^{48,49} both by causing vasodilation and

to improve a HF patient's duration of exercise⁵² in addition to also improving patient ratings of dyspnea, fatigue, orthopnea, and edema when compared with placebo in a double-blind, randomized trial using captopril.⁵³ In addition, data from the Prophylaxis of Thromboembolism in Critical Care Trial (PROTECT) suggest that the adenosine A₁ receptor antagonist rolofylline improves weight loss and achieves early dyspnea relief compared with placebo—potentially surfacing as another viable treatment option in the near future.⁵⁴

Patients with symptoms of fatigue should be evaluated in the same manner as those without HF: treat anemia, infection, dehydration, electrolyte imbalances, thyroid dysfunction, and depression. When appropriate, patients should be screened for sleep-disordered breathing, given its high prevalence among HF patients. If present, patients should be placed on continuous positive airway pressure while sleeping to minimize fatigue and improve their emotional function.⁵⁵ Testosterone supplementation therapy has been shown to improve exercise capacity,

cognitive behavioral therapy, and exercise, should be attempted and may be beneficial.^{69,70} However, when pharmacologic agents are initiated, selective serotonin reuptake inhibitors (SSRIs) are generally used as first-line agents. SSRIs are effective and have fewer side effects and medication interactions than alternative agents—critical attributes in a population that is burdened by polypharmacy.⁷¹

Many patients progress to being symptomatic at rest despite medical therapy. With few alternatives available, studies have evaluated the role of inotropes in chronic treatment of HF and their impact on morbidity and mortality. A study using continuous outpatient inotropic agents in 36 patients with end-stage HF (ie, AHA stage D) demonstrated improved ability to ambulate. In addition, attempts to discontinue inotropes led to worsening dyspnea, hypotension, and renal dysfunction, leading the authors to conclude that continuous outpatient treatment with inotropes may be acceptable for patients with stage D disease.⁷² In a retrospective study, chronic intravenous (IV) inotropes (dobutamine and milrinone) were associated with reductions in days hospitalized at 30, 60, and 180 days after drug initiation, but were associated with high mortality rates of 42.6% and 56.8% at 6 and 12 months, respectively.⁷³ Another retrospective study comparing mortality of patients discharged on chronic IV dobutamine versus milrinone showed no statistically significant difference in mortality at mean follow-up of 95 days, 77% and 74%, respectively.⁷⁴ Data suggesting that continuous chronic inotrope use may increase mortality do not clearly document if these patients have an ICD in place.^{73,75} Because of improvement in symptoms, inotropic therapy is listed as

a IIb indication for patients with refractory symptoms in the 2009 updated AHA/American College of Cardiology Foundation (ACCF) guidelines for diagnosis and management of HF.⁷⁶ Continuous IV support may provide palliation of symptoms as part of an overall plan to allow the patient to die comfortably at home.^{77,78}

End-of-Life Decisions

Traditionally, goals of therapy are to provide life-extending therapies and to alleviate symptoms related to HF. However, goals of treatment must be readdressed as HF progresses. Medical devices such as permanent pacemakers (PMs) and ICDs that are beneficial early in the course of disease may no longer be indicated or desired by patients with disease progression. Discontinuation of such therapies may actually improve quality of life for some patients.⁷⁹ The 2009 AHA/ACCF guidelines for diagnosis and management of HF recommend that patients with refractory end-stage HF and implantable defibrillators should receive information about the option to inactivate the defibrillator (class I, Level of Evidence C).⁷⁶ Palliative care specialists can assist with providing the appropriate information and providing patients and families with the resources necessary to make the most informed decisions.

With a growing number of patients having a PM or ICD inserted and an increasing proportion of our population being > age 65 years, there has been much discussion about the ethical and legal implications of deactivating such devices at the patient's request. Surveys completed by electrophysiologists and device manufacturer representatives suggest that practitioners are more likely to deactivate ICDs than PMs, presumably

because ICD deactivation does not result in immediate death, whereas PM deactivation can be followed by bradycardia and imminent death.⁸⁰ Retrospective reviews of requests by patients or their surrogates to withdraw PM or ICD demonstrated how assistance of ethical consultation and reinforcement of the ethical and legal permissibility of withdrawing PM or ICDs decreased clinician reluctance to grant patients' wishes.⁸¹

It has been > 50 years since the first implantation of a PM and 30 years since the ICD has been used clinically,⁸² and there have been no consensus statements published regarding deactivating these devices until recently. With evidence suggesting that about 20% of ICD patients receive painful shocks that decrease their quality of life⁸³ and research acknowledging that physicians possess a limited understanding of the ethical and legal implications of deactivating a device, the Heart Rhythm Society recently published a consensus statement. Example principles read as follows⁸⁴:

- A patient with decision-making capacity has the legal right to refuse or request the withdrawal of any medical treatment or intervention, regardless of whether she or he is terminally ill, and regardless of whether the treatment prolongs life and its withdrawal results in death
- Ethically and legally, there are no differences between refusing cardiovascular implantable electronic devices (CIED) therapy and requesting withdrawal of CIED therapy
- Legally, carrying out a request to withdraw life-sustaining treatment is neither physician-assisted suicide nor euthanasia.

VADs have resulted in clinically meaningful survival benefit and

improved quality of life compared with medical management when used as destination therapy in patients who are not heart transplant candidates.⁸⁵ Combined with another study,⁸⁶ data suggest that VAD therapy is a feasible long-term

that is associated with a multitude of symptoms and increased risk of sudden cardiac death. Studies in cancer patients and those with chronic illnesses have shown that palliative care involvement has been shown to improve quality of

By not offering HF patients the benefits of palliative care, we are failing to provide them and their families with the best therapeutic options for symptom management and optimal communication about their disease state.

management approach for patients with severe HF. However, patients with VADs are still at risk for serious complications, and discussion of end-of-life care and reassessment of goals must be addressed. A retrospective study performed at the Mayo Clinic (Rochester, MN) reviewed cases of patient requests to withdraw VADs.⁸⁷ The authors concluded that the right to request VAD withdrawal is part of a patient's right to refuse or request to withdraw any unwanted treatment and is no different than withdrawing mechanical ventilation or hemodialysis.

Conclusions

HF is a multifaceted syndrome with a prolonged course of illness

care (eg, decrease the number of interventions and length of hospitalization, and potentially improve morbidity). Despite its benefits, studies have shown that palliative care is underutilized and, when used, tends to be late in the course of disease, decreasing its effectiveness and patient and family satisfaction. Palliative care should be initiated early in the course of the disease process to help with symptom relief, enhance communication, provide patients and families with realistic goals, and discuss withdrawing of care when appropriate. Palliative care education and awareness for health care workers must be expanded and possibly be made as the standard of care for HF patients.

By not offering HF patients the benefits of palliative care, we are failing to provide them and their families with the best therapeutic options for symptom management and optimal communication about their disease state. This leads to suboptimal quality of care, irrespective of the life-prolonging treatments that these patients are receiving; in short, we are failing the failing heart. ■

The authors report no conflicts of interest.

References

1. Lloyd-Jones D, Adams RJ, Brown TM, et al. Heart disease and stroke statistics—2010 update: a report from the American Heart Association. *Circulation*. 2010;121:e46-e215.
2. Administration on Aging. Aging statistics. Administration on Aging. Department of Health & Human Services. http://www.aoa.gov/aoaroot/aging_statistics/index.aspx. Accessed November 15, 2010.
3. Fang J, Mensah GA, Croft JB, Keenan NL. Heart failure-related hospitalization in the U.S., 1979 to 2004. *J Am Coll Cardiol*. 2008;52:428-434.
4. Setoguchi S, Stevenson LW, Schneeweiss S. Repeated hospitalizations predict mortality in the community population with heart failure. *Am Heart J*. 2007;154:260-266.
5. Krumholz HM, Parent EM, Tu N, et al. Readmission after hospitalization for congestive heart failure among Medicare beneficiaries. *Arch Intern Med*. 1997;157:99-104.
6. Krumholz HM, Chen YT, Wang Y, et al. Predictors of readmission among elderly survivors of admission with heart failure. *Am Heart J*. 2000;139(1 Pt 1):72-77.
7. MacIntyre K, Capewell S, Stewart S, et al. Evidence of improving prognosis in heart failure: trends in case fatality in 66 547 patients hospitalized between 1986 and 1995. *Circulation*. 2000;102:1126-1131.
8. Roger VL, Weston SA, Redfield MM, et al. Trends in heart failure incidence and survival in a community-based population. *JAMA*. 2004;292:344-350.

MAIN POINTS

- Heart failure (HF) is a multifaceted syndrome categorized by acute decompensations and increased risk of sudden cardiac death.
- HF patients suffer from symptoms of dyspnea, fatigue, depression, pain, and frequently have unmet social and spiritual needs.
- Studies have shown that HF patients and their families are not satisfied with symptom management and the communication they receive about disease progression as well as the support services available to them.
- Palliative care involvement in patients with chronic illnesses has been shown to bridge this void by offering tailored symptom management and multidisciplinary services to ensure appropriate communication and support.
- Palliative care involvement should be initiated early in the course of HF diagnosis to provide these patients with the benefits of palliative care services.

9. Levy D, Kenchaiah S, Larson MG, et al. Long-term trends in the incidence of and survival with heart failure. *N Engl J Med*. 2002;347:1397-1402.
10. Hupcey JE, Penrod J, Fogg J. Heart failure and palliative care: implications in practice. *J Palliat Med*. 2009;12:531-536.
11. Adler ED, Goldfinger JZ, Kalman J, et al. Palliative care in the treatment of advanced heart failure. *Circulation*. 2009;120:2597-2606.
12. Goodlin SJ. Palliative care in congestive heart failure. *J Am Coll Cardiol*. 2009;54:386-396.
13. Jaarsma T, Beattie JM, Ryder M, et al. Palliative care in heart failure: a position statement from the palliative care workshop of the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail*. 2009;11:433-443.
14. Goodlin SJ, Hauptman PJ, Arnold R, et al. Consensus statement: palliative and supportive care in advanced heart failure. *J Card Fail*. 2004;10:200-209.
15. Casarett D, Pickard A, Bailey FA, et al. Do palliative consultations improve patient outcomes? *J Am Geriatr Soc*. 2008;56:593-599.
16. Gade G, Venohr I, Conner D, et al. Impact of an inpatient palliative care team: a randomized control trial. *J Palliat Med*. 2008;11:180-190.
17. Higginson IJ, Evans CJ. What is the evidence that palliative care teams improve outcomes for cancer patients and their families? *Cancer J*. 2010;16:423-435.
18. Riegel B, Moser DK, Powell M, et al. Nonpharmacologic care by heart failure experts. *J Card Fail*. 2006;12:149-153.
19. Horne G, Payne S. Removing the boundaries: palliative care for patients with heart failure. *Palliat Med*. 2004;18:291-296.
20. Murray SA, Boyd K, Kendall M, et al. Dying of lung cancer or cardiac failure: prospective qualitative interview study of patients and their carers in the community. *BMJ*. 2002;325:929.
21. Matlock DD, Peterson PN, Sivovich BE, et al. Regional variations in palliative care: do cardiologists follow guidelines? *J Palliat Med*. 2010;13:1315-1319.
22. Harding R, Selman L, Beynon T, et al. Meeting the communication and information needs of chronic heart failure patients. *J Pain Symptom Manage*. 2008;36:149-156.
23. Boyd KJ, Worth A, Kendall M, et al. Making sure services deliver for people with advanced heart failure: a longitudinal qualitative study of patients, family carers, and health professionals. *Palliat Med*. 2009;23:767-776.
24. Barclay S, Momen N, Case-Upton S, et al. End-of-life care conversations with heart failure patients: a systematic literature review and narrative synthesis. *Br J Gen Pract*. 2011;61:e49-e62.
25. McCarthy M, Hall JA, Ley M. Communication and choice in dying from heart disease. *J R Soc Med*. 1997;90:128-131.
26. Schwarz ER, Cleenewerck L, Phan A, et al. Philosophical implications of the systemic and patient-oriented management of chronic heart failure. *J Relig Health*. 2011;50:348-358.
27. Hunt SA for the American College of Cardiology and American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure). ACC/AHA 2005 guideline update for the diagnosis and management of chronic heart failure in the adult: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2005;46:e1-e82.
28. Field BE, Devich LE, Carlson RW. Impact of a comprehensive supportive care team on management of hopelessly ill patients with multiple organ failure. *Chest*. 1989;96:353-356.
29. Bekelman DB, Rumsfeld JS, Havranek EP, et al. Symptom burden, depression, and spiritual well-being: a comparison of heart failure and advanced cancer patients. *J Gen Intern Med*. 2009;24:592-598.
30. O'Leary N, Murphy NF, O'Loughlin C, et al. A comparative study of the palliative care needs of heart failure and cancer patients. *Eur J Heart Fail*. 2009;11:406-412.
31. Hupcey JE, Penrod J, Fenstermacher K. Review article: a model of palliative care for heart failure. *Am J Hosp Palliat Care*. 2009;26:399-404.
32. Levy WC, Mozaffarian D, Linker DT, et al. The Seattle Heart Failure Model: prediction of survival in heart failure. *Circulation*. 2006;113:1424-1433.
33. Bittner V, Weiner DH, Yusuf S, et al for the SOLVD Investigators. Prediction of mortality and morbidity with a 6-minute walk test in patients with left ventricular dysfunction. *JAMA*. 1993;270:1702-1707.
34. Doust JA, Pietrzak E, Dobson A, Glasziou P. How well does B-type natriuretic peptide predict death and cardiac events in patients with heart failure: systematic review. *BMJ*. 2005;330:625.
35. Lang CC, Karlin P, Haythe J, et al. Peak cardiac power output, measured noninvasively, is a powerful predictor of outcome in chronic heart failure. *Circ Heart Fail*. 2009;2:33-38.
36. Mancini DM, Eisen H, Kusmaul W, et al. Value of peak exercise oxygen consumption for optimal timing of cardiac transplantation in ambulatory patients with heart failure. *Circulation*. 1991;83:778-786.
37. Lee DS, Austin PC, Rouleau JL, et al. Predicting mortality among patients hospitalized for heart failure: derivation and validation of a clinical model. *JAMA*. 2003;290:2581-2587.
38. Aaronson KD, Schwartz JS, Chen TM, et al. Development and prospective validation of a clinical index to predict survival in ambulatory patients referred for cardiac transplant evaluation. *Circulation*. 1997;95:2660-2667.
39. Koelling TM, Joseph S, Aaronson KD. Heart failure survival score continues to predict clinical outcomes in patients with heart failure receiving beta-blockers. *J Heart Lung Transplant*. 2004;23:1414-1422.
40. Lund LH, Aaronson KD, Mancini DM. Validation of peak exercise oxygen consumption and the Heart Failure Survival Score for serial risk stratification in advanced heart failure. *Am J Cardiol*. 2005;95:734-741.
41. Quaglietti SE, Atwood JE, Ackerman L, Froelicher V. Management of the patient with congestive heart failure using outpatient, home, and palliative care. *Prog Cardiovasc Dis*. 2000;43:259-274.
42. World Health Organization. WHO Definition of Palliative Care. Available at: <http://www.int/cancer/palliative/definition/en>. Accessed November, 2010.
43. Zambroski CH, Moser DK, Bhat G, Ziegler C. Impact of symptom prevalence and symptom burden on quality of life in patients with heart failure. *Eur J Cardiovasc Nurs*. 2005;4:198-206.
44. Evangelista LS, Sackett E, Dracup K. Pain and heart failure: unrecognized and untreated. *Eur J Cardiovasc Nurs*. 2009;8:169-173.
45. Bekelman DB, Havranek EP, Becker DM, et al. Symptoms, depression, and quality of life in patients with heart failure. *J Card Fail*. 2007;13:643-648.
46. West RL, Hernandez AF, O'Connor CM, et al. A review of dyspnea in acute heart failure syndromes. *Am Heart J*. 2010;160:209-214.
47. Bayliss J, Norell M, Canepa-Anson R, et al. Untreated heart failure: clinical and neuroendocrine effects of introducing diuretics. *Br Heart J*. 1987;57:17-22.
48. Johnson MJ, McDonagh TA, Harkness A, et al. Morphine for the relief of breathlessness in patients with chronic heart failure—a pilot study. *Eur J Heart Fail*. 2002;4:753-756.
49. Chua TP, Harrington D, Ponikowski P, et al. Effects of dihydrocodeine on chemosensitivity and exercise tolerance in patients with chronic heart failure. *J Am Coll Cardiol*. 1997;29:147-152.
50. Bart BA, Boyle A, Bank AJ, et al. Ultrafiltration versus usual care for hospitalized patients with heart failure: the Relief for Acutely Fluid-Overloaded Patients With Decompensated Congestive Heart Failure (RAPID-CHF) trial. *J Am Coll Cardiol*. 2005;46:2043-2046.
51. Costanzo MR, Guglin ME, Saltzberg MT, et al. Ultrafiltration versus intravenous diuretics for patients hospitalized for acute decompensated heart failure. *J Am Coll Cardiol*. 2007;49:675-683.
52. Garg R, Yusuf S for the Collaborative Group on ACE Inhibitor Trials. Overview of randomized trials of angiotensin-converting enzyme inhibitors on mortality and morbidity in patients with heart failure. *JAMA*. 1995;273:1450-1456.
53. Captopril Multicenter Research Group. A placebo-controlled trial of captopril in refractory chronic congestive heart failure. *J Am Coll Cardiol*. 1983;2:755-763.
54. Metra M, O'Connor CM, Davison BA, et al. Early dyspnoea relief in acute heart failure: prevalence, association with mortality, and effect of rolofylline in the PROTECT Study. *Eur Heart J*. 2011;32:1519-1534.
55. Mansfield DR, Gollogly NC, Kaye DM, et al. Controlled trial of continuous positive airway pressure in obstructive sleep apnea and heart failure. *Am J Respir Crit Care Med*. 2004;169:361-366.
56. Caminiti G, Volterrani M, Iellamo F, et al. Effect of long-acting testosterone treatment on functional exercise capacity, skeletal muscle performance, insulin resistance, and baroreflex sensitivity in elderly patients with chronic heart failure: a double-blind, placebo-controlled, randomized study. *J Am Coll Cardiol*. 2009;54:919-927.
57. Iellamo F, Volterrani M, Caminiti G, et al. Testosterone therapy in women with chronic heart failure: a pilot double-blind, randomized, placebo-controlled study. *J Am Coll Cardiol*. 2010;56:1310-1316.
58. Malkin CJ, Pugh PJ, West JN, et al. Testosterone therapy in men with moderate severity heart failure: a double-blind randomized placebo controlled trial. *Eur Heart J*. 2006;27:57-64.
59. Radbruch L, Strasser F, Elsner F, et al. Fatigue in palliative care patients—an EAPC approach. *Palliat Med*. 2008;22:13-32.
60. Nordgren L, Sörensen S. Symptoms experienced in the last six months of life in patients with end-stage heart failure. *Eur J Cardiovasc Nurs*. 2003;2:213-217.
61. Goebel JR, Doering LV, Shugarman LR, et al. Heart failure: the hidden problem of pain. *J Pain Symptom Manage*. 2009;38:698-707.
62. Kanner RM. Opioids for severe pain: little change over 15 years. *J Pain Symptom Manage*. 2001;21:3.
63. Rutledge T, Reis VA, Linke SE, et al. Depression in heart failure: a meta-analytic review of prevalence, intervention effects, and associations with clinical outcomes. *J Am Coll Cardiol*. 2006;48:1527-1537.
64. Holzapfel N, Zugck C, Müller-Tasch T, et al. Routine screening for depression and quality of life in outpatients with congestive heart failure. *Psychosomatics*. 2007;48:112-116.
65. Lichtman JH, Bigger JT Jr, Blumenthal JA, et al. Depression and coronary heart disease: recommendations for screening, referral, and treatment: a science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research: endorsed by the American Psychiatric Association. *Circulation*. 2008;118:1768-1775.
66. Gilbody S, Richards D, Brealey S, Hewitt C. Screening for depression in medical settings with the Patient Health Questionnaire (PHQ): a diagnostic meta-analysis. *J Gen Intern Med*. 2007;22:1596-1602.
67. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med Care*. 2003;41:1284-1292.
68. Bigger JT, Glassman AH. The American Heart Association science advisory on depression and coronary heart disease: an exploration of the issues raised. *Cleve Clin J Med*. 2010;77(suppl 3):S12-S19.
69. Gary RA, Dunbar SB, Higgins MK, et al. Combined exercise and cognitive behavioral therapy improves outcomes in patients with heart failure. *J Psychosom Res*. 2010;69:119-131.
70. Strohle A. Physical activity, exercise, depression and anxiety disorders. *J Neural Transm*. 2009;116:777-784.
71. Solai LK, Mulsant BH, Pollock BG. Selective serotonin reuptake inhibitors for late-life depression: a comparative review. *Drugs Aging*. 2001;18:355-368.

72. Hershberger RE, Nauman D, Walker TL, et al. Care processes and clinical outcomes of continuous outpatient support with inotropes (COSI) in patients with refractory endstage heart failure. *J Card Fail.* 2003;9:180-187.
73. Hauptman PJ, Mikolajczak P, George A, et al. Chronic inotropic therapy in end-stage heart failure. *Am Heart J.* 2006;152:1096 e1091-e1098.
74. Gorodeski EZ, Chu EC, Reese JR, et al. Prognosis on chronic dobutamine or milrinone infusions for stage D heart failure. *Circ Heart Fail.* 2009;2:320-324.
75. Felker GM, O'Connor CM. Inotropic therapy for heart failure: an evidence-based approach. *Am Heart J.* 2001;142:393-401.
76. Jessup M, Abraham WT, Casey DE, et al. 2009 focused update: ACCF/AHA Guidelines for the Diagnosis and Management of Heart Failure in Adults: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines: developed in collaboration with the International Society for Heart and Lung Transplantation. *Circulation.* 2009;119:1977-2016.
77. Sindone AP, Keogh AM, Macdonald PS, et al. Continuous home ambulatory intravenous inotropic drug therapy in severe heart failure: safety and cost efficacy. *Am Heart J.* 1997;134(5 Pt 1):889-900.
78. Miller LW, Merkle EJ, Herrmann V. Outpatient dobutamine for end-stage congestive heart failure. *Crit Care Med.* 1990;18(1 Pt 2):S30-S33.
79. Nambisan V, Chao D. Dying and defibrillation: a shocking experience. *Palliat Med.* 2004;18:482-483.
80. Mueller PS, Jenkins SM, Bramstedt KA, Hayes DL. Deactivating implanted cardiac devices in terminally ill patients: practices and attitudes. *Pacing Clin Electrophysiol.* 2008;31:560-568.
81. Mueller PS, Hook CC, Hayes DL. Ethical analysis of withdrawal of pacemaker or implantable cardioverter-defibrillator support at the end of life. *Mayo Clin Proc.* 2003;78:959-963.
82. Kusumoto FM, Goldschlager N. Device therapy for cardiac arrhythmias. *JAMA.* 2002;287:1848-1852.
83. Schron EB, Exner DV, Yao Q, et al. Quality of life in the antiarrhythmics versus implantable defibrillators trial: impact of therapy and influence of adverse symptoms and defibrillator shocks. *Circulation.* 2002;105:589-594.
84. Lampert R, Hayes DL, Annas GJ, et al. HRS Expert Consensus Statement on the Management of Cardiovascular Implantable Electronic Devices (CIEDs) in patients nearing end of life or requesting withdrawal of therapy. *Heart Rhythm.* 2010;7:1008-1026.
85. Rose EA, Gelijns AC, Moskowitz AJ, et al. Long-term use of a left ventricular assist device for end-stage heart failure. *N Engl J Med.* 2001;345:1435-1443.
86. Slaughter MS, Rogers JG, Milano CA, et al. Advanced heart failure treated with continuous-flow left ventricular assist device. *N Engl J Med.* 2009;361:2241-2251.
87. Mueller PS, Swetz KM, Freeman MR, et al. Ethical analysis of withdrawing ventricular assist device support. *Mayo Clin Proc.* 2010;85:791-797.