

REVIEW TOPIC OF THE WEEK

Palliative Care in Heart Failure

Rationale, Evidence, and Future Priorities



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ABSTRACT

Patients with heart failure (HF) and their families experience stress and suffering from a variety of sources over the course of the HF experience. Palliative care is an interdisciplinary service and an overall approach to care that improves quality of life and alleviates suffering for those living with serious illness, regardless of prognosis. In this review, we synthesize the evidence from randomized clinical trials of palliative care interventions in HF. While the evidence base for palliative care in HF is promising, it is still in its infancy and requires additional high-quality, methodologically sound studies to clearly elucidate the role of palliative care for patients and families living with the burdens of HF. Yet, an increase in attention to primary palliative care (e.g., basic physical and emotional symptom management, advance care planning), provided by primary care and cardiology clinicians, may be a vehicle to address unmet palliative needs earlier and throughout the illness course. (J Am Coll Cardiol 2017;70:1919–30) Published by Elsevier on behalf of the American College of Cardiology Foundation.

Hear failure (HF) is a chronic, progressive, and ultimately lethal disease that affects >6 million American adults, with an additional 870,000 individuals diagnosed annually (1).

Despite advances in HF therapies, nearly 40% of patients will die within a year of their first hospitalization (2). During the course of HF, patients typically experience debilitating physical and emotional

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ABBREVIATIONS AND ACRONYMS

| | |
|-----|-----------------------------|
| CI | = confidence interval |
| DT | = destination therapy |
| HF | = heart failure |
| QoL | = quality of life |
| RCT | = randomized clinical trial |
| VAD | = ventricular assist device |

symptoms, loss of independence, and disruptions to social roles, all of which severely degrade quality of life (QoL) (3,4). Physical symptoms in advanced HF, such as pain, are highly distressing for patients and caregivers, yet remain under-recognized and undertreated (5,6). Patients and their caregivers (7,8) often face decisions about high-risk and complex treatments (e.g., cardiac devices, transplantation) without adequate prognosis communication, decision support, or advance care planning (9,10). In addition, HF management poses enormous financial and resource stress on families, health care systems, and society; direct medical costs of HF are projected to be >\$77 billion by 2030, a 215% increase from current spending (11).

Palliative care is an interdisciplinary approach, as well as a clinical subspecialty that focuses on improving QoL and reducing suffering among patients with serious illness and their families (12). Core domains of palliative care interventions include expert assessment of pain and other physical symptoms, psychosocial care, identification of goals of care, and support for complex treatment and decision making. A recent systematic review and meta-analysis of palliative care interventions suggests that a palliative approach is associated with improved patient QoL, reduced symptom burden, and improved caregiver outcomes (13). However, most evidence for palliative care emanates from oncology; the role of palliative care in chronic, nonmalignant illnesses such as HF is underdeveloped (13).

Palliative care takes many forms. Historically, a sub-specialty-trained palliative care specialist works alongside patients' primary clinicians to consult on or co-manage patients' palliative needs. Alternatively, primary palliative care (or "basic" or "generalist" palliative care) is the concept that all clinicians, regardless of specialization, should be competent in fundamental palliative skills (14). These skills include basic physical and emotional symptom management, initial goals of care discussions, and patient referral to specialty palliative care or, for patients at the end of life, hospice care. Palliative care also varies by the location of service. More than 65% of U.S. hospitals have a specialty palliative care program that delivers services to inpatients (15). Community- and outpatient-based palliative care models have been regarded as the "new frontier" in supporting patients and families longitudinally and across a variety of care settings (16).

In this review, we describe the potential role of palliative care in improving outcomes in patients with HF, characterize typical palliative care delivery

models and each model's existing evidence, and describe future priorities for palliative care research and clinical practice models in HF.

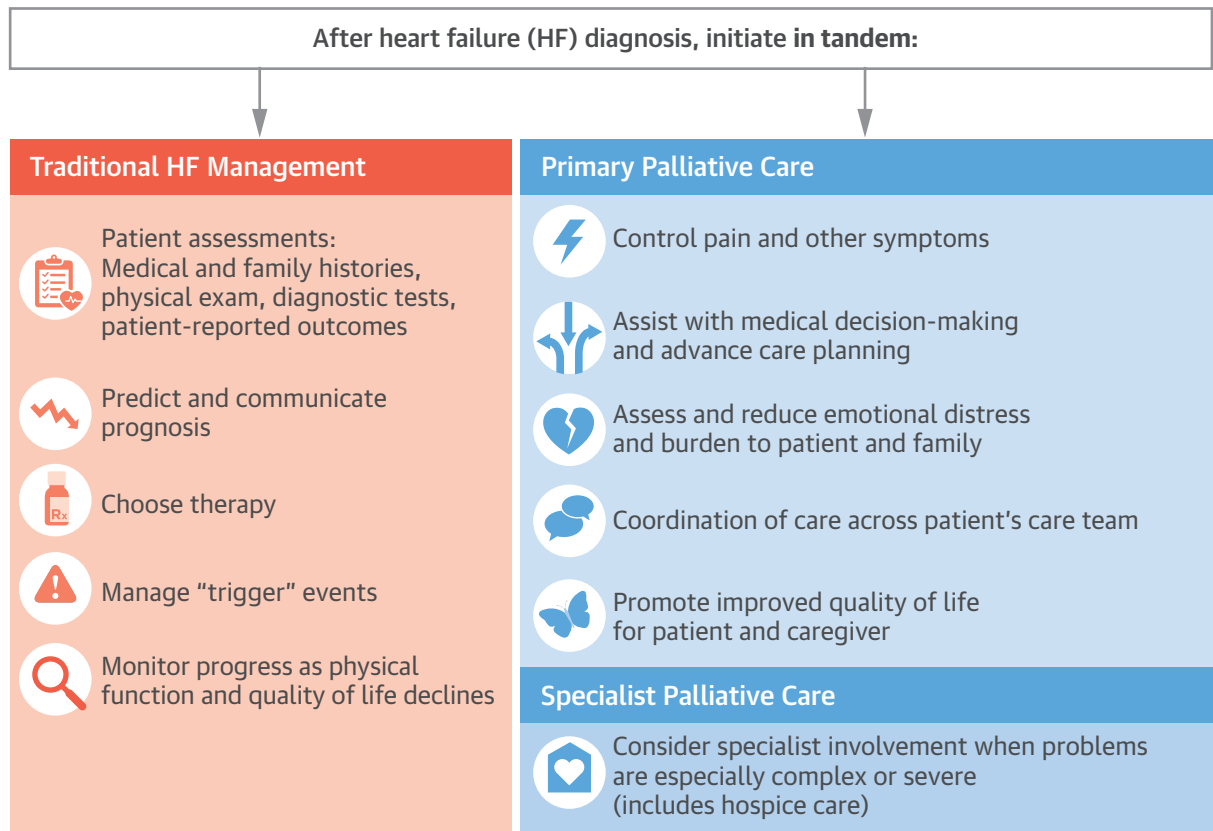
NATURAL OPPORTUNITIES TO INTEGRATE PALLIATIVE DOMAINS IN HF CARE

Historically, the prevailing approach to palliative care has been that of a zero-sum game; palliative and curative therapies have been erroneously regarded as contradictory options (17). It is no longer appropriate to assume that palliative care should be initiated only as a treatment of last resort when traditional HF management fails to fulfill a patient's goals. Particularly given the unpredictable trajectory of HF, waiting for a "trigger" event at which to initiate a palliative approach—either primary palliative care or specialty palliative care consultation—perpetuates the false dichotomy of palliative versus (rather than palliative plus) life-prolonging therapy. In fact, there are often multiple natural opportunities to consider integrating various palliative domains throughout the HF trajectory (Central Illustration). For many patients, primary palliative care, such as basic symptom management and identifying a surrogate decision maker is provided by a primary care, cardiology, or HF clinician. Palliative care specialists can assist with the management of intractable symptoms, and more complex medical decision making, such as instances of discordant patient-family goals or irresolvable unrealistic expectations of medical therapies. Recognizing the potential discordance between objective measures of disease severity (e.g., ejection fraction) and patient-reported outcomes (e.g., symptom burden, QoL), it is important that patient-reported outcomes, such as symptoms and QoL be monitored regularly throughout the entire HF experience by primary care and/or cardiology providers, so as to facilitate optimal patient-centered care. Ultimately, the ideal timing for integrating primary or specialty palliative care for patients with advanced HF will vary, reflecting patient need, not prognosis.

POORLY CONTROLLED SYMPTOMS AND PSYCHOSOCIAL-SPIRITUAL DISTRESS.

Patients with HF often have a wide array of symptoms, including dyspnea, pain, anxiety, depression, sleep disturbance, and fatigue (18,19). There are varying levels of evidence for treating HF symptoms (20). Often, the ideal HF symptom management approach is treating the underlying HF condition (e.g., relieving dyspnea by addressing fluid overload); this is a clear example of the harmony between traditional HF disease management and a palliative approach (17). However, many symptoms persist despite optimal disease

CENTRAL ILLUSTRATION Integrating Palliative Care Across the HF Experience



Kavaliertatos, D. et al. *J Am Coll Cardiol.* 2017;70(15):1919-30.

Core domains of primary palliative care (e.g., symptom assessment and management, psychosocial support, advance care planning) may be seamlessly integrated within usual heart failure (HF) disease and device management. When appropriate, specialty palliative care services may be initiated to address complex or intractable palliative needs. The timing of these referrals should be based on patient need, not prognosis, and can be initiated at any point during the HF trajectory. Given that symptoms, functional status, and quality of life are not perfectly correlated, it is important that palliative needs such as symptoms and quality of life be routinely and systematically monitored throughout the patient's HF care trajectory.

management. For example, pain is common, yet under-recognized and therefore undertreated in HF (5). Similarly, depression occurs in an estimated 1 in 5 patients with HF and is associated with worse QoL and increased mortality (21); yet routine screening for depression in HF is rare (22,23).

The psychosocial-spiritual context of HF beyond depression and anxiety is understudied (24). The HF experience is rife with uncertainty, existential distress, and adjustment to modified social and professional roles. Additionally, patients considering advanced therapies such as ventricular assist devices (VAD) and cardiac transplantation face additional anxieties as they anticipate or adjusting to a new life post-receipt. In addition to limitations in personal

roles, patients experience wide variability in social support and the availability of informal caregivers (e.g., friends, spouses, children) (25,26). Regarding spirituality, patients with HF and poor health status report worse spiritual well-being than do patients with metastatic lung and pancreatic cancer (27).

The assessment and treatment of physical symptoms and psychosocial-spiritual distress in HF should be the responsibility of patients' ongoing care providers (i.e., primary care, cardiology, mental health) and community supports. Yet the assessment and treatment of HF symptoms need not wait until the point of intractability; palliative care principles should be integrated throughout the HF management continuum, allowing cardiology and primary care

clinicians to serve as primary palliative care providers, alleviating symptoms before they become overly burdensome. Although the precise role of palliative care specialists in HF is still being defined, if patient distress persists and palliative care specialists are available, referral should be considered.

HOSPITALIZATION AND DISCHARGE. Patients with HF have a higher rate of acute care service utilization in the 30 days before death than patients with cancer (emergency department visits: 64% vs. 39%; hospitalizations: 60% vs. 45%; and intensive care unit admissions: 19% vs. 7%) (28-32). Each hospital admission is an opportunity to discuss goals of care, as this is most likely when the treatment regimen for a patient with HF may escalate. As the risk for mortality increases with each subsequent hospitalization, hospital discharge planning is an opportunity to discuss what is most important, what QoL means to the patient and family, and under what circumstances they would and would not want life-prolonging treatments (33). Furthermore, depending on the treatments initiated, the patient may require further assistance on discharge, such as home care, physical therapy, or cardiac rehabilitation. In addition, many families are intimately involved in patient care. Caregivers suffer physical, psychological, and financial consequences associated with this care (26). Therefore, clinicians should screen for caregiver burden and stress and help by providing support and counseling.

END-OF-LIFE TRANSITION. Although commonly conflated, palliative care and hospice are related but conceptually distinct services (17). Palliative care is both a clinical specialty and an overall approach to care that focuses on improving QoL and relieving suffering for patients and families facing serious illness, based on need and not prognosis. Hospice care is a specific delivery mechanism of palliative care reserved for individuals at the end of life. In contrast to palliative care, hospice eligibility (in the United States) requires an estimated life expectancy of 6 months or less, and an agreement to forego life-sustaining procedures. One exception is the U.S. Veterans Health Administration, which allows for hospice care concurrent with life-sustaining treatments. Addressing a patient's physical, psychosocial, and existential distress need not wait until the very end of life; palliative care should be seamlessly integrated throughout the HF experience, with referral to hospice services if and when its philosophy aligns with patient and family goals.

Patients with advanced HF (i.e., American College of Cardiology/American Heart Association stage D)

have an estimated 1-year mortality of 29% and an estimated 1-year freedom from hospitalization or death of only 32.9% (34). Despite this high morbidity and mortality, hospice utilization has remained low with about one-third of patients with HF receiving hospice at time of death (35). Patients with advanced HF enroll in hospice at lower rates than those with cancer (19) and compared with patients with cancer, patients with HF were more likely to enroll in hospice late in the course of their disease (within 3 days of death) (36). Nevertheless, numerous cardiology professional societies have called for the continued and earlier integration of hospice care for patients with advanced heart disease (37-41). Further training is needed to assist primary care and HF clinicians to identify patients who are eligible for hospice, to describe what hospice care can provide in different settings (i.e., home, inpatient, and residence), and to introduce hospice as a treatment recommendation when appropriate. When conflict arises between patients and/or families or between clinicians about a hospice recommendation, specialty palliative care can be helpful in facilitating future care planning.

REVIEW OF RANDOMIZED CLINICAL TRIALS OF PALLIATIVE CARE IN HF

Using a recently published systematic review and meta-analysis of randomized clinical trials (RCT) of palliative care interventions (13), we conducted a secondary analysis of studies that either exclusively enrolled patients with HF or reported results separately by disease group. Briefly, we searched MEDLINE, EMBASE CINAHL, and Cochrane Library's CENTRAL, from database inception to July 22, 2016. RCT were eligible for inclusion if their interventions comprised at least 2 of the 8 domains included in the definition of palliative care from the National Consensus Project for Quality Palliative Care (42). Two investigators independently screened and reviewed the resulting 6,158 unique records, ultimately yielding 43 trials; of these 43, 5 trials either only included patients with HF or presented data by disease group and were therefore eligible for inclusion. One relevant additional trial was hand selected as it was published after our initial search (43). Each study was evaluated for risk of bias for subjective outcomes (e.g., patient-reported outcomes) and objective outcomes (e.g., survival, resource utilization) using the Cochrane Risk of Bias tool (44). A complete description of the search and analytic methodology is available elsewhere (13). Although this search is restricted to 6 studies of the strongest

TABLE 1 Summary of Existing Trials of Inpatient Specialty Palliative Care in HF

| Study (Ref. #), Year (Country) | Patient Population* | Intervention (Participants Randomized) | Control (Participants Randomized) | Results | Risk of Bias | |
|-------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| | | | | | Subjective | Objective |
| Hopp et al. (49), 2016 (U.S.) | Acute HF, 1-yr mortality risk of ≥33%, and/or NYHA functional class III-IV (mean age: 68 yrs) | Inpatient specialist consultation from a multidisciplinary team (physician, nurse practitioner, chaplain, social worker) conducted clinical interview(s), assessing symptoms, goals of care and post-treatment location desires, and advance care planning (n = 43) | Usual care (n = 42) | Hospice utilization/ACP Composite outcome: NS; difference between groups: 9.3% (95% CI: -11.8% to 30.0%) | High | High |
| Sidebottom et al. (48), 2014 (U.S.) | Acute HF (mean age: 73 yrs) | Specialty multidisciplinary palliative care consultation assessing physical and emotional symptoms, spiritual, and social aspects of care (n = 116) | Usual care (n = 116) | QoL Minnesota Living with Heart Failure Questionnaire: Improved, mean difference: 3.06 points (95% CI: 2.75-3.37) Symptom burden ESAS: Improved total symptom burden, mean difference: 4.31 points (95% CI: 4.00-4.62) 6-month mortality NS; HR: 1.90 (95% CI: 0.88-4.09) 30-day hospital readmission NS; HR: 1.43 (95% CI: 0.5-4.1) Hospice use within 6 months NS; HR: 1.60 (95% CI: 0.58-4.38) ACP within 6 months Improved; HR: 2.87 (95% CI: 1.09-7.59) Mood PHQ-9: Improved; mean difference: 0.72 (95% CI: 0.41-1.03) | High | High |

*Patient population details the indication for palliative care. All comparisons stated as intervention versus control.
 ACP = advance care planning; CI = confidence interval; ESAS = Edmonton Symptom Assessment Scale; HF = heart failure; HR = hazard ratio; NS = not significant; NYHA = New York Heart Association; PHQ-9 = Patient Health Questionnaire 9; QoL = quality of life; U.S. = United States of America.

methodological design (i.e., RCT), it should be noted that some quasi-experimental and observational studies have also demonstrated benefits of palliative care interventions in HF patients (19,45-47).

INPATIENT SPECIALTY CONSULTATION OR COMANAGEMENT. Two RCT of inpatient specialty team-based consultation yielded mixed results about the impact of palliative care on health care utilization, yet these trials provide some evidence for potential benefits of palliative care on patient-level outcomes (Table 1). However, because both trials were deemed to be at high risk of bias, results should be interpreted cautiously.

A 2015 trial compared the impact of inpatient consultation by a palliative care team versus usual care for patients hospitalized for acute HF (48). The investigators reported statistically significant improvements for all patient-reported outcomes measured, including QoL, symptom burden, and mood. There was no association with patient survival, positive or negative. Although the intervention was associated with increased advance care planning, no effect was found regarding 30-day hospital readmission, nor on hospice referral. Strengths of this study included the use of a multiprofessional team

approach similar to the ideal model of palliative care delivery in inpatient settings (i.e., palliative care physicians, advance practice nurses, social workers, and chaplains). However, given that patients in the trial were financially responsible for any subsequent palliative care visits, the majority of patients (80%) received only 1 visit, which does not allow comment on the effects of a more longitudinal palliative approach.

Hopp et al. (49) evaluated the effect of inpatient palliative care consultation within 3 urban U.S. hospitals (n = 85). Intervention content included symptom assessment and management, elicitation of goals of care, advance care planning, and discharge planning. No effect was found regarding the trial’s composite primary outcome at 3- to 6-month follow-up of hospice utilization or the creation of a “do not resuscitate” order during or after the index hospitalization (difference: 9.3%; 95% CI: -11.8% to 30.0%; p = 0.12). No statistically significant effect was found regarding patient survival (p = 0.47).

OUTPATIENT SPECIALTY PALLIATIVE CARE. The most compelling evidence of the benefits of palliative care in HF arguably comes from the recently published PAL-HF (Palliative Care in Heart Failure) study

TABLE 2 Summary of Existing Trials of Outpatient Specialty Palliative Care in HF

| Study (Ref. #), Year (Country) | Patient Population* | Intervention (Participants Randomized) | Control (Participants Randomized) | Results | Risk of Bias | |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| | | | | | Subjective | Objective |
| Rogers et al. (43), 2017 (U.S.) | Hospitalization for HF in past year and ESCAPE score ≥ 4 indicating >50% risk of 6-month mortality. (mean age: 71 yrs) | Interdisciplinary NP-led specialty palliative care intervention concomitant with usual HF management. Intervention foci included physical and emotional symptom management, spiritual concerns, and advance care planning (n = 75) | Usual care (n = 75) | <p><i>QoL</i></p> <p>KCCQ: Improved at 6 months, mean difference: 9.49 points (95% CI: 0.94 to 18.05; $p = 0.03$)</p> <p>FACIT-Pal: Improved at 6 months, mean difference: 11.77 points (95% CI: 0.84 to 22.71; $p = 0.035$)</p> <p><i>Mood</i> HADS depression: Improved at 6 months, mean difference: -1.94 points (95% CI: 3.57 to -0.31; $p = 0.02$)</p> <p>HADS anxiety: Improved at 6 months, mean difference: -1.83 points (95% CI: -3.64 to -0.02; $p = 0.048$)</p> <p><i>Spiritual well-being</i></p> <p>FACIT-Sp: Improved at 6 months, mean difference: 3.98 points (95% CI: 0.46 to 7.50; $p = 0.027$)</p> <p><i>6-month mortality</i></p> <p>NS, 30.7% vs 26.7% (p value not reported)</p> <p><i>HF-related rehospitalization</i></p> <p>NS, 30.7% vs. 29.3% (p value not reported)</p> | Low | Low |

*Patient population details the indication for palliative care. All comparisons stated as intervention versus control.
 ESCAPE = Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness; FACIT-Pal = Functional Assessment of Chronic Illness Therapy–Palliative Care; FACIT-Sp = Functional Assessment of Chronic Illness Therapy–Spiritual Well-Being; HADS = Hospital Anxiety and Depression Scale; KCCQ = Kansas City Cardiomyopathy Questionnaire; NP = nurse practitioner; other abbreviations as in Table 1.

(low risk of bias) (Table 2) (43). This trial randomized 150 recently hospitalized individuals with advanced HF at high risk of rehospitalization or 6-month mortality to either usual care or usual care plus a 6-month interdisciplinary palliative care intervention led by a palliative care-specialized nurse practitioner. The protocolized intervention aimed to improve patient QoL by addressing physical and emotional symptoms, spiritual concerns, and advance care planning. Compared with usual care, the palliative care intervention was associated with clinically significant improvements in HF-specific and disease-generic QoL at 6-month follow-up (mean difference on Kansas City Cardiomyopathy Questionnaire: 9.49 points; 95% CI: 0.94 to 18.05; mean difference on FACIT-Pal [Functional Assessment of Chronic Illness Therapy–Palliative Care] scale: 11.77 points; 95% CI: 0.84 to 22.71). The trial also reported statistically significant improvements in secondary outcomes such as mood and spiritual well-being. The intervention was not found to be associated with mortality or rehospitalization.

HOME-BASED SPECIALTY PALLIATIVE CARE. Two RCT of home-based palliative care interventions enrolled individuals with advanced disease (New York Heart Association functional class III to IV) and

provided palliative content embedded within a larger framework of disease management, including care coordination and a multidisciplinary team approach (Table 3) (50,51). Although results are generally promising, both trials were deemed to be at high risk of bias; therefore, findings should be cautiously interpreted (13).

Brännström et al. (51) conducted a trial of a home-based integrated HF disease management and palliative care intervention delivered by a multidisciplinary team. Compared with usual care, patients who received the palliative care intervention reported statistically significant improvements in QoL at 6 weeks, despite no effect on symptom burden. The intervention was associated with fewer hospitalizations over 6 months (mean: 0.42 vs. 1.47; $p = 0.009$), whereas there was no association identified regarding total costs of care. In addition, a greater proportion of patients in the intervention group experienced improvement in New York Heart Association functional class at 6 months (39% vs. 9%; $p = 0.015$).

In a trial of transitional palliative care, Wong et al. (50) randomized 84 patients recently discharged from the hospital to receive a combination of home visits and telephone check-ins from palliative care home nurses, or an attention control (i.e., social phone calls

TABLE 3 Summary of Existing Trials of Home-Based Specialty Palliative Care in HF

| Study (Ref. #), Year (Country) | Patient Population* | Intervention (Participants Randomized) | Control (Participants Randomized) | Results | Risk of Bias | |
|------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| | | | | | Subjective | Objective |
| Brännström et al. (51), 2014 (Sweden) | NYHA functional class III-IV HF (mean age: 79 yrs) | Predominately in-home HF disease management and palliative care services via a multidisciplinary approach and care coordination (n = 36) | Usual care (n = 36) | QoL EQ5D: Improved (57.6 ± 19.2 vs. 48.5 ± 24.4; p = 0.05) KCCQ: NS (data not reported) Symptom burden ESAS: NS (data not reported) 6-month survival NS; p = 0.34 Hospitalizations Reduced; 0.42 ± 0.60 vs. 1.47 ± 1.81; p = 0.009 Total costs NS; mean €4,078 vs. €5,727 (p value not reported) Increased proportion of patients with improved NYHA functional class 39% vs. 9%; p = 0.015 | High | High |
| Wong et al. (50), 2016 (Hong Kong) | Advanced HF (e.g., NYHA stage III-IV) (mean age: 78 yrs) | Palliative care home nurses conducted home visits/telephone calls providing transitional palliative care (n = 43) | Usual care (n = 41) | Symptom burden ESAS: Proportion of patients with improvement in total score, 73% vs. 41.4%, p < 0.05 QoL McGill: Improved at 4 weeks; 7.57 points vs. 6.46 points; p < 0.001 Chronic HF Questionnaire: Improved at 4 weeks; 5.26 points vs. 4.47 points; p < 0.001 Satisfaction with care Higher at 4 weeks; 48.84 points vs. 3.55 points, p < 0.001 Hospital readmission NS at 4 weeks; 20.9% vs. 29.3%, p = 0.38; reduced at 12 weeks: 33.6% vs. 61%, p = 0.009 | High | High |

*Patient population details the indication for palliative care. All comparisons stated as intervention versus control.
EQ5D = EuroQoL Five Dimensions Questionnaire; other abbreviations as in Tables 1 and 2.

regarding unrelated topics). At 12-week follow-up, intervention patients had significantly fewer hospital readmissions than control patients did (relative risk: 0.55; 95% CI: 0.35 to 0.88) and higher satisfaction with their health care. At 12 weeks, the intervention was also associated with reduced symptom burden and improved QoL.

PRIMARY PALLIATIVE CARE. We identified 1 RCT of a primary palliative care intervention for patients with HF (unclear risk of bias due to potential concerns regarding intervention fidelity) (Table 4). Within 4 Veterans Affairs Medical Centers, Bekelman et al. (52) compared the effectiveness of a collaborative care management and telemonitoring intervention versus usual care. At 1-year follow-up, there was no significant difference between groups regarding QoL (primary outcome). Among secondary outcomes, there was no difference in rates of hospital readmission (29.4% vs. 29.9%; p = 0.87). Although 1-year mortality was decreased among the intervention group (4.3% vs. 9.6%; p = 0.04), this finding should be viewed as preliminary given that it was a secondary outcome.

SUMMARY OF EVIDENCE. Six palliative care intervention trials met inclusion criteria. Although the evidence base for palliative care in HF is nascent, there is generally consistent evidence that a palliative approach improves a variety of patient-centered outcomes, including symptom burden and QoL. Nevertheless, it is clear that research regarding palliative care in HF is still developing, and due to concerns regarding risk of bias in the majority of included trials, conclusions should be interpreted cautiously. Yet, recent evidence from the high-quality PAL-HF trial provides support for the notion that longitudinal palliative care, provided concomitantly with usual HF management, is associated with improved patient-centered outcomes (43).

EXISTING CLINICAL GUIDELINES REGARDING PALLIATIVE CARE IN HF

There are growing numbers of guidelines from major cardiology societies, including the American College of Cardiology Foundation, American Heart Association, International Society for Heart and Lung

TABLE 4 Summary of Existing Trials of Primary Palliative Care/Collaborative Care Models in HF

| Study (Ref. #), Year (Country) | Patient Population* | Intervention (Participants Randomized) | Control (Participants Randomized) | Results | Risk of Bias | |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| | | | | | Subjective | Objective |
| Bekelman et al. (52), 2015 (U.S.) | HF with poor QoL, limited functional status, and significant symptoms (KCCQ score <60) (mean age: 68 yrs) | Multidisciplinary collaborative HF disease management, and telemonitoring with patient self-care support (n = 187) | Usual care (n = 197) | <p><i>QoL</i> KCCQ: NS at 1 yr; 54.2 (95% CI: 51.7 to 56.6) vs. 53.6 (95% CI: 51.1 to 56.0)</p> <p><i>Mortality</i> Decreased at 1 yr; 4.3% vs. 9.67%, p = 0.04</p> <p><i>Mood</i> PHQ-9: Improvement in depression among patients with initial positive screen; mean difference: 2.1-point reduction (95% CI: 0.43 to 3.78; p = 0.01)</p> <p><i>Hospital readmission</i> NS at 1 yr; 29.4% vs. 29.9%; p = 0.87</p> | Unclear | Unclear |

*Patient population details the indication for palliative care. All comparisons stated as intervention versus control. Abbreviations as in Tables 1 and 2.

Transplantation, the Heart Rhythm Society, and Heart Failure Society of America, encouraging the incorporation of palliative care into the care of patients with HF. Historically, most of these guidelines have focused on end-of-life decision making with respect to device management, including implantable cardioverter-defibrillators and mechanical circulatory support or referral to hospice. More recently, there has been an acknowledgment of the benefits of palliative care earlier in the disease trajectory (37).

Several guidelines also advocate that the HF and specialty palliative care teams jointly help patients and families decide on treatment options, with an emphasis on decision making in the context of advanced HF. For example, the 2013 International Society for Heart and Lung Transplantation statement recommended that specialty palliative care consultation should be included in the treatment of end-stage HF during the evaluation phase for mechanical circulatory support, and that in addition to managing symptoms, clinicians should be having discussions about goals and preferences for end-of-life care with patients receiving mechanical circulatory support as destination therapy (DT) (39). In 2012, American Heart Association experts recommended referral to specialty palliative care for assistance with difficult decision making, symptom management in advanced disease, and caregiver support, emphasizing that “the use of palliative care services should not be considered equivalent to the withdrawal of disease-modifying therapies”(38). A 2015 Heart Failure Society of America statement (40) also recommended incorporating specialty palliative and hospice care into patients with advanced HF care plans, specifying that decision making should include the patient’s

wishes for survival improvement versus QoL optimization.

These recommendations have recently expanded into the Joint Commission and the Centers for Medicare and Medicaid Services mandates. As of October 30, 2014, the Joint Commission revised its requirements for disease-specific advanced certification program for VAD for DT (53) and specifically added a requirement to include a specialty palliative care representative to the core interdisciplinary team. Following the Joint Commission updates, Centers for Medicare and Medicaid Services published its final memorandum for VAD for bridge-to-transplant and DT, again mandating the inclusion of palliative care specialists in the multidisciplinary team of medical professionals caring for beneficiaries receiving VAD as DT (54).

As illustrated, multiple guidelines advocate for the involvement of specialty palliative care in decisions regarding high-technology interventions and end-of-life care. However, there is little emphasis on 1) addressing the many domains of patient and family QoL aside from functional status, 2) integrating palliative care earlier in the HF trajectory, or 3) providing palliative care concurrently with HF-directed therapies, particularly for patients who are ineligible for or who prefer not to receive cardiac devices.

PRIORITIES FOR FUTURE RESEARCH AND CLINICAL IMPLEMENTATION OF PALLIATIVE CARE IN HF

To date, the rationale for palliative care in HF has largely been one of analogy from the benefits

TABLE 5 PPC Versus SPC for Patients With HF and Their Families

| Domain | | PPC | When to Refer to SPC |
|-----------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Symptom management | Shortness of breath | <ul style="list-style-type: none"> Maximize HF therapies to relieve congestion | <ul style="list-style-type: none"> Debilitating refractory dyspnea despite PPC interventions |
| | Pain | <ul style="list-style-type: none"> Determine etiology of pain and treat accordingly Maximize antianginal medications and recommend activity modification for anginal pain Refer to physical therapy, if appropriate Refer to multidisciplinary pain teams and pain specialists, if appropriate | <ul style="list-style-type: none"> Pain refractory to PPC interventions |
| | Depressed mood | <ul style="list-style-type: none"> Distinguish adjustment disorder from depressive disorder Treat adjustment disorder with supportive counseling or referral for psychotherapy Treat depressive disorder with referral to cognitive-behavioral therapy and consider medication management; consider referral to psychiatrist/psychologist | <ul style="list-style-type: none"> Symptoms of major depressive disorder such as incapacitating hopelessness, anhedonia, or suicidality requiring medical management |
| | Anxiety | <ul style="list-style-type: none"> Treat mild anxiety with referral to psychologist for help with relaxation techniques and psychotherapy or initiation of anxiolytic medication (if appropriate) Refer to psychiatrist for severe anxiety | <ul style="list-style-type: none"> Debilitating anxiety or panic symptoms that develop at the time of or shortly after HF diagnosis that prevent patient from participating in regular activities |
| | Nausea | <ul style="list-style-type: none"> Adjust HF therapies Determine etiology of nausea (e.g., gastroparesis vs. supratherapeutic drug levels or electrolyte abnormalities) | <ul style="list-style-type: none"> Ongoing symptoms despite PPC interventions |
| | Fatigue | <ul style="list-style-type: none"> Optimize HF therapies Refer to cardiac rehabilitation Evaluate and treat for insomnia Evaluate for sleep disordered breathing, if indicated | <ul style="list-style-type: none"> Ongoing symptoms despite PPC interventions |
| | Insomnia | <ul style="list-style-type: none"> Educate on sleep hygiene Educate on relaxation techniques Refer for cognitive-behavioral therapy | <ul style="list-style-type: none"> Ongoing symptoms despite PPC interventions |
| Communication and advance care planning | Discussing code status | <ul style="list-style-type: none"> Basic education and discussions about implications of CPR | <ul style="list-style-type: none"> Patients with misunderstandings of illness and prognosis after CPR |
| | Advance care planning, including decisions to withdraw life-sustaining therapies | <ul style="list-style-type: none"> Engage patient and family in discussions to elicit goals of care and identify surrogate Identify preferences regarding cardiac device deactivation (if appropriate) | <ul style="list-style-type: none"> Patients with misunderstandings of their illness and prognosis Patients and families who are in disagreement about the patient's end-of-life choices Patient or family are in disagreement about the chosen surrogate or if patient is ambivalent about choice Patients and/or surrogates who are in disagreement about the treatment that best matches patient's goals and values Surrogates who lack insight into patient's goals and values |
| | LVAD preparedness planning/transplant decisions | <ul style="list-style-type: none"> Involve palliative care specialist (per TJC recommendations) | <ul style="list-style-type: none"> SPC can review treatment options with patient |
| Psychological support | Request for assisted suicide | <ul style="list-style-type: none"> Refer to specialist level palliative care or ethics consultation | <ul style="list-style-type: none"> SPC to navigate complex request and explore other options |
| | Patient support | <ul style="list-style-type: none"> Supportive listening Refer to social work or community resources (if available) | <ul style="list-style-type: none"> Refer to SPC when needs exceed the expertise of HF social worker, especially around issues of end-of-life care, such as counseling parents on how to talk with their children |
| Caregiver support | Caregiver support | <ul style="list-style-type: none"> Supportive listening Refer to social work or community resources (if available) | <ul style="list-style-type: none"> Patient's needs exceed the expertise of the HF social worker, especially if caregiver has significant needs or the patient and caregiver are in conflict |
| | Care coordination | <ul style="list-style-type: none"> Communicate with other health care providers Refer for home hospice for patients with good support at home and without complex medical or social needs | <ul style="list-style-type: none"> Complex hospice or home care referral for patients who require placement in facilities with need for complex medical management (e.g., palliative home inotropes) |

Adapted with permission from Gelfman et al. (70).

CPR = cardiopulmonary resuscitation; HF = heart failure; LVAD = left ventricular assist device; PPC = primary palliative care; SPC = specialty palliative care; TJC = The Joint Commission.

reported from studies of palliative care in oncology. Yet, it is neither likely nor appropriate to assume that the framework of palliative care used in oncology is optimal for patients living with chronic, nonmalignant illnesses, such as HF. Indeed, the next era of palliative care research and clinical implementation will challenge the status quo of palliative care, both in terms of content and structure, to maximize impact and uptake in chronic illness (55). Whereas few randomized trials of palliative care interventions exist in HF, as we have illustrated, these trials are an important yet imperfect starting point for future investigations. Three critical questions remain unanswered in the published data; these questions represent immediate priorities in explicating the role of palliative care in HF.

First, how do we build capacity in addressing the unmet palliative needs of patients with HF? True innovation regarding the ability to disseminate and sustain palliative care will disrupt the prevailing reliance on the increasingly scarce resource of palliative care specialists (56). Indeed, all clinicians caring for patients with serious illness, such as HF, should possess a fundamental palliative proficiency to alleviate and prevent suffering (e.g., basic management of physical and psychological symptoms, eliciting goals of care, responding to family concerns) (14). Initial efforts to educate cardiology fellows in palliative care competencies, such as communication, are underway (57,58). Research is needed to understand how to improve education regarding primary palliative care domains that are relevant to patients with advanced HF, such as elicitation of goals of care, advance care planning, and caregiver support. As a result, not only is palliative care normalized, it is also able to be provided seamlessly and longitudinally across the HF experience—not solely in the inpatient setting in response to acute decompensation crises. Indeed, multiple aspects of palliative care (e.g., symptom self-management, care coordination, decision support, patient activation) align with principles of disease management and HF self-care (59,60). For example, primary clinicians should provide proactive education and support to patients to promote self-management of burdensome symptoms, while offering specialty palliative care resources as an option if these needs become intractable. We present suggested roles for primary and specialty palliative care in HF in Table 5. Yet these considerations for primary palliative care in HF are largely theoretical (55); research is needed to examine integrating primary palliative care within primary care and cardiology settings, reserving specialty palliative care for patients with complex needs.

Second, which palliative care models and delivery methods are most effective in optimizing outcomes for a particular patient with HF? Trials are needed to identify the comparative effectiveness of various permutations of palliative care delivery in HF, specifically across 2 characteristics: provider specialization (e.g., primary care vs. cardiology vs. palliative care) and delivery method (e.g., in person vs. telephonic vs. video-based). First, although more studies are needed to confirm the effectiveness of primary palliative care in HF, subsequent trials must directly compare this model with specialty palliative care management. Whereas intuition would argue for the relative superiority of specialty palliative care over a primary palliative approach, this assumption remains untested, and, as noted previously, access to specialty care for all HF patients is considerably limited. Second, although evidence suggests that telephone-based palliative care is effective in oncology (61), no head-to-head trial has evaluated this model against in-person palliative care. It is unclear whether palliative care delivered remotely is equivalent to the arguably more resource-intensive method of in-person consultation. To ensure maximal relevance, these studies must simultaneously assess patient (e.g., QoL, symptom burden), caregiver (e.g., burden, mood), and health system outcomes (e.g., utilization, costs).

Third, which treatments are most effective for addressing symptom burden in patients with HF? Although the most common symptoms for patients with HF are well known to be depression, anxiety, sleep disturbance, fatigue, dyspnea, and pain (19,62,63), additional studies are needed to expand the range of effective treatment modalities for these symptoms. For example, recent intervention studies of psychiatric comorbidity in HF have failed to yield a clear conclusion of the effectiveness of treatments (64). This is likely due to differences in the underlying pathophysiology of these symptoms, which may differ in cardiac versus noncardiac conditions (65,66). Given this gap in the published data, it remains challenging to effectively treat these very burdensome symptoms. Furthermore, due to often extreme medical complexity and frailty in this population, it can often be additionally difficult to discern a distinct symptom versus progression of the overall disease process (e.g., fatigue due to depression or due to HF). Relatedly, the severity of perceived symptoms notoriously reflects poorly the degree of underlying cardiac pathophysiology. For example, dyspnea is experienced in up to 90% of patients with HF (65), yet this is frequently in the absence of hypoxemia or hypercapnia (18). In addition, physiological measures

of disease severity, such as ejection fraction, may be inadequate proxies for health status and other subjective markers of well-being (67). Idiosyncrasies such as these further complicate studies of potential palliative treatments due to the difficulty of establishing appropriate subject inclusion and response criteria for these symptoms.

CONCLUSIONS

Although the evidence base for palliative care in HF is in its infancy (68,69), interest in this area continues to proliferate as evidenced by the recent publication of the groundbreaking PAL-HF trial, as well as multiple clinical trials also underway examining various forms of palliative care delivery in HF. Given the growing prevalence of HF, the integration of palliative care within HF management represents an opportunity to affect the public health issue of poor QoL in patients and caregivers while optimizing care delivery. Furthermore, research and clinical implementation of palliative care in HF can serve as a

vanguard for explicating the role of palliative care in other chronic, nonmalignant illnesses.

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REFERENCES

1. Mozaffarian D, Benjamin EJ, Go AS, et al. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation* 2016;133:e38–360.
2. Liu L, Eisen HJ. Epidemiology of heart failure and scope of the problem. *Cardiol Clin* 2014;32:1–8, vii.
3. Solano J, Gomes B, Higginson I. A comparison of symptom prevalence in far advanced cancer, AIDS, heart disease, chronic obstructive pulmonary disease and renal disease. *J Pain Symptom Manage* 2006;31:58–69.
4. Bekelman DB, Havranek EP, Becker DM, et al. Symptoms, depression, and quality of life in patients with heart failure. *J Card Fail* 2007;13:643–8.
5. Goebel J, Doering L, Shugrman L, et al. Heart failure: the hidden problem of pain. *J Pain Symptom Manage* 2009;38:698–707.
6. Evangelista L, Sackett E, Dracup K. Pain and heart failure: unrecognized and untreated. *Eur J Cardiovasc Nurs* 2009;8:169–73.
7. Cain CJ, Wicks MN. Caregiver attributes as correlates of burden in family caregivers coping with chronic obstructive pulmonary disease. *J Fam Nurs* 2000;6:46–68.
8. Dracup K, Evangelista LS, Doering L, Tullman D, Moser DK, Hamilton M. Emotional well-being in spouses of patients with advanced heart failure. *Heart Lung* 2004;33:354–61.
9. Harding R, Selman L, Beynon T, et al. Meeting the communication and information needs of chronic heart failure patients. *J Pain Symptom Manage* 2008;36:149–56.
10. Lemond L, Allen LA. Palliative care and hospice in advanced heart failure. *Prog Cardiovasc Dis* 2011;54:168–78.
11. Heidenreich PA, Albert NM, Allen LA, et al. Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. *Circ Heart Fail* 2013;6:606–19.
12. Morrison RS, Meier DE. Palliative care. *N Engl J Med* 2004;350:2582–90.
13. Kavalieratos D, Corbelli J, Zhang D, et al. Association between palliative care and patient and caregiver outcomes: a systematic review and meta-analysis. *JAMA* 2016;316:2104–14.
14. Quill TE, Abernethy AP. Generalist plus specialist palliative care—creating a more sustainable model. *N Engl J Med* 2013;368:1173–5.
15. Dumanovsky T, Augustin R, Rogers M, Lettang K, Meier DE, Morrison RS. The growth of palliative care in U.S. hospitals: a status report. *J Palliat Med* 2016;19:8–15.
16. Meier DE, Beresford L. Outpatient clinics are a new frontier for palliative care. *J Palliat Med* 2008;11:823–8.
17. Kavalieratos D, Mitchell EM, Carey TS, et al. “Not the ‘grim reaper service’”: an assessment of provider knowledge, attitudes, and perceptions regarding palliative care referral barriers in heart failure. *J Am Heart Assoc* 2014;3:e000544.
18. Goodlin SJ. Palliative care in congestive heart failure. *J Am Coll Cardiol* 2009;54:386–96.
19. Bekelman DB, Nowels CT, Allen LA, Shakar S, Kutner JS, Matlock DD. Outpatient palliative care for chronic heart failure: a case series. *J Palliat Med* 2011;14:815–21.
20. Alpert CM, Smith MA, Hummel SL, Hummel EK. Symptom burden in heart failure: assessment, impact on outcomes, and management. *Heart Fail Rev* 2017;22:25–39.
21. Rutledge T, Reis VA, Linke SE, Greenberg BH, Mills PJ. Depression in heart failure: a meta-analytic review of prevalence, intervention effects, and associations with clinical outcomes. *J Am Coll Cardiol* 2006;48:1527–37.
22. Saveanu RV, Mayes T. Diagnosing depression in congestive heart failure. *Heart Fail Clin* 2011;7:75–9.
23. O’Connor CM, Joynt KE. Depression: are we ignoring an important comorbidity in heart failure? *J Am Coll Cardiol* 2004;43:1550–2.
24. Cagle JG, Bunting M, Kelemen A, Lee J, Terry D, Harris R. Psychosocial needs and interventions for heart failure patients and families receiving palliative care support: a systematic review. *Heart Fail Rev* 2017;22:565–80.
25. Hooker SA, Grigsby ME, Riegel B, Bekelman DB. The impact of relationship quality on health-related outcomes in heart failure patients and informal family caregivers: an integrative review. *J Cardiovasc Nurs* 2015;30:552–63.
26. Nicholas Dionne-Odom J, Hooker SA, Bekelman D, et al., for the IMPACT-HF National Workgroup. Family caregiving for persons with heart failure at the intersection of heart failure and palliative care: a state-of-the-science review. *Heart Fail Rev* 2017;22:543–57.
27. 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;24:592–8.

28. Setoguchi S, Glynn RJ, Stedman M, Flavell CM, Levin R, Stevenson LW. Hospice, opiates, and acute care service use among the elderly before death from heart failure or cancer. *Am Heart J* 2010;160:139-44.
29. Bakas T, Pressler SJ, Johnson EA, Nauser JA, Shaneyfelt T. Family caregiving in heart failure. *Nurs Res* 2006;55:180-8.
30. Goodlin SJ, Hauptman PJ, Arnold R, et al. Consensus statement: palliative and supportive care in advanced heart failure. *J Card Fail* 2004;10:200-9.
31. Janssen DJ, Spruit MA, Wouters EF, Schols JM. Daily symptom burden in end-stage chronic organ failure: a systematic review. *Palliat Med* 2008;22:938-48.
32. Goodlin SJ. End-of-life care in heart failure. *Curr Cardiol Rep* 2009;11:184-91.
33. Yim CK, Barron Y, Moore S, et al. Hospice enrollment in patients with advanced heart failure decreases acute medical service utilization. *Circ Heart Fail* 2017;10. pii:e003335.
34. Costanzo MR, Mills RM, Wynne J. Characteristics of "stage D" heart failure: insights from the Acute Decompensated Heart Failure National Registry Longitudinal Module (ADHERE LM). *Am Heart J* 2008;155:339-47.
35. Unroe KT, Greiner MA, Hernandez AF, et al. Resource use in the last 6 months of life among Medicare beneficiaries with heart failure, 2000-2007. *Arch Intern Med* 2011;171:196-203.
36. Cheung WY, Schaefer K, May CW, et al. Enrollment and events of hospice patients with heart failure vs. cancer. *J Pain Symptom Manage* 2013;45:552-60.
37. Yancy CW, Jessup M, Bozkurt B, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 2013;62:e147-239.
38. Allen LA, Stevenson LW, Grady KL, et al. Decision making in advanced heart failure: a scientific statement from the American Heart Association. *Circulation* 2012;125:1928-52.
39. Feldman D, Pamboukian SV, Teuteberg JJ, et al. The 2013 International Society for Heart and Lung Transplantation Guidelines for mechanical circulatory support: executive summary. *J Heart Lung Transplant* 2013;32:157-87.
40. Fang JC, Ewald GA, Allen LA, et al. Advanced (stage D) heart failure: a statement from the Heart Failure Society of America Guidelines Committee. *J Card Fail* 2015;21:519-34.
41. McKelvie RS, Moe GW, Cheung A, et al. The 2011 Canadian Cardiovascular Society heart failure management guidelines update: focus on sleep apnea, renal dysfunction, mechanical circulatory support, and palliative care. *Can J Cardiol* 2011;27:319-38.
42. Dahlin C, ed. *Clinical Practice Guidelines for Quality Palliative Care*. 3rd edition. Pittsburgh, PA: National Consensus Project for Quality Palliative Care; 2013.
43. Rogers JG, Patel CB, Mentz RJ, et al. Palliative care in heart failure: the PAL-HF randomized, controlled clinical trial. *J Am Coll Cardiol* 2017;70:331-41.
44. Higgins JPT, Green S, editors. *Cochrane Handbook for Systematic Reviews of Interventions*. Version 5.1.0. Oxford, UK: The Cochrane Collaboration, 2011.
45. Evangelista LS, Lombardo D, Malik S, Ballard-Hernandez J, Motie M, Liao S. Examining the effects of an outpatient palliative care consultation on symptom burden, depression, and quality of life in patients with symptomatic heart failure. *J Card Fail* 2012;18:894-9.
46. Dionne-Odom JN, Kono A, Frost J, et al. Translating and testing the ENABLE: CHF-PC concurrent palliative care model for older adults with heart failure and their family caregivers. *J Palliat Med* 2014;17:995-1004.
47. Lewin WH, Schaefer KG. Integrating palliative care into routine care of patients with heart failure: models for clinical collaboration. *Heart Fail Rev* 2017;22:517-24.
48. Sidebottom AC, Jorgenson A, Richards H, Kirven J, Sillah A. Inpatient palliative care for patients with acute heart failure: outcomes from a randomized trial. *J Palliat Med* 2015;18:134-42.
49. Hopp FP, Zalenski RJ, Waselewsky D, Burn J, Camp J, Welch RD, Levy P. Results of a hospital-based palliative care intervention for patients with an acute exacerbation of chronic heart failure. *J Card Fail* 2016;22:1033-6.
50. Wong F, Ng A, Lee P, Lam PT, Ng JS, Ng NH, Sham MM. Effects of a transitional palliative care model on patients with end-stage heart failure: a randomised controlled trial. *Heart* 2016;102:1100-8.
51. Brännström M, Boman K. Effects of person-centred and integrated chronic heart failure and palliative home care: PREFER: a randomized controlled study. *Eur J Heart Fail* 2014;16:1142-51.
52. Bekelman DB, Plomondon ME, Carey EP, et al. Primary Results of the Patient-Centered Disease Management (PCDM) for heart failure study: a randomized clinical trial. *JAMA Intern Med* 2015;175:725-32.
53. Modified: ventricular assist device destination therapy requirements. *Jt Comm Perspect* 2014;34:6-7.
54. Centers for Medicare and Medicaid Services. Proposed Decision Memo for Ventricular Assist Devices for Bridge-to-Transplant and Destination Therapy (CAG-00432R). October 30, 2013. Available at: <https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=268>. Accessed March 14, 2017.
55. Kavalieratos D, Rollman BL, Arnold RM. Homeward bound, not hospital rebound: how transitional palliative care can reduce readmission. *Heart* 2016;102:1079-80.
56. Lupu D, American Academy of Hospice and Palliative Medicine Workforce Task Force. Estimate of current hospice and palliative medicine physician workforce shortage. *J Pain Symptom Manage* 2010;40:899-911.
57. Munoz-Mendoza J. Competencies in palliative care for cardiology fellows. *J Am Coll Cardiol* 2015;65:750-2.
58. Berlacher K, Arnold RM, Reitschuler-Cross E, Teuteberg J, Teuteberg W. The impact of communication skills training on cardiology fellows' and attending physicians' perceived comfort with difficult conversations. *J Palliat Med* 2017;20:767-9.
59. Krumholz HM, Currie PM, Riegel B, et al. A taxonomy for disease management: a scientific statement from the American Heart Association Disease Management Taxonomy Writing Group. *Circulation* 2006;114:1432-45.
60. Riegel B, Dickson VV, Faulkner KM. The situation-specific theory of heart failure self-care: revised and updated. *J Cardiovasc Nurs* 2016;31:226-35.
61. Bakitas, Lyons M, Hegel KD, et al. Effects of a palliative care intervention on clinical outcomes in patients with advanced cancer: the Project ENABLE II randomized controlled trial. *JAMA* 2009;302:741-9.
62. Kavalieratos D, Kamal AH, Abernethy AP, et al. Comparing unmet needs between community-based palliative care patients with heart failure and patients with cancer. *J Palliat Med* 2014;17:475-81.
63. Nordgren L, Sorensen S. Symptoms experienced in the last six months of life in patients with end-stage heart failure. *Eur J Cardiovasc Nurs* 2003;2:2137.
64. Ströhle A, Rieckmann N. Escitalopram and outcomes among patients with depression and heart failure. *JAMA* 2016;316:1494.
65. Beattie J, Goodlin S. *Supportive Care in Heart Failure*. Oxford, UK: Oxford University Press, 2011.
66. Xiong GL, Fuzat M, Kuchibhatla M, et al., for the SADHART-CHF Investigators. Health status and depression remission in patients with chronic heart failure: patient-reported outcomes from the SADHART-CHF trial. *Circ Heart Fail* 2012;5:688-92.
67. Heidenreich PA, Spertus JA, Jones PG, et al., for the Cardiovascular Outcomes Research Consortium. Health status identifies heart failure outpatients at risk for hospitalization or death. *J Am Coll Cardiol* 2006;47:752-6.
68. Xie K, Gelfman L, Horton JR, Goldstein NE. State of research on palliative care in heart failure as evidenced by published literature, conference proceedings, and NIH funding. *J Card Fail* 2017;23:197-200.
69. McIlvennan CK, Allen LA. Palliative care in patients with heart failure. *BMJ* 2016;353:i1010.
70. Gelfman LP, Kavalieratos D, Teuteberg WG, Lala A, Goldstein NE. Primary palliative care for heart failure: what is it? How do we implement it? *Heart Fail Rev* 2017;22:611-20.

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