



Canadian Geriatrics Society

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AN APPROACH TO MANAGEMENT OF ADVANCED HEART FAILURE IN THE OLDER PERSON

Abstract

The number of older patients with heart failure (HF) is on the rise. These patients are typically complex, suffering from a variety of acute and chronic conditions. Management of HF in older adults must therefore be individualized, taking into consideration the impact of comorbidities, functional status, frailty and cognitive deficits. As the disease progresses, patient and family education regarding the disease trajectory and early discussion of advance care planning and end-of-life care is needed. At some point a palliative care approach may become appropriate for older HF patients and is particularly relevant to those with advanced disease, as aggressive therapy may not be appropriate, beneficial or desired. An end-of-life care plan must be developed in consultation with the patient and/or the substitute decision-maker regarding appropriate treatment options and their preferences. Physicians need to ensure that care is delivered in a manner consistent with each patient's values and overall goals.

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Key Points

- Heart failure (HF) management in the geriatric population requires a systematic approach with a focus on cognitive impairment, comorbidity, frailty, psychosocial factors and polypharmacy.
- Transitions of care interventions in the geriatric population are essential in preventing readmission to hospital.
- Advanced HF is associated with high morbidity and mortality; as much as 75% one-year mortality and no survival at two years.
- A palliative care approach is appropriate for many older HF patients, particularly in those with advanced disease.

Case Study

Mrs. Smith is an 86-year-old woman presenting to the emergency department with worsening dyspnea and leg edema. She has a longstanding history of hypertension, type II diabetes mellitus, aortic stenosis, forgetfulness and atrial fibrillation. She endorses generalized weakness resulting in a recent fall and decline in her mobility. You noted two recent admissions to the hospital related to heart failure.

On physical examination, her vitals are as follows: blood pressure is 98/70 mmHg, heart rate is 115 irregular, SpO₂ 90% (on 3L via nasal prongs), RR 24 and she is afebrile. Auscultation of the lungs reveals bibasilar pulmonary rales and cardiac examination reveals elevated JVP, normal S1 and S2 and an aortic stenosis murmur.

Her initial blood work revealed sodium of 128, potassium of 4.8 and creatinine of 168.

You suspect acute decompensated heart failure. Given her age and comorbidities, how should you proceed with her care? How do you manage advanced heart failure in this population?

Introduction

Heart failure (HF) is the final common pathway of cardiovascular (CV) aging. It represents the convergence of age-related changes in the CV and other organ systems, and the increasing prevalence of vascular risk factors and diseases of older age. As a result of patient complexity, HF has been defined as a *cardiogeriatric syndrome*.¹

One in five Canadians over the age of 40 will experience HF in their lifetime with an average one-year mortality of approximately 23%.² The risk of developing HF is 4 times higher in those over the age of 75. As the prevalence of HF increases with age, it is projected that the rate of hospitalization will triple over the next few decades.³ It has been reported that only 30% of re-admissions are directly related to cardiovascular disease (CVD) as the primary problem with the remainder of HF decompensations is due to non-CVD comorbidity issues. This highlights the critical role of optimal management of comorbidities.

Older patients with HF are typically complex, suffering from a variety of acute and chronic diseases/conditions such as: cognitive decline; functional impairment; frailty; psychosocial issues; and polypharmacy.⁴ Consequently, the entire patient support system is often under stress, including family/primary caregivers, health care professionals, and supportive services.

Management of HF in older adults must be individualized, recognizing the limitations of existing evidence in this population, and taking into consideration the impact of comorbidities, functional status, quality of life (QoL) and patient preferences. We need to ensure that care is delivered in a manner consistent with each patient's values and overall *goals of care*.^{5,6} HF prognosis follows a progressive albeit nonlinear course, whereby patients can die suddenly or progress to advanced or end-stage HF over time (Figure 1). Typically, there is escalation in the care needs of the HF patient as the disease progresses. Advanced HF is characterized by the severity and non-reversibility of HF symptoms, despite optimal therapy (a more detailed

definition is provided below). It is at this point that key discussions regarding goals of care and QoL need to happen. Patients are either transitioned to a palliative care approach or are evaluated for advanced cardiac therapies by cardiology (such as transplant or mechanical support). However, the Canadian and the American consensus guidelines strongly recommend that clinicians should initiate and facilitate regular discussions with patients and family regarding advance care planning (ACP – see www.advancecareplanning.ca).^{7,39} Unfortunately, these discussions often never happen or happen too late in the patient's course.

This article will provide a systematic approach to managing advanced HF in the older population with a focus on comorbidity, polypharmacy, cognitive impairment, and frailty that fundamentally alter the risk/benefit ratio considerations for virtually all diagnostic procedures, therapeutic interventions and overall end stage management. Furthermore, the role for primary care physicians and involvement of specialists, particularly geriatric medicine and palliative care specialists will also be explored.

How is advanced Heart Failure different in older patients?

The presentation of HF in the elderly can be atypical with nonspecific symptoms, such as acute functional decline, generalized weakness and fatigue, anorexia or delirium.⁴ Once recognized, the initial management and further confirmatory investigations remain similar to that of HF management in younger populations. However, as demonstrated in Table 1, appropriate medical management in this population must be tailored to addressing coexisting conditions, polypharmacy, QoL, functional issues and the end-of-life decisions.⁵⁻⁷

On average, older patients with HF have ≥ 5 comorbidities.⁸ They are also at higher risk of poorer psychosocial support. In addition, the presence of dementia in HF patients, which is double the rate in other CV conditions,⁹ significantly impacts ongoing stabilization of HF symptoms in this group. The overlap of dementia and chronic diseases is considered the main driver of prolonged hospital stay and Alternate Level of Care (ALC) rates.¹⁰

After age 75, there are more women than men who suffer from HF. Heart failure with preserved ejection fraction (HFpEF) typically accounts for 10% of HF in patients younger than 65, but is more than 50% in those over 75.¹¹ The long-term prognosis of HFpEF is felt to be similar to that of HF with reduced EF.¹² The primary focus of HFpEF treatment is on the management of coexisting morbidities such as hypertension, diabetes mellitus (DM), atrial fibrillation, infection and polypharmacy.¹³

For more information on HF management, see "[Heart Failure in Older Persons: Considerations for the Primary Care Physician.](#)"

Definition and prognostication in advanced Heart Failure

The American College of Cardiology Foundation and American Heart Association definition of advanced or stage D heart failure is as follows:

1. repeated (≥ 2) hospitalizations or ED visits for HF in the past year;
2. progressive deterioration in renal function (e.g., rise in BUN and creatinine);
3. weight loss without other cause (e.g., cardiac cachexia);
4. intolerance of ACE inhibitor because of hypotension and/or worsening renal function;
5. intolerance of beta-blockers because of worsening HF or hypotension, frequent systolic blood pressure < 90 mmHg;
6. persistent dyspnea with activities, such as dressing or bathing requiring rest;
7. inability to walk one block on level ground because of dyspnea or fatigue;
8. need to escalate diuretics to maintain volume status; often reaching daily furosemide equivalent dose > 160 mg and/or use of supplemental Metazone therapy;
9. progressive decline in serum sodium, usually < 133 mEq/L; and
10. frequent ICD shocks.¹⁴

Despite advances in therapy, end stage HF is associated with poor outcomes, as much as 75% one-year mortality and no survival at two years.¹⁴ In the older population with HF, more emphasis needs to be given to non-CV prognostic factors, such as cognitive impairment, dementia, frailty, functional state, psychosocial factors (including depression) and polypharmacy.⁶ Discussion of prognosis is essential in guiding treatment decisions. Aggressive therapy may not be appropriate or desired because of disability, comorbidity, poor QoL or the patient's preferences.

In reality, both health care providers and patients consistently overestimate survival in HF.¹⁶ To address uncertainties regarding HF prognosis, various risk stratification methods, based on patient profiles and clinical features, are being developed to make the assessment of life expectancy more accurate.¹⁵ However, the available risk scoring tools generally only have poor to modest discriminatory values. Addition of functional state and cognition significantly improves the discrimination of validated scoring systems.¹⁷ An online tool (eprognosis.ucsf.edu) is available that can be used to calculate the likelihood of mortality in one year.¹⁸

Impact of comorbidities on advanced Heart Failure

1. Cognitive impairment

Cognitive impairment (CI) due to mild cognitive impairment (MCI), dementia or delirium is fairly common among older HF patients, with a prevalence reported anywhere between 25-80%.^{9,21} The presence of CI can result in a five-fold increase in mortality of HF patients.¹⁹ The cognitive deficits include: decline in attention/concentration; memory loss; psychomotor speed retardation; and executive dysfunction (i.e., the cognitive ability required to manage HF). Cognitive screening using the Montreal Cognitive Assessment (MoCA) (see www.mocatest.org) is significantly more sensitive in identifying problems with executive function in comparison to Mini Mental Status Examination (MMSE) (54% vs. 2.2%).²⁰ Optimal HF management in the community requires a fair amount of self-care, including monitoring salt intake, daily weights and diuretic dosing – all of which are negatively impacted by CI. Such patients require simplified medication regimens, supervision of HF management and more supportive home environments. Despite the fact that CI has been identified as one of the strongest independent predictors of mortality in older hospitalized patients, it is only infrequently assessed, documented or optimized by physicians caring for this population.⁹

2. Frailty

Frailty can affect between 25% and 50% of patients with CVD, especially older patients with advanced HF.²² Epidemiological studies have consistently demonstrated that frailty doubles the risk of mortality and morbidity across a spectrum of stable CVD, acute coronary syndromes, HF, as well as surgical and transcatheter interventions.

The pathobiology of frailty and CVD shares several commonalities; in particular, there is a consistent correlation with circulating inflammatory biomarkers interleukin-6 and C-reactive protein.²² Frailty arises from the accumulation over time of deficits across multiple physiological systems, and leads to decreased homeostatic reserve, loss of resistance to health stressors, and a greater vulnerability to poor health outcomes.²² Upward of 20 frailty assessment tools have been developed, with most tools revolving around the core phenotypic domains of frailty: slow walking speed, weakness, inactivity, exhaustion and shrinking stature as measured by physical performance tests and questionnaires. We need to use our clinical judgment and estimate survival based on the associated clinical frailty.²³ The CSHA Frailty Scale (Table 2) is a useful clinical tool in assessing the degree of disability and prognosis.²⁴

For more information on frailty, see "[Frailty](#)."

3. Depression

The importance of psychosocial factors in the management of advanced HF is worth highlighting. Socioeconomic status and mood disorders, especially depression and anxiety, affect morbidity and mortality in HF by interfering with the patient's ability and motivation for self-care. Approximately 22% of HF patients have depression with incremental prevalence based on symptom severity and advanced stage.¹⁴ Early recognition and appropriate management of depression has significant impact on the QoL, function and mortality.²⁵

4. Polypharmacy

Polypharmacy has been defined as the chronic use of ≥ 5 medications and is a major concern in elderly patients with advanced HF. For example, it can result in marked increase in risk of drug interactions and decrease in likelihood of taking meds correctly.²⁶ In an aging population, where vascular and baroreceptor changes predispose to orthostatic hypotension, medication-induced falls and syncope is of significant concern.²⁷ Therefore, regular review of medications and its clinical indication and the need for continuation in partnership with community pharmacist is highly recommended.

For more information on polypharmacy, see "[Better Prescribing in the Elderly](#)".

For more information on orthostatic hypotension see "[4d-Aid: A Practical Approach to the Assessment of Orthostatic Hypotension in Older Patients](#)".

Transition of care in Heart Failure

A Canadian study examining average lifespan of patients discharged from hospital with HF reported mortality rates of 17% and 27% at 6 months and 1 year respectively.²⁸ Moreover, readmission rates for Canadian HF discharges are reportedly as high as 50% at 1 year.²⁹ These findings clearly demonstrate the critical importance of optimal HF transition of care interventions on discharge from hospital.

A Cochrane systematic review of disease management programs implemented post hospital discharge listed the following important transition of care interventions: medication reconciliation; very early post discharge contact and communication with patient and/or care provider; and early office follow-up within first week of discharge.³⁰ In addressing barriers to self-care, patient education and support for HF, including skills for recognizing early warning signs of worsening HF and appropriate response, are recommended.³¹ Communicating the patient health record, goals and plan of care with the patient and post-discharge health care providers assists with better case coordination. Collaborative Cardio-Geriatric clinics between primary care physician, cardiologist and geriatrician can provide integrated care and education for older patients and their caregivers with the objective of improving QoL and function.³²

Advance care planning and end-of-life care in Heart Failure

HF patients and their caregivers often have insufficient understanding regarding the nature of their disease or their prognosis (i.e., limited health literacy) and therefore rarely initiate discussion on end-of-life (EoL) issues. Therefore, patient education regarding the disease trajectory (Figure 1) and early discussion of advanced care planning (ACP) and EoL care is needed.³² A palliative care approach is appropriate for some HF patients and is particularly relevant to those who are elderly with advanced disease.³³ What is important to realize is that as the person becomes sicker, either from advancing HF or frailty (or usually both), the emphasis in expectations and goals of care will shift.

For more information on health literacy, see "[Health Literacy: Improving Communication Between Health Care Practitioners and Older Adults](#)".

Palliative care is distinct from hospice care, which is limited to patients with a prognosis of <6 months. It has been shown that recipients of palliative care had less aggressive medical care at the EoL but had more opportunities for honest effective communication.³⁴ There is a misperception that palliative care support is appropriate only for patients near death.

For more information on palliative and therapeutic harmonization, see "[Palliative and Therapeutic Harmonization: Expanding the Orientation of Geriatric Medicine.](#)"

The EoL approach is aimed at improving the patient's QoL and addressing the challenges associated with refractory symptoms management and dealing with uncertainty.^{35,36} The prevention and relief of suffering by means of early identification and treatment of physical and psychological symptoms, and attention to social and spiritual needs, are of paramount importance.

Given limited health literacy regarding HF prognosis, the EoL care discussions often need to be initiated by the patient's physician or health care team and are developed in consultation with the patient or the substitute decision-makers regarding appropriate treatment plans.⁷ In fact, we need a series of early structured conversations with patients about ACP based on patient's priorities, values and preferences (see www.advancereplanning.ca). Currently, we have a major gap in our approach to discussion of EoL care and documentation of ACP as less than 50% of HF patients have such discussions documented.³⁷ Table 3 offers techniques and approaches to facilitate patient self-determination and future care planning.³⁸ These techniques encourage shared decision making and consensus building by involvement and exchange of information between the patient and physicians to establish goals of care and preferences.

The specific plan for EoL care in consultation with cardiologists, primary care physicians and palliative care specialists should address managing symptoms of angina with nitrates and use of O₂ or CPAP for sleep disordered breathing. Many patients suffer from chronic pain, depression and breathlessness.³⁴ Optimal use of opioids for dyspnea and pain is appropriate as over 84% of these patients suffer from chronic pain. Depression and anxiety symptoms can be treated with SSRIs, SNRIs or anxiolytics.³⁹ Table 4 is a summary of HF management in advanced HF and last days of life.⁴⁰ Most first-line HF medications may improve symptoms and should be continued as long as they are tolerated. However, other medications for comorbid conditions, such as statins or bisphosphonates can be stopped. In last days of life, only medications for symptom control are appropriate. Spiritual care and attention to how the care providers/family are coping with EoL care and the adequacy of support for post bereavement are needed.

When relevant, EoL care and ACP discussions should include timing of implanted defibrillator deactivation to allow natural death. Informed and shared decision making for device-based therapy about sudden death and pump failure is needed. Patients should be encouraged to use the SPEAK UP resource for advance care planning (www.advancereplanning.ca).⁴¹

The clinicians are encouraged to familiarize themselves with the [palliative and therapeutic harmonization model](#) in their approach to advance directives and EoL decisions.⁴² Table 5 provides a list of potential triggers (i.e., red flags) for use in clinical practice in determining the need for palliative care involvement.¹⁴

Back to our case

It is clear that Mrs. Smith is quite frail and is in decompensated HF. She exhibits several poor prognostic factors including two recent admissions to hospital related to HF, hyponatremia, presence of atrial fibrillation and aortic stenosis, and functional and cognitive decline.

Acute management would include O₂, diuretics, heart rate control, stabilization of her comorbid conditions, and treatment of any acute illness. Consultation with HF experts for possible candidacy for transcatheter intervention for aortic stenosis and the geriatric team for comorbidity management and guidance are advisable to optimize her health status, cognition, function and future planning (e.g., ensuring transcatheter

intervention is appropriate given prognosis). Optimizing health literacy via patient and caregiver education regarding medication and lifestyle changes (e.g., fluids, salt restriction and optimal diet) and goals of care are needed. Outlining the shifting/evolving role of the caregiver is often helpful. Medication reconciliation, review of polypharmacy and deprescribing of nonessential medications are crucial. A careful assessment of her physical and social support system or any rehabilitation potential to optimize function and self-care skills by the multidisciplinary team is recommended. Use of tools such as CSHA Frailty Scale (Table 2) and e.prognosis (eprognosis.ucsf.edu)¹⁸ can assist with prognostication. The clinical presentation and the trajectory of this patient are suggestive of advanced stage of HF. Discussion of goals of care and timely post-discharge follow-up are recommended to ensure optimal symptom control and a supportive environment. Mrs. Smith may in fact be at a stage where she needs to relocate to a facility for increased supervision/assistance. Early discussion and planning with the patient and caregiver regarding advance care planning, prognosis, code status, benefits of a palliative care consult, and EoL care needs are of paramount importance.

FIGURES AND TABLES:

Figure 1³²: Comprehensive Heart Failure Care (Printed with permission of Elsevier)

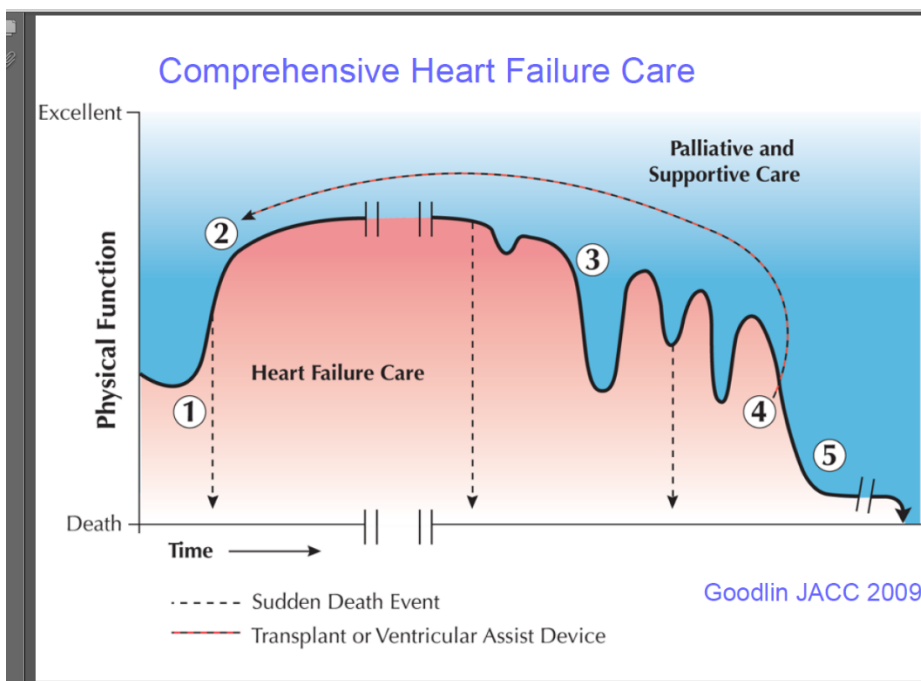


Table 1.⁶ Practice guidelines; the older patient with known or suspected HF should be assessed for:

- Optimal care of comorbid conditions that may affect HF treatment, adherence to therapy, follow-up or prognosis (level I, class C)
- In hospitalized elderly HF patients, delirium should be considered when clinically appropriate (level I, class C)
- Elderly HF patients who are frail and have a high comorbid disease burden should be followed up in a disease management setting (level I, class A)
- The primary care physician or provider should be involved in the disease management plan of frail elderly HF patients (level I, class C)
- Psychosocial issues (e.g., depression, fear, isolation, home supports and need for respite care) should be re-evaluated routinely (level I, grade C)
- Caregivers of patients with advanced heart failure should be evaluated for coping and degree of caregiver burden (level I, grade C)

Table 2.²⁴ CHSA Clinical Frailty Scale (Printed with permission of author)

The CSHA Clinical Frailty Scale

1. **Very fit** – robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
2. **Well** – without active disease, but less fit than people in category 1
3. **Well, with treated comorbid disease** – disease symptoms are well controlled compared with those in category 4
4. **Apparently vulnerable** – although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms
5. **Mildly frail** – with limited dependence on others for instrumental activities of daily living
6. **Moderately frail** – help is needed with both instrumental and non-instrumental activities of daily living
7. **Severely frail** – completely dependent on others for activities of daily living, or terminally ill

Note: CSHA = Canadian Study of Health and Aging

Table 3.^{7, 38} Shared decision-making to facilitate patient self-determination and future care planning

- Involvement of both the patient and the physician(s)
- Sharing of information between two parties
- Expression of treatment preferences (what is desired and what is medically feasible)
- Develop consensus about a treatment plan
- Nomination/designation of a power of attorney (POA) or surrogate decision-maker in case the patient loses decision-making capacity
- Articulation of value-based end-of-life (EOL) preferences
- Balancing of medical vs. personal goals
- Preference of treatment options – including withdrawal of life-sustaining treatments
- Resuscitation preferences and discussions about the likely outcomes of a cardiac or respiratory arrest or worsening HF
- Establish goals and preferences

Table 4.⁴⁰ Conventional medical HF management in advanced HF and last days of life

Drug	Common side effects	Advanced HF	Last days of life
ACE inhibitor	Cough, ↓BP, ↑K ⁺ , renal impairment	Continue if tolerated (except during hypovolemic illness)	Discontinue
Amiodarone	Nausea, liver and thyroid dysfunction, QT prolongation	Continue if required for arrhythmia control unless significant adverse effects	Discontinue
Angiotensin receptor blocker	↓BP, ↑K ⁺ , renal impairment	Continue if tolerated (except during hypovolemic illness)	Discontinue
Aspirin	GI irritation and haemorrhage	Discontinue unless significant vascular disease/recent infarct	Discontinue
Beta blocker	↓HR, ↓BP, cold peripheries, nightmares, fatigue	Continue if tolerated	Discontinue
Digoxin	↓HR, nausea and GI disturbance, agitation, drowsiness	Continue if tolerated but vigilance required to avoid toxicity	Discontinue but may still provide symptom relief so could continue
Diuretic	↓ K ⁺ , dehydration, gout	Continue with dose titration as required	Discontinue but may still provide symptom relief so could continue
Ivabradine	↓HR, visual disturbance, headache	Continue if tolerated	Discontinue
Hydralazine	GI disturbance, headache, flushing	Continue if tolerated	Discontinue
Mineralocorticoid Receptor antagonist	↑K ⁺ , renal impairment, GI disturbance, gynaecomastia (spironolactone only)	Continue if tolerated (except during hypovolemic illness)	Discontinue
Nitrate	Headache, Sleep disturbance	Continue if tolerated	Discontinue
Statin	Liver dysfunction, myalgia, myositis	Discontinue	Discontinue

Table 5.¹⁴ List of potential triggers/red flags for use in determining the need for palliative care involvement

- Evolving renal compromise (worsening CrCl)
- Persistent hypotension
- Persistent tachycardia
- Hyponatremia
- Ventricular arrhythmias refractory to therapy
- Intolerance to evidence-based medication(s)
- Repeated hospital admissions > 2 admissions in 12 months
- Dependence on inotropic agents without candidacy for LV assistive device or transplant
- Refractory physical symptom(s)
- Cardiac cachexia
- Increasing frailty and falls
- 6-minute walk < 300 m
- Peak oxygen consumption < 14 ml/kg/min or < 50% predicted
- 1-year mortality risk >25% by validated risk scores

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