

AHA SCIENTIFIC STATEMENT

# Guidance for Timely and Appropriate Referral of Patients With Advanced Heart Failure

A Scientific Statement From the American Heart Association

Endorsed by the Heart Failure Society of America

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**ABSTRACT:** Among the estimated 6.2 million Americans living with heart failure (HF), ≈5%/y may progress to advanced, or stage D, disease. Advanced HF has a high morbidity and mortality, such that early recognition of this condition is important to optimize care. Delayed referral or lack of referral in patients who are likely to derive benefit from an advanced HF evaluation can have important adverse consequences for patients and their families. A 2-step process can be used by practitioners when considering referral of a patient with advanced HF for consideration of advanced therapies, focused on recognizing the clinical clues associated with stage D HF and assessing potential benefits of referral to an advanced HF center. Although patients are often referred to an advanced HF center to undergo evaluation for advanced therapies such as heart transplantation or implantation of a left ventricular assist device, there are other reasons to refer, including access to the infrastructure and multidisciplinary team of the advanced HF center that offers a broad range of expertise. The intent of this statement is to provide a framework for practitioners and health systems to help identify and refer patients with HF who are most likely to derive benefit from referral to an advanced HF center.

**Key Words:** AHA Scientific Statements ■ advance care planning ■ heart failure ■ heart transplantation ■ heart-assist devices ■ inotropes ■ referral and consultation

Among the large number of patients with heart failure (HF), ≈5%/y will progress to an advanced state.<sup>1</sup> Advanced, or stage D, HF is defined by severe signs or symptoms of HF with minimal exertion or at rest, intolerance to guideline-directed medical therapy (GDMT), or refractory symptoms with or without recurrent hospitalizations despite maximally tolerated medical therapy.<sup>2</sup> In those who require continuous inotropic infusions, annual mortality typically reaches or exceeds 50%.<sup>3–5</sup> Thus, in patients with advanced HF, conventional pharmacological and device therapies no longer provide an adequate quality or duration of life, and specialized interventions, including durable left ventricular assist devices (LVADs) or heart transplantation (HT), often called advanced therapies, are considered.

In recognition of the specialized nature of care of patients with stage D HF, the American Board of

Internal Medicine subspecialty of Advanced Heart Failure and Transplant Cardiology emerged in 2008.<sup>6</sup> Often, advanced HF cardiologists work in a multidisciplinary, team-based setting commonly called an advanced HF center (AHFC). Although we recognize that excellent care of patients with HF can occur in many venues, for the purposes of this document, we are defining an AHFC as a center that is able to offer HT or durable LVAD to patients with stage D HF. On referral to an AHFC, patients are evaluated to determine whether there is a reversible cause of their deterioration that might allow clinical stabilization, and additional intensive disease management is implemented to achieve clinical stability. If stabilization cannot be achieved, eligibility for either an LVAD or HT is assessed. Clarification of the patient's goals

of care by the HF clinician or a palliative care specialist is a critical aspect of this process.

One key question facing practitioners who care for patients with HF is which patients, among the myriad they see, should be referred to an AHFC. Although aspects of care during earlier stages of HF, including uptitration of GDMT and device therapies, are highlighted by many professional organizations,<sup>7</sup> there is less guidance for the overall approach to support optimal decision-making for referral of patients with HF to an AHFC. Furthermore, many patients may be unaware of the availability of subspecialized care and therapeutic options for their advanced condition and thus are dependent on their practitioners to act on their behalf. Knowledge gaps by practitioners may contribute to the documented variations and disparities in the types of patients who receive advanced HF therapies.<sup>8,9</sup> Delayed referral or lack of referral in patients who are likely to derive benefit from an advanced HF evaluation can have important adverse consequences for patients and their families, as well as resource utilization.

The intent of this statement is to provide a framework for practitioners and health systems to help identify and refer patients with HF who are most likely to derive benefit from referral to an AHFC.

## THE SCOPE OF ADVANCED HF

An estimated 6.2 million Americans have HF, and estimates suggest that >8 million Americans will have HF by 2030.<sup>10,11</sup> Although estimates of the prevalence of advanced HF vary anywhere from 5% to 25%, at least 300 000 patients in the United States are living with this condition.<sup>11,12</sup> In 1 study, the 3-year annualized incidence of progression from stage C to D HF was 4.5% (95% CI, 3.8%–5.5%).<sup>1</sup> Annualized rates of progression to stage D HF were higher in Black patients compared with White patients (6.3% versus 2.7%;  $P<0.001$ ) but were similar between men and women (4.7% versus 4.2%;  $P=0.53$ ). Patients with advanced HF consume a large percentage of the health care dollars spent on HF, particularly for hospitalizations and end-stage care.<sup>13</sup>

## UNIQUE BENEFITS OF HF DISEASE MANAGEMENT AND THERAPIES OFFERED AT AN AHFC

The AHFC provides many additional diagnostic and therapeutic components that are of benefit in managing patients with complex or refractory HF, including expert disease management and optimization of conventional therapies, as well as the resources to provide definitive treatment for patients who ultimately require advanced therapies (Figure 1).

## ADVANCED THERAPIES FOR ADVANCED HF

HT remains the gold-standard therapy for patients with advanced HF based on a 1-year survival of  $\approx 90\%$  and a median survival of  $\approx 13$  years.<sup>14</sup> However, HT is constrained by the total number of donor organs available. To fill this gap, mechanical circulatory support has emerged, including the use of both short-term and durable devices as a means to keep patients listed for HT alive until a suitable donor organ is available, as well as durable LVAD for patients who are ineligible for HT. Currently, 1-year survival after LVAD implantation is 82% and may be as high as 91.5% for the newest generation of devices.<sup>15,16</sup> Overall, either HT or a durable LVAD can improve both the quality of life and survival in patients with advanced HF, especially those who are inotrope dependent.

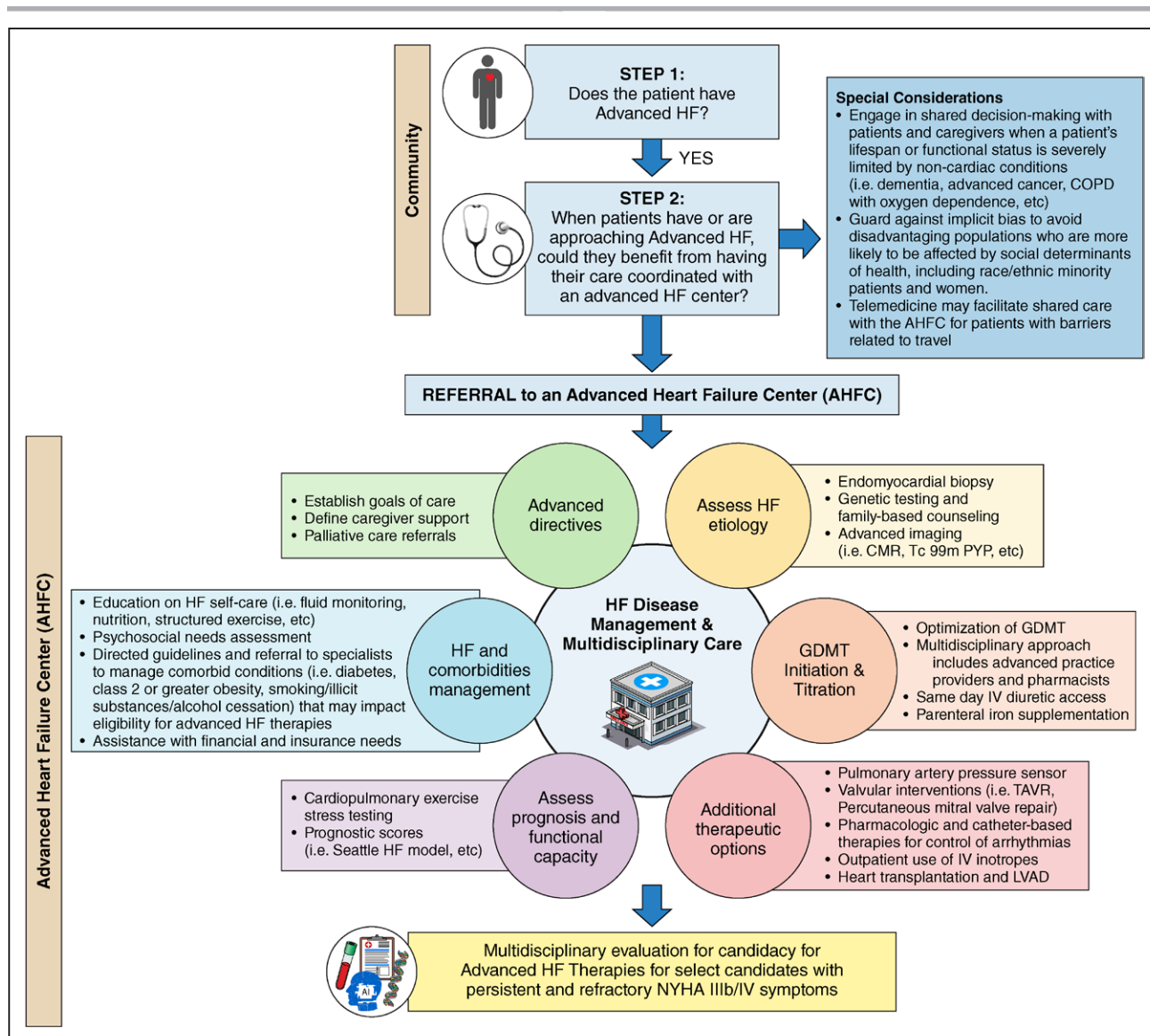
## WHEN TO CONSIDER REFERRAL FOR EVALUATION OF ADVANCED THERAPIES AND FOR WHOM: A 2-STEP PROCESS

Currently, there is a large mismatch between the number of patients in the United States with HF (>6 million) and the number of practicing advanced HF specialists.<sup>10,17</sup> According to current estimates, most patients with HF are treated by internal medicine specialists, not by cardiologists.<sup>18</sup> Given this supply-demand mismatch, it is critical for all clinicians caring for patients with HF to recognize the stages of HF<sup>2</sup> and to feel confident managing decisions related to referral. A 2-step process can be used by practitioners when considering referral of a patient with advanced HF for consideration of advanced therapies (Figure 1).

### Step 1: Does the Patient Have or Is the Patient Approaching Advanced (Stage D) HF?

#### *Clinical Signs and Symptoms Characteristic of Advanced (Stage D) HF*

The first step in the referral process is to identify a patient as having clinical features consistent with advanced HF. Given the potential of increased morbidity and mortality associated with delayed referral for advanced HF therapies, an assessment of an advanced state should be made at each encounter with a patient with HF. Fortunately, many easily recognizable clinical clues and events signify that a patient who is not yet dependent on an inotrope infusion may have advanced HF (Table 1). Particularly ominous features are those that are likely to indicate underlying marginal hemodynamics, including recurrent hospitalizations, inability to tolerate GDMT, increasing burden of arrhythmias, and worsening renal function. A mnemonic, I-NEED-HELP, has previously been described to help practitioners re-



**Figure 1. A 2-step process can be used by practitioners when considering referral of a patient with advanced heart failure (HF) for consideration of advanced therapies.**

Step 1 includes recognition that the patient has characteristics of advanced HF. If the clinical picture is consistent with advanced disease, step 2 includes an assessment of whether the patient could benefit from having their care coordinated with an advanced HF center (AHFC) vs continuing ongoing care at their current site. Special considerations at this step include goals of care and competing risk from severe, noncardiac illness. The potential benefits of referring a patient to an AHFC extend well beyond an assessment for advanced HF therapies and are depicted. CMR indicates cardiac magnetic resonance imaging; COPD, chronic obstructive pulmonary disease; GDMT, guideline-directed medical therapy; LVAD, left ventricular assist device; NYHA, New York Heart Association; TAVR, transcatheter aortic valve replacement; and Tc 99m PYP, technetium 99m pyrophosphate scan.

member many of these clinical clues.<sup>19</sup> Two prior HF admissions (ie, 1 readmission) in a 12-month period designates a patient as very high risk for poor outcomes, including a 1-year mortality >40%.<sup>20–22</sup> A necessary decrease in or withdrawal of GDMT also is associated with a poor prognosis.<sup>23,24</sup> Adults with HF who are discharged from the hospital without an angiotensin-converting enzyme inhibitor because of either hypotension or renal intolerance have an expected mortality of >50% at 1 year.<sup>25</sup> Lack of a response to cardiac resynchronization therapy identifies a patient population

at risk for worse outcomes who might benefit from advanced therapies. Defibrillator shocks for ventricular tachyarrhythmias also indicate a worrisome prognosis, especially when occurring in the setting of New York Heart Association class III to IV symptoms or if there is recurrent ventricular tachyarrhythmia after prior ablation.<sup>26,27</sup> Although it is uncertain how many of the delineated clinical markers are necessary to consider a patient as having advanced HF, the presence of even 1 marker (eg, recurrent hospitalizations) should raise suspicion for advanced disease. In cases when there

**Table 1. Clinical Clues to Help Identify Patients With Advanced HF**

Inotrope dependence
LVEF $\leq$ 25%, particularly with high-risk features on echocardiogram (grade III or IV diastolic dysfunction; significant RV dysfunction; high pulmonary artery pressures or severe MR despite attempts at decongestion)
$\geq$ 2 Hospitalizations or emergency department visits for decompensated HF in 12 mo
Persistent NYHA class III or IV symptoms, including fatigue and confusion
High-risk biomarker profile (eg, hyponatremia, very elevated natriuretic peptides or troponin)
Escalating doses of diuretics (eg, $>$ 160 mg/d furosemide) or persistent edema despite escalating diuretic doses
Downtitration of GDMT as a result of hemodynamic intolerance such as hypotension (SBP $<$ 90 mm Hg), dizziness, excessive fatigue, or nausea
Discontinuation of ACE inhibitor/ARB/ARNI because of hypotension or renal intolerance
Progressive renal failure with rising creatinine/BUN
Recurrent atrial fibrillation or VT with ICD shocks
Nonresponse to cardiac resynchronization therapy
Cardiac cachexia (ie, unintentional loss of $>$ 5% of body weight attributable to HF)
High mortality risk from validated risk prediction models or calculators

ACE indicates angiotensin-converting enzyme; ARB, angiotensin II receptor blocker; ARNI, angiotensin receptor–neprilysin inhibitor; BUN, blood urea nitrogen; GDMT, guideline-directed medical therapy; HF, heart failure; ICD, implantable cardioverter defibrillator; LVEF, left ventricular ejection fraction; MR, mitral regurgitation; NYHA, New York Heart Association; RV, right ventricular; SBP, systolic blood pressure; and VT, ventricular tachycardia.

Many of these clinical clues are also captured in the mnemonic I-NEED-HELP from Baumwo<sup>19</sup>: I=inotropes; N=NYHA class/natriuretic peptides; E=end-organ dysfunction (renal, liver); E=LVEF  $\leq$ 25%; D=defibrillator shock; H=at least 1 HF hospitalization in the prior 12 months; E=edema, escalating diuretics; L=low blood pressure; and P=prognostic medications (inability to increase or need to decrease ACE inhibitor/ARB/ARNI,  $\beta$ -blockers, or mineralocorticoid receptor antagonists).

is uncertainty about the severity of illness (ie, patients who report significant functional limitation but lack other high risk markers), a cardiopulmonary stress test can identify patients ill enough to warrant an evaluation for advanced HF therapies.<sup>28,29</sup>

### Clues on Imaging Studies Characteristic of Advanced HF

In addition to the clinical events described above, imaging studies can provide prognostic information portending a guarded prognosis. Two-dimensional echocardiography with Doppler is indicated for the initial assessment of patients with HF, as well as at the time of change in symptoms or clinical status.<sup>30</sup> Findings suggesting the presence of advanced HF include marked left ventricular dilation (eg,  $>$ 8 cm) or significant secondary mitral regurgitation, presence of pulmonary hypertension, or a restrictive mitral inflow pattern despite efforts to decongest a patient.<sup>31</sup> Concomitant right ventricular dysfunction on echocardiography in a patient with a reduced left ventricular ejection fraction is also a key indicator of an advanced state.

### Invasive Assessment of Hemodynamics

Right-sided heart catheterization is often used as a gateway assessment to determine the extent to which the cardiac function is impaired. Even the perceived need for hemodynamic measurement to assist in the management of a patient with HF identifies a high-risk population.<sup>32</sup> If low cardiac output is suspected on the basis of clinical and laboratory evidence of poor systemic perfusion and ideally confirmed on invasive hemodynamic assessment, the initiation of inotropic therapy with continuous intravenous milrinone or dobutamine may be warranted to improve systemic perfusion.<sup>30</sup> The presence of poor perfusion with low cardiac index or significant congestion with elevated right atrial or pulmonary capillary wedge pressures, along with the inability to relieve congestion despite aggressive intravenous diuretics or GDMT, is an important predictor of poor outcomes<sup>33</sup> and warrants the initiation of an evaluation for advanced HF therapies in potentially suitable candidates.<sup>34,35</sup>

### Step 2: If a Patient Has or Is Approaching Advanced (Stage D) HF, Could They Benefit From Having Their Care Coordinated With an AHFC Versus Ongoing Care at Their Current Site?

Once it has been determined that the patient's severity of illness warrants an advanced HF classification, health care professionals should next assess the likelihood of benefit from referral to an AHFC. Because the medical care requirements after HT and LVAD are highly complex, referral to an AHFC specifically for HT and LVAD consideration may be less beneficial for patients who clearly state that their goals of care are to avoid a multi-part medical or surgical regimen.<sup>36</sup> Likewise, in patients whose life span or functional status is severely limited by noncardiac conditions (eg, dementia, advanced cancer, chronic obstructive pulmonary disease with confirmed oxygen dependence), clinicians should engage in shared decision-making before referral because the outcome may not be favorably altered, given the competing risks of death. However, outside of these particular circumstances, many patients with HF may benefit from the specialized disease management offered by an AHFC, even if they are not potential candidates for HT or LVAD.

A related consideration, one that has not received adequate attention previously, is that clinicians should take steps that both promote clinical stability for their patients with HF and help prepare them should they progress to needing an evaluation for advanced therapies (Table 2). For example, behaviors such as continued substance abuse, missing medical appointments, or discontinuing medications without discussing first with their clinicians may contribute to disease progression and delay their eligibility for LVAD or HT. Likewise, optimization of comor-

**Table 2. Steps That Should Be Addressed at the Current Site of Care for All Patients With HF: Promoting Clinical Stability and Preparing the Patient in Case an Evaluation for Advanced HF Therapies Is Required**

Evaluate and treat any reversible pathogenesises
Unrevascularized CAD
Untreated arrhythmias
Treatable causes (eg, thyroid disease)
Attempt to initiate and optimize GDMT
Optimize device therapy (CRT for patients with LBBB, QRS >120 ms)
Provide appropriate management of noncardiac comorbid conditions
Optimization of diabetes care with reduction of hemoglobin A1c as appropriate
Encourage physical activity or cardiac rehabilitation
Encourage weight loss for patients with class II obesity or greater; consultation with an obesity medicine specialist is encouraged when available
Educate patient about factors that may worsen their HF symptoms and delay their candidacy for LVAD or HT on referral and, if present, help them rectify
Nonadherence with medical appointments
Stopping or frequently missing medications without first discussing with their health care professional
Ongoing use/abuse of illicit substances or alcohol
Ensure that the patient has an adequate support system to allow adherence to the recommended medical regimen and lifestyle

CAD indicates coronary artery disease; CRT, cardiac resynchronization therapy; GDMT, guideline-directed medical therapy; HF, heart failure; HT, heart transplantation; LBBB, left bundle-branch block; and LVAD, left ventricular assist device.

bid conditions (ie, achievement of appropriate targets for patients with diabetes, weight loss in those with significant obesity) can help stabilize patients while simultaneously removing a potential barrier should they progress to needing consideration for HT. Finally, the medical regimen and self-care for patients with HF can be complex. It is not unusual for patients to require assistance, whether that is picking up medications if they are unable to travel to the pharmacy, helping with meal preparation, or having a caregiver drive and accompany them to medical appointments. Encouraging patients to develop a support network not only will help them navigate their current condition but also would be advantageous should they progress to needing advanced therapies, given that having such a support plan is typically recommended before either HT or LVAD implantation.

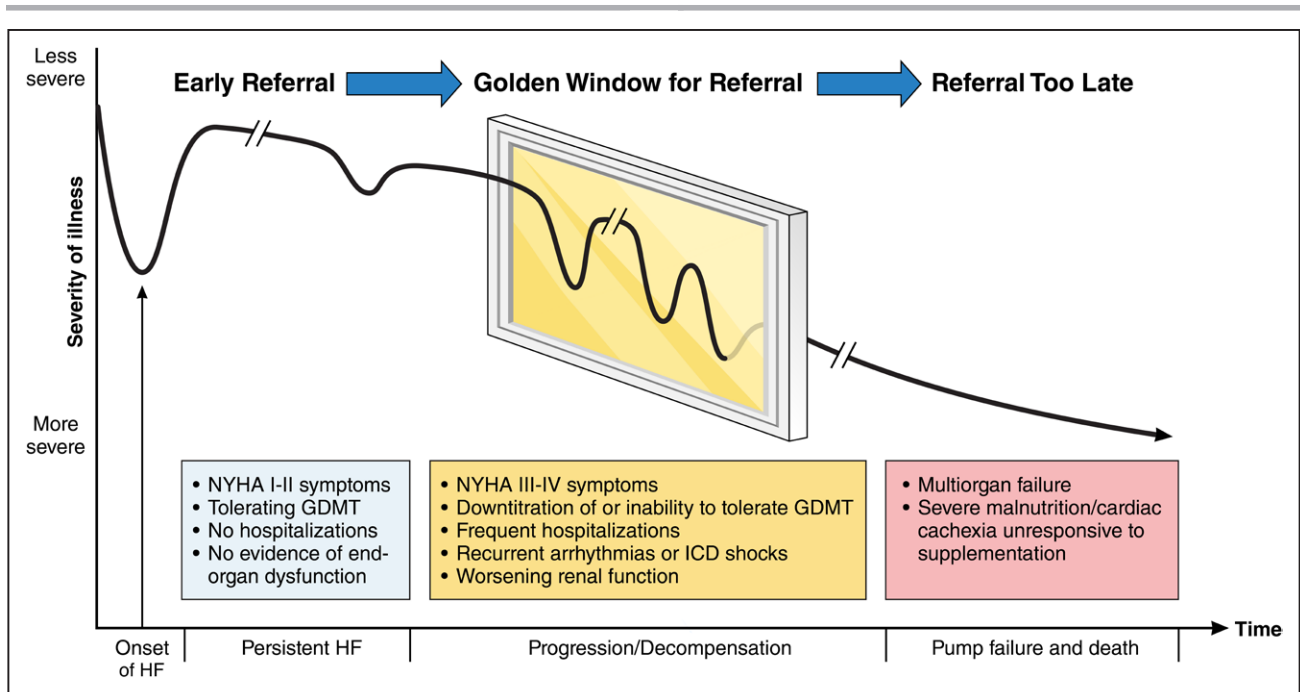
Clinicians must be aware of implicit bias that can lead to delayed referral or nonreferral resulting from perceptions of nonadherence. For instance, symptoms of advanced HF often include nausea and dizziness, both of which can influence a patient's ability to comply with medications and may lead to their being inappropriately labeled as being nonadherent. Furthermore, some patients may seek alternative therapies (ie, cannabis) for symptom relief.<sup>37</sup> In addition, unrecognized financial barriers may prevent patients from purchasing their medications or

adhering to a low-sodium diet. Open communication is critical if clinicians want to understand any unrecognized barriers that may be preventing patients from adhering to their prescribed medical regimen.

### **What Is the Optimal Timing for Referral for Evaluation of Advanced Therapies?**

There is an art to the timing of a referral for consideration of advanced therapies. To provide high-value care for patients with HF, an optimal approach would be to refer patients when they are approaching a level of illness that would warrant consideration of advanced therapies based on refractory symptoms yet are not too far advanced that progressive or irreversible end-organ damage has occurred, a time period that can be considered the golden window (Figure 2). A patient with a low cardiac index but no evidence of hypotension or refractory end-organ dysfunction would be in that window. When in doubt, treating clinicians are encouraged to discuss their patient's case with an advanced HF specialist.

For patients with new-onset systolic HF who are ambulatory and have not yet had an attempt at GDMT, it is certainly reasonable for care to be delivered in their current clinical environment, as long as GDMT and device therapy can be optimized in that location. It is important to acknowledge that referral of such patients may accrue additional costs and burden associated with travel or contribute to unnecessary anxiety for patients and their families with little additional advantage. However, early referral may be of critical importance for those who require advanced diagnostic modalities to determine the HF origin or who display high-risk features (Table 1) early in their clinical course. Of course, the penalties for late referral may be of greater significance. The most catastrophic consequence of late referral is death before patients can potentially benefit from HT or LVAD. For patients who develop cardiogenic shock attributable to an acute cardiac event at a medical center that lacks advanced HF therapy options, a consultation with an advanced HF specialist at an AHFC should be initiated rapidly to determine whether potential therapeutic options exist before the onset of multiorgan failure. Even for patients with chronic HF, a late referral can have a significantly adverse impact on outcomes. First, progressive cardiac cachexia and frailty increase the risks associated with potential interventions such as HT or LVAD. Second, patients may develop irreversible end-organ damage such as progressive liver or renal failure that may ultimately render them ineligible for HT or LVAD. Even for those who are eligible for HT and able to access programs that offer dual-organ transplantation, late referral with renal failure may convert patients who otherwise could have received an isolated HT to now requiring a combined heart-kidney transplantation, thereby using a precious and limited resource (ie, a kidney transplant) unnecessarily. Third, late referral may expose patients to



**Figure 2. Golden window for referral for consideration of advanced heart failure (HF) therapies.**

The optimal or golden window for referral for an evaluation for advanced HF therapies (ie, heart transplantation/left ventricular assist device) is when the severity of illness is consistent with advanced HF but irreversible end-organ damage has not yet occurred and the patient is not in extremis. Early referrals may be reasonable for patients who have particularly high-risk features. To minimize late referrals, practitioners should recognize the clinical clues (Table 1) that help identify patients with advanced HF and expedite referral to an advanced HF center. GDMT indicates guideline-directed medical therapy; ICD, implantable cardioverter defibrillator; and NYHA, New York Heart Association.

the risk of fulminant deterioration and overt cardiogenic shock requiring temporary mechanical support (eg, extracorporeal membrane oxygenation) with its attendant risk. Finally, late referral may allow the development of progressive right ventricular failure such that a durable LVAD is no longer an option, which could prove fatal in a patient ineligible for HT.

### **Special Populations Who May Be Most Likely to Suffer From Late Referrals for Advanced HF Therapies**

Despite the higher rates of death from HF among women and patients from underrepresented racial and ethnic groups, the likelihood of referral for advanced HF therapies is less than expected from epidemiological trends. Women in particular receive proportionally fewer HTs and LVADs annually than men despite their higher incidence of HF.<sup>14,38</sup> Social determinants of health, including underinsurance,<sup>39</sup> low income,<sup>40</sup> and low social support,<sup>41</sup> are more common among women and patients from underrepresented racial and ethnic groups and may contribute to delayed referrals and decreased access to advanced HF therapies. Moreover, residents of rural areas have longer wait times and lower rates of HT than patients who reside in urban areas.<sup>42</sup> Social determinants do not exist in isolation; these factors intersect, overlap, and cluster to disadvantage patients in multiple ways. Implicit bias may influence perceptions of lower social support among Black patients and women compared with White

patients and men, which may adversely affect referral and allocation of advanced HF therapies.<sup>43–45</sup> Strategies to guard against implicit bias in the decision about whether to refer to an AHFC are critical to avoid disadvantaging such populations.

### **BEHIND THE CURTAIN: WHAT HAPPENS ON REFERRAL TO AN AHFC?**

Referral to an AHFC typically equates to referral to a multidisciplinary team of specialized experts who operate with the intent of providing a treatment plan tailored for each individual patient. AHFCs offer both surgical and nonsurgical treatment options that may be beneficial to patients with HF symptoms that are difficult to manage or refractory (Figure 1). The multidisciplinary AHFC team typically includes HF cardiologists and clinicians, cardiothoracic surgeons, nurse practitioners and coordinators, pharmacists, psychologists, social workers, dietitians, palliative care specialists, and financial specialists. Moreover, the AHFC team can rapidly engage with a network of consultants and provide cardiac risk assessment required for the complex care of these extremely ill patients with multiple comorbidities (eg, endocrinologists, obesity medicine specialists, gastroenterologists). Although HF clinicians are adept at managing multiple medical comorbidities, the multidisciplinary team is adept at assessing multiple aspects of the complex nature of the HF syndrome.<sup>46</sup>

## Benefits of Referral of Patients With HF to an Advanced HF Specialist or AHFC

Patients and their referring clinicians will receive assistance with HF disease management, including optimization of GDMT, risk stratification, management and evaluation of medical and psychosocial comorbidities, education on HF self-care and adherence, assessment of advanced directives, and evaluation for advanced therapies, as appropriate. A shared-care model can be used between referring clinicians and advanced HF clinicians whereby some testing and follow-up may be able to be performed locally to minimize the burden on the patient, especially if there is a long distance to the referring center. Recent changes to telemedicine policy that occurred as a result of the coronavirus disease 2019 (COVID-19) pandemic, including options for new patient visits and fewer limitations related to patients' locations, could enable HF clinicians to broaden their reach by consulting and treating patients with HF virtually in an effort to optimize care.<sup>47</sup> Wider use of this type of model may be of particular benefit for patients who live in rural communities, have difficulty taking time off from work to make their clinic appointments, or are unable to attend frequent in-person visits because of financial barriers.<sup>47</sup> Care must be taken, however, not to worsen existing health disparities for those who have limited access to the resources necessary to use telemedicine effectively, including reliable internet, smartphones, at-home blood pressure cuffs, and other devices. Still, robust communication among the patient, the referring clinician, and the AHFC could allow aggressive titration of GDMT via telemedicine, as well as notification of the need for an in-person consultation if the patient fails to improve symptomatically.

### Comprehensive HF Disease Management

Various clinical scenarios highlight the potential benefits of referring patients with advanced HF to an HF specialist. First, patients whose HF pathogenesis is uncertain or who have a cardiomyopathy requiring specialized therapies (eg, amyloid or sarcoid) may derive benefit from referral to a center with expertise in those conditions. HF specialists have access to advanced diagnostic tools (eg, advanced imaging, genetic testing, endomyocardial biopsy) that can help clarify the HF pathogenesis.<sup>48</sup> Moreover, patients in whom a genetic origin is identified can benefit from the expertise of genetic counselors who can assist with variant adjudication and recommendations for screening of at-risk first-degree relatives.<sup>49</sup> Second, in patients with New York Heart Association class III HF with a hospitalization in the prior year, AHFCs may be able to implant a pressure sensor into the pulmonary artery, a strategy that can lead to a reduction in subsequent HF hospitalizations.<sup>50,51</sup> Third, in situations in which the severity of

illness is uncertain because of discordance among various assessment modalities or it is uncertain whether there is a cardiac or pulmonary limitation, referral to an AHFC can facilitate cardiopulmonary exercise testing, which can often resolve such questions.<sup>52</sup>

If the patient's current site of care is unable to initiate or uptitrate GDMT, referral to an AHFC would provide another opportunity to attempt administration of these lifesaving therapies. In addition to advanced HF cardiologists, advanced practice clinicians and pharmacists skilled in medication management are often available at an AHFC to optimize titration of GDMT. This level of expertise can be particularly beneficial for those patients with more advanced symptoms characterized by hypotension or renal insufficiency in whom the use of neurohormonal antagonists can be more challenging. Many HF clinics also have existing infrastructure to allow administration of intravenous diuretics to avoid an emergency department visit or HF hospitalization. In patients who have difficulty with adherence to recommendations on sodium and fluid restriction, a registered dietitian in an AHFC will have particular expertise in providing HF-specific education. Finally, patients progressing on a downward trajectory who do not yet meet the level of clinical severity to require HT or LVAD may benefit from meeting with a financial specialist at an AHFC. These financial specialists can ascertain needs concerning medication coverage, identify insurance plans that will ensure eligibility for HT and LVAD, and educate patients on the expected financial burden associated with advanced therapies.<sup>53,54</sup> Such input may be particularly important for patients from special populations who are economically disadvantaged and historically less likely to be referred for advanced therapies.

### Evaluation for Advanced HF Therapies

For those patients who continue to have refractory HF symptoms despite best efforts at optimization and those who present with acute HF or cardiogenic shock, an evaluation for HT or LVAD will typically ensue. Such an evaluation includes an assessment of both the severity of the HF condition and the presence of comorbid conditions that might limit survival or return to a functional lifestyle after HT or LVAD implantation. During this evaluation, patients will undergo an extensive battery of blood laboratory measurements and imaging studies and will be evaluated by members of the multidisciplinary AHFC team, as well as consultants representing other medical specialties (eg, pulmonary, neurology, gastroenterology).<sup>36,53,55</sup> An important component of the evaluation centers on psychosocial factors to determine whether the patient will be adherent to the complex lifestyle that follows either LVAD implantation or HT, typically conducted by a social worker and mental health specialist specially trained in

the unique needs associated with these therapies for patients and their caregivers.<sup>54,56</sup> After this extensive evaluation, the patient is presented to the multidisciplinary selection committee at the center to determine whether the patient is a suitable candidate for either LVAD or HT. Of note, should the selection committee at one center decline advanced therapies to a patient, another center may come to a different decision. Thus, it is important that both patients and clinicians be aware of the option to seek a second opinion at another AHFC.

### **Role of Palliative Care**

Given the high rates of mortality in patients with advanced HF,<sup>10</sup> it is vital to understand and document the patient's goals of care. Current guidelines for the care of patients with advanced HF recommend consultation with palliative care specialists so that expectations are appropriately set for patients and their families/caregivers regardless of their eligibility for advanced therapies.<sup>53,54</sup> Palliative care specialists are often members of an advanced HF team and are considered a core component of the LVAD team by the Joint Commission.<sup>57</sup> Newer forms of shared decision-making tools also help patients understand their risks and include families and caregivers in the process.<sup>58</sup>

Decisions about the appropriate time to initiate discussions about end-of-life and hospice care, although difficult, are important when HF is at an advanced stage. To discern the best time to initiate these discussions, practitioners should consider patients' 1-year mortality. The "surprise question" has been used as a screening tool to identify patients nearing end of life. Practitioners are asked the following reflective question: "Would you be surprised if this patient were to die within the next year?"<sup>59</sup> In a small series in which doctors and nurses were asked to provide a "surprised" or "not surprised" response for 129 consecutive patients with advanced HF, 1-year mortality was  $\approx$ 50% for patients who received a "not surprised" response compared with only 10% for patients who received a "surprised" response.<sup>59</sup> These data suggest that practitioners often intuitively recognize the cues of advanced HF. Despite this, decisions about when to initiate end-of-life discussions are often delayed, and the specialized services offered by palliative care consultants are underutilized.<sup>60,61</sup> When patients were asked their perspectives and preferences on palliative care, they often confused palliative care with hospice care.<sup>62</sup> Moreover, patients' trust in their primary cardiology team and desire for continuity of care influenced some variability in their desire for palliative care specialty services.<sup>62</sup> Thus, HF specialists at an AHFC can provide a comprehensive approach to clinical care by initiating palliative care and end-of-life conversations,

explaining the differences between palliative care and hospice care, providing family and caregiver support, and understanding that some patients fear loss of continuity of care if they become disconnected from their HF clinician. Ultimately, the use of specialized palliative care consultants should be individualized to each patient and family. However, their expertise may allow the HF team greater adaptation to patient and caregiver needs, in addition to assisting patients to live as well as possible and decrease symptom burden.<sup>63</sup>

## **SYSTEMS OF REFERRAL AND PATIENT ENGAGEMENT**

There are significant opportunities to systematize processes of referral for advanced HF care.<sup>64</sup> Although patients with advanced HF have frequent interactions with the health care system on both the inpatient and outpatient sides, generating large amounts of complex data with multiple clinical encounters and diagnostic tests, these data are frequently disconnected and siloed because patients are often seen by different clinicians within different health systems. Clinical decision support tools to improve referrals may be helpful when customized to specific electronic health systems. For example, audit and feedback interventions show general effectiveness for process-of-care outcomes and could be used to provide clinician alerts or trigger automated referral for patients with high-risk features (eg,  $>1$  hospitalization or emergency department visit, ejection fraction  $<35\%$ ).<sup>65</sup> Although automation and simple sharing of electronic health records are not always possible, particularly across different health systems, open communication among a patient, the primary clinician, and the advanced HF specialist is critical. Future interventions should incorporate patient perspectives into decision-making about referral to an AHFC, thereby empowering patients to engage more directly in their care.

Prior studies have implemented systematic screening of patients with HF to improve the referral process and determine which patients might benefit from advanced HF therapies. The Screening for Advanced HF Treatment study actively screened 1722 patients at 8 outpatient clinics with cardiac resynchronization therapy or an implantable cardioverter defibrillator and found that only 121 (7%) fit the criteria for need for a more detailed assessment to define their underlying need for advanced HF therapies.<sup>66</sup> However, after narrowing the population and performing detailed assessment on this subset, the investigators estimated that 26% of patients may have a need for advanced HF therapies. Thus, screening studies may work if the pre-



test probability of disease is high, although additional research in this area is needed.

## CONCLUSIONS

The following takeaway points summarize the main conclusions of this statement.

1. Patients with advanced (stage D) HF have a condition in which conventional medical, surgical, and electric device therapies offer inadequate quality or duration of life. Such patients may benefit from referral to an AHFC to access advanced therapies, that is, durable LVAD or HT, 2 highly specialized therapies.
2. The multidisciplinary aspects of an HF disease management program available at an AHFC offer additional reasons for referral, including optimization of GDMT, expert assessment of the type of cardiomyopathy and prognosis, access to specialized pharmacological and device therapies and clinical trials, and input by financial coordinators and palliative care specialists.
3. Clinicians can use a 2-step process to triage patients for referral for consideration of advanced therapies. In step 1, clinicians should assess for clinical clues at each encounter to determine whether a patient with HF is approaching or has progressed to an advanced state. In step 2, once patients are classified as approaching or having advanced HF, their clinicians should assess the likelihood of whether they would benefit from referral to an AHFC considering goals of care and competing risks from advanced, noncardiac conditions.
4. The timing of referral for evaluation for advanced therapies requires careful consideration. Early referral may lead to additional costs and anxiety without yielding improved outcomes, whereas late referral exposes the risk of progressive end-organ damage, which increases the risk of any subsequent attempted intervention, among other deleterious consequences.
5. Because certain populations, including women and patients from underrepresented racial and ethnic groups, are more likely to be affected by social determinants of health, clinicians should guard against implicit bias in the decision about whether

to refer a patient to an AHFC to avoid disadvantaging these populations.

6. Clinicians should take steps for their patients with HF that both promote clinical stability and prepare patients in case an evaluation for advanced therapies becomes necessary.
7. Potential processes to improve the recognition of advanced HF include enhanced patient engagement, screening tools to assist in the assessment of prognosis, and health system-wide initiatives to capture patients with high-risk features, including recurrent hospitalizations. Increased use of telemedicine could enhance shared care between referring clinicians and advanced HF clinicians to optimize titration of GDMT and facilitate in-person consultation if the patient fails to improve symptomatically.

## ARTICLE INFORMATION

The American Heart Association makes every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

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## Disclosures

## Writing Group Disclosures

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This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit. A relationship is considered to be "significant" if (a) the person receives \$10 000 or more during any 12-month period, or 5% or more of the person's gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns \$10 000 or more of the fair market value of the entity. A relationship is considered to be "modest" if it is less than "significant" under the preceding definition.

\*Modest.

†Significant.

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†Significant.

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