



Figure 1. Stages in the Development of Heart Failure/Recommended Therapy by Stage. ACEI: angiotensin-converting enzyme inhibitors; ARB: angiotensin II receptors blocker; EF: ejection fraction; FHx CM: family history of cardiomyopathy; HF: heart failure; LVH: left ventricular hypertrophy; and MI: myocardial infarction.

Introduction

This Guidelines Summary describes accepted diagnostic and treatment strategies which primary care physicians may use in managing CHF patients. The guidelines are based on those of the 2005 American College of Cardiology/American Heart Association, as well as recommendations and input from cardiologists and primary care physicians. These guidelines pertain only to systolic left ventricular dysfunction, the most common and most widely studied type of CHF.

Selected Treatment Recommendations from the “2009 Guideline Focused Update on Heart Failure” are presented in this summary which are new or are modifications of the 2005 Guidelines. An entirely new section “Recommendations for the Hospitalized Patient” is presented for 2009.

1. Symptoms of Heart Failure

CHF is a condition in which the heart is unable to pump enough blood to meet oxygen demands of the body. Any patient diagnosed with paroxysmal nocturnal dyspnea, dyspnea upon exertion, or orthopnea as well as other symptoms (such as decreased exercise tolerance, fatigue, chest pain, edema) should undergo evaluation for heart failure.

2. Etiology

Myocardial infarction, long-standing hypertension, and ischemic heart disease are the most common causes of CHF.

3. Stages of Heart Failure

The new approach to the classification of HF emphasizes both the evolution and progression of the disease.

- Stage A—Patients at high risk for developing HF because of the presence of conditions strongly associated with HF.
- Stage B—Patients, without symptoms, who have developed structural heart disease strongly associated with the development of HF.
- Stage C—Patients who have current or prior symptoms of HF associated with underlying structural heart disease.
- Stage D—Patients with advanced heart disease and marked symptoms of HF at rest despite maximal medical therapy and who require specialized interventions.

4. Diagnosis and Initial Evaluation

The initial evaluation should include the following:

- Physical Examination
- Patient History—including coronary artery disease (CAD), valvular heart disease, diabetes mellitus, hypertension, viral illness potentially associated with cardiopathy, anemia, and substance abuse (alcohol, cocaine, methamphetamine).
- Laboratory tests— including complete blood count, serum creatinine, serum albumin, serum electrolytes, liver function, urinalysis, electrocardiogram, blood urea nitrogen, and thyroid stimulating hormone (for patients 65 and older)
- Imaging tests—echocardiography is the first choice to determine ejection fraction.

5. Therapy

Stage A

Patients at high risk of developing Left Ventricular Dysfunction HF

Class I Recommendations

- Control of systolic and diastolic hypertension in accordance with recommended guidelines
- Treatment of lipid disorders in accordance with recommended guidelines
- Avoidance of patient behaviors that may increase the risk of HF (e.g., smoking, alcohol consumption, and illicit drug use)

- Angiotensin converting enzyme (ACE) inhibition in patients with a history of atherosclerotic vascular disease, diabetes mellitus, or hypertension and associated cardiovascular risk factors.
- Control of ventricular rate in patients with supraventricular tachyarrhythmias
- Treatment of thyroid disorders
- Periodic evaluation for signs and symptoms of HF

Stage B

Patients with Left Ventricular Dysfunction who have not developed symptoms

Class I Recommendations

- Measures listed as Class I recommendations for patients in Stage A
 - ACE inhibition in patients with a recent or remote history of myocardial infarction regardless of ejection fraction
 - ACE inhibition in patients with a reduced ejection fraction, whether or not they have experienced a myocardial infarction
 - Beta-blockade in patients with a recent myocardial infarction regardless of ejection fraction
 - Beta-blockade in patients with a reduced ejection fraction, whether or not they have experienced a myocardial infarction
 - Valve replacement or repair for patients with hemodynamically significant valvular stenosis or regurgitation
 - Regular evaluation for signs and symptoms of HF
- Measures listed as Class I recommendations for patients in Stage A

Stage C

Patients with symptomatic Left Ventricular Dysfunction with current or prior symptoms

General Measures

- Measures listed as Class I recommendations for patients in stages A and B. Moderate sodium restriction is indicated, along with daily measurement of weight, to facilitate effective use of lower and safer doses of diuretic drugs
- Immunization with influenza and pneumococcal vaccines
- Moderate physical activity should be encouraged, except during periods of acute decompensation or in patients with suspected myocarditis.
- Patient education and close supervision (which includes monitoring by the patient and family between physician visits) can reduce the chances of noncompliance, and can often lead to detection of changes early enough to give a health care provider the opportunity to initiate treatment that can help to avoid clinical deterioration and hospitalization.

Specific Measures

Class I

- Diuretics in patients who have evidence of fluid retention
- ACE inhibition in all patients, unless contraindicated.
- Beta-adrenergic blockade in all stable patients, unless contraindicated, patients should have no or minimal evidence of fluid retention and should not have required treatment recently with an intravenous positive inotropic agent.
- Digitalis for the treatment of symptoms of HF, unless contraindicated.
- Withdrawal of drugs known to adversely affect the clinical status of patients (e.g., non-steroidal anti-inflammatory drugs, most ant arrhythmic drugs, and most calcium channel blocking drugs).
- The combination of hydralazine and nitrates is recommended to improve outcomes for patients self-described as African-Americans, with moderate-severe symptoms on optimal therapy with ACE inhibitors, beta blocks, and diuretics.

Class IIa

- Spironolactone in patients with recent or current Class IV symptoms, preserved renal function, and a normal potassium concentration.

- Exercise training as an adjunctive approach to improve clinical status in ambulatory patients.
- Angiotensin receptor blockade in patients who are being treated with digitalis, diuretics, and a beta-blocker and who cannot be given an ACE inhibitor because of cough or angioedema.
- A combination of hydralazine and a nitrate in patients who are being treated with digitalis, diuretics, and a beta-blocker and who cannot be given an ACE inhibitor because of hypotension or renal insufficiency.
- It is reasonable to treat patients with atrial fibrillation and HF with a strategy to maintain sinus rhythm or with a strategy to control ventricular rate alone.
- For patients who have LVEF less than or equal to 35%, a QRS duration of greater than or equal to 0.12 seconds, and atrial fibrillation (AF), CRT with or without an ICD is reasonable for the treatment of NYHA functional class III or ambulatory class IV heart failure symptoms on optimal recommended medical therapy.
- For patients with LVEF of less than or equal to 35% with NYHA functional class III or ambulatory class IV symptoms who are receiving optimal recommended medical therapy and who have frequent dependence on ventricular pacing, CRT is reasonable.

Class IIb

- Addition of an angiotensin receptor blocker to an ACE inhibitor.
- Addition of a nitrate alone or in combination) with hydralazine to an ACE inhibitor in patients who are also being given digitalis, diuretics, and a beta-blocker.

Note: All recommendations provided in this document follow the format of previous ACC/AHA guidelines.

- Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is useful and effective.
- Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of performing the procedure/therapy.
- Class IIa: Weight of evidence/opinion is in favor of usefulness/opinion
- Class IIb: Usefulness/efficacy is less well established by evidence/opinion.

Stage D

These individuals represent the most advanced stage of HF and should be considered for specialized treatment strategies such as mechanical circulatory support, continuous intravenous positive inotropic therapy, referral for cardiac transplantation, or hospice care. Before a patient is considered to have refractory HF, it is critical that physicians confirm the accuracy of the diagnosis; identify and reverse, if possible, any contributing conditions, and ensure that all conventional medical strategies have been optimally employed.

A critical step to successful management of end-stage HF is detection and meticulous control of fluid retention.

6. Patient Management

Patients should be instructed to keep a daily log of their weight and to notify their physician of any weight gain or loss of more than three pounds. Patients should be instructed to restrict their sodium intake, keeping as close to two grams per day as possible. Alcohol consumption should be discouraged and limited to no more than one drink per day. Regular exercise, under physician supervision, should be encouraged.

7. Follow up

If a patient remains symptomatic on ACE inhibitors, diuretics, and digoxin or alternative therapies, the physician may want to consider consultation or co-management with a cardiologist. If a patient is stable on optimal therapies, follow up by the physician should be done every three months. Due to the risk of hyperkalemia, patients on both ACE inhibitors and spironolactone should periodically have their potassium measured.

8. Hospitalized Patient

See Table 1

Table 1: Recommendations for the Hospitalized Patient

2009 Focused Update Recommendations	
	Class I
1.	The diagnosis of HF is primarily based on signs and symptoms derived from a thorough history and physical examination. Clinicians should determine the following: <ol style="list-style-type: none">adequacy of systemic perfusion;volume status;the contribution of precipitating factors and/or comorbidities;if the heart failure is new onset or an exacerbation of chronic disease; andwhether it is associated with preserved ejection fraction. Chest radiographs, electrocardiogram, and echocardiography are key tests in this assessment. (Level of Evidence: C)
2.	Concentrations of B-type natriuretic peptide (BNP) or N-terminal pro-B-type natriuretic peptide (NT-proBNP) should be measured in patients being evaluated for dyspnea in which the contribution of HF is not known. Final diagnosis requires interpreting these results in the context of all available clinical data and ought not to be considered a standalone test. 235,236 (Level of Evidence: A)
3.	Acute coronary syndrome precipitating HF hospitalization should be promptly identified by electrocardiogram and cardiac troponin testing, and treated, as appropriate to the overall condition and prognosis of the patient. (Level of Evidence: C)
4.	It is recommended that the following common potential precipitating factors for acute HF be identified as recognition of these comorbidities is critical to guide therapy: <ul style="list-style-type: none">acute coronary syndromes/coronary ischemia;severe hypertension;atrial and ventricular arrhythmias;infections;pulmonary emboli;renal failure; andmedical or dietary noncompliance. (Level of Evidence: C)
5.	Oxygen therapy should be administered to relieve symptoms related to hypoxemia. (Level of Evidence: C) New recommendation
6.	Whether the diagnosis of HF is new or chronic, patients who present with rapid decompensation and hypoperfusion associated with decreasing urine output and other manifestations of shock are critically ill and rapid intervention should be used to improve systemic perfusion. (Level of Evidence: C)
7.	Patients admitted with HF and with evidence of significant fluid overload should be treated with intravenous loop diuretics. Therapy should begin in the emergency department or outpatient clinic without delay, as early intervention may be associated with better outcomes for patients hospitalized with decompensated HF. ^{21,237,238} (Level of Evidence: B) If patients are already receiving loop diuretic therapy, the initial intravenous dose should equal or exceed their chronic oral daily dose. Urine output and signs and symptoms of congestion should be serially assessed, and diuretic dose should be titrated accordingly to relieve symptoms and to reduce extracellular fluid volume excess. (Level of Evidence: C)
8.	Effect of HF treatment should be monitored with careful measurement of fluid intake and output; vital signs; body weight, determined at the same time each day; clinical signs (supine and standing) and symptoms of systemic perfusion and congestion. Daily serum electrolytes, urea nitrogen, and creatinine concentrations should be measured during the use of IV diuretics or active titration of HF medications. (Level of Evidence: C)
9.	When diuresis is inadequate to relieve congestion, as evidenced by clinical evaluation, the diuretic regimen should be intensified using either: <ol style="list-style-type: none">higher doses of loop diuretics;addition of a second diuretic (such as metolazone, spironolactone or intravenous chlorothiazide); orcontinuous infusion of a loop diuretic. (Level of Evidence: C)
10.	In patients with clinical evidence of hypotension associated with hypoperfusion and obvious evidence of elevated cardiac filling pressures (e.g., elevated jugular venous pressure; elevated pulmonary artery wedge pressure), intravenous inotropic or vasopressor drugs should be administered to maintain systemic perfusion and preserve end-organ performance while more definitive therapy is considered. (Level of Evidence: C)
11.	Invasive hemodynamic monitoring should be performed to guide therapy in patients who are in respiratory distress or with clinical evidence of impaired perfusion in whom the adequacy or excess of intracardiac filling pressures cannot be determined from clinical assessment. (Level of Evidence: C)
12.	Medications should be reconciled in every patient and adjusted as appropriate on admission to and discharge from the hospital. (Level of Evidence: C)

13. In patients with reduced ejection fraction experiencing a symptomatic exacerbation of HF requiring hospitalization during chronic maintenance treatment with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, it is recommended that these therapies be continued in most patients in the absence of hemodynamic instability or contraindications. (Level of Evidence: C)
14. In patients hospitalized with HF with reduced ejection fraction not treated with oral therapies known to improve outcomes, particularly ACE inhibitors or ARBs and beta-blocker therapy, initiation of these therapies is recommended in stable patients prior to hospital discharge.239,240 (Level of Evidence: B)
15. Initiation of beta-blocker therapy is recommended after optimization of volume status and successful discontinuation of intravenous diuretics, vasodilators, and inotropic agents. Beta-blocker therapy should be initiated at a low dose and only in stable patients. Particular caution should be used when initiating beta blockers in patients who have required inotropes during their hospital course.239,240 (Level of Evidence: B)
16. In all patients hospitalized with HF, both with preserved (see Section 4.3.2., Patients With HF and Normal LVEF, in the full-text guideline) and low EF, transition should be made from intravenous to oral diuretic therapy with careful attention to oral diuretic dosing and monitoring of electrolytes. With all medication changes, the patient should be monitored for supine and upright hypotension, worsening renal function and HF signs/symptoms. (Level of Evidence: C)
17. Comprehensive written discharge instructions for all patients with a hospitalization for HF and their caregivers is strongly recommended, with special emphasis on the following 6 aspects of care: diet, discharge medications, with a special focus on adherence, persistence, and uptitration to recommended doses of ACE inhibitor/ARB and beta-blocker medication, activity level, follow-up appointments, daily weight monitoring, and what to do if HF symptoms worsen. (Level of Evidence: C)
18. Postdischarge systems of care, if available, should be used to facilitate the transition to effective outpatient care for patients hospitalized with HF.112,241–247 (Level of Evidence: B)

Class IIa

1. When patients present with acute HF and known or suspected acute myocardial ischemia due to occlusive coronary disease, especially when there are signs and symptoms of inadequate systemic perfusion, urgent cardiac catheterization and revascularization is reasonable where it is likely to prolong meaningful survival. (Level of Evidence: C)
2. In patients with evidence of severely symptomatic fluid overload in the absence of systemic hypotension, vasodilators such as intravenous nitroglycerin, nitroprusside or nesiritide can be beneficial when added to diuretics and/or in those who do not respond to diuretics alone. (Level of Evidence: C)
3. Invasive hemodynamic monitoring can be useful for carefully selected patients with acute HF who have persistent symptoms despite empiric adjustment of standard therapies, and
 - a. whose fluid status, perfusion, or systemic or pulmonary vascular resistances are uncertain.
 - b. whose systolic pressure remains low, or is associated with symptoms, despite initial therapy,
 - c. whose renal function is worsening with therapy
 - d. who require parenteral vasoactive agents or
 - e. who may need consideration for advanced device therapy or transplantation. (Level of Evidence: C)
4. Ultrafiltration is reasonable for patients with refractory congestion not responding to medical therapy.248 (Level of Evidence: B)

Class IIb

Intravenous inotropic drugs such as dopamine, dobutamine or milrinone might be reasonable for those patients presenting with documented severe systolic dysfunction, low blood pressure and evidence of low cardiac output, with or without congestion, to maintain systemic perfusion and preserve end-organ performance. (Level of Evidence: C)

Class III

1. Use of parenteral inotropes in normotensive patients with acute decompensated HF without evidence of decreased organ perfusion is not recommended.249 (Level of Evidence: B)
2. Routine use of invasive hemodynamic monitoring in normotensive patients with acute decompensated HF and congestion with symptomatic response to diuretics and vasodilators is not recommended.250 (Level of Evidence: B)

SOURCE

Adapted from the ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. August 2005.

Adapted from the ACC/AHA 2009 Guideline Focused Update on Heart Failure