Chronic Left Ventricular Systolic Heart Failure – Adult – Clinical Practice Guideline

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Chronic Left Ventricular Systolic Heart Failure – Adult – Clinical Practice Guideline

Executive Summary

Guideline Overview: The 2013 Heart Failure workgroup has decided to endorse the 2013 Guidelines for the Diagnosis and Management of Heart Failure in Adults created by the American College of Cardiology Foundation (ACCF) and American Heart Association (AHA). 
http://circ.ahajournals.org/content/128/16/1810

Target Population: Patients 18 years or older with reduced left ventricular heart function.

Major Practice Recommendations for Heart Failure with reduced ejection fraction (HFrEF)
These recommendations are for heart failure with reduced ejection fraction (HFrEF) defined as a left ventricular ejection fraction (LVEF) of less than or equal to 40%. If clinically appropriate, these guidelines can be used with patients who have an LVEF between 41 to 50%.

MANAGEMENT OF RISK FACTORS
1. Control hypertension and lipid disorders according to current guideline.
2. Avoid tobacco use or exposure.
3. Control or avoid obesity, diabetes mellitus, and use of known cardiotoxic agents.

NON-PHARMACOLOGICAL MANAGEMENT
1. Patients with HFrEF should receive education to facilitate self-care.
2. Exercise training/cardiac rehabilitation should be recommended in clinically stable HF patients who are able to participate.
3. Sodium restriction is reasonable to reduce congestive symptoms.
4. Fluid restriction (1.5-2 liters/day) is reasonable for patients with advanced heart failure, especially those with hyponatremia, to reduce congestive symptoms.
5. Effective systems of care coordination, with special attention to care transitions, should be deployed for every patient with chronic HFrEF.
6. Palliative care should be considered for patients with advanced HF, especially those who are not candidates for heart transplantation or mechanical circulatory support.

Stages of HF and recommended treatment are shown in Figures 1 and 2.
ACEI indicates angiotensin-converting enzyme inhibitor; AF, atrial fibrillation; ARB, angiotensin-receptor blocker; CAD, coronary artery disease; CRT, cardiac resynchronization therapy; DM, diabetes mellitus; EF, ejection fraction; GDMT, guideline-directed medical therapy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; HFpEF, heart failure with preserved ejection fraction; HRQOL, health-related quality of life; HTN, hypertension; ICD, implantable cardioverter-defibrillator; LV, left ventricular; LVH, left ventricular hypertrophy; MCS, mechanical circulatory support; and MI, myocardial infarction.

* As appropriate based on existing comorbidities

Reference: Figure 3 from 2013 ACCF/AHA Guideline for the Management of Heart Failure: Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. http://circ.ahajournals.org/content/128/16/1810
FIGURE 2. Stage C HFrEF Guideline-Directed Medical Therapy

ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin-receptor blocker; HFrEF, heart failure with reduced ejection fraction; Hydral-Nitrates, hydralazine and isosorbide dinitrate; LOE, Level of Evidence; and NYHA, New York Heart Association.

* Statement should read: “For NYHA class II-IV patients. Provided estimated creatinine clearance >30mL/min and K+ <5.0 mEq/dL”

Reference: Figure 1 from 2013 ACCF/AHA Guideline for the Management of Heart Failure: Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. http://circ.ahajournals.org/content/128/16/1810
MEDICATIONS

In patients requiring hospitalization during chronic maintenance guideline directed medical therapy for HFrEF, the medical therapy should be continued during the hospitalization in the absence of hemodynamic instability or contraindications. If the therapy requires a decrease or discontinuation during the hospital stay, the therapy should be resumed at or following hospital discharge as the patient’s condition allows.

1. Angiotensin-converting enzyme inhibitors (ACEI) should be prescribed unless contraindicated.
2. Angiotensin receptor blockers (ARB), preferably candesartan or valsartan, should be prescribed in ACEI intolerant patients, unless contraindicated.
3. Contraindications to BOTH ACEIs and ARBs must be documented individually. Such a patient should be prescribed the combination of hydralazine/nitrates.
4. One of the beta blockers proven to reduce mortality in HFrEF (carvedilol, metoprolol succinate, or bisoprolol) should be prescribed to patients with HFrEF. If not prescribed, a contraindication must be documented.
5. An aldosterone receptor antagonist (ARA) should be prescribed in high risk patients with NYHA Class II HF (prior hospitalization or elevated natriuretic peptide levels) and in all patients with NYHA Class III or IV HF, if the creatinine is <2.5 mg/dL in men or <2.0 mg/dL in women and potassium <5.0 mEq/L. When ARAs are prescribed, renal function and potassium levels must be checked weekly until stable, then every three months.
6. The combination of hydralazine and isosorbide dinitrate is recommended to reduce mortality in African Americans with Class III-IV heart failure on optimal ACEI/ARB and beta-blocker therapy.
7. Loop diuretics are recommended for treatment of volume overload to improve symptoms. Appropriate dosing should result in a compensated patient with no signs and symptoms of volume overload.
8. Digoxin should be reserved for patients with persistent symptoms and hospitalizations due to heart failure. Low doses should be prescribed, and the steady state serum level should not exceed 1.0 ng/mL.
9. Medications to AVOID:
   9.1 Nonsteroidal anti-inflammatory drugs (NSAIDs)
   9.2 Most antiarrhythmics, except amiodarone
   9.3 Non-dihydropyridine calcium channel blockers with negative inotropic effects, such as diltiazem or verapamil. The dihydropyridine calcium channel blocker amiodipine has been shown to be safe, but not beneficial, in patients with heart failure and EF < 30%.
   9.4 Thiazolidinediones
   9.5 Alpha blocking drugs used to treat hypertension (prasozin, doxazosin) are associated with increased mortality in heart failure with LV systolic dysfunction, and alternative therapy should be sought.
A summary of drugs commonly used for Stage C HFrEF are shown in Table 1 below:

**TABLE 1. Drugs Used in Stage C HFrEF**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Initial Daily Dose(s)</th>
<th>Maximum Dose(s)</th>
<th>Mean Doses Achieved in Clinical Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACE inhibitors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Captopril</td>
<td>6.25 mg 3 times</td>
<td>50 mg 3 times</td>
<td>122.7 mg/d(^{12})</td>
</tr>
<tr>
<td>Enalapril</td>
<td>2.5 mg twice</td>
<td>10 to 20 mg twice</td>
<td>16.0 mg/d(^{13})</td>
</tr>
<tr>
<td>Fosinopril</td>
<td>5 to 10 mg once</td>
<td>40 mg once</td>
<td>N/A</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>2.5 to 5 mg once</td>
<td>20 to 40 mg once</td>
<td>32.5 to 35.0 mg/d(^{14})</td>
</tr>
<tr>
<td>Perindopril</td>
<td>2 mg once</td>
<td>8 to 16 mg once</td>
<td>N/A</td>
</tr>
<tr>
<td>Quinapril</td>
<td>5 mg twice</td>
<td>20 mg twice</td>
<td>N/A</td>
</tr>
<tr>
<td>Ramipril</td>
<td>1.25 to 2.5 mg once</td>
<td>10 mg once</td>
<td>N/A</td>
</tr>
<tr>
<td>Torcetrapril</td>
<td>1 mg once</td>
<td>4 mg once</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>ARBs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Candesartan</td>
<td>4 to 8 mg once</td>
<td>32 mg once</td>
<td>24 mg/d(^{15})</td>
</tr>
<tr>
<td>Losartan</td>
<td>25 to 50 mg once</td>
<td>50 to 150 mg once</td>
<td>129 mg/d(^{16})</td>
</tr>
<tr>
<td>Valsartan</td>
<td>20 to 40 mg twice</td>
<td>160 mg twice</td>
<td>254 mg/d(^{17})</td>
</tr>
<tr>
<td><strong>Aldosterone antagonists</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spironolactone</td>
<td>12.5 to 25.0 mg once</td>
<td>25 mg once or twice</td>
<td>26 mg/d(^{18})</td>
</tr>
<tr>
<td>Eplerenone</td>
<td>25 mg once</td>
<td>50 mg once</td>
<td>42.6 mg/d(^{19})</td>
</tr>
<tr>
<td><strong>Beta blockers</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bisoprolol</td>
<td>1.25 mg once</td>
<td>10 mg once</td>
<td>8.6 mg/d(^{20})</td>
</tr>
<tr>
<td>Carvedilol</td>
<td>3.125 mg twice</td>
<td>50 mg twice</td>
<td>37 mg/d(^{21})</td>
</tr>
<tr>
<td>Carvedilol CR</td>
<td>10 mg once</td>
<td>80 mg once</td>
<td>N/A</td>
</tr>
<tr>
<td>Metoprolol succinate extended release (metoprolol CR/XL)</td>
<td>12.5 to 25.0 mg once</td>
<td>200 mg once</td>
<td>159 mg/d(^{22})</td>
</tr>
<tr>
<td><strong>Hydralazine and isosorbide dinitrate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed-dose combination(^{23})</td>
<td>37.5 mg hydralazine/20 mg isosorbide dinitrate 3 times daily</td>
<td>75 mg hydralazine/40 mg isosorbide dinitrate 3 times daily</td>
<td>~175 mg hydralazine/90 mg isosorbide dinitrate daily</td>
</tr>
<tr>
<td>Hydralazine and isosorbide dinitrate(^{24})</td>
<td>Hydralazine: 25 to 50 mg, 3 or 4 times daily and isosorbide dinitrate: 20 to 30 mg daily in divided doses</td>
<td>Hydralazine: 300 mg daily in divided doses and isosorbide dinitrate: 120 mg daily in divided doses</td>
<td>N/A</td>
</tr>
</tbody>
</table>

ACE indicates angiotensin-converting enzyme; ARB, angiotensin-receptor blocker; CR, controlled release; CR/XL, controlled release/extended release; HFrEF, heart failure with reduced ejection fraction; and N/A, not applicable.

Reference: Table 11 from 2013 ACCF/AHA Guideline for the Management of Heart Failure: Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. [http://circ.ahajournals.org/content/128/16/1810](http://circ.ahajournals.org/content/128/16/1810)
REFERRAL TO ELECTROPHYSIOLOGY
(For Consideration of Device Therapy [AICD &/or Cardiac Resynchronization Therapy] if LVEF ≤ 35%)

1. Implantable cardiac defibrillator (ICD) implantation
   1.1 ICD therapy is recommended in patients with nonischemic dilated cardiomyopathy or ischemic heart disease at least 40 days post-MI with LVEF < 35% and NYHA class II or III symptoms on guideline directed medical therapy who have reasonable expectation of meaningful survival for > 1 year.
   1.2 ICD therapy is recommended in patients at least 40 days post-MI with LVEF < 30% and NYHA class I symptoms while receiving guideline directed medical therapy who have reasonable expectation of meaningful survival for > 1 year.
   1.3 ICD implantation is of uncertain benefit in patients with a high risk of nonsudden death as predicted by frequent hospitalizations, advanced frailty, or comorbidities such as systemic malignancy or severe renal dysfunction.

2. Cardiac resynchronization therapy (CRT) – see Figure 3.
FIGURE 3. Indications for CRT therapy algorithm

CRT indicates cardiac resynchronization therapy; CRT-D, cardiac resynchronization therapy-defibrillator; GDMT, guideline-directed medical therapy; HF, heart failure; ICD, implantable cardioverter-defibrillator; LBBB, left bundle-branch block; LVEF, left ventricular ejection fraction; MI, myocardial infarction; and NYHA, New York Heart Association.

Reference: Figure 2 from 2013 ACCF/AHA Guideline for the Management of Heart Failure: Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines.
http://circ.ahajournals.org/content/128/16/1810
LAB TESTS
Patients with heart failure should have BUN, serum creatinine and potassium monitored on a regular basis (at least every 6 months or more frequently if clinically unstable).

REFERRAL TO CARDIOLOGY
1. Failure to tolerate Guideline based therapy.
2. Persistent volume overload despite therapy with diuretics, leading to repeated hospitalizations.

Companion Documents
None identified

Pertinent UW Health Information

RELATED HEALTH LINK TOOLS
1. Admission and discharge order sets
2. Complex Case Management build
3. Best Practice Advisories (with related orders and documentation) for ACEI/ARB/Beta Blocker ordering during hospital stay, at discharge, and in the outpatient setting
4. Delegation protocol for lab ordering in UWHC, UWMF, and DFM Ambulatory Clinics
5. Delegation protocol for heart failure med titration in the UWHC Heart Failure Program and UWHealth Complex Case Management Program

PATIENT RESOURCES
Health Facts for You:
1. Congestive Heart Failure - #6087
2. Your Risk of Heart and Vascular Disease - #5817
3. About Plaque - #5818
4. Weight and Vital Signs Log - #6094
5. Sodium (Nutrition Care for You) - #180
Benefits/Harms of Implementation

**Potential Benefits:** Following the Guidelines should lead to improved patient outcomes, including reduced mortality and decreased hospital readmission. Hospital readmissions for heart failure will begin carrying a penalty from the government and select insurers in the near future, and will not be reimbursed. Additionally, ACEI/ARB/Beta Blocker use and smoking cessation will be reportable to PQRS and NQF.

**Potential Harms:** Medications such as NSAIDs, most antiarrhythmic drugs, and most calcium channel blocking drugs could be indicated for other conditions while contraindicated for Heart Failure.

Implementation Tools/Plan

1. This guideline will be housed in UConnect in a dedicated folder for Clinical Practice Guidelines.
2. Advertise release of this guideline in the Center for Knowledge Management corner within the Best Practices Newsletter.
3. Review and update as indicated doc flowsheets, delegation protocols, order sets, smart sets, and BPAs.

Metrics

1. Percentage of heart failure patients discharged home with written instructions given to patient or caregiver at discharge or during the hospital stay addressing all of the following: activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if HF symptoms worsen (TJC/CMS core measure HF-1).
2. Percentage of heart failure patients with documentation in the hospital record that left ventricular systolic (LVS) function was evaluated before arrival or during hospitalization (TJC/CMS core measure HF-2).
3. Heart failure patients with left ventricular systolic dysfunction (LVSD) who are prescribed an ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction (TJC/CMS core measure HF-3; PQRI 5).
4. Number of deaths per 100 discharges with principal diagnosis code of CHF (AHRQ – IQI 16).
5. All discharges of age 18 years and older with ICD-9-CM principal diagnosis code for heart failure (AHRQ – IQI 8).
6. Percentage of patients aged 18 years and older with a diagnosis of heart failure (HF) with a current or prior left ventricular ejection fraction (LVEF) < 40% who were prescribed beta-blocker therapy either within a 12 month period when seen in the outpatient setting OR at each hospital discharge (CMS HF-6).
Disclaimer
Clinical Practice Guidelines assist clinicians by providing a framework for the evaluation and treatment of patients. This Clinical Practice Guideline outlines the preferred approach for most patients. It is not intended to replace a clinician’s judgment or to establish a protocol for all patients. It is understood that some patients will not fit the clinical condition contemplated by a guideline and that a guideline will rarely establish the only appropriate approach to a problem.

References for Supporting Evidence
References can be found in the executive Summary and full guideline accessed through the following links: