Clinical Practice Guideline for Heart Failure

This guideline is a uniform algorithm for Mercy Medical Center and Medical Associates Clinic and Health Plans regarding patient enrollment and participation in the Heart Failure Disease Management Program.

REFERRAL/EVALUATION
1) Referral to Heart Failure Program by a primary care physician, advance practice provider, or cardiologist.
2) Establish diagnosis of heart failure.
   a) Symptoms consistent with heart failure including dyspnea, cough, orthopnea, PND, fatigue, decreased activity tolerance, or confusion.
   b) Clinical signs of heart failure including JVD, pulmonary congestion, hepatojugular reflux, S3 gallop, laterally displaced PMI, ascites, or edema.
   c) Echo: LV size and systolic/diastolic function, valve function, other chamber sizes, PA pressure
d) EKG including rhythm
e) CBC, BMP, TSH, CXR, BNP

3) Determine the etiology of heart failure with special attention to correctible causes.
   a) Ischemic heart disease
      i) Cardiac catheterization for patients with angina or with high risk of ischemic disease
      ii) Radionucleotide study for patients with angina or when optimal medical therapy is achieved
   b) Non Ischemic heart disease
      i) Hypertension
      ii) Valvular heart disease
      iii) Idiopathic
      iv) Secondary cause: Alcohol (ETOH), drug-induced, tachyarrhythmia

4) Enrollment in Heart Failure disease management program recommended:
   a) All patients with primary systolic dysfunction, LVEF 40% or less, or combined systolic/diastolic dysfunction.
   b) Consider for patients with diastolic dysfunction that has been difficult to manage:
      i) Hospital admission
      ii) Frequent diuretic adjustments
      iii) Multiple comorbidities including atrial fibrillation, valve disease, or hypertension.

MEDICAL TREATMENT PLAN
1) Systolic heart failure or combined systolic/diastolic dysfunction
   a) Loop diuretics preferred over thiazide –type diuretics to reduce fluid overload.
      i) Provide and educate patient and family re: use of additional PRN diuretic for fluid retention.
      ii) Addition of Metolazone dosed intermittently for persistent fluid retention.
iii) Monitor carefully for side effects including renal dysfunction, electrolyte abnormalities, and hypotension.

b) ACE Inhibitors: incremental dosing to target doses, not BP control, recommended.

<table>
<thead>
<tr>
<th>Agents</th>
<th>Initial Dose</th>
<th>Target</th>
<th>Max Daily Dose</th>
<th>Titration</th>
</tr>
</thead>
<tbody>
<tr>
<td>captopril</td>
<td>Three times a day</td>
<td>6.25</td>
<td>12.5</td>
<td>25</td>
</tr>
<tr>
<td>enalapril</td>
<td>Twice a day</td>
<td>2.5</td>
<td>5</td>
<td>7.5</td>
</tr>
<tr>
<td>lisinopril</td>
<td>Daily</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>quinapril</td>
<td>Twice a day</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>ramipril</td>
<td>Daily</td>
<td>1.25</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>trandolopril</td>
<td>Daily</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fosinopril</td>
<td>Daily</td>
<td>10</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

i. Check labs (creatinine, BUN, Na+, K+) with each dosage adjustment.

ii. Consider dose decrease or nephrology consultation for Cr >3 or K+>5.3.

iii. For patients intolerant of ACE-Inhibitor with cough, an ACE receptor blocker (ARB) is recommended.

iv. For patients intolerant of ACE-Inhibitor with renal insufficiency or hyperkalemia, a combination of Hydralazine and Nitrate is recommended.

c) Beta blockers: incremental dosing to target doses, not BP control, recommended.

<table>
<thead>
<tr>
<th>Agents</th>
<th>Initial Dose (mg)</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>carvedilol</td>
<td>Twice a day</td>
<td>3.125 6.25 12.5 25</td>
</tr>
<tr>
<td>metoprolol succinate</td>
<td>Daily</td>
<td>25</td>
</tr>
<tr>
<td>bisoprolol</td>
<td>Daily</td>
<td>1.25</td>
</tr>
</tbody>
</table>

i. Beta blocker use is recommended with caution in patients with COPD, diabetes, or peripheral vascular disease.

ii. It is recommended that beta blockers be continued in most patients experiencing heart failure exacerbation unless they develop cardiogenic shock, refractory volume overload, or symptomatic bradycardia.

iii. If discontinued or reduced, beta blockers should be reinstated or returned to the previously tolerated dose as soon as safely possible.

d) Aldosterone antagonists (Spironolactone or Eplerenone) are recommended for patients with class III-IV heart failure or post myocardial infarction.

i. Avoid aldosterone antagonists when creatinine is =/ >2.5, creatinine clearance =/ <30, or serum potassium =/>5.0.

ii. Monitor renal function and serum potassium frequently on initiation of an aldosterone antagonist and regularly thereafter.

iii. In the absence of persistent hypokalemia, supplemental potassium is not recommended with an aldosterone antagonist.

e) Digoxin may be considered for patients with persistent signs or symptoms of heart failure on optimized therapy with a diuretic, ACE-Inhibitor, and beta blocker.

i. Digoxin dose of 0.125 mg daily is recommended in the majority of patients, with a trough digoxin level < 1.0 ng/mL checked 1-2 weeks after initiation.
ii. Digoxin dose up to but not exceeding 0.25 mg daily is recommended to achieve ventricular rate control in patients with atrial fibrillation.

f) Consider adding a combination of hydralazine and a nitrate in addition to standard therapy with an ACE-inhibitor and beta blocker in African Americans.

g) Consider replacing ACE Inhibitor or ARB therapy with Entresto (Sacubitrol/Valsartan) in patients with reduced EF and NYHA class II-IV symptoms.

i) Eliminate potentially harmful drugs:
   i. Most calcium channel blockers; dihydropyridine CCBs may be used.
   ii. Nonsteroidal anti-inflammatory drugs (NSAIDS).
   iii. Antiarrhythmic drugs except for Amiodarone.
   iv. Tricyclic antidepressants.

h) Device therapy: Cardiac Resynchronization Therapy (CRT)
   i. CRT is recommended for patients in sinus rhythm with QRS $\geq$ 120 ms, EF $\leq$ 35%, and NYHA class III heart failure on optimal medical therapy.
   ii. CRT may be considered for patients in atrial fibrillation with QRS $\geq$ 120 ms, EF $\leq$ 35%, and NYHA class III heart failure on optimal medical therapy.
   iii. Select ambulatory NYHA class IV patients with sinus rhythm, QRS $\geq$ 120 ms, and EF $\leq$ 35% may be considered for CRT.
   iv. CRT may be considered in NYHA class I or II patients with QRS $\geq$ 150 ms and reduced EF.
   v. CRT may be considered in patients with reduced EF in whom chronic, frequent ventricular pacing is expected.

i) Device therapy: Implantable Cardioverter-Defibrillator (ICD)
   i. Prophylactic ICD should be considered in patients with ischemic or non-ischemic cardiomyopathy and EF $\leq$ 35%.
   ii. ICD is recommended in survivors of cardiac arrest from ventricular fibrillation or sustained ventricular tachycardia that is not due to a reversible cause.
   iii. ICD is not recommended in patients with chronic, severe heart failure when there is no expectation of clinical improvement and life expectancy is less than one year.
   iv. ICD should be considered in patients undergoing implantation of a CRT device.

j) Tertiary referral should be considered for patients who remain symptomatic with persistent low EF despite optimized pharmacologic and device treatment.
   i. Availability of research protocols.
   ii. ii) LVAD or cardiac transplant consideration.

2) Diastolic heart failure
   a) Thiazide or loop diuretics are recommended to reduce fluid overload.
      i) Provide and educate patient and family re: use of additional PRN diuretic for fluid retention.
      ii) Addition of Metolazone dosed intermittently for persistent fluid retention.
      iii) Monitor carefully for side effects including renal dysfunction, electrolyte abnormalities, and hypotension.
b) ACE inhibitors should be considered in all patients who have symptomatic atherosclerotic cardiovascular disease or diabetes, and may be considered in other patients.
   i) Ace Receptor Blockers (ARB) should be considered for patients who are not tolerant of an ACE-Inhibitor.
   ii) Check labs (creatinine, BUN, Na+, K+) with each dosage adjustment.
   iii) Consider dose decrease or nephrology consultation for Cr >3 or K+ >5.3.

c) Beta blockers are recommended in patients with prior myocardial infarction, hypertension, or requiring control of ventricular rate.

d) Calcium channel blockers should be considered in patients with:
   i) Atrial fibrillation requiring control of ventricular rate and intolerance to beta blockers. In these patients, diltiazem or verapamil should be considered.
   ii) Symptom-limiting angina.
   iii) Hypertension.

e) Measures to restore and maintain sinus rhythm may be considered in patients who have symptomatic atrial flutter-fibrillation, but this decision should be individualized.

EDUCATION AND HEALTH MAINTENANCE FOR ALL PATIENTS WITH HEART FAILURE

1) Dietary instruction is recommended for all patients.
   a) 2000 gram sodium diet.
   b) Diabetic, low fat, renal, and/or weight loss/ maintenance dietary education as indicated.
   c) Fluid restriction for patients with Na+ levels <130 mEq/L.

2) Pharmacy education and assistance
   a) Expected benefits, possible side effects, dosing, and timing of prescribed medication.
   b) Compliance assistance including pillboxes, pharmacy-filled medbox or dispensing systems as indicated.
   c) Evaluation of OTC or herbal products used for potential adverse effect or drug interaction.

3) Regular endurance exercise/ activity with a goal of 30 minutes 5 days weekly is recommended for most patients if deemed safe.
   a) Patients with EF =/< 35 and clinically stable for 6 weeks may be candidates for cardiac rehab phase 2.
   b) Education on safe exercise and activity guidelines and symptom monitoring is recommended for all patients with chronic heart failure.

4) Telephone support
   a) Teleminder daily surveillance for patients at higher risk of decompensation or undergoing frequent medication adjustments.
   b) Reinforcement of heart failure provider contact information and importance of calling early for changes or concerns.

5) It is recommended that patients with HF be advised to stop smoking and to limit alcohol consumption to 2 standard drinks per day in men or 1 standard drink per day in women.
6) Pneumococcal and annual influenza immunization are recommended unless there is a contraindication.

7) Home health referral for patients who qualify.

8) End-of-life support
   a) Pastoral care referral for assistance with advanced directive documents.
   b) Hospice or palliative care referral.

MANAGEMENT OF CO-MORBIDITIES
1) Anemia of chronic illness
   a) Anemia will be screened for on admission (CBC or HGB/HCT) and as indicated based on clinical history and physical exam.
   b) Abnormal results will be referred to primary care physician for further evaluation and management.

2) Sleep apnea
   a) Sleep apnea has been shown to commonly coexist undiagnosed in patients with heart failure, and has been implicated in the progression of vascular disease and heart failure.
   b) All patients will be screened early in the program using the sleep assessment survey. Patients with abnormal criteria will be recommended for overnight pulse oximetry or referred to pulmonologist, and subsequent management directed by those results.
   c) Patients with diagnosed sleep disordered breathing will be asked about their use of prescribed therapies, and efforts made to optimize compliance.

3) Depression
   a) Patients with heart failure are at risk for depression and will be evaluated for untreated depression or effectiveness of current treatment.
   b) Patients with untreated or sub-optimally managed depression will be referred to primary care for further management.

4) Diabetes mellitus
   a) Screening for undiagnosed diabetes mellitus.
   b) Referral to primary care for management of diabetes concerns.

5) Thyroid disorders
   a) Screening TSH on enrollment.
   b) Referral to primary care for management of thyroid abnormalities.

6) Hyperlipidemia
   a) Screening fasting lipid panel for patients with coronary artery or vascular disease.
   b) Treatment of abnormal lipids according to hyperlipidemia guidelines.

References
2009 Focused Update: ACCF/AHA Guidelines for the Diagnosis and Management of


Heart Failure Society of America Practice Guidelines @http://www.heartfailureguideline.org

---

Original: 10/03  Reviewed: 09/10  Revised: 08/16
Revised: 04/04  Revised: 06/07  Reviewed: 09/11  Reviewed: 01/18
Revised: 11/04  Revised: 08/08  Reviewed: 09/12
Revised: 03/05  Reviewed: 09/09  Revised: 06/14