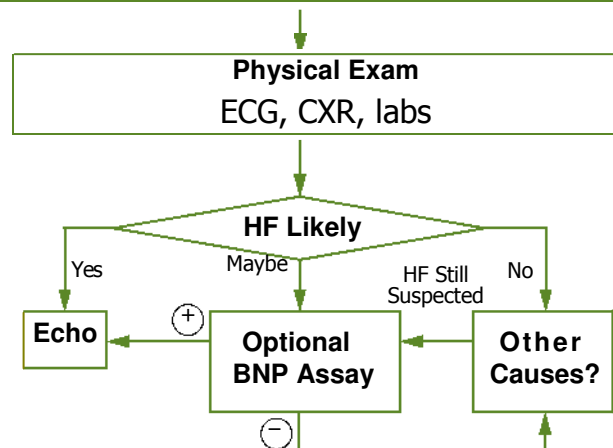


Guide to Heart Failure Management

Presentation Suggestive of HF

- Dyspnea
- Orthopnea
- Unexplained fatigue, weakness, anorexia or mental disturbances may indicate HF in older adults
- PND
- JVP, edema



Based on 2006 Kaiser Permanente National Heart Failure Guidelines

These guidelines are informational only. They are not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners, considering each patient's needs on an individual basis. Guideline recommendations apply to populations of patients. Clinical judgment is necessary to design treatment plans for individual patients.

Note: These guidelines focus on the diagnosis, treatment, and management of heart failure in the outpatient primary care setting, care management programs, home health and skilled nursing facilities. Inpatient and emergency department settings are not addressed.

FINDINGS SUGGESTIVE OF HEART FAILURE (HF)

More Specific

- Orthopnea
- PND
- Neck-vein distention
- Abdominojugular reflux
- Third heart sound
- Cardiomegaly
- Displaced apical impulse
- Pulmonary vascular congestion on CXR
- Acute pulmonary edema
- Weight loss ≥ 4.5 kg in response to diuretics

Less Specific

- DOE
- Ankle edema
- Hepatomegaly
- Pleural effusion
- Tachycardia (rate ≥ 120 /min)
- Nocturnal Cough
- Rales

B-type Natriuretic Peptide (BNP) level does not give a definitive diagnosis of heart failure. It must be interpreted in light of clinical findings and other tests but not as a yes/no result for a diagnosis of heart failure. It may be helpful in determining the need for echocardiography. A knowledge of how BNP level correlates to differing levels of heart failure severity, as well as to sex, age, and other conditions (especially pulmonary) is essential.

Use of serial BNP testing is not recommended at this time.

Device Therapy

For some patients with LVSD, implantable cardioverter defibrillators (ICDs) may reduce risk of sudden death, while for others, cardiac resynchronization therapy (CRT) with biventricular pacing can improve survival and symptoms.

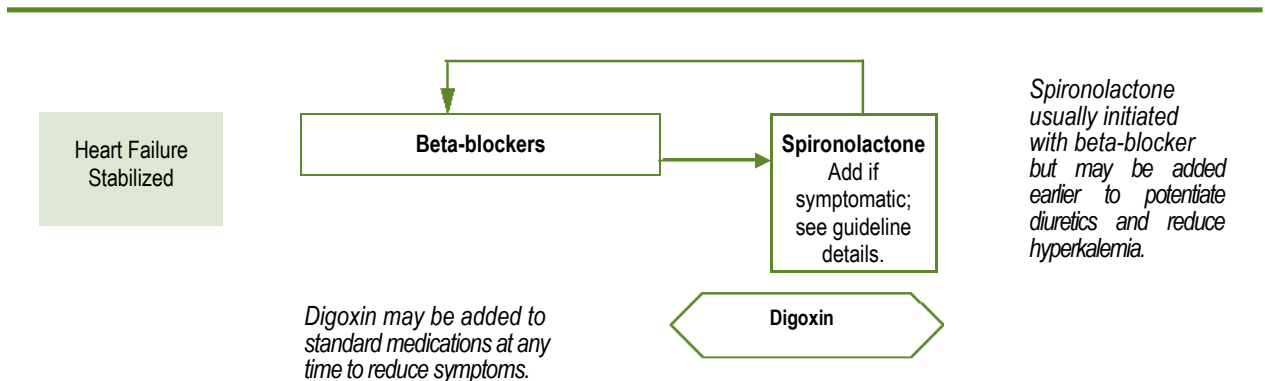
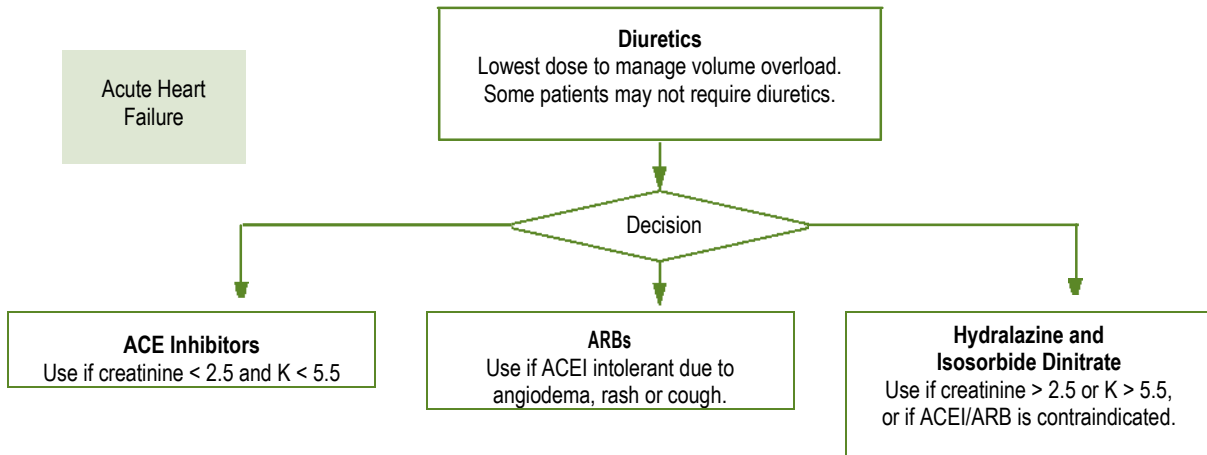
Consider referral for ICD assessment if 1) LVEF \leq 35% and is not expected to improve, 2) class II or III symptoms (class IV if CRT eligible), 3) prognosis $>$ 1 year, and 4) avoidance of sudden death is desired.

Consider referral for CRT if 1) LVEF \leq 35%, 2) class III or IV symptoms, and 3) LBBB \geq 120 msec in width.

Potential Non-Cardiac Factors in Refractory symptoms

- Anemia: treat with erythropoetin
- Sleep apnea: screen and treat

Medication sequencing for Left ventricular systolic Dysfunction (LvsD)



Diuretics

Manage pulmonary and peripheral edema with diuretics. Mild volume overload may respond to vasodilators alone or with thiazide diuretics. In some cases, response to vasodilators may allow diuretics to be stopped or dosage decreased.

DRUG	INITIAL DOSAGE	MAXIMAL DOSAGE	COMMENTS
Loop Diuretics			<ul style="list-style-type: none"> • Increase dose as needed to achieve euvolemia. • Use hydrochlorothiazide with mild volume overload.
furosemide	20 to 40 mg daily	200 mg tid	
bumetanide	0.5 to 2.0 mg daily	10 mg bid	<ul style="list-style-type: none"> • Use loop diuretics with moderate to severe volume overload. • Use combination loop and thiazide diuretics for insufficient response to loop diuretics alone.
Thiazide Diuretics			
hydrochlorothiazide	25 mg, 1 or 2 times daily	100 mg daily	<ul style="list-style-type: none"> • Avoid overuse. Excessive diuresis can be as harmful as inadequate diuresis. • Monitor potassium and creatinine frequently during initiation, titration, or modification.
metolazone	2.5 mg qod	5 mg bid	
For insufficient response, add a thiazide to loop diuretic.			<ul style="list-style-type: none"> • Start hydrochlorothiazide or metolazone at lowest dose needed. • Give hydrochlorothiazide or metolazone 30 min. before furosemide.
hydrochlorothiazide	25 mg, 1 or 2 times daily to weekly	200 mg daily	
metolazone	2.5 mg daily	10 mg daily	

ACE inhibitors

It is strongly recommended that ACE inhibitors be given to patients with LVSD.

DRUG	INITIAL DOSAGE	TARGET DOSAGE	COMMENTS
captopril	6.25** mg tid	50 mg tid	<ul style="list-style-type: none"> • Dose may be increased every 1 to 2 weeks. • Check creatinine and potassium 3 to 10 days after initiation and each increase, then every 3 to 6 with months when stable dosage is achieved. • Titrate to dose necessary to control acute HF, 10 to 20 mg daily of lisinopril, leaving blood pressure room to titrate beta-blockers. After beta-blocker titration, titrate to higher dose if tolerated. <p>Contraindications</p> <ul style="list-style-type: none"> • Creatinine > 2.5 mg/dl and/or potassium > 5.5 mEq/l • ACEI-induced angioedema, rash • Symptomatic hypotension
lisinopril	2.5** to 5 mg daily	20 to 40 mg daily	
enalapril	2.5** mg bid	10 to 20 mg bid	
** For patients with risk factors for hypotension.			

Angiotensin Receptor Blockers

If the patient is intolerant to ACE inhibitors due to cough, allergy, or angioedema, angiotensin-receptor blockers (ARBs) are a recommended alternative. However, if ACEI-induced angioedema is severe, use caution when ARBs are given.

The routine addition of ARBs to ACE inhibitors is not recommended. If ARBs are added to ACEIs it should be done for specific reasons, such as uncontrolled hypertension or insufficient vasodilation.

DRUG	INITIAL DOSAGE	TARGET DOSAGE	COMMENTS
losartan	25 to 50 mg daily	50 to 100 mg daily Maximum 100 mg daily	<ul style="list-style-type: none">• Increase dose every 1 to 2 weeks.• Check creatinine and potassium 3 to 10 days after initiation and with each increase. Contraindications <ul style="list-style-type: none">• Creatinine > 2.5 mg/dl and/or potassium > 5.5 mEq/L• Symptomatic hypotension

Hydralazine and isosorbide Dinitrate in Combination

If ACE inhibitors or angiotensin receptor blockers are contraindicated due to worsening renal function or hyperkalemia, the combination of hydralazine and isosorbide dinitrate is an alternative choice for vasodilator therapy.

DRUG	INITIAL DOSAGE	TARGET DOSAGE	COMMENTS
hydralazine	10 to 25 mg tid	100 mg tid or 75 mg qid	<ul style="list-style-type: none">• Increase dose every 1 to 2 weeks.• Use hydralazine with caution in patients with lupus (SLE).
isosorbide dinitrate	10 mg qid	80 mg tid 60 mg qid	Contraindications <ul style="list-style-type: none">• Symptomatic hypotension, intolerance or allergy• Severe mitral or aortic stenosis
isosorbide mononitrate	30 mg daily	120 mg daily	

Beta-Blockers

Beta-blockers are strongly recommended for all patients with LVSD.

DRUG	INITIAL DOSAGE	TARGET DOSAGE	COMMENTS
bisoprolol 5 mg tablet 10 mg tablet	1.25 to 2.5 mg daily	10 mg daily	<ul style="list-style-type: none"> Initiate BBs when patient is stable with no or minimal evidence of fluid overload. Double the dose every 2 to 4 weeks. For LVSD; carvedilol, bisoprolol, and long-acting metoprolol are preferred. For HF with preserved LVEF, no specific beta-blocker is known to be superior. Monitor for significant decrease in HR and BP. COPD and asthma are not absolute contraindications for use of beta-blockers (cardio-selective beta-blockers may be better tolerated). <p>Cautions</p> <ul style="list-style-type: none"> Heart rate < 60 bpm, SBP < 90 mm hg. 1st degree AV block (PR interval > 0.3 seconds). Severe renal insufficiency (creatinine > 3.0 mg/dl). Hepatic disease (LFTs > 3x normal). Well-controlled, mild to moderate asthma. At risk for severe hypoglycemia. <p>Contraindications</p> <ul style="list-style-type: none"> Heart rate < 50 bpm, SBP < 80 mm hg. 2nd or 3rd degree heart block. Uncontrolled, severe asthma.
bisoprolol and HCTZ [6.25 mg]** 2.5 mg (bisoprolol) tablet 5 mg (bisoprolol) tablet 10 mg (bisoprolol) tablet			
carvedilol	3.125 mg bid	25 mg bid 50 mg bid in patients wt. > 85 kg	
metoprolol	12.5 mg daily	200 mg daily	

** Hydrochlorothiazide in bisoprolol/HCTZ combination tablet is useful for treating hyperkalemia, HTN, hypervolemia. If these effects are unwanted, consider using bisoprolol alone.

Aldosterone Antagonists

Spironolactone is recommended, in addition to standard treatment, for patients with LVSD, EF ~ 35%, NYHA class III or IV, and no contraindications, OR for patients with Left Ventricular Ejection Fraction (LVEF) ~ 40%, recent MI, either diabetes or signs of HF, and no contraindications. It is an acceptable but less well-established option to use spironolactone in patients with EF ~ 40%, any symptoms of HF, and no contraindications. It is usually initiated with a beta-blocker but may be added earlier to potentiate diuretics and reduce hypokalemia.

DRUG	INITIAL DOSAGE	TARGET DOSAGE	COMMENTS
spironolactone	12.5 to 25 mg daily	25 mg daily	<ul style="list-style-type: none"> If potassium (K) > 4.5 mEq/L, start with 12.5 mg spironolactone. Check potassium and creatinine at baseline, then at 1, 4, 8, and 12 weeks, every 3 months for the first year, and every 6 months thereafter. Reduce or eliminate potassium supplements if K > 4.2 mEq/L. Use caution if starting during ACEI / ARB titration. <p>Contraindications</p> <ul style="list-style-type: none"> Creatinine > 2.5 mg/dl. Potassium > 5.0 mEq/L.
eplerenone <i>Eplerenone may be used if gynecomastia is problematic.</i>	25 mg daily	25 mg daily	

Digoxin

Digoxin may be added to standard therapy of ACE inhibitors, diuretics, and beta-blockers for heart failure, to improve symptoms and reduce hospitalization. Digoxin is not recommended for patients with few or no symptoms of heart failure who are in normal sinus rhythm, because it does not reduce mortality.

Because of possible toxicity, which may be more common in women, and for maximum benefit, use lower doses of digoxin, and consider maintaining serum digoxin levels to no more than 0.8 ng/ml.

DRUG	INITIAL DOSEAGE	COMMENTS
digoxin	0.125 to 0.25 mg daily	<ul style="list-style-type: none">• Use caution and monitor carefully in patients with reduced renal function.• If patient has severe renal insufficiency, especially with low body weight, start at 0.0625 mg daily or 0.125 mg every other day.• Digoxin serum levels are used to monitor for toxicity, not for drug efficacy. The serum concentrations of 0.5 to 1.0 ng/ml prevent worsening heart failure.

Calcium Channel Blockers

Calcium channel blockers are not a primary treatment for LVSD. Generally, calcium channel blockers (CCBs) other than amlodipine and felodipine should be avoided in patients with LVSD. Amlodipine or felodipine (second generation dihydropyridine calcium channel blockers) may be used for the treatment of refractory angina pectoris or hypertension in patients with LVSD, on maximally tolerated heart failure therapy.

Aspirin

Aspirin, like other NSAIDs, may exacerbate fluid retention in heart failure and should be avoided unless otherwise indicated. When indicated, e.g., CAD, the lowest acceptable dose should be used.

Medication Management in HF with Preserved Left ventricular Ejection Fraction (LVEF)

Because of the lack of RCTs showing improved morbidity and mortality with specific therapies, treatment for HF with preserved LVEF is empiric and directed at the underlying etiology. The goal is to relieve symptoms and to treat concomitant conditions.

- **Fluid Retention:** Treat with loop diuretics (or thiazide diuretics if fluid retention is mild).
- **Blood Pressure Control:** Treat hypertension aggressively with diuretics, ACE inhibitors, and beta-blockers (goal: SBP \leq 139, DBP \leq 79). The choice between ACE-Is and beta-blockers should be based on the need to lower the heart rate (see next bullet). ARBs are considered second-line if patient is ACE-intolerant. Calcium channel blockers are third-line agents.
- **Heart Rate Control:** For patients with atrial fibrillation, restore and maintain normal sinus rhythm if possible. To lengthen diastolic filling time, control ventricular response rate with beta-blockers, digoxin, or calcium channel blockers (verapamil or diltiazem). For patients in sinus rhythm, slow sinus rate if possible to 55 to 75 bpm with beta-blockers.
- **Treat Ischemia:** Treat symptoms with anti-anginal medications, e.g., beta-blockers, nitrates, or calcium channel blockers. Refer for invasive procedures as clinically indicated.
- **Provide Patient Education:** Patients with diastolic dysfunction will benefit from the same education provided for LVSD—low sodium diet, daily weight monitoring, avoidance of excessive fluid intake, flexible diuretic doses based on weight changes, physical activity as tolerated, tobacco cessation, and moderation in consumption of alcohol.

Key Patient Messages

Although treatment can improve both the length and quality of life with heart failure:

- Heart failure is a serious disease and often cannot be cured.
- Many, but not all, patients will die of their heart failure.
- Health decline in heart failure varies - it may be sudden or gradually progressive, with or without episodes of deterioration.
- It is important to plan for advancing illness, including medical, financial/legal, and personal needs.

Advancing illness Considerations

The patients' core values (what is important to them) should guide the intensity of medical interventions.

- Discuss the nature of heart failure with the patient, as well as the patient's general prognosis.
- Discuss the patient's goals for treatment, and treatment options in terms of prolonging life versus symptom relief.
- Ask the patient to complete an Advance Directive for Health Care and to discuss it with physician and family.
- When appropriate, discuss pre-hospital and hospital DNR orders, and hospice care at home versus in the community.

Assessment of Core values

Determine what is important to the patient:

- The patient's goals for treatment.
- The importance of life prolongation versus quality of life.
- The importance of dying at home versus in the hospital.

Discussing Patient Wishes

A discussion of end-of-life planning and death can be introduced with an open-ended question:

"Many patients with heart failure tell me they think about the possibility of dying. They have questions about this. Do you?"

- "Who do you want to make decisions for you when you can't? Does that person know your wishes?"
- "What kind of medical treatment do you want or not want?"
- "What personal planning do you need to do?"
- "What kind of support do you desire or need from health care professionals, family, friends, and the community?"

Actions

- Ask patient to complete Advance Directives for Health Care.
- Discuss management of symptoms of heart failure, e.g., dyspnea or pain.
- Refer patient to culturally appropriate social services or community resources to help them plan for the future, including financial, social, and health care considerations.
- Discuss do not resuscitate (DNR) orders - both hospital and pre-hospital.
- Refer patient to hospice according to prognosis and patient wishes.

Cultural Considerations

Advanced illness, palliative care, and the end of life are highly complex, value-driven issues. The importance of paying attention to and respecting cultural norms and values in this realm cannot be overstated. Clinicians need to be aware of the cultural and personal beliefs of their patients, patients' families, and their clinical colleagues in order to deliver culturally competent care.

Relief of symptoms at the End of Life

In addition to optimal medical treatment, opioids, and oxygen (even in the absence of hypoxia) may improve dyspnea (to manage constipation common with the use of opioids, use stimulant laxatives). Depression, anxiety, and pain are common at the end of life, and should be assessed and treated appropriately.

Key self-Management Messages for Patients With Heart Failure

- Although treatment can improve both the length and quality of your life, heart failure is a serious disease and often cannot be cured.
- To control HF you need to be an active member of your health care team. Here are six key things you can do to stay healthy:
 - Weigh yourself every day and record the results. If your weight increases by 2 pounds or more in a day, or 5 pounds or more in 5 days, call us right away. Also call us if your HF symptoms worsen, such as shortness of breath or difficulty breathing, edema or dizziness.
 - Choose foods and beverages low in salt or sodium. Don't drink more than 8 to 12 cups of fluids per day of any liquids.
 - If you drink alcohol, do so only in moderation. Have no more than 1 drink a day.
 - Physical activity is important to help you feel better and stay healthier. Start low, increase gradually, and pay attention to how you feel. When you stop, you should feel like you could have done more.
 - Medications are an important part of treatment. They work best if you take them as prescribed. Always check with us before taking any prescription or over-the-counter (OTC) medicines. Do not take OTC non-steroidal anti-inflammatory drugs, like ibuprofen, naproxen, or ketoprofen.
 - If you are a smoker, I advise you to quit. This is the single most important way to improve your health.