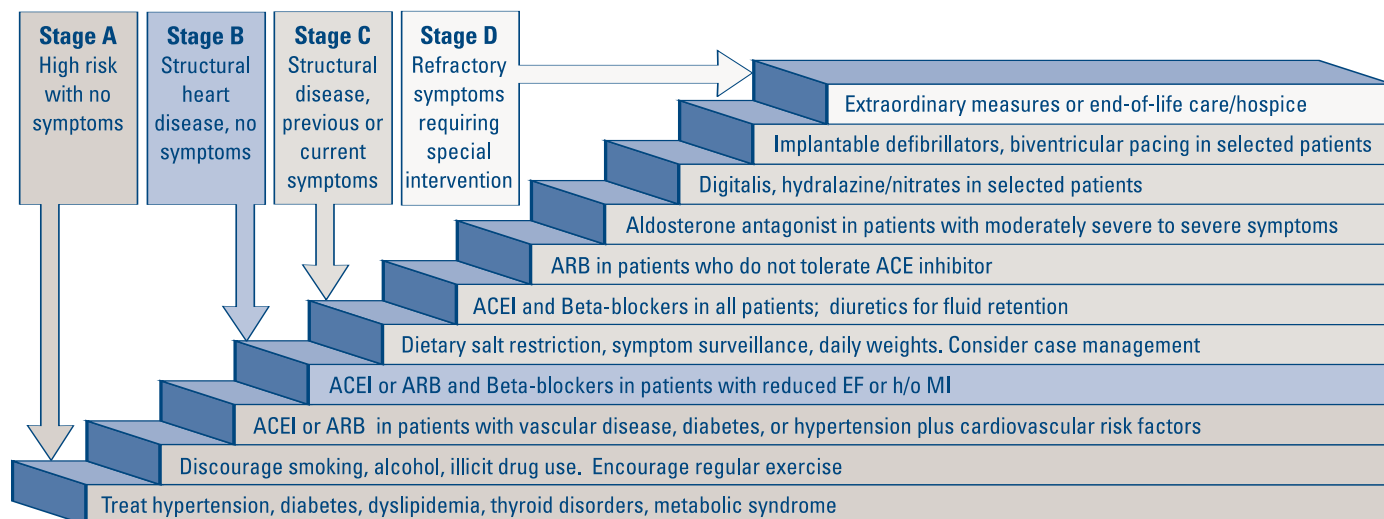


Stages of Heart Failure with Recommended Therapy



Drugs Commonly Used for Treatment of Chronic Heart Failure

PAL	Drug	Initial Daily Dose	Maximum or Target Dose	Cautions
	Loop Diuretics			
	Furosemide	20 to 40 mg once or twice	up to 600 mg daily	
	Bumetanide	0.5 to 1.0 mg once or twice	up to 10 mg daily	
	Torsemide	10 to 20 mg once or twice	up to 200 mg daily	
	Thiazide Diuretics			
	Hydrochlorothiazide	25 mg once or twice	up to 200 mg	
	Metolazone	2.5 mg once	up to 20 mg	Reactive airway dz on beta blocker Severe reactive airway disease
	Beta-receptor blockers			Resting HR <60; Systolic BP <80 Sick sinus syndrome w/o pacemaker Partial or complete A-V block
	Bisoprolol	1.25 mg once	10 mg once	
	Carvedilol	3.125 mg twice	25 mg twice; 50 mg twice if wt>85 kg	
	Metoprolol succinate CR/XL	12.5 to 25 mg once	200 mg once	
	ACE Inhibitors			Contraindications: H/O angioedema or anuric renal failure on ACEI; mod-severe aortic stenosis,
1*	Lisinopril	2.5 to 5.0 mg once	20 to 40 mg once	
1*	Enalapril	2.5 mg twice	10 to 20 mg twice	
1*	Captopril	6.25 mg 3 times	50 mg 3 times	
1	Accupril (quinapril)	5 mg twice	20 mg twice	Use with caution: Systolic BP <80; Cr>3.0;
1	Monopril (fosinopril)	5 to 10 mg once	40 mg once	Potassium>5.5 ; Bilateral renal artery stenosis
1	Aceon (perindopril)	2 mg once	8 to 16 mg once	
2	Altace (ramipril)	1.25 to 2.5 mg once	10 mg once	
2	Mavik (trandolapril)	1 mg once	4 mg once	
	Angiotensin receptor blockers			Contraindications: H/O angioedema on ARB; mod-severe aortic stenosis, Use with caution: SBP <80; Cr>3.0; K+>5.5; Bilateral renal artery stenosis
	Valsartan	20 to 40 mg twice	160 mg twice	
	Candesartan	4 to 8 mg once	32 mg once	
	Losartan	25 to 50 mg once	50 to 100 mg once	
	Aldosterone antagonists			Cr >2.5 ; creatinine clearance <30; Potassium >5.0 ;Systolic BP <80
	Spironolactone	12.5 to 25 mg once	25 mg once or twice	
	Eplerenone	25 mg once	50 mg once	
	Hydralazine/ nitrate	10 to 25 mg 3 times 10 to 20 mg 3 times	Depends on indication, see text	Systolic BP <80; Severe aortic stenosis
	Digoxin	0.125 mg once	0.125 to 0.25 mg once	Creatinine >2.0, AV block. Safest to maintain serum concentration <1.0

PAL (Prescription Advantage List) refers to NC Medicaid drug cost: (1*) >50% below avg net cost; (1) 15-50% below avg net cost; (2) +/- 15% avg net cost; (3) >15% avg net cost.

Evaluation of Patients with Heart Failure

Strongly recommended:

- History and physical exam to identify etiologic or exacerbating factors
- Initial labwork: CBC, UA, serum electrolytes (including calcium, magnesium), BUN, Cr, glucose or HgbA1C, LFTs, TSH, lipid profile
- Measurement of β -type natriuretic peptide can be useful in the urgent care setting when clinical diagnosis of heart failure is uncertain
- Initial EKG and CXR
- 2-D echocardiography with Doppler to assess LVEF, LV size and wall thickness, valve function

- Cardiac catheterization in pts with angina or significant ischemia who are candidates for revascularization.
- Serial assessment of patient's ability to perform desired activities of daily living
- Serial assessment of volume status, weight, and NYHA class functional status
- Serial monitoring of electrolytes and renal function

Also consider:

- Cardiac catheterization in pts with known or suspected CAD without angina, or pts with chest pain of unknown etiology, who are candidates for revascularization.

- Noninvasive imaging to detect ischemia and viability in pts with known CAD and no angina.
- Maximal exercise testing with measurement of respiratory gas exchange to help determine whether HF is the cause of exercise limitation when uncertain.
- Additional labwork: screening for hemochromatosis, sleep-disordered breathing, HIV, rheumatologic diseases, amyloidosis, or pheochromocytoma in selected patients
- Repeat measurement of ejection fraction after change in clinical status (but not routine reassessment).

Therapeutic Recommendations for Patients with LV Dysfunction and Heart Failure Symptoms

General Measures

Strongly recommended

- Control of systolic and diastolic HTN
- Treatment of lipid disorders and diabetes
- Avoidance of smoking, alcohol consumption, and illicit drug use
- Treatment of thyroid disorders
- Control of ventricular rate in patients with supraventricular tachyarrhythmias
- Moderate sodium restriction
- Influenza and pneumococcal immunizations
- Physical activity
- Withdrawal of drugs known to adversely affect clinical status (e.g., NSAIDs, most antiarrhythmic drugs, and most calcium channel blockers: nifedipine, verapamil, diltiazem)
- Monitoring of daily weights and close symptom surveillance (consider referral for nurse case management)

Medications:

Strongly recommended

- ACE inhibitor in all patients, unless contraindicated.
- Beta-blocker in all stable patients (no or minimal evidence of fluid retention, no recent need for treatment with an intravenous positive inotropic agent). Long-acting beta-blocker with proven mortality benefit recommended (see med chart).
- Diuretics in patients with fluid retention

Also consider:

- Aldosterone antagonist in patients with moderately severe to severe symptoms, preserved renal function, and normal potassium. Potassium should be rechecked within 1 week, at 1 month, and closely thereafter.
- Angiotensin receptor blocker in patients who cannot tolerate ACEI
- Hydralazine/nitrate as alternative therapy for pts intolerant of ACEI and ARB (target daily dose 300mg/ 160 mg).
- Addition of hydralazine/nitrate in patients already taking ACEI and beta blocker with persistent moderate to severe symptoms (target daily dose 225mg/ 120mg).
- Digitalis for treatment of heart failure symptoms

Additional Recommendations:

- Valve replacement or repair if hemodynamically significant stenosis or regurgitation.
- Implantable cardioverter-defibrillator in pts with a h/o cardiac arrest, ventricular fibrillation, or hemodynamically unstable ventricular tachycardia
- Implantable cardioverter-defibrillator in selected pts with LVEF < 30-35%, NYHA II or III symptoms on optimal therapy, and life expectancy >1 year
- Biventricular pacemaker in selected pts with EF <35%, NYHA III or IV symptoms on optimal therapy (ACE or ARB + beta blocker + diuretic) with QRS duration >120 ms.
- Nitrates and beta-blockers for treatment of angina
- Anticoagulants for paroxysmal or chronic atrial fibrillation or a previous thromboembolic event
- Control of ventricular response in atrial fibrillation with a beta-blocker; amiodarone if beta-blocker not tolerated
- Anti-platelet agents in pts with coronary artery disease

Suggestions for Titrating Medications

1. Start diuretics along with ACE inhibitor if there is fluid retention. Use lowest dose diuretic necessary to achieve dry weight.
2. Begin beta blocker after patient is on diuretic, with no evidence of fluid retention. It is reasonable to add beta blocker before full target dose of ACE inhibitor is achieved.
3. If patient develops fluid retention, increase the diuretic dose and continue beta blocker unless severe symptoms of hypoperfusion.
4. Titrate ACE inhibitor and beta blocker upward to maximum tolerated doses. Titration is generally achieved by doubling doses at least every two weeks.

Diastolic Heart Failure

(20-60% of HF patients have diastolic heart failure, in which a patient has typical signs and symptoms of HF with normal LVEF and no valvular abnormalities on echocardiogram. Few conclusive clinical trials are available to guide the management of these patients.)

Strongly recommended:

- Control systolic and diastolic hypertension
- Control ventricular rate in patients with atrial fibrillation
- Diuretics to control pulmonary congestion and peripheral edema

Also consider:

- Coronary revascularization when symptomatic or demonstrable myocardial ischemia is judged to be adversely affecting diastolic function
- Restoration of sinus rhythm in patients with a fib
- Beta-blockers, ACE inhibitors, angiotensin-receptor blockers, or calcium antagonists in patients with controlled hypertension to minimize symptoms of HF