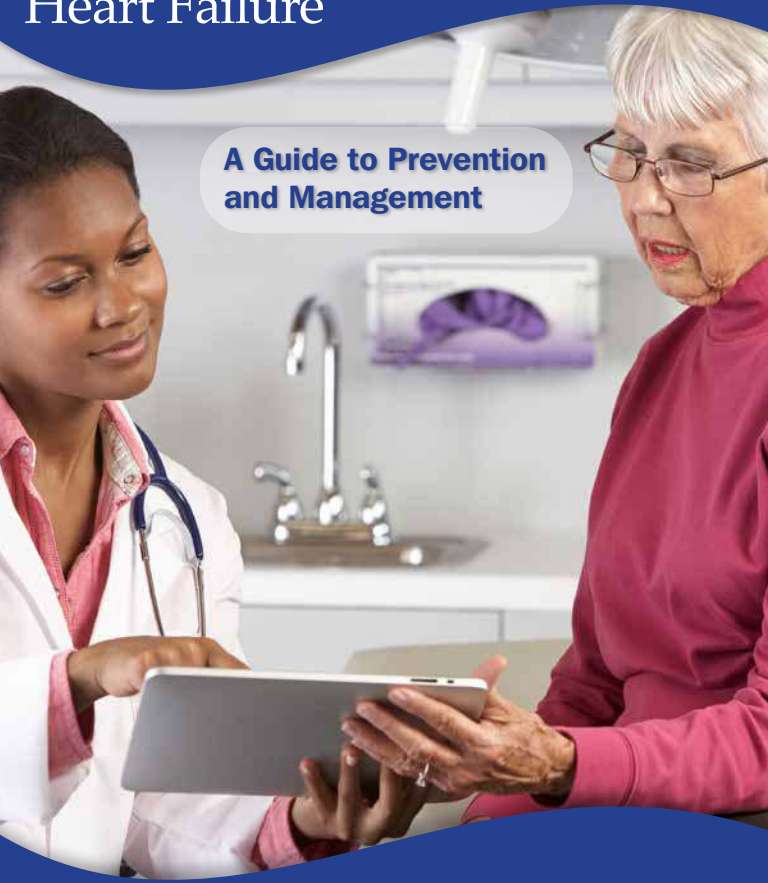
Heart Failure

A Guide to Prevention and Management



PCNA
PREVENTIVE CARDIOVASCULAR NURSES ASSOCIATION

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Introduction

The Preventive Cardiovascular Nurses Association (PCNA) recognizes that implementing guidelines-based treatment for patients with, or at risk for, Heart Failure (HF) can slow the progression of HF, lead to improved patient outcomes, and quality of life.

Heart Failure (HF) by the Numbers

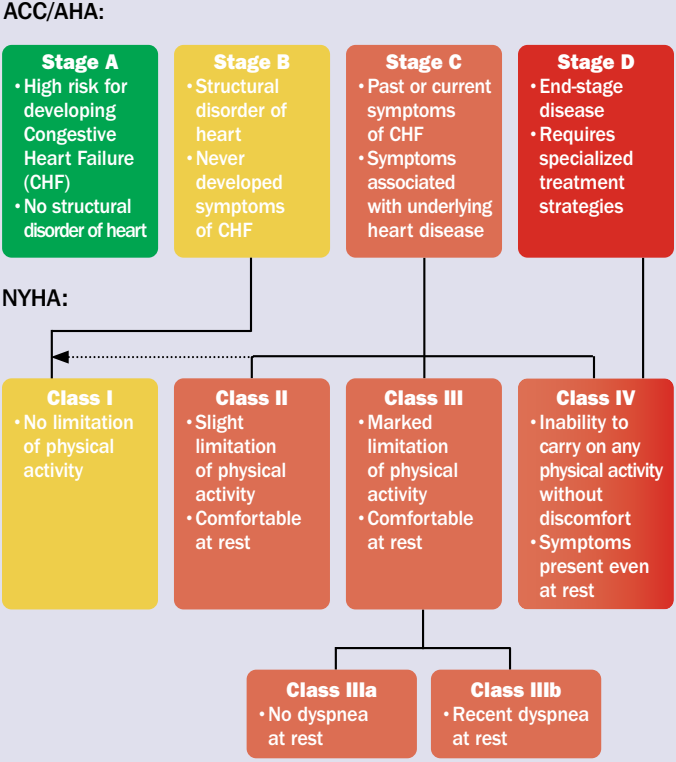
Of all American adults 40 and older, one in five will develop HF in their lifetime. Today, more than 6 million Americans live with HF; the number is predicted to continue to rise to an estimated 8 million Americans by 2030.

HF Risk Factors & Common Co-Morbid Conditions

- **Coronary artery disease:** When cholesterol and fatty deposits build up in the heart's arteries, less blood reaches the heart muscle. This buildup is known as atherosclerosis. The result may be chest pain (angina) or, if blood flow becomes obstructed, a myocardial infarction (MI). Coronary artery disease can also contribute to having high blood pressure which, over time, may lead to HF.
- **MI:** An MI occurs when an artery that supplies blood to the heart muscle gets blocked. The denial of oxygen and nutrients damages the heart muscle. The damaged heart muscle does not contract as well, which weakens the heart's ability to pump blood.
- **Hypertension (HTN):** Uncontrolled HTN is a major risk factor for developing HF. When pressure in the blood vessels is too high, the heart must pump harder than normal to keep the blood circulating. This takes a toll on the heart, and over time the chambers may enlarge, and become weak and stiff.
- **Abnormal heart valves:** Heart valve problems can result from disease, infection (endocarditis), or a defect present at birth. When the valves don't open or close completely during each heartbeat, the heart muscle has to pump harder to keep the blood moving. If the workload becomes too great, HF results.
- **Heart muscle disease (dilated cardiomyopathy, hypertrophic cardiomyopathy) or inflammation (myocarditis):** Any damage to the heart muscle – whether because of drug or alcohol use, viral infections or unknown reasons – increases the risk of HF.
- **Heart defects present at birth (congenital heart disease):** If the heart and its chambers don't form correctly, the healthy parts have to work harder to compensate.

- **Severe lung disease:** When the lungs don't work properly, the heart has to work harder to get available oxygen to the rest of the body.
- **Diabetes:** Diabetes increases the risk for developing HF. People with diabetes tend to develop HTN and atherosclerosis from elevated lipid levels in the blood. Both HTN and atherosclerosis have been linked to HF.
- **Obesity:** Obesity can cause the heart to work much harder than for a non-obese person. Being obese is also a cause of sleep apnea and can cause cardiomyopathy.
- **Sleep Apnea:** Sleep apnea is a potentially life-threatening sleep disorder. Pauses in breathing can contribute to severe fatigue during the day, increase safety risks, and make it difficult to perform tasks that require alertness. Sleep apnea is also a risk factor for medical problems like high blood pressure, HF, diabetes, and stroke. In some cases, people with HF may need to use a CPAP machine.
- **Low red blood cell count (severe anemia):** When there aren't enough red blood cells to carry oxygen, the heart tries to move the small number of cells at a faster heart rate. It can become overtaxed from the effort.
- **An overactive thyroid gland (hyperthyroidism):** This condition causes the body to work at a faster pace, and the heart can be overworked trying to keep up.
- **Abnormal heart rhythm (arrhythmia or dysrhythmia):** When the heart beats too fast, too slow or irregularly, it may not be able to pump enough blood to meet all the body's needs.

HF Classifications: Stages and Classes

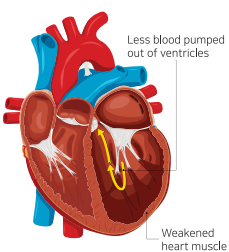


Ejection Fraction and Types of Heart Failure

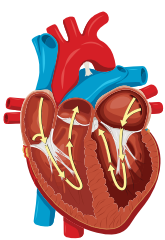
- **Ejection fraction** compares the amount of blood in the heart to the amount of blood pumped out with each heartbeat. It is expressed in a percentage and describes how well the heart's pumping function is working.

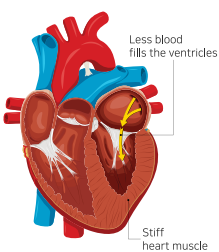
Normal ejection fraction: 50-70%
Borderline ejection fraction: 41-49%
Reduced ejection fraction: < 40%

- **Heart failure with reduced ejection fraction (HFrEF), also called systolic failure:** The left ventricle loses its ability to contract normally. The heart can't pump with enough force to push enough blood into circulation.
- **Heart failure with preserved ejection fraction (HFpEF), also called diastolic failure (or diastolic dysfunction):** The left ventricle loses its ability to relax normally, because the muscle has become stiff. The heart can't properly fill with blood during the resting period between each beat.



Systolic Dysfunction


Normal



Diastolic Dysfunction

Evaluation of the Patient for Diagnosis of HF

Medical history	• Evaluate risk factors such as age, family history, coronary artery disease (CAD), valvular heart disease, hyperlipidemia, diabetes, HTN, smoking, and lifestyle.
Symptom evaluation	• Ask about common HF symptoms: o Dyspnea, resting or w/exertion o Orthopnea o Paroxysmal nocturnal dyspnea o Angina o Cough o Edema o Weight gain o Nausea, poor appetite o Excessive fatigue or weakness

Physical examination	• Vital signs: height, weight, body mass index (BMI), heart rate (HR), blood pressure (BP) • Jugular venous distention (JVD) is assessed while the patient is supine with the upper body at a 45-degree angle from the horizontal plane. The top of the waveform of the internal jugular venous pulsation determines the height of the venous distention. • In HF, a 3rd heart sound (S_3), also known as a ventricular gallop, and a 4th heart sound (S_4), also known as an atrial gallop, may be present. An S_3 can be a normal finding; however, in the presence of an S_4 it is almost always pathologic. • Auscultation of the lungs may reveal rales and/or diminished breath sounds. • The hepatojugular reflux can be a useful test in patients with right-sided HF. This test should be performed while the patient is lying down with the upper body at a 45-degree angle from the horizontal plane. The patient keeps the mouth open and breathes normally to prevent Valsalva's maneuver, which can give a false-positive test. Moderate pressure is then applied over the middle of the abdomen for 30 to 60 seconds. Hepatojugular reflux occurs if the height of the neck veins increases by at least 3 cm and the increase is maintained throughout the compression period.

Physical examination (continued)	• Lower extremity edema, a common sign of HF, is usually detected when the extracellular volume exceeds 5 L. The edema may be accompanied by stasis dermatitis, an often chronic, usually eczematous condition characterized by edema, hyperpigmentation and, commonly, ulceration. • Diagnosing HF in elderly patients may be particularly challenging because of the atypical presentations in this age group. Anorexia, generalized weakness, and fatigue are often the predominant symptoms of HF in geriatric patients. Mental disturbances and anxiety are also common.
Blood tests	• B-type natriuretic peptide (BNP), or N-terminal pro-BNP: measures the concentration of a hormone produced by the left ventricle (LV—the main pumping chamber of the heart) to help diagnose and grade the severity of HF. • Metabolic panel: to check for electrolyte imbalance, kidney failure (since symptoms of kidney disease are similar to those of HF), and liver disease. • Complete blood count (CBC): to check for anemia, which can cause similar symptoms to HF as well as contribute to HF. • Thyroid stimulating hormone (TSH): to assess level of thyroid hormone in the blood; both hyperthyroidism (too much thyroid hormone) and hypothyroidism (too little thyroid hormone) can cause HF.
CXR (chest x-ray)	• Evaluate for enlargement of the heart and congestion in the lungs.
EKG (electrocardiogram)	• Assess for prior myocardial infarction (MI), LV thickening, and arrhythmias such as atrial fibrillation (AFib).

Echocardiography	• Evaluate LV wall size and function, valve function, and estimate LV ejection fraction (LVEF).
Exercise Stress Test	• Assess functional capacity and hemodynamic response to exercise. Useful for exercise counseling and prescription.
MUGA (multigated acquisition scan)	• Radionuclides are injected into the bloodstream to evaluate myocardial perfusion and function.
Cardiac Catheterization and Coronary Angiography	• A catheter is inserted into an artery to evaluate the heart's structure (muscle, valves, and chambers) as well as CAD and myocardial perfusion.
MRI (magnetic resonance imaging)	• A non-invasive test to evaluate the heart's structure (muscle, valves, and chambers) as well as CAD and myocardial perfusion.

Lifestyle Management and Self Care

Sodium restriction:

- Commonly recommended, although there is limited or inconsistent evidence
- AHA recommendation for restriction of sodium to 1500 mg/d appears to be appropriate for most patients with stage A and B HF
- For stage C and D HF, currently there are insufficient data to endorse any specific level of sodium intake; however, some degree of sodium restriction for management of symptom improvement is reasonable
- Assess patient's ability to adhere to a low-sodium diet:
  - Understanding of sodium and edema
  - Knowledge that sodium is salt
  - Ability to read a nutritional label
  - Ability to calculate sum total daily sodium
  - Recognition of sources of dietary sodium (i.e., not just table salt)

Fluid restriction:

- Fluid restriction (1.5 to 2 L/d) is reasonable in stage D to reduce congestive symptoms
- Fluid restriction, especially in combination w/sodium restriction, may enhance volume management w/diuretics
- May be best used in those who are either refractory to diuretics and/or have hyponatremia

Smoking and alcohol use:

- Current smoking is an indicator of predicted mortality in HF
- Smoking cessation should be strongly encouraged
- Counsel patients to limit alcohol use
  - ≤2 drinks per day for men and ≤1 drink per day for women

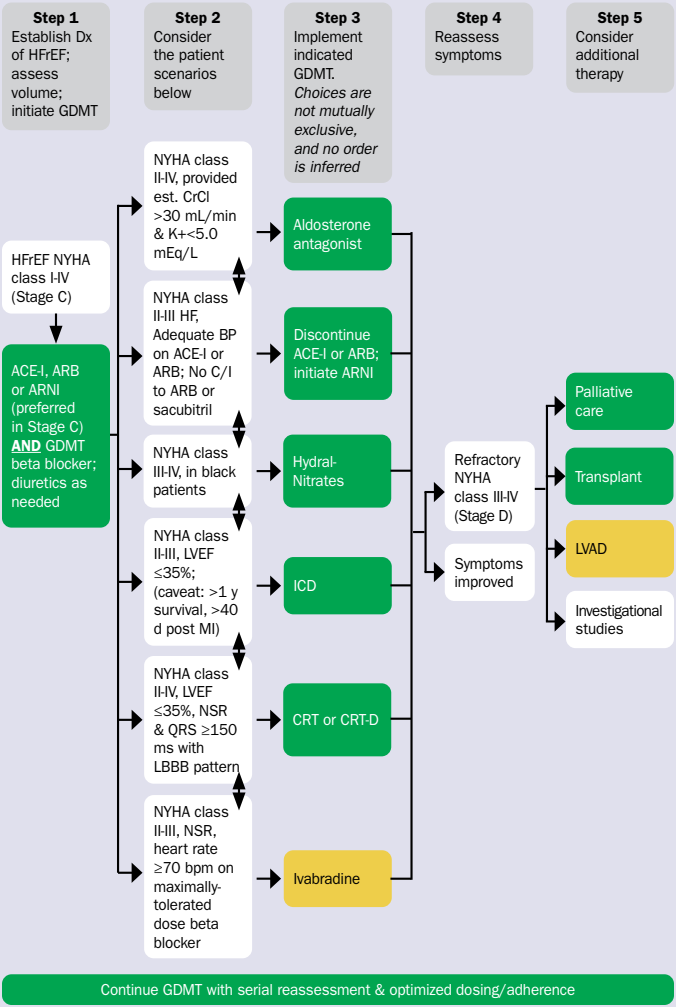
Exercise and Cardiac Rehabilitation

- Individuals with HF often have limited exercise capacity due to dyspnea and fatigue
- Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate, to improve functional status
- Cardiac rehabilitation can be useful in clinically stable patients with HF to improve functional capacity, exercise duration, health-related quality of life, and mortality
  - Reduces mortality, improves functional capacity, and reduces hospitalizations
  - Indications: HFrEF or HFpEF with NYHA class II to III
  - Insurance coverage may be limited/unavailable for HFpEF
  - Comprehensive program includes:
    - Patient evaluation
    - Exercise training
    - Physical activity counseling
    - Cardiovascular (CV) risk management
    - Psychosocial support
    - HF education
    - Types of exercise training:
      - Aerobic: movement through space; includes treadmill walking and stationary cycling; is dominant type
      - Resistance
      - Respiratory muscle training
      - Combination of any of these types

Self-monitoring

- **Daily weights**
  - Weigh at same time in AM, after urinating, before drinking/eating, in similar clothing
  - Zero scale and record weight
  - Patient should know target weight
  - 2-5 lb weight gain in 1 week may constitute dietary or medication alterations
  - >5 lbs in 1 week should be reported to health care team
- **Edema**
  - Check legs daily for edema
  - Note if any swelling and "how far up" leg(s)
  - Notify health care team of abdominal distension and severe swelling
- **Symptom check**
  - Monitor exercise tolerance, nighttime breathing, dizziness/lightheadedness
- **Home monitoring devices**
  - This may include:
    - Scales, watches, smart phones, blood pressure monitors, pulse oximetry
    - Data gathered from non-invasive monitoring:
      - Weight, BP, HR, oxygen saturation, respiratory rate, activity

Guideline-Directed Medical Therapy (GDMT)
proven to improve morbidity and mortality for HFrEF



Medication adherence should be assessed regularly

Interventions helping with adherence include:

- Patient education
- Medication management
- Pharmacist co-management
- Cognitive behavioral therapies
- Medication-taking reminders

Heart Failure Pharmacotherapies

Drug classes commonly used for HFrEF:

- Renin-Angiotensin System Inhibition
  - ACE-I
  - ARB
  - ARNI
- Beta Blockade
- Aldosterone Receptor Antagonist
- SGLT-2 Inhibition
- I_f channel inhibitor
- Isosorbide dinitrate and hydralazine
- Diuretics
- Digoxin

Heart Failure Pharmacotherapies

Key Points:

- For patients with newly-diagnosed Stage C HF with reduced ejection fraction (HFrEF), a beta-blocker and an angiotensin-converting enzyme inhibitor (ACE-I), or angiotensin receptor blocker (ARB), or angiotensin receptor-neprilysin inhibitor (ARNI) should be started in any order. Each agent should be up-titrated to maximally-tolerated or target dose.
- Only guideline-recommended beta-blockers (i.e., carvedilol, metoprolol succinate, or bisoprolol) should be used in patients with HFrEF
- After initiation of beta-blocker and angiotensin antagonist, addition of an aldosterone antagonist should be considered with close monitoring of electrolytes
- Sodium-glucose cotransporter-2 (SGLT-2) inhibitors should also be considered for HFrEF with NYHA class II-IV patients
- For persistently symptomatic Black patients, in addition to above therapies, consider hydralazine and isosorbide dinitrate
- Despite maximally-tolerated beta-blocker, if resting HR is ≥70 bpm in sinus rhythm, ivabradine may be considered
- As an outpatient, adjustment of therapies should be considered every 2 weeks to achieve GDMT within 3-6 months of initial diagnosis

Drug Class: ACE-I, or ARB, or ARNI

Reduce morbidity and mortality in HF. Choose one from this class, unless contraindicated. Renal function and potassium should be checked within 1-2 weeks of initiation or dose up-titration of ACE-I/ARB/ARNI.

Name (ACE-I)	Initial Dose	Maximum Dose
Captopril	6.25mg TID	50mg TID
Enalapril	25mg BID	10-20mg BID
Fosinopril	5-10mg QD	40mg QD
Lisinopril	2.5-5mg QD	20-40mg QD
Perindopril	2mg QD	8-16mg QD
Quinapril	5mg BID	20mg BID
Ramipril	1.25-2.5mg QD	10mg QD

Name (ARB)	Initial Dose	Maximum Dose
Candasartan	4-8mg QD	32mg QD
Losartan	25-50mg QD	50-150mg QD
Valsartan	20-40mg BID	160mg BID

Name (ARNI)	Initial Dose	Maximum Dose
Sacubitril/Valsartan	24/26mg BID	97/103mg BID

Caution using ACE-I, ARB or ARNI in patients:

- Who have experienced life-threatening adverse reactions (angioedema or anuric renal failure) during previous exposure to the drug
- Are pregnant or plan to become pregnant in the near future. ACE-I, ARB or ARNI treatment should be discontinued immediately when pregnancy is known
- Are at immediate risk of cardiogenic shock
- **Do not use ARNI** in patients with a history of angioedema
- **Do not use ARNI** within 36 hours of the last dose of an ACE-I

Drug Class: Beta Blockers

Recommended to treat patients with current, or prior, symptoms of HFrEF to reduce morbidity and mortality. Choose one of the four, approved for HF, unless contraindicated.

Name	Initial Dose	Maximum Dose
Bisoprolol	1.25mg QD	10mg QD
Carvedilol	3.125mg BID	50mg BID
Carvedilol CR	10mg QD	80mg QD
Metoprolol Succinate	12.5-25mg QD	200mg QD

Beta blockers should be started as soon as LV dysfunction is diagnosed, and at low doses that are gradually increased if lower doses are well tolerated.

Beta blocker treatment should not be:

- Prescribed without diuretics in patients with current or recent history of fluid retention
- Prescribed to patients with higher degree AV heart block, and should be used with caution in those with second degree AV block
- Prescribed for initiation in patients with acute HF symptoms or decompensated HF
- (If a non-cardioselective beta blocker (e.g., carvedilol)), prescribed to patients with significant asthma or bronchoconstriction, especially if with a positive methacholine challenge

Drug Class: Aldosterone Receptor Antagonist

Recommended to reduce morbidity and mortality following an acute MI in patients who have LVEF of 40% or less who develop symptoms of HF, or who have a history of diabetes mellitus, unless contraindicated.

Name	Initial Dose	Maximum Dose
Spironolactone	12.5-25mg QD	25mg QD or BID
Eplerenone	25mg QD	50mg QD

- Inappropriate use of aldosterone receptor antagonists is potentially harmful because of life-threatening hyperkalemia or renal insufficiency when serum creatinine is greater than 2.5 mg/dL in men or greater than 2.0 mg/dL in women (or estimated glomerular filtration rate <30 mL/min/1.73 m^2), and/or potassium greater than 5.0 mEq/L
- A basic metabolic panel (BMP) is recommended within one week of initiating or titrating aldosterone antagonist to monitor for the presence of hyperkalemia
- The incidence of gynecomastia is higher with spironolactone than eplerenone. If a patient experiences gynecomastia on spironolactone, eplerenone should be considered as an alternative.

Drug Class: SGLT2-Inhibitor

Reduces the risk of cardiovascular (CV) death and hospitalization for HF.

Name	Initial Dose	Target Dose
Dapagliflozin	10mg QD	10mg QD
Empagliflozin	10mg QD	10mg QD

- Not approved for use in patients with type 1 diabetes due to increased risk of diabetic ketoacidosis
- Temporary discontinuation 3 days before scheduled surgery is recommended to avoid potential risk for ketoacidosis
- Assess patients who present with signs and symptoms of metabolic acidosis for ketoacidosis, regardless of blood glucose level
- May contribute to volume depletion. Consider altering diuretic dose, if applicable.
- Caution: increased risk of mycotic genital infections

Drug Class: I_f Channel Inhibitor

Reduces the risk of hospitalization for worsening HF in adult patients with stable, symptomatic chronic HF with left ventricular ejection fraction ≤35%, who are in sinus rhythm with resting HR ≥70 beats-per-minute, and either are on maximally-tolerated beta blockers or a contraindication to beta blocker use.

Name	Initial Dose	Maximum Dose
Ivabradine	5mg BID	7.5mg BID

- In those who have a history of conduction defects or adults in whom bradycardia could lead to hemodynamic compromise, decrease initial dose to 2.5 mg PO BID; may increase dose based on heart rate
- Contraindicated in acute decompensated HF, BP < 90/50 mmHg, pretreatment HR < 60 bpm, severe hepatic impairment, pacemaker dependence, sick sinus syndrome, SA block, or 3rd degree heart block, unless a functioning demand pacemaker is in use

Drug Class: Hydralazine/Isosorbide

Reduces morbidity or mortality in patients with current or prior symptomatic HFrEF who cannot be given an ACE inhibitor or ARB because of drug intolerance, hypotension, or renal insufficiency, unless contraindicated.

Name	Initial Dose	Maximum Dose
Hydralazine	25-50mg TID	100mg TID
Isosorbide Dinitrate	20-30mg TID	40mg TID

- In African American patients, the addition of hydralazine and isosorbide dinitrate to standard therapy improves survival and decreases hospitalization
- Hydralazine and isosorbide dinitrate may play a role in patients who do not tolerate either an ACE-I or an ARB due to renal dysfunction, hyperkalemia or angioedema

Drug Class: Digoxin

Can be beneficial in patients with HFrEF, unless contraindicated, to decrease hospitalizations for HF.

Name	Initial Dose	Maximum Dose
Digoxin	0.125mg QD	0.125-0.25mg QD

- Clinicians may consider adding digoxin in patients with persistent symptoms of HFrEF during GDMT
- Digoxin may also be added to the initial regimen in patients with severe symptoms who have not yet responded symptomatically during GDMT
- Patients should not be given digoxin if they have significant sinus or atrioventricular block, unless the block has been addressed with a permanent pacemaker
- Use cautiously in patients taking other drugs that can depress sinus or atrioventricular nodal function or affect digoxin levels (e.g., amiodarone or a beta blocker), even though such patients usually tolerate digoxin without difficulty
- Low doses (0.125 mg daily or every other day) should be used initially if the patient is >70 years of age, has impaired renal function, or has a low lean body mass

Drug Class: Diuretics

Recommended for all patients who have evidence of, and to most patients with a prior history of, fluid retention. Diuretics should generally be combined with an ACE-I, beta blocker, and aldosterone antagonist.

Name (ACE-I)	Initial Dose	Maximum Dose
Loop Diuretics		
Bumetanide	0.5-1.0mg once or twice	10mg
Furosemide	20-40mg once or twice	600mg
Torsemide	10-20mg once	200mg
Sequential nephron blockade		
Metolazone	2.5-10.0mg once as needed with loop diuretic	n/a

- The principal adverse effects of diuretics include electrolyte and fluid depletion, as well as hypotension and azotemia (elevated blood nitrogen)
- Diuretics can cause the depletion of potassium and magnesium, which can predispose patients to serious cardiac arrhythmias
- The risk of electrolyte depletion is markedly enhanced when two diuretics are used in combination
- Check BUN/Cr, serum CO_2, and electrolytes frequently early in treatment, then periodically

Therapeutic management beyond pharmacotherapies

Implanted remote pulmonary artery (PA) pressure monitoring system:

- Implantable miniature sensor system which monitors PA systolic pressure, PA diastolic pressure, mean PA pressure, and HR
- Located in the PA
- Values are monitored remotely and can aid in early detection of worsening HF and treatment decision-making

Implanted left atrial (LA) pressure monitoring system:

- Implantable miniature sensor system which monitors LA pressures
- Located in LA
- Values are monitored remotely and can aid in early detection of worsening HF and treatment decision-making

Implantable Cardio-Defibrillator (ICD):

Indications:

- Secondary prevention sudden cardiac death (SCD) with prior sustained ventricular arrhythmia
  - Including valvular, ischemic, hypertrophic, dilated or infiltrative cardiomyopathy (CM)
- Primary prevention of SCD in patients who are at risk of life-threatening ventricular arrhythmia
  - Prior MI at least 40 days ago and LVEF <30%
  - CM, NYHA III or IV, and LVEF <35%
  - CM and intraventricular conduction delay (≥120 milliseconds), may be candidates for dual ICD and cardiac resynchronization therapy (CRT-D)

CRT: CRT is a modality of cardiac pacing.

Indications:

- LV systolic dysfunction and dyssynchronous ventricular activation provides simultaneous electrical activation of the LV and right ventricle (RV) via stimulation of the LV and RV (biventricular pacing), or LV alone

ICD/CRT for volume management

- Indirect measures of volume accumulation/increased filling pressures measurement of intrathoracic impedance or by multisensory algorithm. Examples: OptiVol system, MultiSENSE system

Coronary Revascularization

Percutaneous coronary intervention (PCI) or coronary artery bypass graft surgery (CABG)

Indications specific to HF:

- PCI or CABG in HFpEF and HFrEF on GDMT with angina and suitable coronary anatomy, especially for a left main stenosis (>50%) or left main equivalent disease
- CABG in mild to moderate LV systolic dysfunction (EF 35% to 50%) and significant (≥70% diameter stenosis) multivessel CAD or proximal left anterior descending coronary artery stenosis when viable myocardium is present in the region of intended revascularization
- CABG or medical therapy is reasonable to improve morbidity and cardiovascular mortality for patients with severe LV dysfunction (EF <35%), HF, and significant CAD
- CABG may be considered with the intent of improving survival in patients with ischemic heart disease with severe LV systolic dysfunction (EF <35%) and operable coronary anatomy, whether or not viable myocardium is present

When to refer to a HF Specialist

Referral to a HF specialist should be considered in patients needing inotropes (medications that change the force of contractions), NYHA class IIIB/IV symptoms or persistently elevated natriuretic peptides, end-organ dysfunction, EF ≤35%, ICD shocks, recurrent hospitalizations, congestion despite escalating diuretics, low blood pressure and/or high heart rate, and progressive intolerance to GDMT needing down-titration.

Use the Acronym I NEED HELP to determine if a referral is warranted

I	**Intravenous inotropes:** Previous or ongoing requirement for dobutamine, milrinone, dopamine or levosimendan
N	**New York Heart Association (NYHA) class IIIB/IV or persistently elevated natriuretic peptides:** Persisting NYHA Class III or IV and/or persistently high BNP or NT-pro-BNP
E	**End-organ dysfunction:** Worsening renal or liver dysfunction in the setting of heart failure
E	**EF ≤35%**
D	**Defibrillator shocks:** Recurrent appropriate defibrillator shocks
H	**Hospitalizations >1:** More than 1 hospitalization with heart failure in the last 12 months
E	**Edema despite escalating diuretics:** Persisting fluid overload and/or increasing diuretic requirement
L	**Low systolic BP ≤90, high heart rate:** Consistently low BP with systolic <90 to 100 mm Hg
P	**Prognostic** medication; **progressive** intolerance or down-titration of GDMT

Source: "I Need Help"—A mnemonic to aid timely referral in advanced heart failure *The Journal of Heart and Lung Transplantation*, Volume 36, Issue 5, May 2017, Pages 593-594.

Palliative and End-of-Life Care

Advances in HF care delay the progression of disease but rarely lead to a cure, such that palliative care needs of the patient must be considered. The principles below may guide clinicians in developing an end-of-life plan consistent with values and goals expressed by patient and family.

Principle	Action
Reduce pain and manage symptoms while integrating psychological and spiritual care	Solicit goals of care and focus on quality of life throughout the clinical course of HF
Good HF management is cornerstone of symptom palliation	Meticulous management of HF therapies – particularly diuretic agents – is a critical component of symptom management and should continue through end of life
Palliative care consultation and complementary approaches to care may further ameliorate refractory HF symptoms and improve patient satisfaction and quality of life	Targeted specialty palliative care consultation can be helpful for complex decisions, refractory symptoms and end of life; palliative care teams should have expertise in management of both HF and non-HF related symptoms
Patients with HF often face major treatment decisions over time and should be provided with support when thinking through the benefits and burdens of each treatment option	Decision support tools help frame options, which should be followed by dynamic and personalized conversations

Proactive shared decision-making discussions simplify difficult decisions in the future	Preparedness planning discussions should occur at least annually, and at the time of major procedural interventions, between patients and clinicians, leading to review of clinical status and current therapies, estimates of prognosis, clarification of patient values and beliefs, anticipation of treatment decisions, and advanced care directives that identify surrogate decision-makers and health care proxies
Attention to the clinical trajectory is required to calibrate expectations and guide timely decisions, but prognostic uncertainty is inevitable and should be included in discussions with patients and caregivers	Worsening disease and "milestone events" (recurrent hospitalization or progressive intolerance of medications due to hypotension and kidney dysfunction) should trigger heightened preparation with patients and families, but without specific estimates of how much time remains due to high levels of unpredictability in the clinical course of HF
The transition from "do everything" to "comfort only/ hospice" is often bridged through a phase of "quality survival," during which time patients increasingly weigh the benefits, risks and burdens of initiating or continuing life-sustaining treatments	Revising the medical regimen for symptom relief and quality of life may involve discontinuation of some recommended therapies (e.g., reducing neurohormonal antagonists in the setting of symptomatic hypotension, deactivation of defibrillator therapy) and the addition of therapies not usually recommended (e.g., opioids for refractory dyspnea); the decisions should be individualized and made in partnership with the patient, their caregivers, and the care team