

HEART FAILURE

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Overview

A clinical syndrome defined by symptoms suggestive of impaired cardiac output and/or volume overload with concurrent cardiac dysfunction

Normal LVEF	>60%
HF with Preserved Systolic Function	>40%
Systolic HF	<40%

Prevention

- Assess for and treat RFs: HTN, ischemic heart disease, arrhythmia, DM, dyslipidemia, smoking, obesity, increased alcohol intake, illicit drug use, HIV, amyloidosis, SLE, chemotherapy hx
- Periodic evaluation for signs and symptoms of HF (see below)
- Routine screening for asymptomatic LV dysfunction is not recommended
 - May screen selected patients at high risk for HF due to multiple risk factors
- ACE-I and BB at target doses in patients with asymptomatic LV dysfunction (LVEF <40%)
 - Avoid digoxin and non-DHP CCBs in this subset of patients as there is no benefit

Diagnosis

History: (I, C)

- Current and past symptoms of HF: dyspnea, orthopnea, PND, fatigue, weakness, presyncope, orthostatic complaints, exercise intolerance, cough, dependent edema, weight gain, abdo distention, nocturia, cool extremities
- Functional limitation by NYHA Class (I, C) →
- CV RFs, known CV disease, other comorbid conditions
- Assessment of patient's endurance, cognition, and ability to perform ADLs

Class I	Asymptomatic
Class II	Symptoms with ordinary activity
Class III	Symptoms with less than ordinary activity
Class IV	Symptoms at rest

Physical: (I, C)

- Assessment of volume status: weight, postural hypotension, JVP, S3, peripheral edema, rales, hepatomegaly, ascites

Investigations: (I, C)

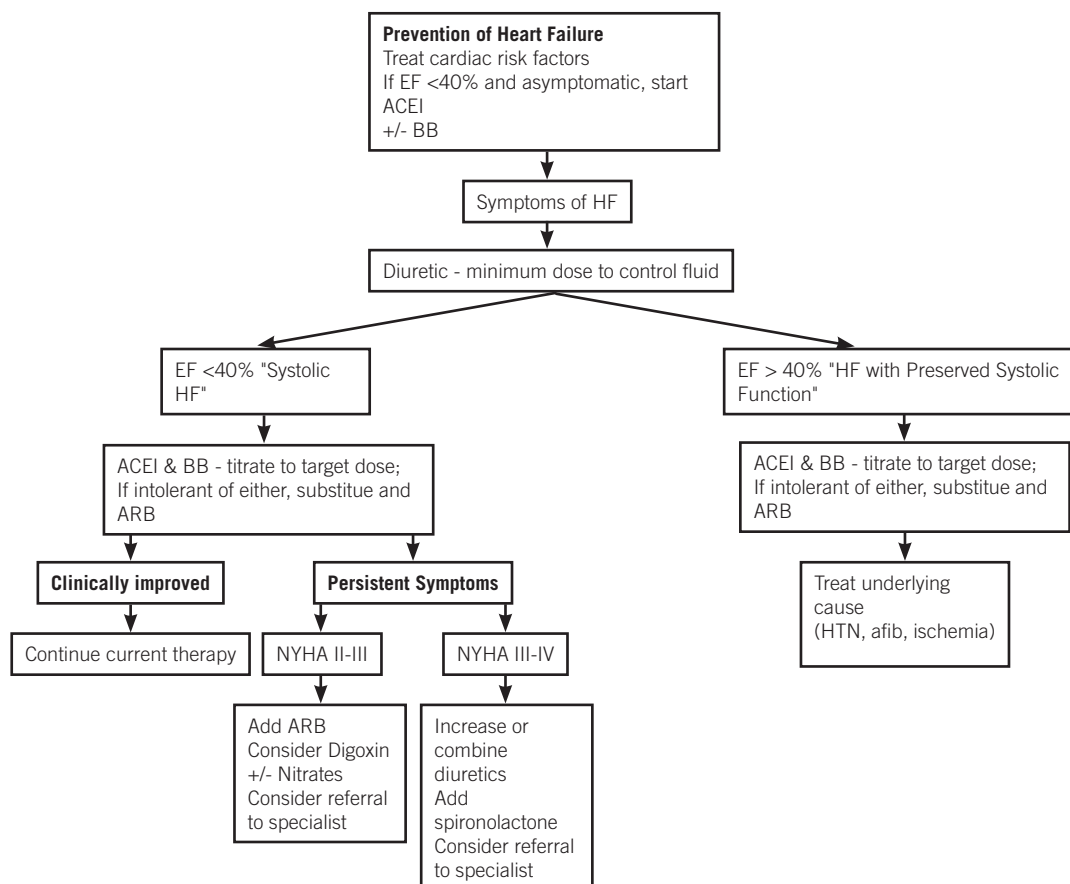
- Labs: CBC, lytes, Cr, eGFR, urinalysis, microalbuminuria, AST, albumin, TSH, FBG, lipid profile
 - BNP to confirm or R/O HF in acute or ambulatory setting if diagnosis is unclear (IIa, A)
- ECG
- CXR
- Echo (or radionucleotide ventriculography) (I, C)
- +/- more specialized cardiac testing i.e. coronary angiography if etiology of HF is unclear (I, C)

Management

Non-Pharmacologic:

- Determine goals of care, identify a substitute decision maker, address advance directives
- Discuss the importance of self-management
- Monitor daily weights (I, C)
 - Goal of self-assessment and adjustment of fluid/sodium restriction and/or diuretic dosing
- Restrict sodium intake to 2-3g/day (1-2g/day in NYHA III-IV) – 1tsp salt = 2.3g sodium (I, C)
- Limit fluid intake to 6-8 cups liquid/day in all HF patients with hyponatremia or severe fluid retention/congestion that is not easily controlled with diuretics (I, C)
- Restrict alcohol to less than one drink per day
 - In alcohol-related HF, alcohol must be totally avoided
- Moderate intensity aerobic and resistance exercise 3-5 times per week for 30-45 minutes for all patients with stable symptoms and volume status (IIa, B)
 - 60-80% of peak HR, 10-15 repetitions at 50-60% of max effort
- Immunize: pneumococcal and annual influenza vaccine (I, C)
- Collaborate with complementary health care providers with expertise in HF management (I, A)

Pharmacologic:



Adapted from BC Guidelines. HF Flow Sheet and Patient Reminders available from BC Guidelines

Diuretics

	Usual Starting Dose	Maximum Total Daily Dose	Duration	Additional Info
K⁺-depleting diuretics Furosemide Bumetanide Metolazone Hydrochlorthiazide K⁺-sparing diuretics Triamterene Amiloride	20-40mg daily or bid 0.5-1mg daily or bid 2.5mg daily 25mg daily or bid 50-75mg bid 5mg daily	600mg 10mg 20mg 200mg 200mg 5mg	6-8 hours 4-6 hours 12-24 hours 6-12 hours 7-9 hours 24 hours	Used to control symptomatic volume overload Start with furosemide 20 – 160 mg/day depending on fluid status; divide the doses bid if >80mg/day Aim for minimum effective dose to control symptoms Check Cr, Na ⁺ and K ⁺ before initiating therapy and 1-2 weeks after dose adjustments; check at 3-7 days if higher doses, increased age or low eGFR If Cr increases >30% from baseline, reduce/hold diuretic until volume status normalizes If muscle cramping occurs, check Mg and Ca and replace prn Thiazides are not the drug of choice for volume overload & are used only in combination
Aldosterone Antagonists Spironolactone Eplerenone	12.5mg daily 25mg daily	25mg daily 50mg daily		Used in patients in NYHA III-IV systolic HF despite ACEI and BB Titrate at 2-4 week intervals C/I in renal dysfunction Check K ⁺ , Cr, and eGFR at 3-7d and 1-2wk after each dose change S/E: gynecomastia in 5-10% of males

Non-Diuretic Meds

	Starting Dose	Target Dose (Max Dose)	Additional Info
Beta-Blockers Carvedilol (preferred) Bisoprolol Metoprolol Tartrate* *change to sustained release formulation when stable and target reached	3.125mg bid 1.25mg daily 12.5mg bid	25mg bid if <75kg, 50mg bid if >75kg 10mg daily 100 mg bid	Family MD can safely initiate & titrate BB in NYHA Class I-II Titrate at 2 week intervals & monitor clinically C/I in asthma but can be used in COPD, PVD or DM Start when no evidence of fluid retention with HR >60 and SBP >85 Monitor BP, HR and HF symptoms with dose adjustments Pts may deteriorate over the first 6-12 weeks May have to adjust doses of other drugs to increase tolerance of BB If significant bradycardia, obtain ECG to exclude heart block, reduce or eliminate other drugs that slow HR
ACE-Inhibitors Ramipril Enalapril Captopril Lisinopril Trandolapril Perindopril	1.25mg bid 2.5mg bid 6.25mg tid 2.5mg daily 1mg daily 2mg daily	5mg bid (10mg bid) 10mg bid (20mg bid) 25-50mg tid (150mg tid) 20-35mg daily (80mg daily) 4mg daily (4mg daily) 8mg daily (8mg daily)	Check Cr & K+ before initiating therapy and 1-2 weeks after each dose adjustment (sooner for the elderly) If stable dose, check Cr & K+ q3-6months Should be initiated by nephrologist and monitored more closely if baseline eGFR <30mL/min If Cr increases >30% from baseline, first reduce/hold diuretic for 1-2 days; if no response, reduce/stop ACEI and consider hydralazine/nitrate combination; consider referral to nephro
ARBs Candesartan Valsartan Losartan Telmisartan Irbesartan	4mg daily 40mg bid 25mg daily 40mg daily 75 mg daily	32mg daily 160mg bid 100mg daily 80mg daily 300mg daily	Reserved for patients intolerant of ACEI or BB or for patients in NYHA II-IV despite treatment with both ACEI and BB Same C/Is, monitoring and considerations as with ACEI If used in combination with ACEI, K+ monitored 1 week after initiation & any dose changes
Direct-Acting Vasodilators Hydralazine Isosorbide Dinitrate OR Nitropatch	37.5mg tid 20mg tid 0.2-0.4mg/h x 12h/d	75mg tid 40mg tid 0.6-0.8mg/h x 12h/d	Hydralazine and nitrates should be used concurrently Use in ACEI-intolerant patients or can be added to ACEI in black patients Nitrates can also be useful to relieve orthopnea, PND, exercise-induced dyspnea or angina
Digoxin	0.125-0.25mg qhs	Dose to level 0.65-1 nmol/L 8-12 hours post-dose	Used in patients in NYHA II-III systolic HF despite ACEI and BB Has no survival benefit Caution in patients with renal dysfunction Monitor Cr, lytes and digoxin level 5-7 days after dose changes

When to Refer

- Cause of HF unknown
- Suspicion of ischemia or valvular disease as the primary cause
- Symptomatic arrhythmias
- Severe HF that is refractory or difficult to control
- LVEF \leq 35% (for consideration of cardioverter-defibrillator implantation)
- Consideration for heart transplantation/implantable defibrillator/cardiac resynchronization
- Serum sodium <132mmol/L (persistent after water restriction)
- Renal function impaired or deteriorating for unclear reasons -> refer to nephro
- Elderly patient with significant medical comorbidity, medication management issues and/or significant cognitive, psychological and functional issues -> refer to a geriatric medicine specialist or to long-term care managers
- If available, refer to Heart Function Clinics, Cardiac Rehabilitation or Risk Reduction Centres

Prognosis

- Outcomes are highly variable, predicting time of death is challenging
- Poor prognostic factors include:
 - o Recurrent hospitalization for acute HF
 - o Age >75 years
 - o Female
 - o Ventricular arrhythmias (non-sustained vtach) and afib
 - o NYHA Class III and IV
 - o LVEF <35% or combined systolic and diastolic LV dysfunction
 - o Marked LV dilatation
 - o High BNP levels (*use of BNP for prognostication require further study)
 - o Na <132mmol/L
 - o Hypocholesterolemia

Patient Resources

For a comprehensive guide for patients: Managing Congestive Heart Failure by the Heart & Stroke Foundation. <http://www.heartandstroke.com/atf/cf/%7B99452D8B-E7F1-4BD6-A57D-B136CE6C95BF%7D/manage-heart-failure-en.pdf>

References can be found online at http://www.dfcu.utoronto.ca/programs/postgraduateprograme/One_Pager_Project_References.htm