NYHA CLASSIFICATION OF HF:

Class I	Sx with more than ordinary activity
Class II	Sx with ordinary activity
Class III	Sx with minimal activity • Class IIa: no dyspnea at rest • Class IIb: recent dyspnea at rest
Class IV	Sx at rest

GOALS OF THERAPY:

1. PROLONG SURVIVAL *****
2. Reduce morbidity: exercise tolerance, hospitalization, exacerbations, QOL

HF PRECIPITANTS:

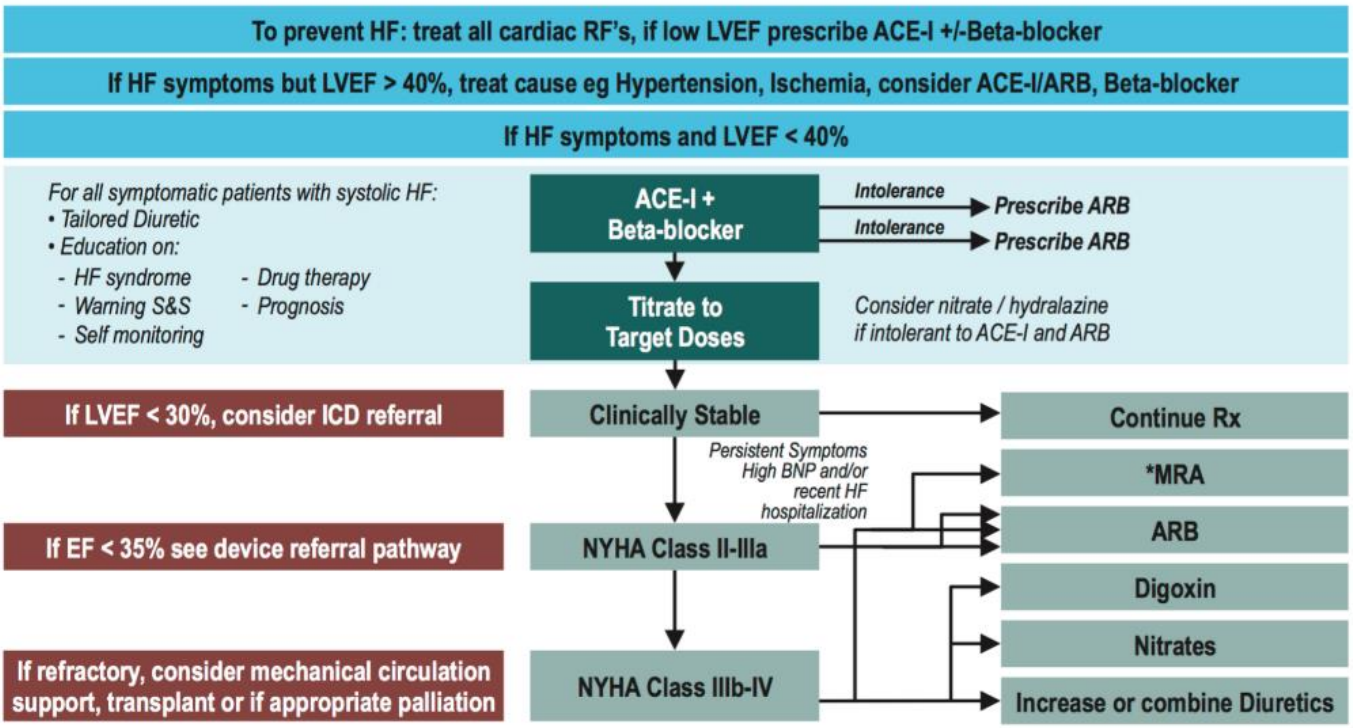
- Anemia
- Ischemia
- Arrhythmia (V or A)
- Infection
- Medication non-adherence

- Drugs
  - NSAIDs
  - Corticosteroids
  - Verapamil/ diltiazem
  - VW class I antiarrythmics
  - B-blockers
  - Glitazones / Gliptins (diabetic drugs)
    - Generally avoid if known LV dysfunction, if not then counsel re: edema
  - Anthracyclines

ECHOCARDIOGRAM;

	Systolic HF HFrEF	Diastolic HFHFpEF	Valve dysfunction
EF	< 35 – 40%	≥ 40%	Sx like HF but is problem with valves • Valves won't open = aortic, mitral or tricuspid stenosis • Valves won't close = prolapse
Pathophys	Inability to eject blood from LV (contraction problem)	Inability to fill LV (relaxation problem)	
CXR	Enlarged heart (cardiothoracic ratio > 0.55) because LV is weak (dilated, thin walls)	LV is stiff (thick, hypertrophied) but normal heart size	
Population	Mostly male, CAD	Mostly female, HTN	
Drug efficacy (mortality)	ACEI, B-blocker, MRA, hydralazine + ISDN, ARB	N/A	
Drug efficacy (mortality)	Digoxin, diuretics, others above	**Digoxin, candesartan, verapamil (?), diltiazem (?), beta blockers (?), diuretics** **NOT ACEI or MRA**	

HF TREATMENT:



ACEI

Drugs	**Drug**	**Start dose**	**Target dose**
	Captopril	6.25 – 12.5 mg tid	25 mg to 50 mg tid
	Enalpril	1.25 – 2.5 mg bid	10 mg bid
	Ramipril (MOST COMMON)	1.25 – 2.5 mg bid	5 mg bid or 10 mg od
	Lisonopril (RCT showed improved exercise tolerance, but not large enough to show mortality benefit)	2.5 mg – 5 mg od	20 mg – 35 mg od
	Trandolapril (preferred in pts with MI)	1 mg od	4 mg od
Benefits	• Mortality, Class I – IV = 20% RRR, NNT 3y = 18 • Morbidity (hospitalization) = 20% RRR, NNT 3y = 42		
Dosing Strategy	Start low, titrate to target doses over several weeks		
Risks/monitoring	Hypotension, hyperkalemia, renal dysfunction, cough, angioedema		

Checklist	• Allergy/intolerance (ACEI – cough?)
	• Hypovolemia = contraindication
	• Hypotension
	• Renal dysfunction
	  ○ Bilateral renal artery stenosis or RAS in pt with solitary kidney = contraindication
	  ○ Unilateral renal artery stenosis is ok (other kidney can compensate)
	• Aortic stenosis (pts very sensitive to vasodilating drug, monitor BP closely)		

ACEI/ARB and renal function	• Generally contraindicated when SCr > 200 mcmol/L		

ACEI/ARB can worsen GFR ….	What to do …
Concurrent NSAID	Remove NSAID
Volume depleted / heavily diuresed	Decrease diuretic dose
Hyponatremia (marker for volume depletion, neurohormonal activation, severe HF)	Increase Na intake slightly
• Low GFR to start with • Renal artery stenosis, especially bilateral	Decrease ACEI dose

• ACEI can improve GFR by reducing SVR
• In 1/3 of people, ACEI intiation doesn't affect GFR at all

B-blockers

Drugs	**Drug**	**Start Dose**	**Target Dose**
	Carvedilol (alpha and beta blocker + antioxidant properties)	3.125 mg bid	25 mg bid
	Bisoprolol	1.25 mg od	10 mg od
	Metoprolol CR/XL	12.5 mg bid (or 12.5 – 25 mg od)	100 mg bid (or 200 mg od)
Benefits	• Mortality, Class I – IV = RRR 30%, NNT 1 y = 26 • Morbidity (hospitalization) = 30% RRR, NNT 1 y = 25		
Dosing strategy	Start low, work toward target doses from trials over several weeks (q 1-2 weekly increase)		
Risks/monitoring	Abrupt withdrawal, worsening HF symptoms during first 1-12 weeks (also see checklist)		
Checklist	• Allergy/ intolerance • Bradycardia • Hypotension (NORMOTENSIVE IS FINE, even mild hypotensive is okay) • Heart block > 1^{o} (i.e. 2nd or 3rd degree heart block) = contraindication • Asthma/severe COPD • Severe PVD • Hypoglycemic risk (be cautious, counsel)		

Diuretics	
Benefits	• Morbidity, if fluid overloaded – Class II – IV

Dosing strategy	• Furosemide 10 – 160 mg daily
	  ○ Self-management strategy
	  ▪ If weight gain x lbs over x days, then take furosemide for a few days until weight is normal again
	  ▪ If weight loss x lbs over x days, hold furosemide
	• HCTZ may be added for surgery
	• Add metolazone if really resistant to furosemide (better at diuresis than HCTZ)

Risks/monitoring	Hypovolemia, hypokalemia, hypomagnesemia, hyperglycemia, hyperuricemia (HCTZ), hypocalcemia (furosemide)

MRA	
Benefits	• Mortality, Class I – IV • Morbidity
Dosing strategy	Add 25 mg once daily to stable Class II/IV patient already on ACEI and B-blocker
Risks/monitoring	HYPERKALEMIA, breast tenderness/gynecomastia, hypotension
Pre-spironolactone checklist	• Allergy/intolerance • Hypotension • NYHA Class III – IV heart failure (this is the population to use in) • Hyperkalemia (note pt ,may be on K supplements when on furosemide)
Eplerenone checklist	• CCS recommends in NYHA II • Can probably use spironolactone instead (covered by PharmaCare, cheaper)

ARB			
Drugs	Drug	Start does	Target dose
	Candesartan (gold standard)	4 mg od	32 mg od
	Valsartan	40 mg bid	160 mg bid
Benefits	• Morbidity (vs. placebo, and when added to standard therapy) – Class I – IV • Mortality (candesartan, whether or not on ACEI)		
Dosing strategy	• Start low go slow when adding to ACEI therapy • When switching from ACEI to ARB, may switch directly to a comparable dose		
Risks/monitoring	Renal dysfunction, hypotension, hyperkalemia		

Hydralazine/nitrate (used concurrently)			
Drugs (use hydralazine + isosorbide OR nitropatch)	Drug	Start does	Target dose
	Hydralazine	37.5 mg TID	75 mg TID
	Isosorbide dinitrate	20 mg TID	40 mg TID
	Nitropatch	0.2 – 0.4 mg/h x 12 h/day	0.6 – 0.8 mg/h x 12 h/day
Benefits	Only statistically significant benefit in African American patients (males)		

~~Diuretics~~ digoxin	
Benefits	Morbidity, Class II – III
Dosing strategy	0.0625 – 0.375 mg QD depending on renal function, age, tolerability
Risks/monitoring	CNS ADRs (confusion, hallucinations), diarrhea, increased toxicity during hypokalemia, monitor RENAL FUNCTION

Sacubitril / Valsartan (LCZ696, Entresto)	
Benefits	Add on if still uncontrolled after standard therapy (Class II – IV)