Congestive Heart Failure Comorbid Conditions: Hypertension (HTN)

Background
1. Tx of HTN in HF must take into account the type of HF present
   - Systolic dysfunction: impaired cardiac contractility primary abnormality
   - Diastolic dysfunction: limitation to diastolic filling due to increased ventricular stiffness
   - Diagnosis can be made by measurement of EF by ultrasonography or radio nuclide scanning
2. HTN and ischemic heart disease are the major causes of diastolic dysfunction
3. Type of HF determines which antihypertensive agents should be used

Diastolic Dysfunction
1. Optimal therapy uncertain
2. Beta-blockers
   - Preferred Tx
   - Beneficial effects:
     - Decreased heart rate, reduction in myocardial O2 demand, lower blood pressure leading to regression of LV hypertrophy
   - Carvedilol and metoprolol are the most effective beta-blockers
3. CCBs, usually verapamil, second line
   - Added if BBlkr does not adequately control symptoms
   - Verapamil may improve compliance of LV and slow heart rate in response to exercise
4. Diuretics, venodilators (eg nitrates, dihydropyridine, calcium channel blockers), ACEi, ARBs
   - Used only with caution as can cause excessive LV preload reduction → fall in cardiac output and hypotension
5. ACEi & ARB
   - Reduction in afterload can cause hypotension, however, can also give symptomatic improvement and reduce LV mass
   - Use may be determined by another indication: eg DM, cardiovascular dz, chronic renal failure

Systolic Dysfunction
1. Goal: reduce preload (diminish congestive symptoms) and reduce afterload (improve cardiac contractility)
2. Preferred antihypertensive: diuretics, ACEi, BBlkr
   - All shown to improve survival
3. ACEi
   - Incremented cardiac output, decr congestive symp, reduce rate of progressive cardiac dysfunction, decr. cardiovascular mortality at one to four yrs
   - Significantly reduce mortality and hospital admissions in Pts with heart failure
More effective in decreasing mortality than hydralazine and isosorbide dinitrate
- Beneficial in pts with asymptomatic left ventricular dysfunction
- In hypertensive pts with LVH promote more regression of hypertrophy than BBls
- Can cause rise in serum creatinine in pts with HF
  - Most likely to occur in pts on high dose diuretics
- Lesser antihypertensive response in African Americans than in caucasians
- Begin therapy with low dose (reduces hypotension and azotemia); gradually incr until side effects occur or maintenance dose is reached
  - eg, Enalapril 2.5-10 mg BID PO, captopril 6.25-50 mg TID PO
- Use of NSAIDS (including aspirin) can reduce hemodynamic improvement

4. Beta Blockers
- Improve survival in pts with mild to advanced HF
- Should be considered, independent of HTN, in pts with NYHA class II, III, IV HF
- Can relieve angina in pts with ischemic heart dz, provide rate control in pts with AFib.
- Begin with low dose and double every 2 weeks until target dose reached or side effects become limiting
  - Eg carvedilol 3.125-25 mg BID PO, metoprolol 6.25-75 mg BID PO, bisoprolol 1.25-10 mg qD PO
- Pts should be instructed in daily weights and notify physician if gain > 1 kg

5. Loop Diuretics & Spironolactone
- Loop diuretic most commonly used for reduction of fluid, eg furosemide
- Fluid removal \(\rightarrow\) decr. cardiac output & BP
  - Usually well tolerated
  - Rise in BUN may indicate reduction in tissue perfusion
- Spironolactone 25-50 mg/d PO: improves survival in pts with advanced HF, may prevent arrhythmic mortality in pts with mild-mod. HF
- Consider eplerenone as it has a greater specificity than spironolactone for the mineralocorticoid receptor resulting in a lower incidence of endocrine side effects

6. Other antihypertensive drugs
- ARBs
  - Use in Pts who cannot tolerate ACEi
  - Should not be given to Pts taking ACEi & BBlr
  - Significantly reduce mortality and hospital admissions in Pts with heart failure
- Hydralazine & isosorbide dinitrate: prolongs survival, less effective than ACEi, multiple daily doses
- CCBs: no benefit, possible deleterious effect in pts with HF
- Centrally acting sympathetic blockers, eg, clonidine: limited trials suggest improvement in HF, not commonly used
Evidence-Based Inquiries
1. Is combining ACE inhibitors and ARBs helpful or harmful?
2. What is the most effective beta-blocker for heart failure?
3. Do anti-arrhythmics prevent sudden death in patients with heart failure?
4. How effective are ACE inhibitors and ARBs in the treatment of systolic heart failure?
5. How effective are beta-blockers in the treatment of congestive heart failure?

References

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