Question 51

A 67-year old woman with congestive cardiomyopathy remains breathless on moderate exertion despite treatment with 40mg frusemide and 20mg enalapril daily. On examination she has a pulse rate of 80/minute, blood pressure of 125/70mmHg and a JVP of 1cm. She has a soft systolic murmur with no added sounds, her chest is clear and she has no oedema. An ECG shows sinus rhythm. A chest X-ray shows cardiomegaly with a cardiothoracic ratio of 15.5/28 but no pulmonary congestion. Echocardiography demonstrates systolic dysfunction with fractional shortening of 18% and mild mitral regurgitation. Her serum creatinine level is normal.

Which of the following is the most appropriate next step in treatment?

a) Increase the frusemide dose
b) Add digoxin
c) Add an aldosterone antagonist
d) Add an angiotensin II receptor antagonist
e) Add a beta blocker

Heart Failure Therapy

General principles:

Aim is to relieve symptoms, slow progression and prolong survival.

Involves modification of lifestyle factors, reviewing medication which may be contributing to heart failure and commencing medications to treat heart failure.

Need to correct systemic conditions that may be contributing (eg: thyroid disorders)

Need to treat underlying conditions:

1) HT
2) IHD
3) Valvular heart disease
4) AF (loss of atrial enhancement of ventricular filling can compromise CO and rapid ventricular rate may diminish LV filling in diastole)

Medications to treat HF:

Improve symptoms with
- Digoxin
- Diuretics
- BB
- ACE-I
- ARB

Prolong survival with:
- ACE-I
- BB
- ARB
- Hydralazine/nitrates
- Spironolactone (in selected patients)

Order of therapy:

1) Loop diuretics should be started first to control fluid and improve symptoms.
2) ACE-I (or ARBs if ACE-I not tolerated) are introduced once diuretics optimised. Start at low dose and titrate up at 1-2 week intervals.

3) Beta blockers are started once pt stable on frusemide and ACE-I. Titrate up.

4) Digoxin is started if pt has ongoing symptoms despite being on above regimen.

5) ARB, spironolactone or hydralazine + nitrate can be added if pt still symptomatic.

ACE-I

- Improve survival in all severities of HF
- Maximum dose is recommended if tolerated (trials showing improved survival used maximum doses only)

ARBs

- Appear to be as or possibly slightly less effective than ACE-I
- Recommended in patients who cannot tolerate an ACE-I
- Seems to be benefit when ACE-I and ARB combined

Beta Blockers

- Carvedilol, metoprolol and bisoprolol improve survival in patients with NYHA class II to III HF and probably class IV
- Reduced hospitalisations
- Relative contraindications
  - HR < 60bpm
  - Hypotension
  - Signs of peripheral hypoperfusion
  - PR > 0.24 sec
  - 2nd or 3rd degree heart block
  - Severe COAD
  - Asthma
- Should have minimal or no evidence of fluid retention prior to starting BB
- Metoprolol has high specificity for beta-1 adrenergic receptors
- Carvedilol blocks beta-1, beta-2 and alpha-1 adrenergic receptors
- Unknown which is better, but pts with low BP may tolerate metoprolol better than carvedilol
- Expect improvement in 4 to 10 weeks
- Start at lowest dose and titrate to maximum if tolerated

Hydralazine plus nitrates

- Produce modest benefit
- Less effective than ACE-I
- Reduced mortality, fewer hospitalisations

Digoxin

- For symptom control
- Reduced hospitalisations but probably little effect on survival
- Recommended for patients who have class II, III or IV symptoms despite treatment with ACE-I, BB and frusemide
Diuretics

- For symptom control
- Fluid retention can also diminish the response to ACE-I and ARBs and risk decompensation if BB commenced
- If pt overloaded, aim weight reduction of 1kg per day
- IV more potent than oral
- Can consider adding a thiazide for a synergistic effect

Spironolactone

- Prolongs survival
- May prevent adverse effects of hyperaldosteronism on the heart
- Evidence suggests that it should be used in selected patients with moderate to severe HF
- Need to monitor closely especially U+Es

CCBs

- No direct role in treatment of HF
- Peripheral CCBs seem to be safe to use for treatment of other conditions in patients with HF

Statins

- Recommended for secondary prevention of cardiac disease, independent of HF

Be caution with:

- NSAIDS: Increase afterload due to vasoconstriction
- Thiazolidinediones: Cause fluid retention
- Metformin: Increase risk of lactic acidosis in patients who are have other medical problems
- Antiarrhythmics: Most have some negative inotropic effect; amiodarone is generally considered safe

Ventricular arrhythmias and ICD

- Almost all patients with HF have ventricular premature beats and 50-70% have non-sustained VT
- Associated with increased risk of sudden cardiac death
- Sudden cardiac death estimated to cause 1/3 of mortality in HF patients
- Sudden cardiac death reduced with BB
- No proven benefit from antiarrhythmics
- ICD in patients with class II to III HF and LVEF < 35% give significant survival benefit

Pacemakers

- In patients in SR with LVEF < 35%, prolonged QRS and moderate to severe HF despite medical treatment there is clear survival benefit from cardiac resynchronization (biventricular pacemaker)

EPO

- Two small trials have shown benefit in patients with mild anaemia and HF
- Awaiting further trials
Lifestyle modifications

- Smoking
- Alcohol
- Salt
- Daily weight
- Weight loss if obese
- Cardiac rehab

Refractory HF

- IV inotropes and/or IV vasodilators
- Mechanical circulatory support
- Usually in patients waiting for transplant

Transplant

- Survival after transplant is 79% at one year and 50% at 8.8 years
- If pt survives 1st year then annual mortality is about 4% per year

Classification of severity (NYHA)

- Class I - symptoms of HF only at levels that would limit normal individuals
- Class II - symptoms of HF with ordinary exertion
- Class III - symptoms of HF on less than ordinary exertion
- Class IV - symptoms of HF at rest

Stages of HF

There are several stages in the evolution of HF, as outlined by an ACC/AHA task force:

- Stage A — High risk for HF, without structural heart disease or symptoms
- Stage B — Heart disease with asymptomatic left ventricular dysfunction
- Stage C — Prior or current symptoms of HF
- Stage D — Advanced heart disease and severely symptomatic or refractory HF