Heart failure & atrial fibrillation

Objectives

- Understand the role of medications in the acute and chronic management of HF
- Identify the underlying causes & precipitating factors for HF exacerbation
- Identify the precipitating factors for AF
- Understand the medications that should be avoided in HF
- Implement a care plan for a HF patient being discharged from hospital

S Bennett, Clinical Pharmacy Course, University of Peradeniya, Sri Lanka, June 2013

Mr MA

- 77 year old man admitted with severe dyspnoea and pitting bilateral pedal oedema.
- Progressively worse over last 5 days
- Can only sleep when sitting up
- Red suppurating left leg ulcer
- Weight 77kg, height 167 cm
- On examination:
  - Elevated JVP, pitting pedal oedema, hepatomegaly, bilateral basal crackles
  - HR 95 bpm, irregularly irregular
  - BP 115/65
  - RR 20 breaths/min

Symptoms of HF……

lead to poor quality of life

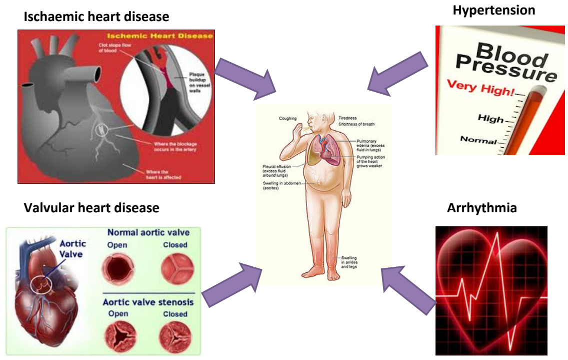
Signs of worsening HF

- peripheral oedema
- crepitations when listening to the chest with a stethoscope
- enlarging abdominal girth
- elevation in heart pressures seen as enlarged veins in the neck.
- orthopnea (need to sleep with 2 or 3 pillows).

Mr MA's medical & surgical history

- Chronic heart failure
- STEMI 5 years ago, treated with thrombolysis
- IHD
- Heartburn
- Gout
- Appendectomy 1985

All roads lead to HF……….



Heart Failure Definition

Complex clinical syndrome with

typical symptoms (dyspnoea, fatigue, oedema)

resulting from

structural or functional cardiac disorder

that impairs the ability of the ventricle

to fill with or eject blood

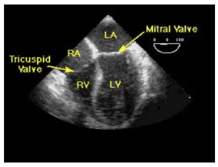
(particularly during physical activity).

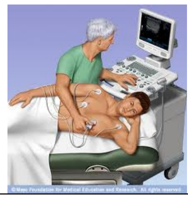
Diagnosis of HF

- Suspected HF
  - Symptoms
  - Clinical history
  - Physical examination
  - ECG, CXR, Blood tests

➡ Probable HF

➡ Echocardiogram





Type & Causes of HF

- Systolic (impaired ventricular contraction)
  - Common
    - Ischaemic heart disease, hypertension
  - Less common
    - Non-ischaemic idiopathic dilated cardiomyopathy
- HF with PEF (impaired ventricular relaxation)
  - Common
    - Hypertension, ischaemic heart disease, diabetes
  - Less common
    - Valvular disease, especially aortic stenosis

HF should never be the only diagnosis*

* ESC Guidelines 2005

Common causes of deterioration

- Ischaemia
- Arrhythmias
- Infections
- Renal failure
- Anaemia
- Pulmonary embolus
- Thyroid dysfunction
- Poor self-care
- Use of medications that worsen CHF
- Poor adherence to medication
- Unrestricted salt and water intake

Medications to be avoided in HF

- NSAIDs & COX-2 inhibitors
- Corticosteroids
- Non-dihydropyridine Ca antagonists (verapamil & diltiazem)
- Antiarrhythmics except digoxin & amiodarone
- Tricyclic antidepressants
- Clozapine
- Thiazolidinediones: rosiglitazone, pioglitazone
- Oncology treatments: anthracyclines, trastuzumab, tyrosine kinase inhibitors
- TNF-alpha inhibitors: infliximab, etanercept
- Moxonidine
- **OTC:** High-salt content eg effervescent meds, decongestants, complementary meds (lack of evidence)

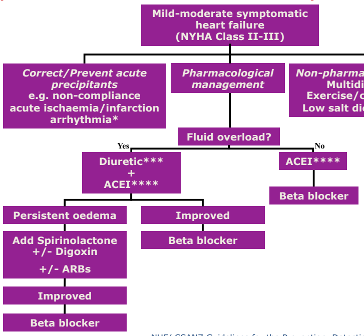
Major goals of HF treatment

- to **prolong survival**,
- reduce the need for **re-hospitalisations** and
- improve **patient quality of life**.

- **Treatment may often be a balance between improvement in survival and symptom improvement**.

Treatment of systolic HF

(NYHA Class II and III - LVEF<40%)



*Patients in AF should be anticoagulated with target INR of 2.0-3.0. Amiodarone may be used to control AF rate or attempt cardioversion. Electrical cardioversion may be considered after 4 weeks if still in AF. Digoxin will slow resting AF rate.

** Multidisciplinary care (pre-discharge & home review by community, nurse, pharmacists & allied health personnel) with education regarding prognosis, compliance, exercise & rehabilitation, lifestyle modification, vaccinations & self-monitoring.

***Most commonly prescribed first choice diuretic is a loop diuretic e.g. frusemide – however there is no evidence that loop diuretics are more effective or safer than thiazides.

****Or ARB if patient is ACEI intolerant.

NHF/ CSANZ Guidelines for the Prevention, Detection and Management of Chronic Heart Failure, 2011

Therapy of systolic HF

Treatment	Mortality RRR
ACEI/ARB	17-25%
BBs	≈ 35%
MRAs*	15-30%

Improve survival, symptoms, need for hospitalisation

** on top of ACEIs & BBs*

RRR= relative risk reduction

Mr MA's medications

- Furosemide 40mg m
- Enalapril 10mg bd
- Carvedilol 6.25mg bd
- Acetylsalicylic acid (aspirin) 150mg mane
- Atorvastatin 20mg nocte
- Allopurinol 150mg mane
- Omeprazole 20mg mane
- Amoxicillin 250mg tds
- Ibuprofen 400mg tds for leg pain

- Nil known allergies		Nil smoking, nil alcohol

Activity: What might be the medication-related causes for Mr MA's worsening of HF?

- Use of NSAID for pain
- Non-adherence to medications?
- Non-target dose of carvedilol

Activity: What might be the other causes for Mr MA's deterioration?

- Infection
- Atrial fibrillation
- Renal impairment?
- Dietary non-adherence? (Too much salt/water)

- May be other causes as well (admissions often due to multiple factors which need addressing otherwise likely patient will be rehospitalised at later stage)
- See next slide for investigations to rule out other causes

Investigations: results for Mr MA

- Sodium 133 mmol/L (135-140) → Dilutional effect
- Creatinine 110 micromol/L (60-120) → Determine Cr Cl
- Urea 7.5 mmol/L (3.0-8.0)
- TSH 1.02 mIU/L (0.3-4.0) → Euthyroid
- Hb 120 g/L (115-150) → Not anaemic
- D-dimer negative → No PE

- ECG: AF, likely old infarct → AF but no ischaemia
- Previous echo: LVEF 35% → HF with LVSD
- Swab leg wound: pending → Likely cellulitis

What is Mr MA's creatinine clearance?

Adult estimated creatinine clearance calculator

Results

Note: Choose the lower result.
Using ideal bodyweight (64 kg): 45 mL/minute
Using actual bodyweight (77 kg): 54 mL/minute

Units: Metric / Imperial
Height: 167 cm
Weight: 77 kg
Age: 77 years
Sex: Male / Female
Frame: Small / Medium / Heavy
Serum creatinine: 110 micromol/L / millimol/L
Calculate
Cockcroft-Gault Equation

→ Mr MA has mild renal impairment

Renal function likely to improve with cessation of ibuprofen & improvement in HF & AF

https://www.amh.net.au/online/misc/creatinineclearancecalculator.php

HF: further reading & references

Heart Online
- http://www.heartonline.org.au/Pages/default.aspx

Guidelines
Australian:
- http://www.heartfoundation.org.au/information-for-professionals/Clinical-Information/Pages/heart-failure.aspx

European
- http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/acute-chronic-heart-failure.aspx

US
- http://www.heartfailureguideline.org

Atrial fibrillation

Associated with

- Increasing age
- Structural heart disease
  - Hypertension,
  - Ischaemic heart disease,
  - Mitral valve disease
  - Chronic Heart failure
- Thyrotoxicosis
- Lung disease

Precipitating factors

- Reversible/irreversible?
- Alcohol, caffeine, illicit
- Exercise
- Emotion
- Post surgery (heart, thoracic, abdominal)
- Endocrine eg thyroid
- Infection
- Acute ischaemia
- Acute pulmonary embolism

Goals of treatment in AF

- identify and treat associated or causative factors which may abort the arrhythmia
- decide whether goal is control of ventricular rate (rate control) or restoration of sinus rhythm (rhythm control)
- prevent thrombo-embolism, balancing the risk of stroke against the risk of bleeding.

Assessing thrombotic risk

- **$CHADS_2$** *Score ≤ 6*
- 1 Congestive HF
- 1 Hypertension (any history)
- 1 Age (> 75 years)
- 1 Diabetes
- 2 Stroke/TIA

If = 0, use CH_2ADS_2-VASc

- **CHA_2DS_2-VASc** *Score ≤ 9*
- 1 Congestive HF
- 1 Hypertension (any history)
- 2 Age (> 75 years)
- 1 Diabetes
- 2 Stroke/TIA
- 1 Vascular disease
- 1 Age 65-74
- 1 Sex (female)

Anticoagulation recommended $CHADS_2$ ≥ 1 (TG CV 2012)

CHADS2: 0 = low risk of stroke -1.9% over a year if untreated
1 = intermediate risk- 2.8% over a year if untreated
≥2 high risk- > 4% over a year if untreated

Assessing bleeding risk

- **HAS-BLED :** Risk of major bleed
  - **H**ypertension (systolic BP > 160mmHg)
  - **A**bnormal renal (Cr > 200 micromol/L) or hepatic function (1 pt each)
  - **S**troke (history of)
  - **B**leeding (history of predisposition)
  - **L**abile INR (time in INR range < 60%)
  - **E**lderly (age >65 years of age)
  - **D**rugs eg NSAIDs, antiplatelets/ alcohol use > 8 units/wk

HAS-BLED ≥ 3 high risk of major bleeding
Refer for specialist advice those with active bleeding or ICH history

AF Assessment for Mr MA

- Precipitating factors
  - Infection, worsening HF
- Symptoms
  - ✓ Symptoms
- Duration of AF
  - AF type: Resolves spontaneously so diagnosed with Paroxysmal AF
- Thrombotic risk
  - Nil previous anticoagulaton
  - CHADS2/ CHA2DS2-VASc= 2
- Bleeding risk
  - HASBLED score = 2

Mr MA's management at discharge

- To continue oral Cloxacillin for 5 days
- Oral furosemide, 40mg mane, monitor weight, watch fluid & salt intake
- Future plan to increase in carvedilol dose to target
- May need spironolactone in future
- Counselling re pain management in future: avoid NSAIDs, use paracetamol
- Counselling re self-care including seeking medical help early & regular medical monitoring
- ? Amiodarone to maintain sinus rhythm (only rhythm control medication suitable with reduced EF)
- ? Warfarin for some weeks in case thrombus present, consideration for long term?

Further reading & resources

Atrial fibrillation
- European Soc of Cardiology AF guidelines

http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/atrial-fibrillation.aspx

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Warfarin
- NPS MedicineWise

http://www.nps.org.au/medicines/heart-blood-and-blood-vessels/anti-clotting-medicines/anti-clotting-medicines/anticoagulant-medicines

https://www.veteransmates.net.au/VeteransMATES Topic: warfarin
http://www.aspenpharma.com.au/resources/index/warfarin
ww.anticoagulation.com.au
http://www.racgp.org.au/download/documents/AFP/2010/July/201007tadros_warfain.pdf