Heart Failure

*A Disease for the Internist?*

Dr Chris Davidson
Sussex Cardiac Centre
BRIGHTON UK
Hot Topics in Heart Failure

- Drug treatments
  - Valsartan / neprilysin inhib
- Investigations
  - BNP and others
- Devices
  - Pacemakers/Defibrillators
  - LVAD
- Cardiac Surgery
Heart Failure
Case 1

Medical Outpatients
- 68 year old man: Dyspnoea 1 month
- MI 10 years ago
- Rx: atenolol, enalapril, simvastatin, aspirin
- On Examination:
  - JVP, lung crepitations, mild oedema, systolic murmur
- CXR:
  - cardiomegaly, pulmonary congestion
- ECG:
  - Sinus tachycardia (110/min), LBBB
ESIM Riga 2015

Measurement Results:
- QRS: 174 ms
- QT/QTcB: 488 / 483 ms
- PR: 202 ms
- P: 120 ms
- RR/PP: 1004 / 1015 ms
- P/QRS/T: 73/ -56/ 221 degrees

Interpretation:
- *** Age and gender specific ECG analysis ***
- Sinus bradycardia
- Left axis deviation
- Left bundle branch block
- Abnormal ECG

Unconfirmed report.
Heart Failure

Case 1

Rx: atenolol, enalapril, simvastatin, aspirin

Management Options?

- Echo:
  - EF 32%; mitral regurgitation, dilated LV

- Drugs
  - Diuretics
  - Optimise BB ACEI
  - Consider Ivabradine

Investigations

- Angiography?
- Myocardial viability?

Other Treatments:

- Exercise programme
- Cardiac Surgery?
- Biventricular Pacemaker/defibrillator?
Heart Failure

Case 1

Q1: Who should look after this patient in Hospital?
A. Cardiologist
B. Internist
C. Both

Q2: Who should look after this patient after discharge?
A. Cardiologist
B. Internist
C. Both
Heart Failure

Case 2

Emergency Room

- 43 yr old Banker
- Acute dyspnoea
- Past History: increasing stress at work, treated for panic attacks by counsellor

On Examination:
- Acute pulmonary oedema
- Sinus tachycardia 132/min; BP 160/100; basal creps; JVP not seen; no oedema

Labs:
- normal; pO2 low, pCO2 low

Bedside Echo: LV function and size normal (EF 65%); valves not clearly seen
Heart Failure

Case 2

Cardiology Ward

- Responds to intravenous opiates, nitrates and diuretics
- ECHO: LVEF 65%; no dysynchrony; no valvular or other structural abnormality
- Catheterisation: normal coronary arteries; LVEDP 4mm Hg
- Patient anxious to go home

What is your advice about further investigations/treatment?
Heart Failure
Case 2

Diagnosis

- Phaeochromocytoma
  - Urinary/plasma catecholamines elevated
  - Adrenal Tumour on imaging
  - No evidence of MEN2
- Successful surgery
Heart Failure
Case 2

Q1: Who should look after this patient in Hospital?
A. Cardiologist
B. Internist
C. Both

Q2: Who should look after this patient after discharge?
A. Cardiologist
B. Internist
C. Both
Heart Failure:
Case 3 - a more typical case?

Medical Assessment Unit
- 78 year old woman
- Hypertension; type II
- Diabetes; osteoarthritis
- Rx: Atenolol, metformin, thiazide, indomethacin
- AF 110/min, 180/80, JVP+, oedema++
- CXR: cardiomegaly, pulmonary congestion
- ECG: Atrial Fibrillation

Given iv Frusemide 80mg with a ‘good’ diuresis and feels better today
Heart Failure:
Case 3 - a more typical case?

- Blood tests:
  - Hb: 9.6g/dl (>12)
  - Electrolytes: normal
  - Renal:
    - Creatinine: 215 micromol/l (<90)
    - eGFR 32ml/min (>90)
  - BS: 15.6mmol/l (<10)
  - B Gases: no acidosis

ECHO: LVH, Ejection Fraction 48%, diastolic dysfunction, valves normal

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Heart Failure:
Case 3 - a more typical case?

Rx: Atenolol, metformin, thiazide, indomethacin

- **TREATMENT OPTIONS**
  - Diuretics?
  - Beta-blockers?
  - ACEI?
  - Diabetes: metformin?
  - NSAID?

- **INVESTIGATIONS**
  - Anaemia?
  - Renal function?
  - Cardiac?
Heart Failure
Case 3

Q1: Who should look after this patient in Hospital?
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Q2: Who should look after this patient after discharge?
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Heart Failure
A Disease for the Internist

- Who looks after patients with Heart Failure?
- Use of Evidence-based Treatments
- The problem of Heart Failure with ‘Preserved’ LV function
- Co-Morbidity in Heart Failure
- How do we prevent early relapse?
EuroHeart Failure Survey

Registry of 46,786 consecutive admissions to general medicine and cardiology wards in 24 European countries over a 6 week period 2001-2

- 11,327 diagnosis HF
- Mean age 71 years; 47% women
- GIM / geriatrics 55%, cardiology 45%
- CHD 66%, Valve disease 29%, DCM 5%
- HF principle reason for admission in 40%

MORE MALIGNANT THAN CANCER?

Five year Survival of Patients admitted to Hospital in Scotland 1991

HF – Trial Evidence

- ACE inhibitors
- Vasodilators: Hydralazine/Nitrate
- Beta-Blockers
- Spironolactone
- Angiotensin Receptor Blockers
- Exercise Training

- Biventricular Pacing / Defibrillators
- Cardiac Transplantation
Mortality Benefit of Treatments in Heart Failure

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CONSENSUS

6mo           3.5yr            6mo           1.3yr            1yr           2yr
Guidelines for the Treatment of Heart Failure

- American Heart Ass. / American College of Cardiology 2013
  - *Guideline for the management of Heart Failure*
    Circulation 2013; 128(16):e240-e327

- European Society of Cardiology 2012
  - *Acute and Chronic Heart Failure* EHJ 2012; 33:1787-1847

**ALL THERAPEUTIC GUIDELINES RELATE TO SYSTOLIC DYSFUNCTION**
Heart Failure:
Case 3 - a more typical case?

Medical Assessment Unit

- 78 year old woman
- Hypertension; type II Diabetes; osteoarthritis
- Rx: Atenolol, metformin, thiazide, indomethacin
- AF 110/min, 180/80, JVP+, oedema++
- CXR: cardiomegaly, pulmonary congestion
- ECG: Atrial Fibrillation

Echocardiography: LVH, Ejection Fraction 48%
HEART FAILURE

Systolic vs. Diastolic Dysfunction
EuroHeart Failure Study: Preserved vs Impaired LV Function (EF < 40%)

- Patients with echo assessment:
  - n = 6806
  - 54% impaired LV, 46% ‘preserved’ LV

- ‘Preserved’ LV function
  - women > men
  - 4 years older
  - Hypertension more common


ESIM Riga 2015
Adjusted Survival Curves for Patients with Heart Failure with Reduced or Preserved Ejection Fraction over the Year after the First Hospital Admission


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HF – Trial Evidence

- ACE inhibitors
- Vasodilators: Hydralazine/Nitrate
- Beta-Blockers
- Spironolactone
- Angiotensin Receptor Blockers
- Exercise Training

- Biventricular Pacing / Defibrillators
- Cardiac Transplantation

Most patients with HF and Diastolic dysfunction have HT and require BB/ACEI anyway
“Trials using comparable and efficacious agents for HFrEF have generally been disappointing when used in patients with HFpEF (590). Thus, most of the recommended therapies for HFpEF are directed at symptoms, especially co-morbidities, and risk factors that may worsen cardiovascular disease.

Blood pressure control concordant with existing hypertension guidelines remains the most important recommendation in patients with HFpEF.”
CHARM-Preserved: Primary outcome  
CV death or CHF hospitalisation

![Graph showing outcome over time for Placebo and Candesartan]

- **RRR=11%**
- **Placebo**
  - 366 (24.3%)
- **Candesartan**
  - 333 (22.0%)

HR 0.89 (95% CI 0.77-1.03), p=0.118
Adjusted HR 0.86, p=0.051

Association Between Use of β-Blockers and Outcomes in Patients With Heart Failure and Preserved Ejection Fraction
Lars H. Lund, MD, PhD; Lina Benson, MSc; Ulf Dahlström, MD, PhD; Magnus Edner, MD, PhD; Leif Friberg, MD, PhD

Swedish Heart Failure Registry
Consecutive sample of 41,976 patients, 19,083 patients with HFPEF (mean [SD] age, 76 [12] years; 46% women)

Conclusions and Relevance In patients with HFPEF, use of β-blockers was associated with lower all-cause mortality but not with combined all-cause mortality or heart failure hospitalization.
Heart Failure
A Disease for the Internist

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Co-Morbidity in Heart Failure
Survey of 122,630 patients in US Healthcare System

39% overall had 5 or more co-morbidities; Only 4% had HF alone

Braunstein et al JACC 2003 42; 1226
HEART FAILURE:

How can we best manage this chronic disease?
EuroHeart Failure Study

Hospital Mortality 12 week mortality 12 week Re-admissions
Recovery from Heart Failure

25% Re-admissions due to poor compliance with Medication
Randomised controlled trial of specialist nurse intervention in heart failure


% event free survival

No of months since randomisation

Nos at risk:

Intervention
Usual care

P=0.033
Heart Failure Disease Management Trials:
Meta-analysis

Recovery from Heart Failure

INTERNIST
Heart Failure

A Disease for the Internist?

Yes!
Metformin Use and Mortality in Ambulatory Patients with Diabetes and Heart Failure

- Aguilar D et al, Circ. Heart Failure 2011; 4, 53
- 6185 pts with diabetes and HF for 2 years
- Improved mortality in patients taking Metformin (HR 0.76, p<0.01)
Anaemia in a cohort of 12,065 patients with new-onset heart failure.

Cumulative Survival

- No Anaemia: 83%
- Anaemia Chronic Disease: 7%
- Anaemia other causes: 10%

Days of Follow-up

Circulation 2003;107;223-225

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Anaemia in Heart Failure

- **FAIR-HF study**
  - *NEJM 2009; 361, 2436*
  - Intravenous iron
  - 459 pts EF <40%; Hb <12g/dl
  - FU: 24 weeks

- **RED-HF study**
  - *NEJM 2013; 368, 1210*
  - Darbepoietin
  - 459 pts EF <40%; Hb <12g/dl
  - Death or hospitalisation
  - RESULT: no significant difference

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