



UPDATES IN THE DIAGNOSIS AND MANAGEMENT OF CARDIAC FAILURE

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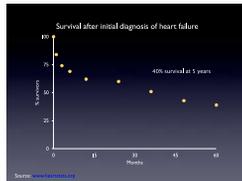
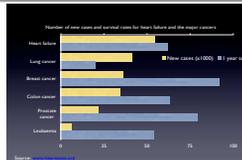
Disclosures

- Consultancy and speaker fees
 - Novartis
 - Servier
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 - James Lind Alliance Heart Failure Steering Group
 - Cardiomyopathy UK
 - ESC Myocardial and Pericardial Diseases Working Group
 - Association for Inherited Cardiac Conditions

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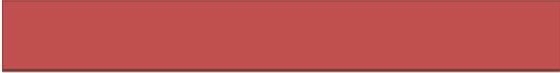
Why do you need to know about HF?

- HF is a progressive, highly symptomatic and deadly disease that places great demands on patients, caregivers and health care systems
- More common yet worse survival rates than most major cancers
- In-patient mortality around 9%
- One year all-cause mortality for those who survive to discharge 35%
- 40% survival at 5 years



NATIONAL INSTITUTE FOR CARDIOVASCULAR OUTCOMES RESEARCH (NICOR)
www.ud.ac.uk/nicor/audit/heartfailure National Annual Heart Failure audit 2015/16

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What updates do you need to know about HF?



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Aims

- Brief recap - definitions of heart failure, basic terminology and aetiology
- Updates on the diagnosis and clinical course of HF
- Management of HF
 - Pharmacological
 - Non-pharmacological
 - Lifestyle
 - Palliation



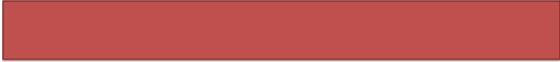
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Aims

- Definitions of heart failure and basic terminology
- Aetiology
- Diagnosis and clinical course of HF
- Management of HF
 - Pharmacological
 - Non-pharmacological
 - Lifestyle
 - Palliation



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Definition of heart failure



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Definition - what is heart failure?

Pathophysiological definition

- Inability of the heart to generate a cardiac output sufficient to pump adequate oxygenated blood to meet the demands of the body despite an adequate filling pressure

Clinical definition

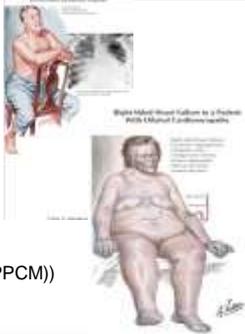
- Clinical syndrome characterised by symptoms (breathlessness, fatigue and oedema) accompanied by signs (raised JVP, rales) caused by structural/functional cardiac abnormality → ↓cardiac output and/or raised intracardiac pressure at rest or during stress



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Descriptive terms

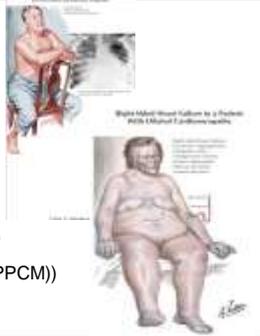
- Acute vs chronic
- Systolic vs diastolic
- Right vs left
- Low output vs High output
- HFrEF vs HFmrEF vs HFpEF
- Dilated cardiomyopathy (DCM)
- (Peripartum cardiomyopathy (PPCM))



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Descriptive terms

- Acute vs chronic
- **Systolic (LVSD) vs diastolic**
- Right vs left
- Low output vs High output
- **HFReEF vs HFmrEF vs HFpEF**
- **Dilated cardiomyopathy (DCM)**
- (Peripartum cardiomyopathy (PPCM))



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ESC definition

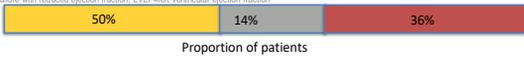
Table 3.1 Definitions of heart failure with preserved (HFpEF), mid-range (HFmrEF) and reduced ejection fraction (HFReEF)

Systolic (LVSD) vs diastolic

Type of HF	HFpEF	HFmrEF	HFReEF
Symptoms	1. Dyspnoea 2. Legit	1. Dyspnoea 2. Legit	1. Dyspnoea 2. Legit
	3. LVEF > 40%	3. LVEF 40-49%	3. LVEF < 40%
Etiology	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. Dilated structural heart disease (DVI and/or LAE) b. Diastolic dysfunction (see Section 4.1.2)	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. Dilated structural heart disease (DVI and/or LAE) b. Diastolic dysfunction (see Section 4.1.2)	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. Dilated structural heart disease (DVI and/or LAE) b. Diastolic dysfunction (see Section 4.1.2)

HF=heart failure; HFpEF=heart failure with preserved ejection fraction; HFmrEF=heart failure with mid-range ejection fraction; HFReEF=heart failure with reduced ejection fraction; LVEF=left ventricular ejection fraction

2016 ESC Guidelines for the treatment of acute and chronic heart failure www.escardio.org



Have not been prospectively evaluated against gold standard

1. Haich & Wilkoff. Clevelandclinic.org 2013. Available at: <http://my.clevelandclinic.org/services/heart/conditions/heart-failure-what-is/ejectionfraction>. Last accessed 9 Jan 2014; 2. Dickstein et al. Eur Heart J 2008;29:2388-442; 3. McMurray et al. Eur Heart J 2012;33:1787-847; 4. Steinberg et al. Circulation 2012;126:65-75.

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What is 'end-stage' heart failure?

(I prefer the term 'advanced heart failure', otherwise we focus on 'the end')

- Advanced stage but often advanced age
- Refractory symptoms despite optimal therapy
- > 3 hospital admissions with decompensation in < 6 months
- Dependent for > 3 activities of daily life
- Cardiac cachexia
- Resistant hyponatraemia
- Albumin <25 g/litre, ascites
- Multiple shocks from ICD
- A co-morbidity conferring a poor prognosis, e.g. terminal cancer

Connolly et al 2010 cited in Ashton-Clarkson S & Thackway J (2012) Heart failure: Why we don't talk about dying. *British Journal of Cardiac Nursing*. Vol 7, No 9, page 421, table 1

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Aims

- Definitions of heart failure and basic terminology
- Aetiology
- Clinical course of HF
- Diagnosis
- Management of HF
 - Pharmacological
 - Non-pharmacological
 - Lifestyle
 - Palliation

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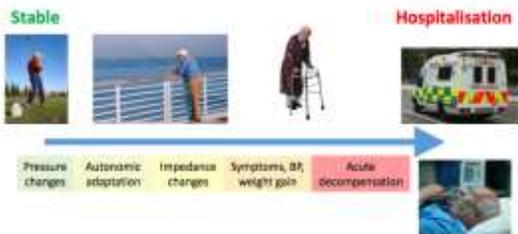
Heart Failure

Can be hard to recognise and challenging to treat



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Development of Heart Failure Events



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Symptoms & Length of life

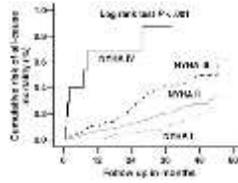
NYHA classification

Class I: No symptoms

Class II: Symptoms on ordinary exertion

Class III: Symptoms on minimal exertion

Class IV: Symptoms at rest



The more severe the symptoms, the greater the risk to life
 Diuretics (such as frusemide) improve symptoms but do not lengthen life

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Other common symptoms esp in advanced HF

- Lack of energy
 - Breathlessness
 - Feeling drowsy
 - Dry mouth
 - Numbness/ tingling in hands/feet
 - Difficulty sleeping
 - Worrying
 - Cough
 - Feeling sad
 - Pain
 - Change in taste
 - Weight loss
- 62–70%
 - 56–65%
 - 52%
 - 50–73%
 - 48–55%
 - 44-47%
 - 44-50%
 - 40-45%
 - 38-43%
 - 38-52%
 - 25-50%
 - 15-52%

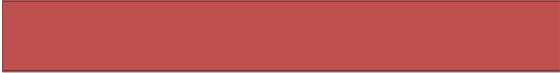
Johnson M., Lehman R, Hogg K. (2015) Heart Failure and Palliative Care: a team approach, 2nd Ed. CRC Press. P 84

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Aims

- Definitions of heart failure and basic terminology
- Aetiology
- Clinical course of HF
- **Diagnosis**
- Management of HF
 - Pharmacological
 - Non-pharmacological
 - Lifestyle
 - Palliation

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UPDATES IN THE DIAGNOSTIC ALGORITHM

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The collage includes the following documents:

- ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure (2012)**: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure (AHF) of the European Society of Cardiology, developed in collaboration with the Heart Failure Association (HFA) of the ESC.
- NICE Clinical Guideline 108**: Chronic heart failure in adults: diagnosis and management.
- NHS.uk Chronic heart failure**: Information on symptoms, diagnosis, and treatment.
- ESC ACCORDIA Toolkit for the Management of Heart Failure**: A practical approach to the management of heart failure.

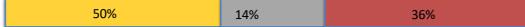
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ESC definition

Table 3.1 Definitions of heart failure with preserved (HFpEF), mid-range (HFmrEF) and reduced ejection fraction (HFrEF)

Type of HF	HFpEF	HFmrEF	HFrEF
1	Symptoms & Signs	Symptoms & Signs	Symptoms & Signs
2	LVEF ≥50%	LVEF 40-49%	LVEF <40%
3	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. elevated pulmonary pressure (LVEF and/or LVEDV) b. elevated left atrial pressure (LVEDP and/or LAAP)	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. elevated pulmonary pressure (LVEF and/or LVEDV) b. elevated left atrial pressure (LVEDP and/or LAAP)	1. Elevated levels of natriuretic peptides? 2. At least one additional criterion: a. elevated pulmonary pressure (LVEF and/or LVEDV) b. elevated left atrial pressure (LVEDP and/or LAAP)

HF=heart failure; HFpEF=heart failure with preserved ejection fraction; HFmrEF=heart failure with mid-range ejection fraction; HFrEF=heart failure with reduced ejection fraction; LVEF=left ventricular ejection fraction



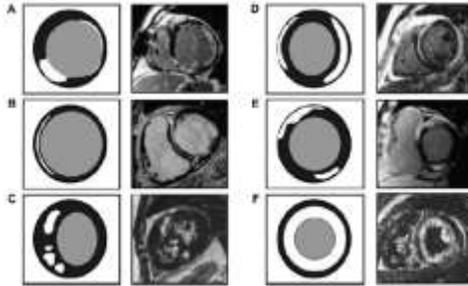
Proportion of patients

Have not been prospectively evaluated against gold standard

1. Heisch & Wilkoff. Clevelandclinic.org 2013. Available at: <http://my.clevelandclinic.org/services/heart-disorders/heart-failure-what-is-ejection-fraction>. Last accessed 9 Jan 2014. 2. Dickstein et al. Eur Heart J 2008;29:2388-442. 3. McMurray et al. Eur Heart J 2012;33:1787-

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Patterns of LGE to guide diagnosis & prognosis

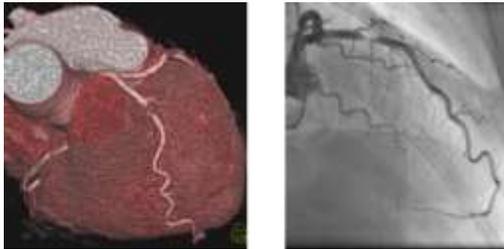


(A) Ischaemic (B) Idiopathic dilated cardiomyopathy (C) HCM (D) Myocarditis (E) Sarcoidosis (F) Amyloidosis

White et al, Cardiol Clinics, 2007

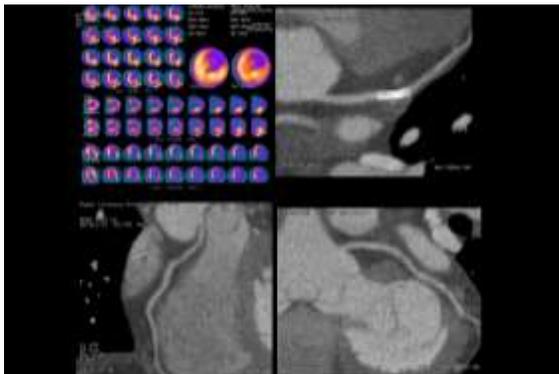
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Exclude CAD with CT if CP



Excellent Rule out test
In multicentre trials NPV > 95% in unselected patients
? Benefits of seeing early atherosclerosis

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Clinical scenario

- 67 year old male in A+E having woken from his sleep unable to breathe. He cannot complete a sentence due to being unable to breathe.
- You listen to his chest and there are diffuse crackles all over
- He has swelling of his legs and after a succinct history you have established a 6 week Hx of worsening SOB
- What do you do next?

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AHF – Management

Normally we do this...

Assessment

- Detailed history and examination
- Arterial blood gases (if needed to guide O₂ therapy)
- Venous bloods
 - biochemistry: U&Es, LFTs, troponin, TSH, glucose
 - haematology: FBC, clotting screen, (anaemia screen)
- ECG
- Chest x-ray
- Echocardiogram (or equivalent imaging) – to detect LV systolic impairment, identify cause and assess severity

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Management of acute HF

- Sit up, 100% O₂ high flow
- Do an ECG, FBC, U&E, cardiac enzymes, ABG, CXR
- Sublingual 2 puffs nitrates or oral to enhance myocardial perfusion
- Oxygen to keep SaO₂ ≥95% (or 88-92% if chronic lung disease)
- Consider IV opiates (diamorphine 2.5-5mg) with anti-emetic (eg. metoclopramide 10mg bolus) to reduce anxiety and preload
- IV/SC frusemide 40-80mg IV to reduce fluid retention & pulmonary oedema
- If systolic >90 then give IV infusion isosorbide dinitrate 2-10mg/h titrated to BP, if sys <90 then treat as cardiogenic shock - caution for drop in BP
- In advanced situation or in cardiogenic shock, can consider:
 - IV inotropic drug (dobutamine or other) to increase contractility and CO
 - IV dopamine to enhance renal perfusion to prevent renal failure
 - Rarely IV aminophylline to enhance contractility and bronchodilate (slow)
 - Assisted ventilation (CPAP if T1 resp failure)
 - Treat underlying cause/precipitant
 - Start prognostic drugs once LVSD confirmed and plan safe d/c and follow-up

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AHF – Management

Principles of treatment

- **Treat congestion** – diuretics, vasodilators (caution), ultrafiltration
- **Treat hypoxia / distress** – opiate, oxygen, ventilatory support (CPAP), treat congestion
- **Treat hypotension / hypoperfusion** – inotropes, intra-aortic balloon pump (IABP), ventricular assist device (VAD), cardiac transplantation
- **Treat precipitant(s)** – e.g. acute coronary syndromes, arrhythmias, acute mechanical problem (e.g. ruptured mitral valve), myocarditis, anaemia
- Do not stop HF drugs unless good reason to (e.g. hypotension)
- Refer to heart failure specialist - cardiogenic shock is an emergency

Table 1.5.5 Goals of treatment in acute heart failure

Intentional (EXPECTED)
Improve haemodynamics and oxygenate tissues
Reduce congestion
Reduce symptoms
Limit cardiac and renal damage
Prevent thromboembolism
Minimise ICU length of stay
Unintentional (to AVOID)
Identify and/or prevent complications
Reduce the risk to cause organ damage and cognitive and spiritual harm
Reduce and/or prevent disease-causing pharmacological therapy
Consider device therapy in appropriate patients
Pro-Discharge and Long-term management
Identify high-risk for mortality
Set standards for up-titration and down-titration of pharmacological therapy
Identify and/or manage causes for disease relapse
Identify when and how to refer for follow-up and after
Identify or discuss management, prognosis, medical and social opportunities (health inequalities)
Prevent early readmission
Improve prognosis, quality of life and survival

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AHF guidelines



European Heart Journal Volume 39, Advance online first published May 11, 2018

RECOMMENDATIONS

Recommendations on pre-hospital and early hospital management of acute heart failure: a consensus paper from the Heart Failure Association of the European Society of Cardiology, the European Society of Emergency Medicine and the Society of Academic Emergency Medicine – short version

Alexandros Pitsavos^{1,2}, Mihailo Filipovic³, Philip Lewis⁴, Peter Ponikvar⁵, W. Frank Peacock⁶, Edd Lurie⁷, Steven D. Ezekowitz⁸, Eleanor M. Lambertson⁹, Jozsef Mihalik¹⁰, Jigar M. Raval¹¹, Thomas M. Chong¹², Christian Mueller¹³, Christopher-John Hooper¹⁴, Yusef-Pasha Hammad¹⁵, Roger Thacker¹⁶, Massimo P. Pagani¹⁷, Marco Merco¹⁸, Aleks Hladikovic¹⁹, John M. Morrison²⁰, Giovanni Biondini²¹, Renato Boriani²², Peter M. Sattar²³, Ravi Bansal²⁴, Adriano P. Lacerda Pereira²⁵, Abdulmalik Basha²⁶, Stefan D. Anker²⁷, and Susanna Rippecci²⁸

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Management of oral therapy < 48hrs

Table 2 Management of oral therapy in AHF (acute) < 48h

Drug/Class	Indication	Regimen	Low Heart Rate	Precaution	Renal Impairment
ACE Inhibitor	Heart failure	100 mg daily	< 60 bpm	< 30 mg daily	Cr < 2.5, CrCl < 30
Diuretic	Heart failure	20-40 mg daily	< 60 bpm	< 30 mg daily	Cr < 2.5, CrCl < 30
Beta-blocker	Heart failure	5-10 mg daily	< 60 bpm	< 30 mg daily	Cr < 2.5, CrCl < 30
Statins	Heart failure	20-40 mg daily	< 60 bpm	< 30 mg daily	Cr < 2.5, CrCl < 30
Other Heart Failure Drugs	Heart failure	20-40 mg daily	< 60 bpm	< 30 mg daily	Cr < 2.5, CrCl < 30

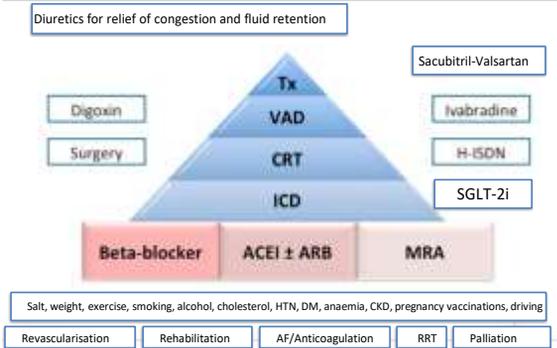
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Treatment

- Standard approach in the management of HF:
 - Confirm diagnosis, aetiology, educate and monitor every 6 months
 - If for palliative management...
 - Symptom control
 - Supportive, holistic care

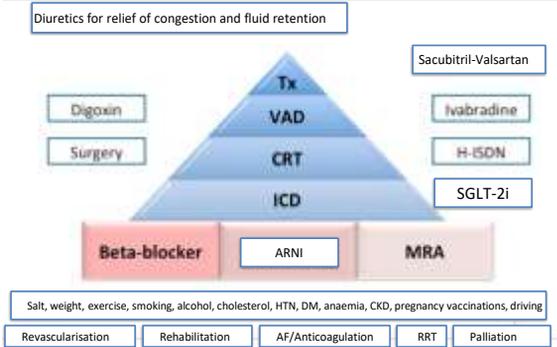
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Treatment options



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Treatment options



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Caveats

- Do not start ACEi if haemodynamically significant valve disease until assessed by a specialist
- Do not withhold BB solely because of age, PVD, ED, DM, pulmonary disease or COPD
- Avoid verapamil, diltiazem, short-acting dihydropyridine agents in HFrEF
- Consider amiodarone in consultation with a specialist and review 6-monthly thereafter and screen LFTs, TFTs lungs
- If HF and AF, follow anticoagulation guidance (caution in renal and liver impairment)
- If SR but history of thromboembolism, LV aneurysm or intracardiac thrombus, consider anticoagulation

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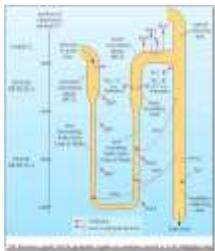
Summary of prognostic treatments

	Starting dose (mg)	Target dose (mg)
ACE-i		
Captopril	6.25 b.i.d.	50 t.i.d.
Enalapril	2.5 b.i.d.	10-20 b.i.d.
Lisinopril	2.5-5.0 o.d.	20-30 o.d.
Ramipril	2.5 o.d.	10 o.d.
Trandolapril	0.5 o.d.	4 o.d.
Beta-blockers		
Bisoprolol	1.25 o.d.	10 o.d.
Carvedilol	3.75 b.i.d.	25 b.i.d.*
Metoprolol succinate (CR/CR)	12.5-25 o.d.	200 o.d.
Nebivolol	1.25 o.d.	10 o.d.
ARBs		
Candesartan	4-8 o.d.	32 o.d.
Losartan	40 o.d.	160 o.d.
Losartan*	50 o.d.	150 o.d.
MRA		
Eplerenone	25 o.d.	50 o.d.
Spiroglactone	25 o.d.	50 o.d.
ARNI		
Sacubitril/Valsartan	49/51 o.d.	81/103 o.d.
Hydralazine		
Hydralazine	5 b.i.d.	7.5 b.i.d.

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Diuretics

- For relief of symptoms and signs of congestion – no mortality benefit
- Not contraindicated by renal failure, hyponatraemia or hypotension
- Classes:
 - **loop** (first-line) e.g. furosemide – inhibit Na-K-2Cl carrier in thick ascending loop of Henle
 - **DCT - thiazide** (synergistic adjuncts) e.g. bendroflumethiazide – inhibit active reabsorption of Na in distal convoluted tubule
 - **collecting duct - MRA**



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More tips

- PND or orthopnoea = decompensated HF requiring escalation of diuretics
- Diuretic options: oral, s/c, i/v
 - 40mg furosemide = 1mg bumetanide
- Weight increasing by 1kg/day and developing peripheral oedema
 - 1kg gain = likely 1L fluid on board
 - For patients in last days of life, avoid weighing daily & checking fluid balance as will not improve symptoms
 - For longer prognoses, review every 24hours and aim for weight loss of <1kg/day (monitor bloods twice weekly unless would not change Mx plan)
- If someone deteriorates acutely - ?ESRF or congestion - consider drains
- Remember that anaemia is common in HF and iron replacement is beneficial in deficiency
- Ideally do not stop prognostic HF medications unless in last few days of life
- Stop statins

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Important side effects of medications

Drug	SEs
Furosemide	Low K+, Low Mg2+, Low Ca2+ Gout IGT Tinnitus - with fast IV boluses
Thiazides	Low K+ (profound with metolazone), Low Mg2+, Low Na+, High Ca2+ Gout IGT
ACE inhibitors	High K+ Postural hypotension (usually just first dose) AKI and flash pulmonary oedema (if bilateral RAS) Cough (15%) Angioedema (rapid swelling of dermis and underlying tissues due to inhibition of bradykinin catabolism)
Spirolactone	High K+ Gynaecomastia (in 25% men) - can switch to eplerenone or amiloride
BBs	Nightmares Cold peripheries

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Treatments to avoid in HF

- Statins also do not improve prognosis in HF/EF
- Uncertainty regarding anticoagulation in severe LVSD
- Aliskiren is not recommended as an alternative to ACEi or ARB

Recommendations	Class*	Level*	Ref*
Thiazolidinediones (glitazones) are not recommended in patients with HF, as they increase the risk of HF worsening and HF hospitalization.	III	A	209, 210
NSAIDs or COX-2 inhibitors are not recommended in patients with HF, as they increase the risk of HF worsening and HF hospitalization.	III	B	211-213
Diltiazem or verapamil are not recommended in patients with HF/EF, as they increase the risk of HF worsening and HF hospitalization.	III	C	214
The addition of an ARB (or renin inhibitor) to the combination of an ACE-i and an MRA is not recommended in patients with HF, because of the increased risk of renal dysfunction and hyperkalaemia.	III	C	

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The human face of heart failure

- Atrial fibrillation
- Diabetes
- Anaemia
- Iron deficiency
- CHD/angina
- Hypertension
- Asthma/COPD
- Prostatic disease
- Psychiatric illness



- Hyperkalaemia
- Arthritis
- Glaucoma
- Cachexia
- Hyperuricaemia/gout
- Renal impairment
- Sleep apnoea
- Parkinson's disease
- Cognitive impairment

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Others

- Drugs**
 - Treatment**
 - Prevention**
- Devices/interventions/surgery**

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'Devices' in heart failure patients

- Electronic implantable cardiac devices (EICD)
 - Pacemakers (incl. cardiac resynchronisation therapy (CRT))
 - Implantable cardioverter-defibrillators (ICD)
 - Implantable rhythm monitors (loop recorders (ILR))
- Prosthetic valves
- Pulmonary pressure monitors (cardiomems)

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- Pacemakers and ICDs monitor and can intervene
- Loop recorders *only* monitor
- Remote monitoring of all EICDs possible



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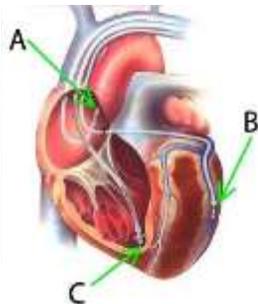
Device therapy



- Several different types of implantable defibrillators - increasing choice
- all can detect and treat dangerous heart rhythms
 - some can act as pacemakers
 - some can help the heart improve its efficiency
 - some can wirelessly send data to physicians
 - some MRI conditional
 - CRT - allows simultaneous pacing of RV and LV

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Biventricular pacemaker



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NICE Guidance

1.2 Implantable cardioverter defibrillators (ICDs), cardiac resynchronization therapy (CRT) with defibrillator (CRT-D) or CRT with pacing (CRT-P) are recommended as treatment options for people with heart failure who have left ventricular dysfunction with a left ventricular ejection fraction (LVEF) of 35% or less as specified in table 1

QRS interval	NYHA class			
	I	II	III	IV
<120 milliseconds	ICD (there is a high risk of sudden cardiac death)	ICD and CRT not clinically indicated	ICD and CRT not clinically indicated	ICD and CRT not clinically indicated
120-145 milliseconds (without LBBB)	ICD	CRT-D	CRT-D or CRT-P	CRT-P
120-145 milliseconds with LBBB	ICD	CRT-D	CRT-P or CRT-D	CRT-P
>150 milliseconds with or without LBBB	CRT-D	CRT-D	CRT-P or CRT-D	CRT-P

QRS Morphology NYHA Class

Adapted from NICE TAG 314 published in June 2014
 McAlister F.A., Ezekowitz J., Hooton N., et al. Cardiac resynchronization therapy for patients with left ventricular systolic dysfunction: a systematic review. JAMA. 297 (2007), pp. 2502-2014

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DEVICES – when and how to deactivate



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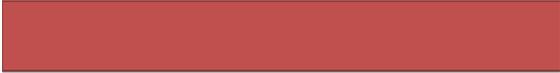
Deactivation at the end of life: Principles and Practice - Dr James Beattie

- 'HCPs have a duty of care to consider withdrawal of non-contributory therapies and the distress caused by resuscitation measures in those near the end of life with a progressive and irreversible decline in their condition.'
- Autonomy – the right of an individual to make their own decisions based on personal values
- Beneficence – the obligation to benefit people (prevent SCD)
- Non-maleficence – the obligation not to cause harm (cause uncomfortable shocks)
- Justice – fair and equitable treatment based on guidelines, practice, the law and societal norms

www.bhf.org.uk – British Heart Foundation (2013) ICD Deactivation at the end of life: Principles and Practice. A discussion document. Dr James Beattie

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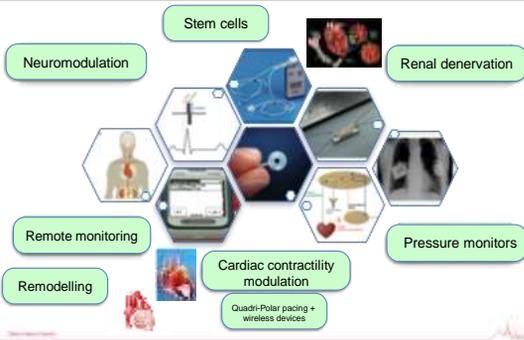


Other possible things you may come across



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Gadgets



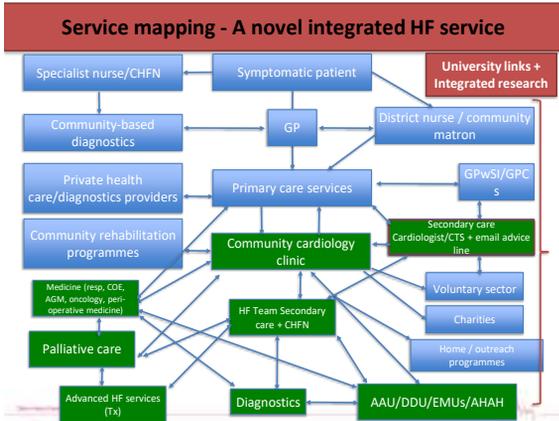
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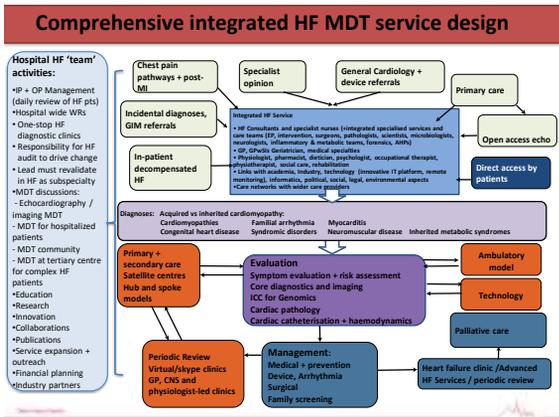
**HOW DO WE BRING ALL OF THIS TOGETHER?
INTEGRATION OF MULTI-DISCIPLINARY HF SERVICES**



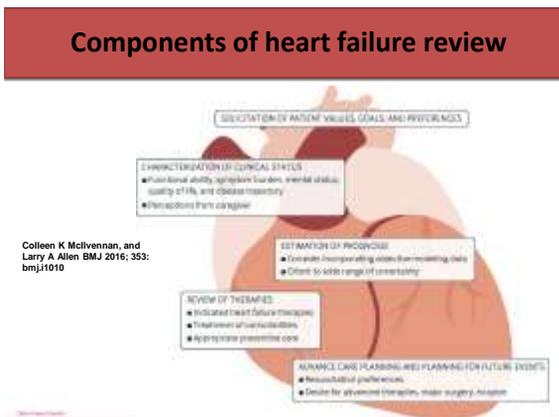
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Case 1

- 35 year old gentleman SOB/BOE, PND and orthopnoea, pedal oedema
- Hx depression and paranoid psychosis
- SHx: prior substance mis-use
- Father died with DCM aged 64 years
- Bloods: renal function normal but deranged LFTs, troponin 0.04, **BNP >2000**, DCM screen (CK, ANA/ANCA/ferritin, virology etc) negative, genetics pending
- ECG: **LBBB**

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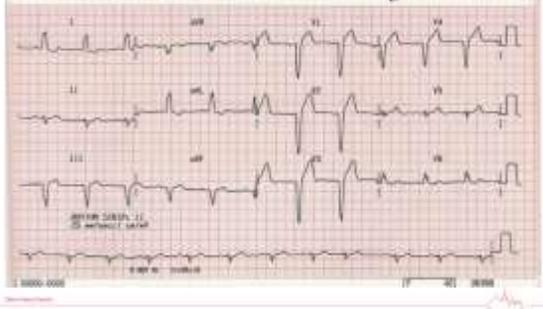
Assessment and work up

- To assess symptoms and confirm diagnosis
- Establish aetiology
- Assess severity
- Commence appropriate treatment (to treat cause and prognostic medical therapy)
- Consider risk assessment
 - Arrhythmia/SCD, thrombus/thromboembolic risk
- Consider family screening

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ECG - LBBB

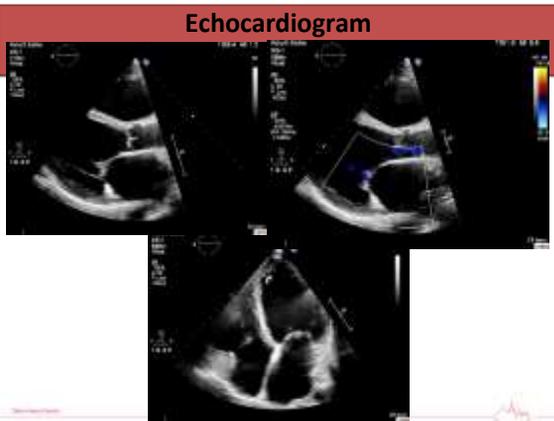
Diagnosis
Risk
Arrhythmia
Anticoagulation



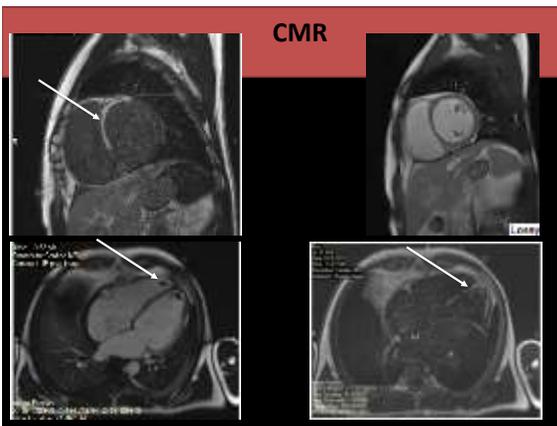
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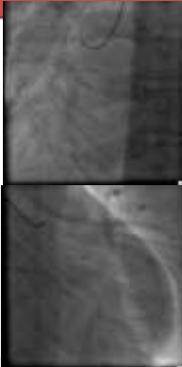
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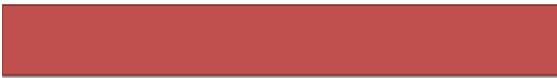
109

Diagnosis and outcome

- Angiogram confirmed in part ischaemic cardiomyopathy but with probable confounding familial DCM
- Commenced on prognostic therapy
 - ACEi, BB, MRA (subsequently entresto ± ivabradine), anticoagulation for thrombi
- Under close review for optimisation of prognostic HF medications
- Referred for CRTD for primary prevention
 - CRTD if broad QRS
- Genetic testing in view of FHx
- Referred for assessment for transplantation
- CHFV FU, cardiac rehab, vaccinations
- **still intermittently smoking...and psychiatric illness is a potential contra-indication to Tx



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CASE 2



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Case 2:

- 63 year old lady complex ischaemic cardiomyopathy, previous CABG 4 and CVA
- Moderate-severe LVSD, new severe MR and TR (retracted PMVL)
- Refractory pulmonary oedema with slow offloading despite high dose diuretics
- Morbid obesity, diabetes on insulin with macro and microvascular complications
- PVD with angioplasties, CKD, OSA (CPAP), high BMI (Weight 97 kg)
- Poor prognosis, not for intubation – and not a candidate for transplantation in view of her significant co-morbidities, turned down locally for surgery

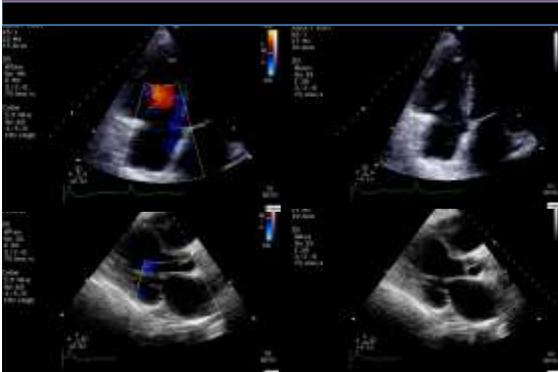
112

CXR



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Imaging



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Investigations

- Bloods: **urea** 30, **creatinine** 147-157. Normocytic anaemia with essentially normal iron studies, **hyponatraemia** (sodium 130 - 127)
- ECG: Sinus rhythm rate 84 bpm, left bundle branch block **QRS duration** 146 ms, T-wave inversion high lateral leads
- RHC Pressures (mmHg):
 RA 21/20/17 (mean RAP 17 mmHg)
 PA 79/31/51 (**mPAP 51 mmHg**)
 Wedge 25/48/34 (wedge 34 mmHg with v-wave to 48)
 RV 78/15/21 mmHg
BP 109/57 MAP 68 mmHg (systemic non-invasive) Saturations: PA 34%
 Systemic arterial (non-invasive) 90% Room air From baseline measures:
 HR 85/min SR; Hb 10.9 g/dL; Height 156 cm; Weight 97 kg
 CO 2.2 L/min CI 1.15 L/min/m² PVR 7.7 Woods Units
- MPS: no reversible ischaemia – so not for PCI/intervention

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Indicators for transplant referral

- Two or more admissions for treatment of decompensated HF within the last 12 months
- Persistent clinical evidence of overt heart failure after optimised medical treatment
- Calculated SHFM score indicating a $\geq 20\%$ 1-year mortality
- Echocardiographic evidence of right ventricular dysfunction or increasing pulmonary artery pressure on optimal treatment (aim to refer before the PA systolic pressure exceeds 50 mm Hg)
- Anaemia, involuntary weight loss, liver dysfunction or hyponatraemia attributable to heart failure
- Deteriorating renal function attributable to heart failure or inability to tolerate diuretic dosages sufficient to clear congestion without change in renal function (aim to refer before creatinine clearance falls below 50 ml/min or the eGFR falls below 40 ml/min/1.73 m²)
- Significant episodes of ventricular arrhythmia despite full drug and electrophysiology/device treatment
- Increasing plasma BNP or NT-proBNP levels despite adequate HF treatment

Banner N et al. Heart 2011;97:1520-1527

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Management

- Diuresed extensively and ascitic drain
- Not a candidate for transplantation or AF ablation
- Attempted to seek compassionate use of MitraClip - did not qualify for RESHAPE HF 2 study
- Deteriorated and referred for palliative management
- Discharged home with palliative supportive care

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Indicators of approaching end stage HF

- SHFM >20% 1 year mortality
- RV dysfunction (before PAP >50mmHg)
- Low Na
- Low Hb
- Abnormal LFTs
- Worsening renal function
- High / rising BNP
- Low peak VO2

Banner N et al. Heart 2011;97:1520-1527



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Seattle HF model

Baseline

	1 year	2 year	3 year
Mortality	8.6%	17%	25%
Quality of Life	0.8	0.7	0.6
Expected	0.8	0.7	0.6

Post Intervention

	1 year	2 year	3 year
Mortality	6.6%	12%	18%
Quality of Life	0.9	0.8	0.7
Expected	0.9	0.8	0.7

Baseline Clinical

Gender: Male Female
 Age: 64
 Weight (kg): 127
 NYHA Class: III
 EF: 30
 Systolic BP: 150

Medications

ACEI Beta Blocker Aldi Blocker Diuretic SGLT2 Mineralocorticoid Receptor Antagonist

Diuretics

Furosemide 50mg Bumetanide 0.5mg Torsemide 20mg Metolazone 5mg HCTZ Thiazide Other

Laboratory

High (pO2) 10.9 Lymphocytes (%) 19 WBC 10.8 Hemoglobin (g/dL) 11.8 Total (mg/dL) 188 BUN (mg/dL) 12.1 Creatinine (mg/dL) 1.8

Interventions

ACEI Beta Blocker Aldi Blocker Diuretic SGLT2 Mineralocorticoid Receptor Antagonist

Devices

None ICD CRT LVAD VAD Other

Units for weight: kg lbs

Units for lab values: SI US

N=1125
LVEF 0.21
NYHA 3.6
validated in
9942 pts
Higher
score
associated
with SCD
Can assess
effect of
interventions

Levy WC, et al. Circulation 2006, 113:1424-1433

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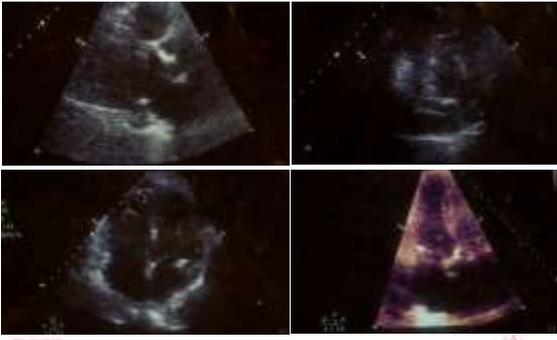
Case 3:

- 81 year old lady seen in AAU - 'fluid overload' - weight 127kg
- Diagnoses:
 1. Heart failure, NYHA class III
 2. Severe LV systolic dysfunction (LVEF 30%)
 3. Moderate aortic stenosis, AVA 1.0 (low flow, low gradient, absent S2)
 4. CKD IV - creatinine 200
 5. T2 Diabetes
 6. Gout
 7. Hypertension
 8. Osteoarthritis
 9. Obesity BMI 35 to 40
 10. Prior stroke
- Drug Hx: Ezetimibe 10 mg, insulin Humulin, Linagliptin 5 mg, Warfarin, Allopurinol, Bisoprolol 6.25 mg once a day, Glimepiride 80 mg twice a day, Digoxin 62.5 mcg, Bumetanide 2 and 1 mg.



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Case 3: TTE



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Case 3:

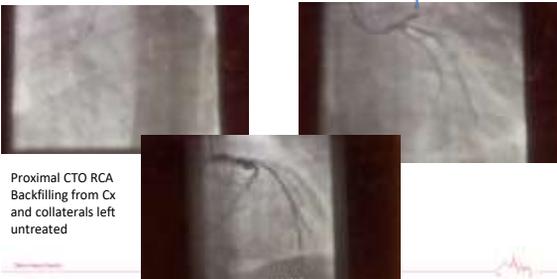
- Stubborn diuresis - what action to take?
- Increase diuretics - iv loop, with additional metolazone ± BFZ to aid diuresis
- Close monitoring of Sx, weight and renal function and BP
- Addition of MRA to maintain potassium (not with ACEi given her AS)
- Daily weights to ensure loosing 1kg per day
- Postural BP to guide diuresis
- Review of AS to guide need for intervention
- Haematinics - given iv iron (ferrinject) as ferritin <100 (or Ferritin 100-300) and T-Saturations <20%. (This has a symptomatic benefit in HF. Oral iron is not well absorbed in this context)

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Case 4:

- 56 year old previously fit and well prisoner, presented 28/1/18 with CP and Q waves V1-V4. Trop >50,000
- Dx? Taken directly to the cath lab:

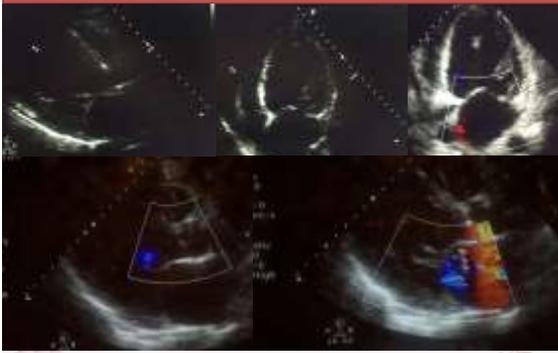
Occluded LAD
Rx thrombectomy and DES



Proximal CTO RCA
Backfilling from Cx
and collaterals left
untreated

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Case 4: TTE the next day



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Case 4:

- Severe LVSD, significant MR. BP remained low, hypoxic but discharged.
- Presented the next day with SOB, hypoxia, pyrexia and raised inflammatory markers.
- CXR - Thoughts?
- Represented... Rx: ABx and diuretics and d/c again



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Case 4:

- Re-presented 6/2/18 with worsening SOB and pulmonary oedema.
- Referred to HF team - Rx iv diuretics and iv tazocin.
- Chest symptoms improved, oxygen requirements fell, inflammatory markers declined but blood pressure was always rather low - Not for beta blockade...
- Short runs of NSVT and 19/2/18 VT arrest on the ward - 1x shock and adrenaline with rapid recovery - given amiodarone
- Further VF arrest on 21/2/18 at 4am > shocked, with BP falling to around 60/40 and rising lactate and anuria with pulmonary oedema and required an FIO2 of 50% via Airvo.
- IABP inserted and a Swan-Ganz via his RIJ. His initial R heart measurements were PA sats 45%, PA 49/27/37, PCWP mean 27, CVP mean 10. He was treated with 15mg/h furosemide with amiloride to maintain K+
- Over the next 24-48h he improved fairly quickly. He passed 5-6l urine/day, urea and creatinine fell. His BP rose to around 105/70. The IABP was weaned and removed on 25/2/18. The Swan removed on 26/2, and the final measurements were PA 25/17 (23) 54%, PCWP 18, CVP around 0, CO 3.8 (therm). Weaned O2, able to lie flat.
- His furosemide was reduced to 7.5mg/h.
- 2 runs of slow monomorphic VT overnight, 5-10min long, around 100-105 bpm, asymptomatic, self-terminating. His renal function deteriorated and K rising - now a little dry but stopped amiloride.

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Case 4:

Weight 79.3kg, 10kg drop.
Height 180cm.

Bloods:

Medications:

- Amiodarone 200mg tds (Day 5)
- Aspirin 74mg
- Atorvastatin 80mg
- Bisoprolol 1.25mg
- Clopidogrel 75mg
- Dalteparin 15000u (treatment dose for sluggish LV flow)
- Eplerenone 50mg
- Ezetimibe 10mg
- Furosemide 7.5mg/h
- Ramipril (vasodilation & prognostic)

- Cr 108 (risen from 94)
- Ur 11 (risen from 8.7)
- Na 132
- K 5.2
- WCC 14.39 (stable), neut 9.3
- CRP 26 (falling steadily)
- Hb 113
- Plt 211
- Alb 28
- Alk phos 83
- ALT 19
- Bili 12

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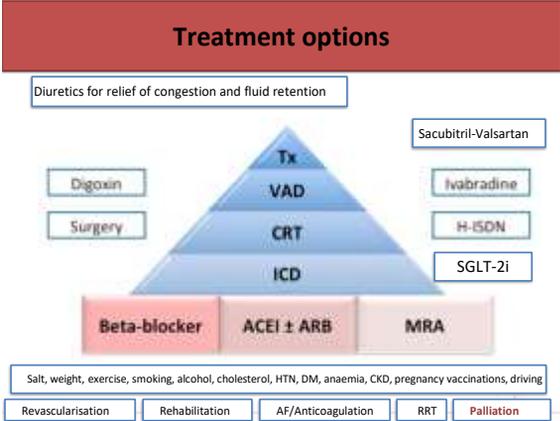
Case 4:

- Outcome:
 - LVEF 15%, severe functional MR, spontaneous contrast - anti coagulated
 - QRSd 110 - 120ms (ICD pending)
 - Virology perfumed
 - Blood group AB+
 - Accepted by Papworth for VAD/Tx
 - What if he hadn't have been accepted for a VAD
 - A VAD is only a bridge to Tx...

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Conclusions

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Updates in HF

- Guideline-driven diagnostic and therapeutic pathways
- Complex but need to place emphasis on prevention and optimisation of evidence-based HF care
- Break down the barriers that prevent us delivering quality HF care and think about how we better integrate palliative services for joint collaborative working
- Develop strategies to provide care closer to home
- Improve accessibility to services and engage our patients
- Provide quality, personalised care that is patient-centred, responsive and seamless across the care network

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Palliative care challenges in HF

- Uncertain disease trajectory and prognosis
- Siloed care and poor communication
- Lack of knowledge
- Overlay of comorbidity and frailty
- Life saving devices and complex trade-offs
- Limited evidence base
- Barriers to having 'the conversation'
 - Concern that hope will be taken away
 - Are we sure that everything that can be done has been done?
 - Complexity of ensuring whole team are in agreement
 - Emergency situations
 - Difficult access to advanced communication skills training

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We need to tackle this together

- Develop an integrated palliative: heart failure MDT approach to care that focuses on communication, share decision making, advanced care planning and relief from symptoms
- Integrates psychological and spiritual aspects of care
- Enables a support system to help families cope during illness and bereavement
- Palliative care has applications across the stages of HF

NATIONAL INSTITUTE FOR CARDIOVASCULAR OUTCOMES RESEARCH (NICOR)
www.escardio.org/audit/heartfailure
 National Annual Heart Failure audit 2015/16

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How to arrange more experience in HF

- Consider a placement with the HF team in hospital or the community to shadow us
- Become a palliative care link with the HF team locally
- Looking to develop accreditation in HF
- Attend the BSH (British Society of HF) conference in March/November
- Help us learn as it's never too early to raise the subject of advance care planning or device deactivation – the more frequently it is mentioned, the better
- If we wait for the 'right time' we will probably be too late

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How to seek advice from the HF team?

- Know your local HF teams – hospital and community (esp CHFN)
- Telephone/email advisory support
- Know where to find your local protocols for managing HF (intranet, ESC/NICE guidelines (www.escardio.org))

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Seek advice from your HF team

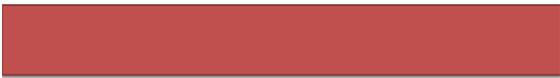
- If you need advice for any reason
- To answer a question, no matter how trivial
- If you feel that someone would benefit from cardiologist (HF specialist) or HF specialist nurse input
- If someone seems to have improved
- If someone would benefit from cardiac rehabilitation or further education (or to attend a programme such as 'living with HF' programme at Sobell House)
- If someone has questions that you do not feel appropriate to answer yourself
- If you need help with someone's device

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Please may I ask for your help?

- Prioritising HF research questions
- Please complete our HF questionnaire:
 - <https://4o2bv4f0.optimalworkshop.com/optimalsort/ahfppsp>
- Looking for volunteers (patients, carers, health care workers) to attend a (free) workshop in Birmingham on 13th Feb (travel reimbursed) to help prioritise research questions
- Please let me know if interested: eleanor.wicks@ouh.nhs.uk

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- Thank you
- Any questions?

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Where to find further resources

- **National heart failure audit**
- **National Institute for Health and Clinical Excellence (NICE) Guidance**
- Chronic heart failure (August 2018)
- Chronic heart failure quality standard (June 2011)
- Acute heart failure: diagnosing and managing acute heart failure in adults (October 2014)
- **ESC HF guidelines (2016)**
- **ACCF/AHA Guidelines (2013)**
- **Department of Health White Paper - Equality and excellence: 'Liberating the NHS' (2010)**
- **Quality Standards - Chronic heart failure (2011)**
- **NHS England: Monitor - 2015/2016 Heart Failure Best Practice Tariff (BPT) proposed if specific criteria are met**
- **Global HF awareness programme: HF – preventing disease and death worldwide** White Paper May 2014
- **AHA recommendations for hospital discharge** Yancy CW et al. *Circulation* 2013; 128: e240 – 327

