HEART FAILURE

Diagnosis & Treatment Options

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Epidemiology

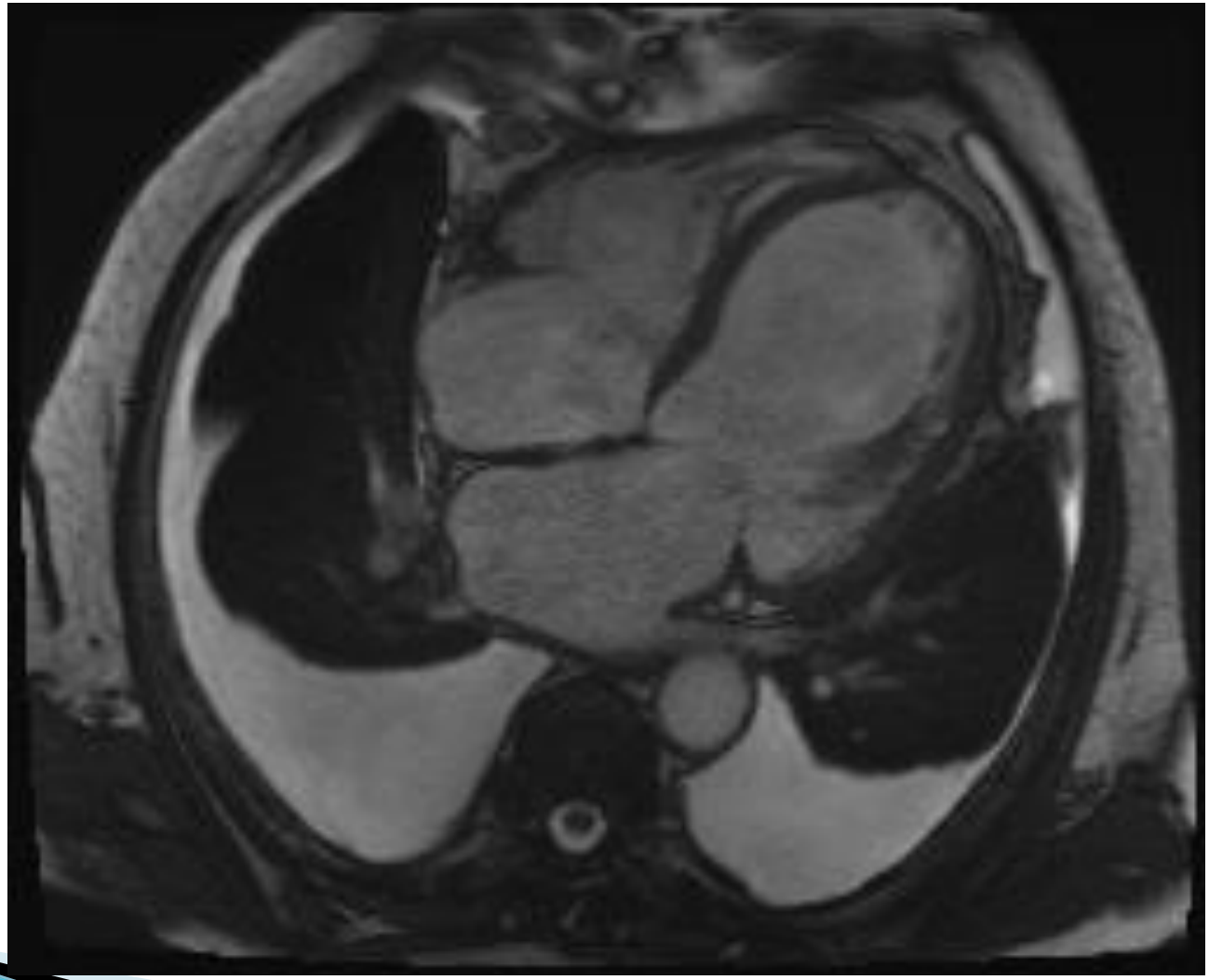
- Around 26 million worldwide. Around 500,000 people in the UK have heart failure.
- 1-2% NHS budget spent on HF, mostly due to cost of hospitalisation.
- Heart failure (2005 data) accounts for:
  - 1 million inpatient bed-days
  - 2% of all NHS inpatient bed-days
  - 5% of all emergency medical admissions to hospital.

- https://www.bhf.org.uk/publications/statistics/cvd-stats-2015

Heart Failure: LV

- Myocardium
  - Ischaemic (CAD, hibernating, stunned)
  - Inflammatory (myocarditis, sarcoidosis, drugs)
  - Infiltrative (Amyloidosis, Fabry's)
  - Genetic (HCM, DCM, LVNC)
- Abnormal Loading
  - Hypertension
  - Valvular disease (AS, MR, pericardial, high output)
- Arrhythmias
  - AF, frequent VEs

Heart Failure



Cardiac imaging in patients with suspected or established heart failure (1)

Recommendations	Class	Level
TTE is recommended for the assessment of myocardial structure and function in subjects with suspected HF in order to establish a diagnosis of either HFrEF, HFmrEF or HFpEF.	I	C
TTE is recommended to assess LVEF in order to identify patients with HF who would be suitable for evidence-based pharmacological and device (ICD, CRT) treatment recommended for HFrEF.	I	C
TTE is recommended for the assessment of valve disease, right ventricular function and pulmonary arterial pressure in patients with an already established diagnosis of either HFrEF, HFmrEF or HFpEF in order to identify those suitable for correction of valve disease.	I	C
TTE is recommended for the assessment of myocardial structure and function in subjects to be exposed to treatment which potentially can damage myocardium (e.g. chemotherapy).	I	C
Other techniques (including systolic tissue Doppler velocities and deformation indices, i.e. strain and strain rate), should be considered in a TTE protocol in subjects at risk of developing HF in order to identify myocardial dysfunction at the preclinical stage.	IIa	C
CMR is recommended for the assessment of myocardial structure and function (including right heart) in subjects with poor acoustic window and patients with complex congenital heart diseases (taking account of cautions/contra-indications to CMR).	I	C
CMR with LGE should be considered in patients with dilated cardiomyopathy in order to distinguish between ischaemic and nonischaemic myocardial damage in case of equivocal clinical and other imaging data (taking account of cautions/contra-indications to CMR).	IIa	C
CMR is recommended for the characterization of myocardial tissue in case of suspected myocarditis, amyloidosis, sarcoidosis, Chagas disease, Fabry disease non-compaction cardiomyopathy, and haemochromatosis (taking account of cautions/ contra-indications to CMR).	I	C

Cardiac imaging in patients with suspected or established heart failure (2)

Recommendations	Class	Level
Non-invasive stress imaging (CMR, stress echocardiography, SPECT, PET) may be considered for the assessment of myocardial ischaemia and viability in patients with HF and CAD (considered suitable for coronary revascularization) before the decision on revascularization.	IIb	B
Invasive coronary angiography is recommended in patients with HF and angina pectoris recalcitrant to pharmacological therapy or symptomatic ventricular arrhythmias or aborted cardiac arrest (who are considered suitable for potential coronary revascularization) in order to establish the diagnosis of CAD and its severity.	I	C
Invasive coronary angiography should be considered in patients with HF and intermediate to high pre-test probability of CAD and the presence of ischaemia in non-invasive stress tests (who are considered suitable for potential coronary revascularization) in order to establish the diagnosis of CAD and its severity.	IIa	C
Cardiac CT may be considered in patients with HF and low to intermediate pre-test probability of CAD or those with equivocal non-invasive stress tests in order to rule out coronary artery stenosis.	IIb	C
Reassessment of myocardial structure and function is recommended using non-invasive imaging: – in patients presenting with worsening HF symptoms (including episodes of AHF) or experiencing any other important cardiovascular event; – in patients with HF who have received evidence-based pharmacotherapy in maximal tolerated doses, before the decision on device implantation (ICD, CRT); – in patients exposed to therapies which may damage the myocardium (e.g. chemotherapy) (serial assessments).	I	C

European Heart Journal (2016) **37**, 2129-2200 - doi:10.1093/eurheartj/ehw 128

Management

Pharmacological Therapies

Management: Before Acute HF

Before admission with acute HF…

Recommendations	Class	Level
Treatment of hypertension is recommended to prevent or delay the onset of HF and prolong life.	I	A
Treatment with statins is recommended in patients with or at high-risk of CAD whether or not they have LV systolic dysfunction, in order to prevent or delay the onset of HF and prolong life.	I	A
Counselling and treatment for smoking cessation and alcohol intake reduction is recommended for people who smoke or who consume excess alcohol in order to prevent or delay the onset of HF.	I	C
Treating other risk factors of HF (e.g. obesity, dysglycaemia) should be considered in order to prevent or delay the onset of HF.	IIa	C
Empagliflozin should be considered in patients with type 2 diabetes in order to prevent or delay the onset of HF and prolong life.	IIa	B
ACE-I is recommended in patients with asymptomatic LV systolic dysfunction and a history of myocardial infarction in order to prevent or delay the onset of HF and prolong life.	I	A

www.escardio.org/guidelines European Heart Journal (2016) 37, 2129-2200 - doi:10.1093/eurheartj/ehw 128

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Management: After Acute HF

- β-blockers
  - Metoprolol
  - Bisoprolol
  - Carvedilol
- ACE-inhibitors
- Angiotensin-Receptor blockers (ARBs)
  - Candesartan
  - Valsartan
- Hydralazine/Dinitrate (ethnic subgroups)
- Aldosterone antagonists
  - Spironolactone
  - Eplerenone

ESC 2016

Symptomatic medications

- Digoxin
- Frusemide
- Metolazone
- Anti-arrhythmics

- GENERALLY AVOIDED:
  - Ca channel blockers
  - Aliskiren
  - Glitazones
  - NSAIDs
  - COX II inhibitors

Newer Therapies

- IVABRADINE
  - Well known for stable angina
  - SHIFT trial (2010)
    - 6558 patients. Ivabradine added to standard therapy VS placebo. HR > 70, EF < 35%.
    - Reduction in HF admissions
    - 2% absolute risk reduction (18% RRR) in mortality due to HF
- Recommended for add on to Bisoprolol if resting HR >70 (or if Bisoprolol not tolerated)

Newer Therapies

- FERRINJECT
  - FAIR-HF (2009)
  - Anaemia causes ↑HF admissions, ↑mortality and poorer Q of L.
  - 459 patients with ↓ferritin and EF < 45%
  - Randomised to receive Ferrinject vs placebo
  - 50% patients had improvement of symptoms, exercise capacity and Q of L c.f. 28% placebo
- One injection can replenish stores for several months

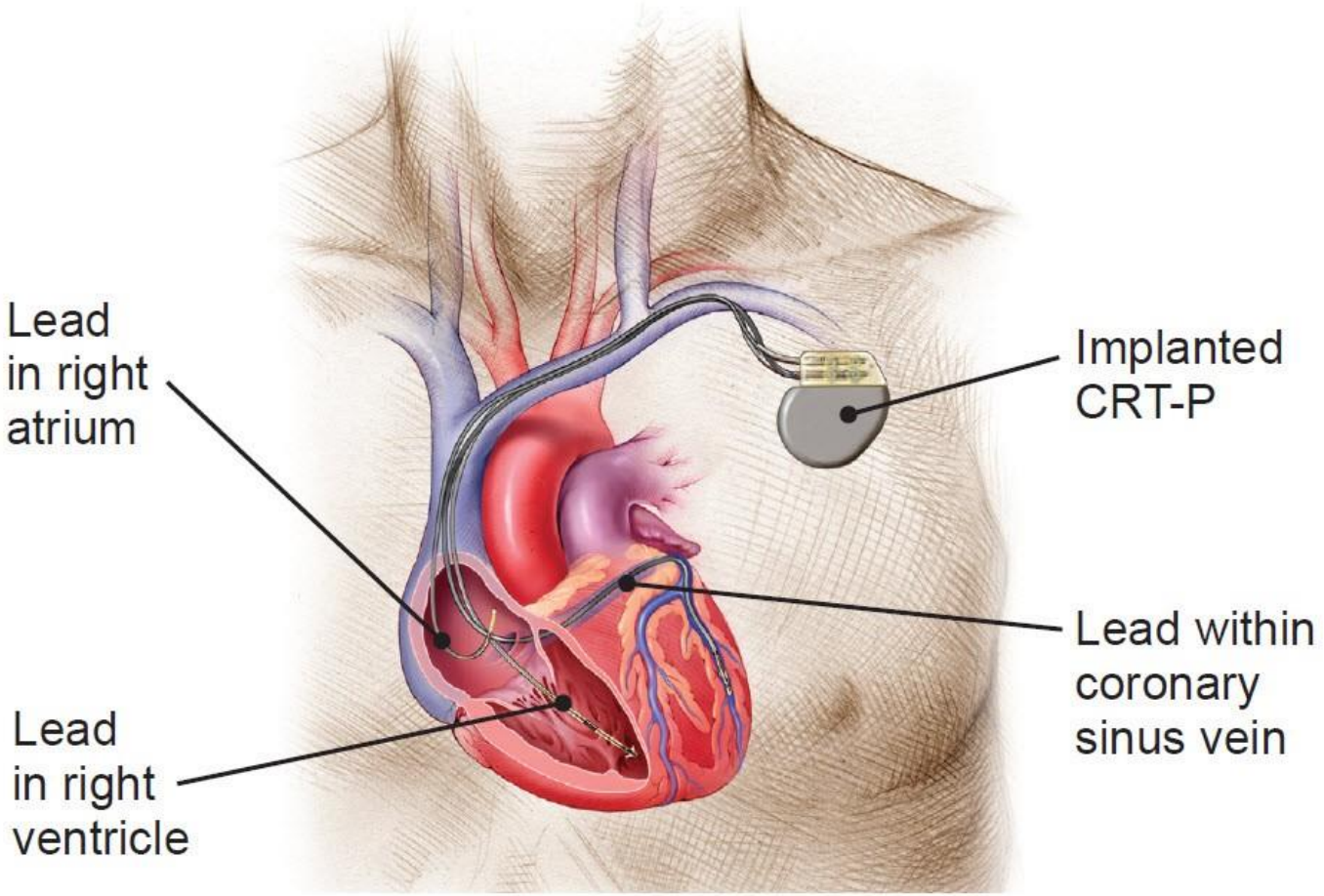
Newer Therapies

- ENTRESTO
- Angiotensin is a potent vasoconstrictor
- Neprilysin – breaks down vasodilators e.g. BNP
  - Valsartan – blocks angiotensin type 1
  - Sacubitril – Neprilysin inhibitor
- PARADIGM-HF (2014)
  - 8442 patients, EF<40%, randomised to ARNI or Enalapril in addition to standard therapy.
  - Primary outcome (composite endpoint) 21% vs 28%
- Entresto recommended by NICE if recurrent HF admissions on ACE-I or if ACE-I not tolerated.
- Problems: Hypotension

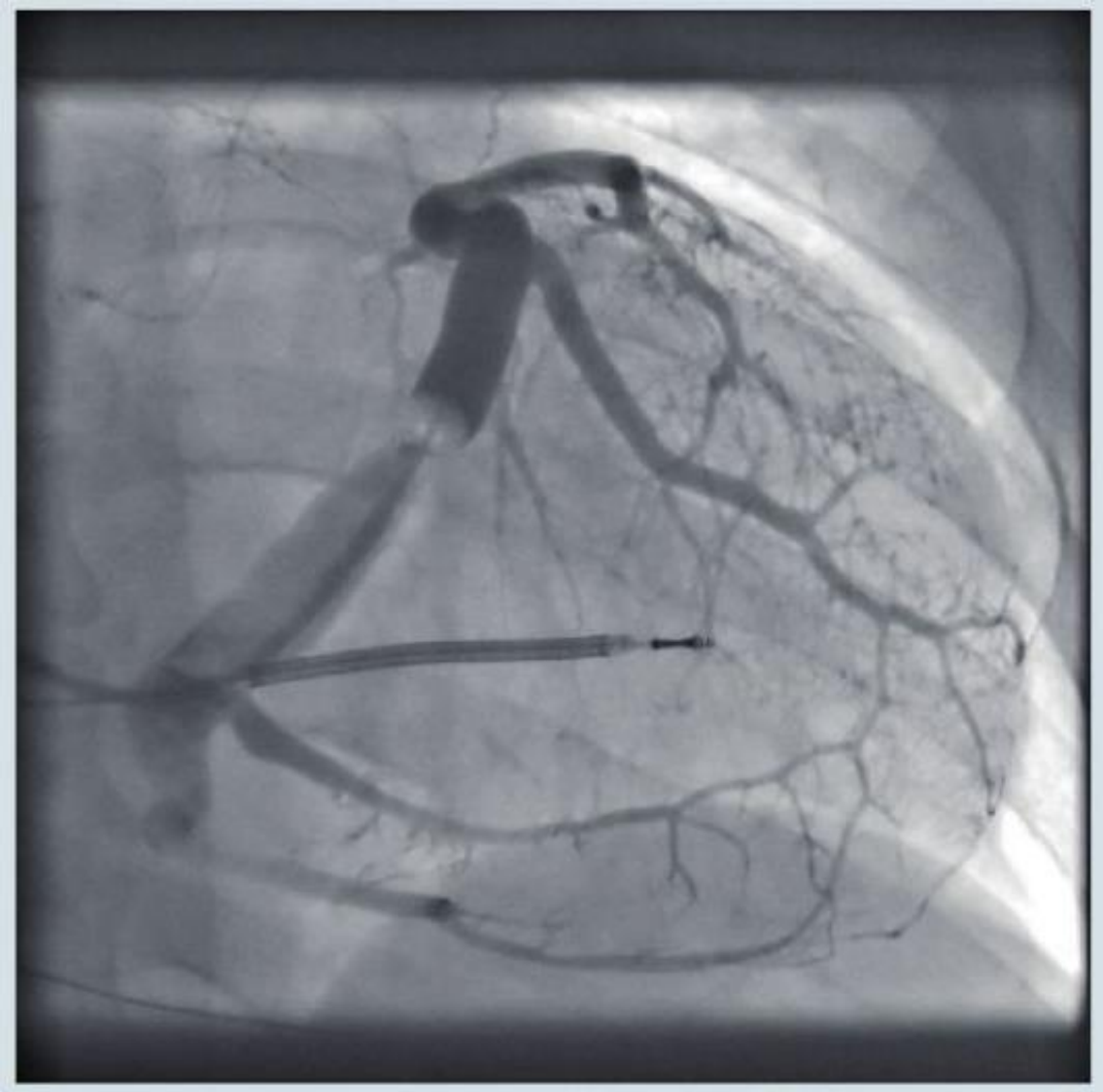
Management

Device Therapies

Device Therapy

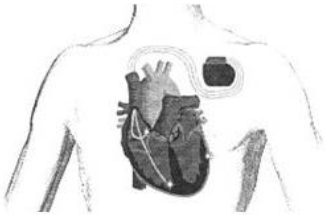


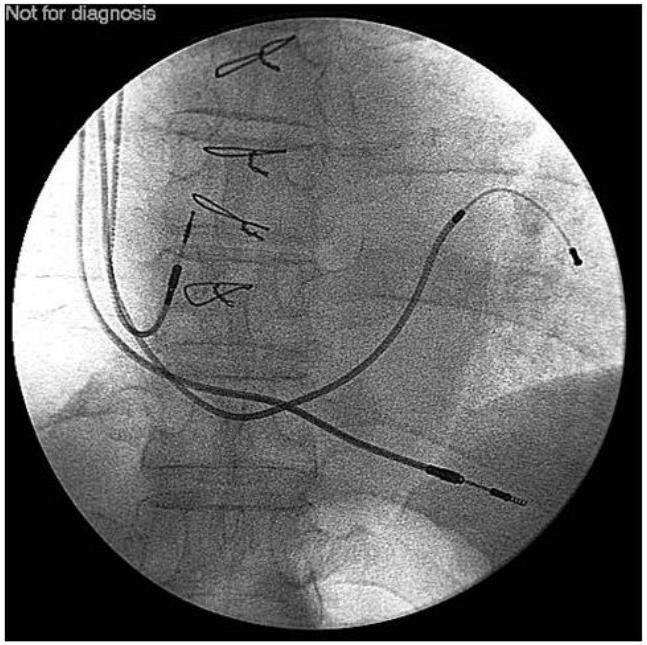
Device Therapy

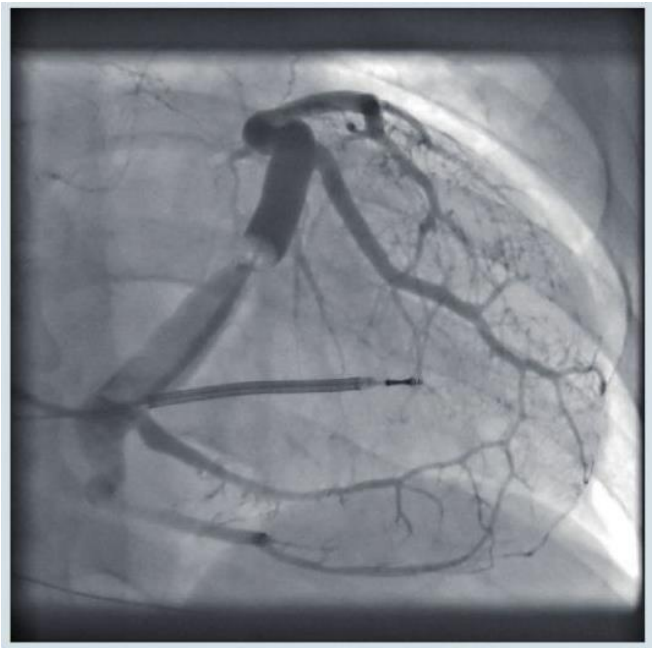


Device Therapy

BiV Pacemaker/CRT







Device Therapy

	NYHA class			
QRS interval	**I**	**II**	**III**	**IV**
<120 milliseconds	**ICD if there is a high risk of sudden cardiac death**			**ICD and CRT not clinically indicated**
120–149 milliseconds without LBBB	ICD	ICD	ICD	CRT-P
120–149 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

Future

- Direct myosin activators
  - Omecamtiv Mecarbil
- ANP analogues
  - Uralitide

Local Facilities

Heart Failure Specialist Nurses

- Approx 80-100 referrals per month
- Usually running 10% above capacity
- Will assess:
  - Medication doses depending on fluid overload
  - Check U&Es
  - Prescribers (?Entresto)
  - Psycho-social aspects / palliation

Local Developments

- Improved echo service delivery
  - More staff
  - Streamlined working protocols
- Ambulatory HF unit on B18 on RBH.
  - Reduce hospital admissions
  - Frusemide / ferrinject

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