Heart Failure

Nadia Dallsingh

Cardiac Specialist Nurse Practitioner

What is Heart Failure?

- Heart failure (HF) can be a very debilitating condition affecting more than 920,000 people in the UK annually. This is due to structural or functional abnormalities which impairs the pumping action of the left ventricle. As a result of this, patients may present with either left ventricular systolic dysfunction (LVSD), or HF with preserved ejection fraction (HFPEF). Evidence suggests that the majority of patients treated for LVSD, are commonly caused by coronary artery disease (CAD) and myocardial infarction.

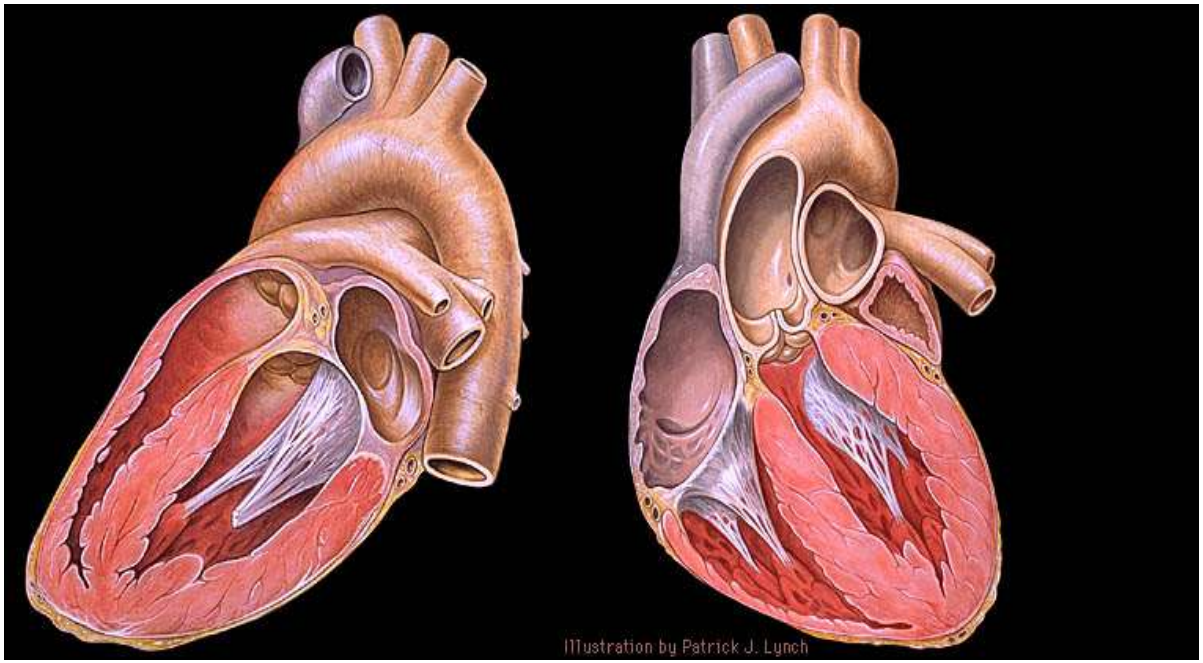
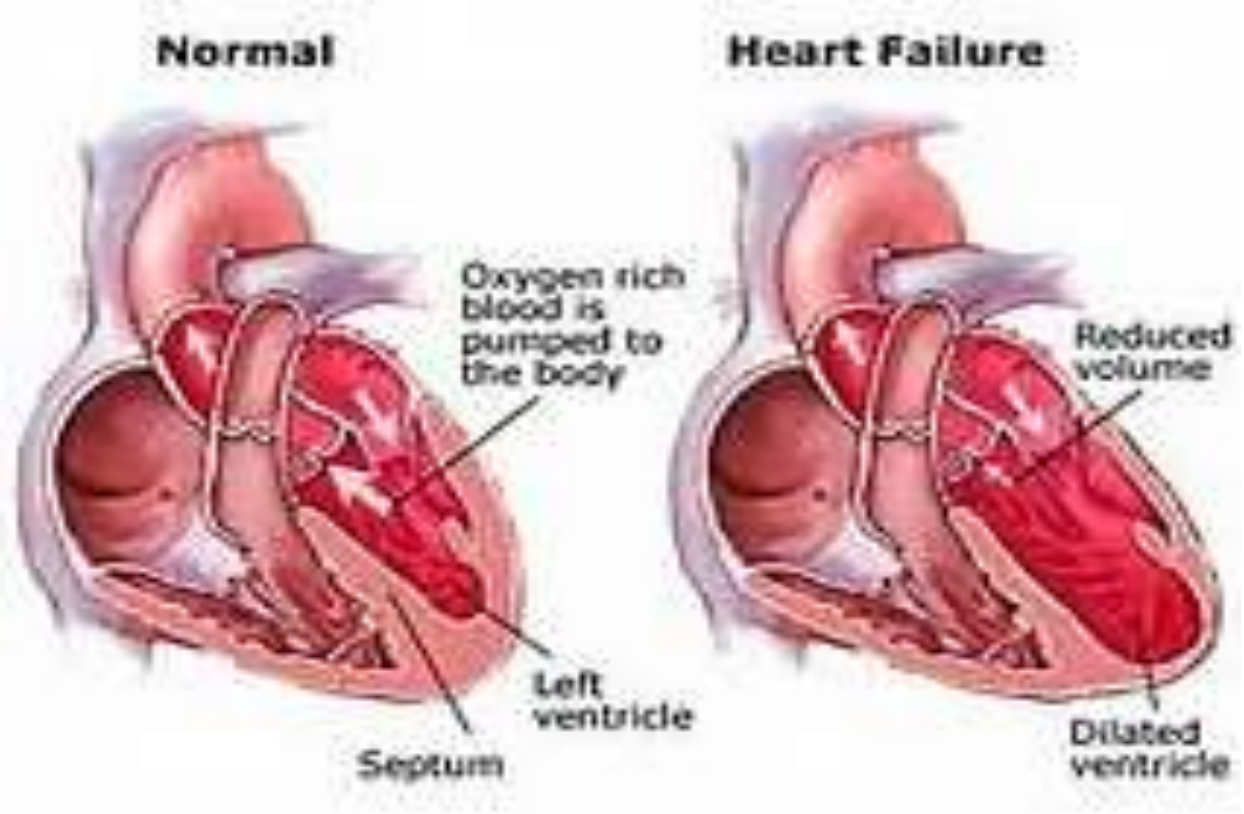
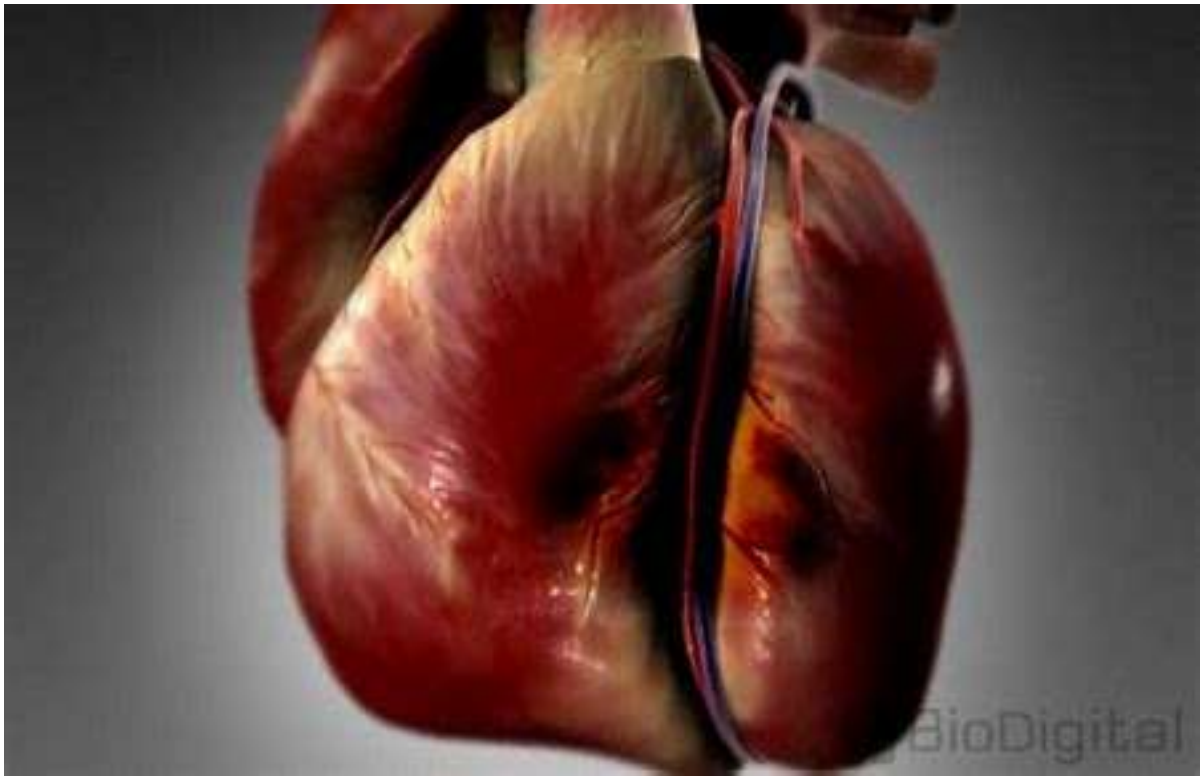


Illustration by Patrick J. Lynch


Normal
Heart Failure
Oxygen rich blood is pumped to the body
Left ventricle
Septum
Reduced volume
Dilated ventricle


BioDigital

HTN to HF

- Increase in cardiac afterload in a hypertrophic myocardium together with increased peripheral vascular resistance, has an increased burden on the myocardium. Due to increased workload of the myocardium in HF, hypertension also contributes to ischaemia by increasing myocardial oxygen demand. Also, abnormalities in the electrolyte balance, water and neuro-hormonal activation plays a key role in the process from hypertension to HF. During hypertrophy and HF, there is an increase in activity of the renin-angiotensin-aldosterone system and B-adrenoceptor activity.

What Causes Heart Failure?

- Heart Attack – Damage of the heart muscles
- High blood pressure
- Cardiomyopathy disease of the heart muscle
- Virus Infection in the heart
- Heart Valve problems
- Drinking too much alcohol
- An irregular heart rate (Arrhythmia)
- Anaemia
- Thyroid gland disease
- SARs CoV 2 (Covid 19)

Categories of HF

- Ischaemic cardiomyopathy eg caused by CAD and myocardial infarction
- Non-ischaemic cardiomyopathy caused by anything other than CAD and MI
- Idiopathic cardiomyopathy

Grading for HF

- NYHA class 1: no limitations to physical activity
- NYHA class 2: mild limitations to physical activity
- NYHA class 3: significant limitations to physical activity
- NYHA class 4: highly symptomatic with or without activity

Symptoms of Heart Failure

- Oedema
- Dyspnoea
- Fatigue (feeling unusually tired and weak)
- Coughing or wheezing
- Sudden weight gain
- PND
- Orthopnea
- Frequent urination at night
- Light headedness or dizziness
- Confusion

JVP

INVESTIGATIONS

- BNP or NTproBNP
- FBC
- ELECTROLYTES
- ECG
- ECHOCARDIOGRAM
- CHEST XRAY

BNP and NTproBNP

- B-type natriuretic peptide (BNP) and N-terminal pro b-type natriuretic peptide (NT-proBNP) are substances that are produced in the heart and released when the heart is stretched and working hard to pump blood. Tests for BNP and NT-proBNP measure their levels in the blood in order to detect and evaluate heart failure.

BNP and NTproBNP

- BNP is actually produced primarily by the left ventricle of the heart (the heart's main pumping chamber). It is associated with blood volume and pressure and with the work that the heart must do in pumping blood throughout the body. Small amounts of a precursor protein, pro-BNP, are continuously produced by the heart. Pro-BNP is then cleaved by the enzyme called corin to release the active hormone BNP and an inactive fragment, NT-proBNP, into the blood.

How Do We Manage Heart Failure?

- Adjusting medications to suit the patient and treat heart failure effectively to manage symptoms
- Teaching the patient to manage the condition by:
  - *Eating a healthy heart diet – (low salt and fat)*
  - *Managing your fluid balance including monitoring weight*
  - *Stop Smoking*
  - *Limiting alcohol intake*
  - *Take regular activity*

HF

- Angiotensin II is an important initiator of extracellular remodelling, which contributes to the pathogenesis of atherosclerosis and cardiac hypertrophy (Georgiopoulou et al, 2012). Early initialisation and titration of ACE inhibitor, together with beta-blockade and neuro-hormonal antagonist are recommended in the treatment of HF.

Main Drugs in Heart Failure

- **ACE inhibitors** – They lighten the workload of your heart and easier for your heart to pump blood around your body . (*Ramipril, Lisinopril*

  Enalapril, Perindopril, Captopril,)

- **Beta blockers** – Prevent the heart from beating too quickly and too forcefully.(*Bisoprolol,* C*arvedilol, Atenolol,Metoprolol)*

ARB

- Entresto: combination of sabubitril and valsartan
- Other anti-hypertensive treatment include candesartan, losartan

Main Drugs in Heart Failure

- **Diuretics** – Help your kidneys get rid of excess fluid by making you pass more urine. (*Furosemide, Bumetanide, Metolazone, Bendrofluazide)*

- **Aldosterone antagonist** – Gets rid of excess fluid by passing more urine. (*Eplerenone, Spironolactone)*

- **Digoxin** – Slows down and strengthens your heartbeat, helps control irregular heart rhythms and helps your heart pump blood around your body efficiently.

Self Monitoring

Patient Details/Label:

Name: *A.N. Other*

Date of Birth: *10/2/35*

Hospital Number: *Z159007*

Advice/Notes:

St George's Healthcare NHS
NHS Trust

Weigh yourself after getting up,
before dressing,
after going to the toilet,
before breakfast.

WEIGHT CHART

Month: *June* *July*

Date / Kg		*27*	*28*	*29*	*30*	*1*	*2*	*3*
(+8)	*80*							
(+7)	*79*							
(+6)	*78*							
(+5)	*77*							
(+4)	*76*							
(+3)	*75*							
(+2)	*74*							
(+1)	*73*							
0	*72*							
(-1)	*71*							
(-2)	*70*							
(-3)	*69*							
(-4)	*68*							
(-5)	*67*							
(-6)	*66*							
(-7)	*65*							
Weight:		*72.5*	*73.0*	*72.7*	*73.5*	*74.0*	*74.3*	*74.5*

Weighing yourself daily or a few times a week means that you can monitor whether you are storing excess water in the body **(oedema)**.

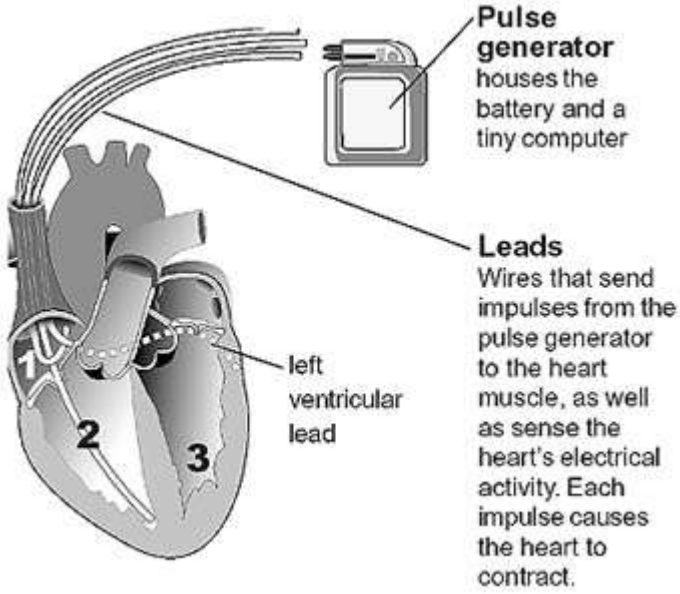
Self Monitoring continued

- Ask the patient to be aware of symptoms and what activities make them feel worse.
- Self monitoring means that the patient can identify whether their heart failure is getting worse.
- Notify their doctor or Heart Failure nurse so that treatment can be altered.
- **This can prevent worsening symptoms which can be treated promptly at home or in the community**

Pacemakers

- Biventricular pacemakers (CRT-P)
- Biventricular with ICD (CRT-D)
- ICD


Medtronic


Pulse generator
houses the battery and a tiny computer
Leads
Wires that send impulses from the pulse generator to the heart muscle, as well as sense the heart's electrical activity. Each impulse causes the heart to contract.
left ventricular lead
2
3

Recommended reading list

- NICE guidelines (2019) Hypertension in adults: diagnosis and management (NG136)
- Nice guidelines (2018) Chronic heart failure in adults: diagnosis and management (NG106)
- Nice guidelines (2020) Covid-19 rapid guideline: managing the long-term effects of Covid-19 (NG188)
- Schilling, J. D (2020) Management for hospitalized Covid-19 patient with acute cardiomyopathy or heart failure. American College of Cardiology.

Recommended reading list

- Ludovica Carerj, M. et al (2020) Outcomes of cardiovascular magnetic resonance imaging in patients recently recovered from Coronavirus disease (Covid-19). JAMA cardiology, Vol. 5(11), p. 1265-1273

Questions?